



TECHNOLOGY Catalog



ABOUT EXCELSIOR COLLEGE

Excelsior College is a regionally accredited, nonprofit distance learning institution founded in 1971 focused on providing educational opportunity to adult learners. The College contributes to the development of a diverse, educated society by valuing lifelong learning with an emphasis on serving individuals who are historically underrepresented by higher education. Excelsior meets students where they are—academically and geographically—removing obstacles to the educational goals of adult learners through affordable access to quality instruction and the assessment of learning. Our pillars include innovation, flexibility, academic excellence, and integrity.

Excelsior College does not discriminate on the basis of age, color, religion, creed, disability, marital status, veteran status, national origin, race, gender, or sexual orientation in the educational programs and activities which it operates.

Excelsior College is a Title IV-eligible institution offering federal student aid to students who qualify in course-based programs. Stand-alone exam-based options and certificate programs are not eligible.

OUR MISSION

Excelsior College provides educational opportunity to adult learners with an emphasis on those historically underrepresented in higher education. The College meets students where they are—academically and geographically, offering quality instruction and the assessment of learning.

VISION

Excelsior College is a provider of choice for adults seeking access to higher education and academic success, and it is a model for addressing societal and workforce needs.

ACCREDITATION

Excelsior College (and under its former name, Regents College) has been continuously accredited since 1977 by the Middle States Commission on Higher Education, 3624 Market Street, Philadelphia, PA 19104, 215-662-5606. Middle States is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation (CHEA).

The associate, bachelor's, and master's degree programs in nursing at Excelsior College are accredited by the Accreditation Commission for Education in Nursing (ACEN):

Accreditation Commission for
Education in Nursing (ACEN)
3343 Peachtree Road, Suite 850
Atlanta, GA 30326
404-975-5000
www.acenursing.org

The ACEN is a specialized accrediting agency for nursing recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation (CHEA).

The bachelor's degree programs in electrical engineering technology and nuclear engineering technology are accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>. The bachelor's degree program in information technology is accredited by the Computing Accreditation Commission of ABET, <http://www.abet.org>. ABET is a specialized accrediting agency recognized by the Council for Higher Education Accreditation (CHEA).

Excelsior College has received specialized accreditation for its business programs through the International Assembly for Collegiate Business Education (IACBE), 11374 Strang Line Rd., Lenexa, KS 66215. The business programs in the following degrees are accredited by the IACBE:

Bachelor of Science in Business with concentrations in: *Finance, General Accounting, General Business, Global Business, Management of Human Resources, Management of*

Information Systems, Marketing, and Operations Management; and the Master of Business Administration (MBA) with concentrations in: General Track (no concentration), Cybersecurity Management, Health Care Management, Human Performance Technology, Human Resource Management, Leadership, Social Media Management, and Technology Management.

All the College's academic programs are registered (i.e., approved) by the New York State Education Department.

RECOGNITION

The Master of Arts in Liberal Studies program has been accepted into full membership by the Association of Graduate Liberal Studies Programs (AGLSP).

The American Council on Education's College Credit Recommendation Service (ACE CREDIT) has evaluated and made college credit recommendations for Excelsior College Examinations.

The National League for Nursing (NLN) has designated the Excelsior College School of Nursing as a Center of Excellence in Nursing Education, 2016–2021. This distinction has been awarded in recognition of the College's sustained achievements in creating environments that promote student learning and professional development and it is the fourth consecutive designation the School has received since the NLN began the program in 2005.

The National Security Agency and the Department of Homeland Security designated Excelsior College as a National Center of Academic Excellence in Cyber Defense Education, 2015–2019.

Excelsior College has achieved institutional-level recognition for implementing Quality Matters™ standards for the design of online courses. The College systematically develops and evaluates its online courses based on rigorous, research-based Quality Matters™ standards to ensure learner engagement and provide tools and information for successful learning.

Message from the Dean



DR. LIFANG SHIH, PhD

Dear Student:

Welcome to Excelsior College! We are excited and honored that you chose the School of Business & Technology to take the next step in achieving your educational and professional goals.

Your interest in technology could not come at a more opportune time. The new developments in renewable energy, advanced technologies in electronics, evolving information technologies, emerging technologies in cybersecurity, and job openings in nuclear have resulted in tremendous growth in the industry. The School of Business & Technology is committed to preparing a skilled and credentialed workforce to support the increasing demand in this sector. The time to earn a degree or certificate—or simply update your knowledge and skills through an online course—has never been better.

As a not-for-profit, private institution of higher education chartered by the New York State Board of Regents, Excelsior College is fully accredited by the Commission of Higher Education of the Middle States Association of Colleges and Schools, one of the oldest and most respected regional accreditors in the United States. Additionally, within our division of technology, three programs are accredited by ABET, and the cybersecurity programs are accredited through the National Centers of Academic Excellence in Information Assurance/Cyber Defense. These specialized accreditations attest to the quality of our programs in preparing students for the workforce.

Our priority is, and will always be, our students. Excelsior prides itself on its more than 40 years of experience in serving adult learners. We're a leading institution that accepts prior coursework, work experience, and industrial certifications for college credits, and we provide you with flexible and affordable ways to achieve your educational goals.

In this catalog, you will find detailed descriptions of the many degree options available through the School of Business & Technology. We encourage you to review it and contact us if you have any questions.

Thank you for taking the time to view our course catalog. The School of Business & Technology, our faculty, staff, and academic advisors are committed to your academic and professional success.

Sincerely,

A handwritten signature in cursive script that reads "Lifang Shih".

Dr. Lifang Shih,
Dean, School of Business & Technology

LIMITATIONS

Information in this catalog is current as of December 2017, and is subject to change without advance notice.

CHANGES IN COLLEGE POLICIES, PROCEDURES, AND REQUIREMENTS

The College reserves the right to modify or revise the admission requirements of any program of the College; degree and graduation requirements; examinations, courses, tuition, and fees; and other academic policies, procedures, and requirements. Generally, program modifications and revisions will not apply to currently matriculated students so long as they actively pursue their degree requirements. However, in the event that it is necessary to make program changes for matriculated students, every effort will be made to give notice. It is also the responsibility of students to keep themselves informed of the content of all notices concerning such changes.

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Excelsior College maintains a drug-free workplace and is a drug-free school, as provided by the Federal Drug-Free Schools and Communities Act Amendments of 1989 and the Drug-Free Workplace Act of 1988.

Excelsior College does not discriminate on the basis of age, color, religion, creed, disability, marital status, veteran status, national origin, race, gender, or sexual orientation in the educational programs and activities which it operates. Portions of this publication can be made available in a variety of formats upon request.

Campus Crime Statistics can be found at the following website: ope.ed.gov/security

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THE EXCELSIOR COLLEGE SCHOOL OF BUSINESS & TECHNOLOGY

MISSION

The mission of the School of Business and Technology is to empower learners to achieve academic and professional success. Through the assessment of prior learning and aggregation of credit, rigorous course design, high quality instruction and engaging student support, the school provides learners with flexible pathways to achieve their personal aspirations.

VISION

The School of Business and Technology will provide a diversified approach to degree completion to serve adult learners in achieving their educational and career aspirations.

IMPORTANT INFORMATION FOR ALL STUDENTS

Student Policy Handbook

The Excelsior College [Student Policy Handbook](#) is your resource for understanding the academic and administrative policies that are important to your academic success. It includes a wide range of information from important federal policies, including your right to privacy, to grading policies and policies and procedures concerning refunds, withdrawals, and other administrative issues.

It is your responsibility to be familiar with these policies. The term “students” includes those currently matriculated at Excelsior College taking examinations and/or courses, non-matriculated students taking examinations and/or courses, non-matriculated students in the application process, individuals using the OneTranscript® service (formerly Credit Bank), formerly matriculated students currently in withdrawn status, and graduates.

Policies and procedures that apply only to a specific degree program are listed in the appropriate school catalog. You may download a copy of the [Student Policy Handbook from our website](#). File your handbook with your other important academic papers and this program catalog for easy reference.

Standardized Testing Participation

Students have a responsibility to participate in standardized tests (an example is the “Proficiency Profile” published by Educational Testing Services) that may be required during the period of their enrollment. These tests may be in addition to regular coursework and are required to gather critical information on achievement of student learning. Students are expected to actively participate and make every effort to do their best on these assessments to produce scores that accurately reflect their abilities. The results from these assessments will not be part of the course grade but are crucial for the purpose of program improvement and are frequently required by regulators and accreditation agencies. Participation in these assessments contributes toward increasing the value of the degree by providing evidence of student learning to external organizations, employers, and the general public.

Excelsior College Website

Through the College’s [website](#), you have access to a wealth of information to help you succeed as a student. If you haven’t already done so, create a [MyExcelsior user account](#). It will serve as your gateway to a variety of support services and is where you will find up-to-date information tailored to your specific academic program as well as general announcements from the College.

General Education Outcomes for All Undergraduate Degree Programs

Each undergraduate degree program has a strong arts and sciences component designed to help you develop a broad-based understanding of multiple disciplines, to provide a breadth of academic experience to enrich your life, and to allow you to become more informed and engaged as a citizen and a lifelong learner in an increasingly complex and changing world. This arts and sciences component, offered in a delivery model of flexibility, quality, and accessibility that is based on adult learning theory, helps you to integrate knowledge from multiple sources and experiences in diverse ways of knowing. These guiding principles have thus formed the five learning goals for General Education at Excelsior College.

A. Communication and Oral Expression

Upon completion of their degree programs, Excelsior students will be able to express themselves effectively in English, both orally and in writing, and with clarity, persuasiveness, and coherence using standard conventions of communication.

B. Mathematics and Scientific Method

Upon completion of their degree programs, Excelsior students will use scientific reasoning and basic mathematical calculations in problem solving in their daily lives.

C. Information Literacy

Upon completion of the program, students will have learned to evaluate information critically. They will have learned to identify the amount and type of information needed, to locate and effectively access information, to evaluate the source of information, and to use it as per legal and ethical considerations.

D. Diversity and Global Understanding

Excelsior students will gain an understanding of a global society and appreciation for the complexities of diversity so they will be able to interact effectively with people from backgrounds and cultures different from their own. They will challenge their own sense of “self” vis-à-vis an understanding of those with different thoughts, beliefs, and traditional behaviors.

E. Ethics

Upon completion of the program, students will recognize the importance of ethical behaviors and decision-making.

For more information on the General Education goals and outcomes, visit www.excelsior.edu/gened.

Average Time to Degree Completion

Excelsior’s degree programs are designed to be completed at your own pace. However, at Excelsior, a student attending full-time could complete:

- ▶ an associate degree in two years;
- ▶ a bachelor’s degree in four years; or
- ▶ a master’s degree in two years.

Requirements for All Degree Programs

Students in all undergraduate degree programs at Excelsior College are required to meet requirements in the following general education categories:

- ▶ Information Literacy
- ▶ Written English
- ▶ Ethics
- ▶ Humanities
- ▶ Social Sciences and History
- ▶ Natural Sciences and Mathematics

Each degree program may require credits in specific, core subjects, within the categories listed above.

Students must work closely with their academic advisors to plan how to meet the requirements that are in place for their particular degree program.

Coursework used in transfer to satisfy the written English requirement must be from an English-speaking institution. English as a Second Language courses may not be used to satisfy the written English requirement.

Technology Literacy

Excelsior College Definition of Technology Literacy
Based on State Educational Technology Directors Association (SETDA)

Excelsior College defines technology literacy as the ability to identify and responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning. This will facilitate the ability to acquire new knowledge for lifelong learning in the 21st-century global workplace.

Baseline Technology Skills and Resources

Prior to being admitted to Excelsior College, all students should be knowledgeable in the use of a personal computer (Windows or Macintosh). Entering students should have the ability to

- ▶ use a personal computer,
- ▶ use office automation programs to create, edit, store and print documents,
- ▶ use electronic communication tools, and search and retrieve information from electronic resources to complete assignments and activities.

Students must have reliable access to a computer with Internet connectivity.

Student’s computer and operating systems must meet the minimal technical requirements as noted in the Excelsior College Computer System Requirements (www.excelsior.edu/system-requirements).

Students must be able to use required software applications.

Students need to use the Excelsior College website to access information, resources, and the Message Center, and to participate in activities. See the Excelsior College Electronic Use policy (www.excelsior.edu/electronic-use-policy).

Students are required to conduct themselves appropriately and professionally at all times, including online.

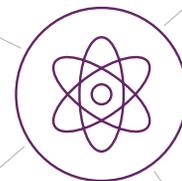
Students need to use the Excelsior College website to access information, resources, and the Message Center.

See the Excelsior College Electronic Use policy (excelsior.edu/electronic-use-policy).

Students are required to conduct themselves appropriately and professionally at all times, including online.

CHOOSING A DEGREE PROGRAM IN TECHNOLOGY

You may find it helpful to compare the requirements for each degree with your own educational background and career aspirations to determine the best degree for you. Professionals in your field of choice may be able to advise you about the preparation necessary for particular areas, and graduate school admissions counselors can advise you about requirements for entry into specific graduate schools. Excelsior College academic advisors can offer you general information about how previous study might apply to degree requirements and about your general options for continued study.



The bachelor's degree programs in electrical engineering technology and nuclear engineering technology are accredited by the Engineering Technology Accreditation Commission of ABET, and the bachelor of science in information technology is accredited by the Computing Accreditation Commission of ABET.

ABET is a specialized accrediting agency recognized by the Council for Higher Education Accreditation (CHEA). (www.abet.org)

Requirements and Policies for All Technology Degrees

Because of limited technological degree program opportunities across the country, completing degree requirements at a distance is often the only option for adults with technical backgrounds acquired at institutions of higher education, on the job, and/or in the military. As an adult learner undertaking study for a technology degree at a distance, you should familiarize yourself with the various academic requirements and policies that form the basis of available programs and make your educational decision based on a complete understanding of all relevant factors. Included here is a summary of the most important information regarding the Excelsior College technology degree programs.

Policies Specific to All Technology Programs

The Excelsior College Student Policy Handbook is your resource for understanding the academic and administrative policies that are important to your academic success. It includes a wide range of information from important federal policies, including your right to privacy, to grading policies and policies and procedures concerning refunds, withdrawals, and other administrative issues. It is your responsibility to be familiar with these policies.

Policies and procedures that apply specifically to the technology degree programs are listed on the following pages. File your Student Policy Handbook with your other important academic papers and this program catalog for easy reference.

Minimum Academic Average

You must have a cumulative grade point average of C (2.00) or better in order to qualify for graduation from Excelsior College. Only courses or examinations with grades of C or higher (to include pass [P] grades) may be used to satisfy the technology component and other specific requirements.

Time Limits on Coursework

Since the content of different technologies change at varying rates, most degree programs have specific time limits applied to certain core courses submitted for transfer credit. See particular degree information for further details.

Capstone Requirement

The capstone course should be taken in your final term. You should plan to complete all core requirements prior to taking the capstone course. Core requirements include specifically required courses in the arts and sciences component as well as the specific requirements in the technology component.

Second Degree Restrictions

No student is permitted to earn a second technology degree in the same or similar area of study or focus. Please refer to your Student Policy Handbook for specific information.

Mathematics Policy

Arithmetic courses and other mathematics courses designated as developmental or remedial may not be used toward the degree. No more than 9 credits of math below the level of calculus may be applied to any degree. Representative titles of math courses below the level of calculus include College Math, College Algebra, Trigonometry, and Precalculus.

Business/Industry/Military Training

Courses offered by business, industry, and the military tend to be application-oriented and may not contain sufficient depth and breadth of content to meet our technology core requirements. Transfer credit from the Community College of the Air Force, for example, is usually applicable to the arts and sciences, career/professional, or free elective credits components of our technology degree programs. We encourage you to contact our Admissions Office before you enroll if you have questions about how your business, industry, and/or military courses will apply.

Diversity

Excelsior College encourages you to plan your program in the humanities and social sciences to include study of the diverse perspectives of various ethnic and cultural groups as well as investigation of the fundamental assumptions of Western civilization.

Requirements for All Technology Degree Programs

Every Excelsior College technology degree program requires a specific number of semester hours of credit in each of its component areas. These areas include an arts and sciences component, a technology component (or, in some programs, a career/professional component) and, for some degrees, a free elective component in which you may earn credits through applicable coursework or examinations in subject areas that interest you to individualize your program design.

Within the arts and sciences component, you must earn a specified number of credits by successfully completing coursework or examinations in the humanities, social sciences/history, and natural sciences/mathematics areas. Within the technology component (or career/professional component), you must earn a specified number of credits by successfully completing coursework in core requirement and technology elective areas. The free elective component includes courses taken in any discipline. A maximum of two credits in physical education activity courses may be applied to your degree.

Written English Requirement (WER)

Students are required to demonstrate competence in expository writing in English.

- ▶ Associate Degree students must complete one expository writing course or examination (minimum three semester hour credits or four quarter hour credits) with a minimum of C grade. This must be completed within the first 13 Excelsior College credits attempted.
- ▶ Bachelor's degrees students must complete two expository writing courses or examinations (minimum six semester hour credits or eight quarter hour credits) with a minimum of C grade,
OR
- ▶ one expository writing course or examination (minimum three semester hour credits or four quarter hour credits) and one applied writing or writing intensive course (minimum three semester hour credits or four quarter hour credits). The expository writing course must be completed within the first 13 Excelsior College credits attempted.

Methods of Satisfying the Written English Requirement

1. **Examination**
 - a. UEXCEL® examination, ENGx111 **English Composition** (fulfills the requirement for associate and bachelor degrees)
 - b. UEXCEL® examination, ENGx110 **College Writing** (fulfills the requirement for the associate degrees; partially fulfills the requirement for the bachelor degrees)
 - c. Advanced Placement (AP) English Examinations (fulfills the requirement for associate and bachelor degrees)

Excelsior College does not accept the CLEP General Examination in English Composition with Essay toward this requirement.

2. **College coursework**
See requirements above.

Coursework must be from an English-speaking institution. English as second language courses may not be used to satisfy this requirement.

3. **Statement of Equivalency**
Submission of an official statement from a regionally accredited institution, from which transfer credit is being accepted, verifying satisfactory completion of the student's writing requirement. The statement must reflect whether the institution had a one course or two course writing requirement in effect at the time of the student's matriculation.
4. **Noncollegiate-sponsored instruction**
Successful completion of a noncollegiate-sponsored instructional writing course or program that has been evaluated by either the NYS Board of Regents National Program on Non-collegiate Sponsored Instruction (National PONSI) or the American Council on Education Center for Adult Learning and Educational Credentials (ACE CREDIT), and contains a recommendation of at least three semester-hour credits for the course; this course must contain an actual assessment of the student's competence in expository writing in English.

A maximum of two semester hour courses or three quarter hour courses in English composition/freshman English courses will apply toward degree requirements. Courses or examinations used to fulfill the Written English Requirement may not be used to satisfy the Humanities requirement.

ASSOCIATE DEGREE PROGRAMS IN TECHNOLOGY



For the technology student, the Excelsior College School of Business & Technology offers two programs at the associate degree level focused specifically on high-growth industries with exciting career opportunities. You may apply workplace and military training as credit, accelerating the path to your degree.



Excelsior College offers virtual student chapters of the **Association of Computing Machinery (ACM)**, **Institute of Electrical and Electronic Engineers (IEEE)**, and the **American Nuclear Society (ANS)**. Memberships are open to currently enrolled Excelsior College students. Visit excelsior.edu or more information about these chapters.

ASSOCIATE IN APPLIED SCIENCE IN TECHNICAL STUDIES

The Associate in Applied Science in Technical Studies (AAT) program focuses on preparing students to be employed as technicians in technology-related industries such as nuclear, energy, computer, electronics, and electrical. While the AAT program is designed specifically to meet the needs of students with military backgrounds by recognizing college-level learning that takes place as a result of military training, the program may also be appropriate for non-military students. Specifically, the program has identified four technical concentrations that provide students with a broad professional and technical foundation in the various functional components of technology. The concentrations are a group of related college-level courses within a technical component that combine depth and breadth of study in a recognized math/science-based technology discipline. The goal of the degree program in specific concentrations is to foster the ability of students to apply what they have learned within the degree program to the real-world contexts of a technology-based industry.

The four concentrations are:

- ▶ **Computer Technologies**
 - ▶ **Electromechanical Technologies**
 - ▶ **Electronic/Instrumentation Technologies**
 - ▶ **Nuclear Technologies/Power Plant Technologies**
-

Student progress within the degree program is based on the demonstration of proficiency, and is attainable through multiple, flexible pathways — offering aggregation pathways to degree completion. In this way, the program is customizable and tailored to each student's need and learning style. Graduates of the Associate in Applied Science in Technical Studies program who are interested in continuing on to baccalaureate-level study should contact the technology advising team for advice on the preferred program of study.

Refer to [pages 15–18](#) to review sample concentration area subjects and technical elective subjects.

Program (Student) Outcomes

Upon successful completion of the Excelsior College Associate in Applied Science in Technical Studies program, the graduate will be able to:

1. Demonstrate effective oral and written communication skills.
2. Demonstrate introductory college-level proficiency in one or more of the subject areas in mathematics and/or natural sciences.
3. Demonstrate introductory college-level proficiency in one or more of the social sciences.
4. Demonstrate a comprehension of cultural diversity, human behavior, and the relationship between technology and society.
5. Demonstrate the application of technology in the concentration area.

Concentrations

Computer Technologies

A concentration in computer technologies focuses on training and preparing students to stay up-to-date with the rapidly changing tech environment. The computer technologies concentration is a technical discipline centered on the design, assembly, testing, and maintenance of computer circuitry and peripheral hardware. The concentration also emphasizes the design, development, operation, and troubleshooting of computer, database, and network systems. The computer technologies outcomes are geared toward providing students with a foundational knowledge of computer technologies in a wide variety of subject areas and preparing students for positions including circuit design engineer, hardware technician, software developer, database specialist, or network engineer.

Upon successful completion of the Excelsior College Associate in Applied Science in Technical Studies with a Computer Technologies area of focus, the student will be able to:

1. Use electric circuits, analog and digital electronics, software applications, and operating systems to build, test, operate, and maintain computer systems and networks.
2. Install, update, and configure computer applications software.

Electromechanical Technologies

A concentration in electromechanical technologies focuses on training and preparing the students with the knowledge and practical skills in mechanical technology along with electrical and electronic circuits. It is centered on design, assembly, testing, maintenance, and upgrading of electronic and computer-integrated mechanical components and systems, such as automated manufacturing tools and engineering service equipment. The electromechanical technologies' outcomes are geared toward providing students with fundamental as well as applied knowledge in automated, servo-mechanical, or electromechanical tools, equipment, and processes. These will prepare the students for positions in operating, repairing, and upgrading unmanned submarines, aircraft, robots, or such automated equipment.

Upon successful completion of the Excelsior College Associate in Applied Science in Technical Studies with an Electromechanical Technologies area of focus, the student will be able to:

1. Use circuit analysis, analog and digital electronics, basic instrumentation, and computers to aid in the characterization, analysis, and troubleshooting of electromechanical systems.
2. Use mechanics, strength of materials, engineering materials, and manufacturing processes to aid in the characterization, analysis, and troubleshooting of electromechanical systems.

Electronic / Instrumentation Technologies

A concentration in electronic/instrumentation technologies focuses on training and preparing the students with the knowledge and practical skills in electrical/electronic circuits and process instrumentation. It is centered on design, assembly, testing, maintenance, and upgrading of electrical and electronic components and systems used in analytical instruments and measurements, medical technology, communications, and industrial process control. The electronic/instrumentation technologies' outcomes are geared toward providing students with fundamental as well as applied knowledge in AC, DC, and digital circuits, microprocessors, and programmable controllers. These will prepare the students for positions in operating, repairing, and upgrading process instrumentation tools, equipment, and systems.

Upon successful completion of the Excelsior College Associate in Applied Science in Technical Studies with an Electronic / Instrumentation Technologies area of focus, the student will be able to:

1. Apply the concepts of automatic control, measurements, and sensor selection for the operation and testing of continuous and discrete systems.
2. Use electrical/electronic devices, computers, and instrumentation for the operation and troubleshooting of analog and digital communication systems.

Nuclear Technologies / Power Plant Technologies

A concentration in nuclear technologies/power plant technologies focuses on preparing students for technician/operator positions in the nuclear industry. The nuclear technologies/power plant technologies concentration is a technical discipline centered on the design, materials, operations, and maintenance associated with radiation shielding, radiation detection instrumentation, and emergency planning for nuclear research and power generation facilities. The nuclear technologies/power plant technologies outcomes are geared toward providing students with a foundational knowledge of nuclear technologies/power plant technologies in support of technician/operator positions at nuclear facilities.

Upon successful completion of the Excelsior College Associate in Applied Science in Technical Studies with a Nuclear Technologies / Power Plant Technologies area of focus, the student will be able to:

1. Apply the applicable regulations and the concepts of control performance, human interface, and quality assurance to the operation and maintenance of nuclear systems.
2. Demonstrate a proficiency in radiation protection procedures and regulations pertaining to the safe operation of nuclear systems.
3. Describe the key procedures in the recording and interpretation of measurements, start-up and shut-down of plant equipment and the maintenance of power plant systems.
4. Identify the key principles in the proper operation, testing, and troubleshooting of boilers, turbines, electric generators, pumps, and other auxiliary.

Degree Requirements

The Associate in Applied Science in Technical Studies requires a minimum of **60 credits**, distributed as follows:

- ▶ 20 credits minimum in the arts and sciences
- ▶ 27 credits minimum in the career component (to include the capstone)
- ▶ 13 credits in the free electives component (to include information literacy)

Arts and Sciences Component (20 credits)

Arts and sciences are those areas of study classified as humanities, social sciences/history, and natural sciences/mathematics. The Associate in Applied Science in Technical Studies requires a minimum of 20 credits in the arts and sciences, distributed as follows:

A. Humanities

At least 6 credits must be earned in humanities. Three credits must come from a course that satisfies the written English requirement [ENGx111 **English Composition**, ENG 101 **English Composition**] (see page 3). The remaining 3 credits must be in humanities subjects other than writing, which include literature, foreign languages, religion, philosophy, art, ethics, and music.

B. Social Sciences/History

At least 6 credits must be earned in social sciences/history—a minimum of 3 credits in behavioral science and a minimum of 3 credits in technology and society [TECH 230 **Technology and Society**].

C. Natural Sciences/Mathematics

At least 6 credits must be earned in natural sciences/mathematics—a minimum of 3 credits in college-level math and a minimum of 3 credits in natural sciences. Some sample natural science subjects and courses are biology, chemistry, physics, and geology. Some sample math subjects and courses are intermediate algebra, college algebra, trigonometry, and statistics.

D. Arts and Sciences Electives

The remaining credits needed to satisfy the 20-credit requirement may be earned in any area of the arts and sciences.

Career Component (27 credits)

A minimum of 27 credits are required in the career component. The career component consists of 6 core component credits, 15 concentration area credits, and 6 technical electives credits. Credits applied to the Career Component require a grade of C or better.

Core Component (6 credits)

- ▶ Introduction to Computing
[IT 221 **Introduction to Computers**]
- ▶ Integrated Technology Assessment
(required capstone course)
[TECH 290 **Integrated Technology Assessment**]

The TECH 290 capstone course is required and must be taken through Excelsior College. It cannot be transferred in.

Technology Component (15 credits)

- ▶ Computer Technologies
- ▶ Electromechanical Technologies
- ▶ Electronic/Instrumentation Technologies
- ▶ Nuclear Technologies/Power Plant Technologies

Technical Electives (6 credits)

Free Elective Component (13 credits)

The degree program allows room for up to 13 credits in free electives. Applied to this component is the 1 credit for Excelsior College's information literacy requirement [INL 102 **Information Literacy**]. See page vi or refer to our website for more information about information literacy.



Associate in Applied Science in Technical Studies

60
CREDITS

ARTS AND SCIENCES COMPONENT	CREDIT HOURS
▶ Written English Requirement	3
▶ Humanities Must be in subjects other than writing	3
▶ TECH 230 Technology and Society (Required)	3
▶ Behavioral Sciences	3
▶ Natural Sciences/Mathematics Must include one natural science course and one college-level math course	6
▶ Arts and sciences electives	2
TOTAL CREDITS FOR ARTS AND SCIENCES COMPONENT	20
CAREER COMPONENT	CREDIT HOURS
A minimum of 27 credits are required in the career component. The career component consists of 6 core component credits, 15 concentration area credits, and 6 technical electives credits in the concentration area.	
▶ Core Component	
<i>Introduction to Computing</i>	6
Integrated Technology Assessment ^①	
▶ Technology Component	
Computer Technologies	15
Electromechanical Technologies	
Electronic/Instrumentation Technologies	
Nuclear Technologies/Power Plant Technologies	
▶ Technical Electives	6
TOTAL CREDITS FOR CAREER COMPONENT	27
FREE ELECTIVE COMPONENT	CREDIT HOURS
Includes 1-credit Information Literacy Requirement	13
TOTAL CREDITS FOR FREE ELECTIVE COMPONENT	13
TOTAL DEGREE CREDITS REQUIRED	60

^① TECH 290 capstone course is required and must be taken through Excelsior College. It cannot be transferred in. A grade of "C" or higher is required.

ASSOCIATE IN SCIENCE IN TECHNOLOGY

The Associate in Science in Technology program focuses on preparing students to be employed as technicians in technology-related industries such as nuclear, energy, computer, electronics, and electrical. The program puts special emphasis on developing the technical knowledge, skills, and values required for technicians to meet the demands of a 21st-century workforce. This includes an emphasis on specific areas like: field services, design, testing, manufacturing, and quality assurance. To do this, the program emphasizes a strong liberal arts base; ensuring students have the academic breadth required in an increasingly project-based work environment. A focus on lifelong learning prepares students to adapt to and succeed in an ever-changing world. Specifically, the program has identified four technical Areas of Focus that provide students with a broad professional and technical foundation in the various functional components of technology. The Areas of Focus are a group of related college-level courses within a technical component that combine depth and breadth of study in a recognized math/science-based technology discipline. The goal of the degree program in specific Areas of Focus is to foster the ability of students to apply what they have learned within the degree program to the real-world contexts of a technology-based industry.

The Areas of Focus are:

- ▶ **Computer Technologies** ▶ **Electromechanical Technologies** ▶ **Electronic/Instrumentation Technologies**
 - ▶ **Nuclear Technologies** ▶ **Power Plant Technologies**
-

Student progress within the degree program is based on the demonstration of proficiency, and is attainable through multiple, flexible pathways—offering course-based, prior learning assessment, and credit aggregation pathways to degree completion. In this way, the program is customizable and tailored to each student's need and learning style. Earning an Associate in Science in Technology degree can be an intermediate step to earning a Bachelor of Science in Technology.

Refer to [page 15–18](#) to review sample area of focus subjects and technical elective subjects.

Program (Student) Outcomes

Upon successful completion of the Excelsior College Associate in Science in Technology program, the graduate will be able to:

1. Demonstrate effective oral and written communication skills.
2. Apply observation and measurement skills to develop quantitative expressions of natural science phenomena.
3. Apply algebra, trigonometry, or higher order mathematics to solve technology-related problems.
4. Demonstrate introductory college-level proficiency in one or more of the social sciences.
5. Demonstrate a comprehension of diverse cultural heritage, interpersonal relationships, the relationship between technology and society, and personal values to make intelligent and discerning judgments.
6. Demonstrate a proficiency in computer applications used in technology areas.

Area of Focus

Computer Technologies

An area of focus in computer technologies focuses on training and preparing students to stay up-to-date with the rapidly changing tech environment. The computer technologies area of focus is a technical discipline centered on the design, assembly, testing, and maintenance of computer circuitry and peripheral hardware. The concentration also emphasizes the design, development, operation, and troubleshooting of computer, database, and network systems. The computer technologies outcomes are geared toward providing students with a foundational knowledge of computer technologies in a wide variety of subject areas and preparing students for positions including circuit design engineer, hardware technician, software developer, database specialist, or network engineer.

Upon successful completion of the Excelsior College Associate in Science in Technology with a Computer Technologies area of focus, the student will be able to:

1. Use electric circuits, analog and digital electronics, software applications, and operating systems to build, test, operate, and maintain computer systems and networks.
2. Install, update, and configure computer applications software.

Electromechanical Technologies

An Area of Focus in electromechanical technologies focuses on training and preparing students with the knowledge and practical skills in mechanical technology along with electrical and electronic circuits. It is centered on design, assembly, testing, maintenance, and upgrading of electronic and computer-integrated mechanical components and systems, such as automated manufacturing tools and engineering service equipment. The electromechanical technologies' outcomes are geared toward providing students with fundamental as well as applied knowledge in automated, servo-mechanical, or electromechanical tools, equipment, and processes. These will prepare the students for positions in operating, repairing, and upgrading unmanned submarines, aircraft, robots, or such automated equipment.

Upon successful completion of the Excelsior College Associate in Science in Technology with an Electromechanical Technologies area of focus, the student will be able to:

1. Use circuit analysis, analog and digital electronics, basic instrumentation, and computers to aid in the characterization, analysis, and troubleshooting of electromechanical systems.
2. Use mechanics, strength of materials, engineering materials, and manufacturing processes to aid in the characterization, analysis, and troubleshooting of electromechanical systems.

Electronic/Instrumentation Technologies

An Area of Focus in electronic/instrumentation technologies focuses on training and preparing students with the knowledge and practical skills in electrical/electronic circuits and process instrumentation. It is centered on design, assembly, testing, maintenance, and upgrading of electrical and electronic components and systems used in analytical instruments and measurements, medical technology, communications, and industrial process control. The electronic/instrumentation technologies' outcomes are geared toward providing students with fundamental as well as applied knowledge in AC, DC, and digital circuits, microprocessors, and programmable controllers. These will prepare the students for positions in operating, repairing, and upgrading process instrumentation tools, equipment, and systems.

Upon successful completion of the Excelsior College Associate in Science in Technology with an Electronic/Instrumentation Technologies area of focus, the student will be able to:

1. Apply the concepts of automatic control, measurements, and sensor selection for the operation and testing of continuous and discrete systems.
2. Use electrical/electronic devices, computers, and instrumentation for the operation and troubleshooting of analog and digital communication systems.

Nuclear Technologies

The Area of Focus in Nuclear Technologies is centered on providing students with a foundational knowledge of nuclear technologies in support of technician/operator positions at nuclear facilities. Nuclear technologies is a technical discipline centered on the design, materials, operations, and maintenance associated with radiation shielding, radiation detection instrumentation, and emergency planning for nuclear research and power generation facilities.

Upon successful completion of the of the Excelsior College Associate in Science in Technology with a Nuclear Technologies Area of Focus, the graduate will be able to:

1. Apply the applicable regulations and the concepts of control performance, human interface, and quality assurance to the operation and maintenance of nuclear systems.
2. Demonstrate a proficiency in radiation protection procedures and regulations pertaining to the safe operation of nuclear systems.

Power Plant Technologies

The Area of Focus in Power Plant Technologies is centered on the design, materials, operations, and maintenance associated with power generation facilities. The power plant technologies outcomes are geared towards providing students with a foundational knowledge of power plant operations in support of potential advancement in the utility industry.

Upon successful completion of the Excelsior College Associate in Science in Technology with a Power Plant Technologies Area of Focus, the graduate will be able to:

1. Describe the key procedures in the recording and interpretation of measurements, start-up and shut-down of plant equipment and the maintenance of power plant systems.
2. Identify the key principles in the proper operation, testing, and troubleshooting of boilers, turbines, electric generators, pumps, and other auxiliary power plant equipment.

Refer to [page 15–18](#) to review sample areas of focus subjects and technical elective subjects.

Degree Requirements

The Associate in Science in Technology requires a minimum of 61 credits, distributed as follows:

- ▶ 30 credits minimum in the arts and sciences
- ▶ 30 credits minimum in the technology component
- ▶ 1 credit to satisfy the information literacy requirement

Arts and Sciences Component (30 credits)

The Associate in Science in Technology requires a minimum of 30 credits in the arts and sciences distributed as follows:

A. Communications

At least 6 credits must be earned in communications, including a course (minimum of 3 credits) that satisfies the written English requirement [ENGx111 English Composition, ENG 101 English Composition, ENG 201 Writing for the Professions] (see page 3). Courses in speech, technical writing, or similar courses either in written or oral communications are applicable toward the communications requirement.

B. Humanities

At least 3 credits must be earned in humanities subjects other than writing. Humanities subjects include, but are not limited to, literature, foreign languages, religion, philosophy, art, ethics, and music.

C. Social Sciences/History

At least 6 credits must be earned in social sciences/history. Social sciences/history subjects include, but are not limited to, political science, anthropology, economics, geography, history, psychology, and sociology.

D. Natural Sciences

At least 6 credits must be earned in natural sciences. Some sample natural science courses are biology, chemistry, astronomy, oceanography, and geology.

E. Mathematics

At least 6 credits must be earned in mathematics at the level of college algebra or higher [MAT 116 Precalculus Algebra, MAT 118 Trigonometry, TECH 201–202 Foundations of Technology Problem Solving I–II].

F. Arts and Sciences Electives

The remaining 3 credits needed to satisfy the 30-credit requirement may be earned in any area of the arts and sciences.

Technology Component (30 credits)

The Associate in Science in Technology requires a grade of C or better for applicable credit, and a minimum of 30 credits in technology distributed as follows:

A. Area of Focus

At least 18 credits must be earned in an area of focus. See pages 15–18 for a list of sample area of focus subjects. TECH 295 Integrated Technology Assessment (capstone) is the required capstone course included in the Area of Focus.

The TECH 295 capstone course is required and must be taken through Excelsior College. It cannot be transferred in.

B. Technical Electives

A maximum of 12 credits in technical electives may be applied toward the Associate in Science in Technology. This includes at least 3 credits to satisfy the Computer Applications requirement or Computer Programming [IT 221 Introduction to Computers]. See pages 15–18 for a list of sample technical electives for each concentration area.

Information Literacy Requirement (1 credit)

Students are expected to demonstrate competency in information literacy [INL 102 Information Literacy]. Visit our website for more information about this requirement.

Degree-Specific Policies

Policies and procedures that apply specifically to the Associate in Science in Technology follow. Refer to your Student Policy Handbook for academic and administrative policies that apply to all students and programs.

Time Limit on Courses and Exams

Because of the rapidly changing nature of technology, Excelsior College has established a time-related restriction on the application of credit from previous computer- and electronics-related coursework, with the exception of Circuit Theory I and Circuit Theory II. To meet this requirement, relevant coursework must have been completed more recently than 10 years prior to entrance into the Associate in Science in Technology. The time limit may be appealed with verification of appropriate and current professional and/or academic experience showing that electronics/computer knowledge is current.



Associate in Science in Technology

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CREDITS

ARTS AND SCIENCES COMPONENT	CREDIT HOURS
<ul style="list-style-type: none"> ▶ Communications Must include a course that satisfies the 3-credit Written English Requirement 	6
<ul style="list-style-type: none"> ▶ Humanities Must be in subjects other than writing 	3
<ul style="list-style-type: none"> ▶ Social Sciences/History 	6
<ul style="list-style-type: none"> ▶ Natural Sciences 	6
<ul style="list-style-type: none"> ▶ Mathematics At the level of college algebra or above 	6
<ul style="list-style-type: none"> ▶ Arts and Sciences electives 	3
TOTAL CREDITS FOR ARTS AND SCIENCES COMPONENT	30
INFORMATION LITERACY COMPONENT	CREDIT HOURS
<ul style="list-style-type: none"> ▶ INL 102 Information Literacy 	1
TOTAL CREDITS FOR INFORMATION LITERACY COMPONENT	1
TECHNOLOGY COMPONENT	CREDIT HOURS
<ul style="list-style-type: none"> ▶ Area of Focus TECH 295 Integrated Technology Assessment (capstone) is the required capstone course.^① 	
Computer Technologies	
Electromechanical Technologies	
Electronic/Instrumentation Technologies	18
Nuclear Technologies	
Power Plant Technologies	
See page 15–18 for sample Area of Focus and technical elective subjects.	
<ul style="list-style-type: none"> ▶ Technical Electives Must include one course in computer applications 	12
TOTAL CREDITS FOR TECHNOLOGY COMPONENT	30
TOTAL DEGREE CREDITS REQUIRED	61

^① TECH 295 Integrated Technology Assessment capstone course is required and must be taken through Excelsior College and cannot be transferred in.

AREAS OF FOCUS AND TECHNICAL ELECTIVES

ASSOCIATE IN SCIENCE IN TECHNOLOGY AND BACHELOR OF SCIENCE IN TECHNOLOGY

Students enrolled in the Associate in Science in Technology and Bachelor of Science in Technology programs have the flexibility to explore a wide range of subjects in their declared Areas of Focus and the opportunity to branch out into different areas of technology education to round out the program.

The following charts contain typical focus area subjects and technical elective subjects for each of the areas of focus. While these charts do not list all of the possible subjects, they provide a solid base upon which you can plan your educational goals. As always, it is best to speak with a member of your advising team before registering for courses.

Please note that not all subjects listed have corresponding courses available at Excelsior College. However, all subjects listed may be transferred in from external institutions, subject to faculty approval. Speak to an academic advisor to discuss available courses at Excelsior College that will apply toward your Area of Focus.

Computer Technologies

A technical discipline centered on the design, assembly, testing, and maintenance of computer circuitry and peripheral hardware. It also emphasizes the design, development, operation, and troubleshooting of computer, database, and network systems.

TYPICAL AREA OF FOCUS SUBJECTS

AC Circuit Theory	Operating Systems	Data Communications
Applied Electronics	Computer Architecture	Data Structures
DC Circuit Theory	Digital Systems Design I	Electronic Communications
Digital Circuits	Database Concepts	Computer Security
Microprocessors	Systems Analysis and Design	Project Management

TYPICAL TECHNICAL ELECTIVE SUBJECTS

Assembly Language Programming	Software Engineering	Industrial Safety
High-Level Structured Language	Microprocessor Interfacing	Computer Programming
Digital Systems Design II	Computer-Based Robotics	CAD
Advanced Digital Electronics	Statistical Quality Control	Engineering Graphics
Computer Graphics	Control Theory	Computer Security
Computer Integrated Manufacturing	Blueprint Reading	

Electromechanical Technologies

A technical discipline centered around the combined efforts of the electrical engineer and mechanical engineering technologist to design, develop, and maintain devices that combine electrical, electronic, and mechanical principles in their operations.

The number of technology credits should be evenly distributed between electronics/electricity technologies and mechanical technologies.

TYPICAL AREA OF FOCUS SUBJECTS		
Applied Circuit Theory	Operating Systems	Data Communications
Applied Mechanics	Computer Architecture	Data Structures
Digital Circuits	Digital Systems Design I	Electronic Communications
Electromechanical Devices and Mechanisms	Database Concepts	Computer Security
Electronic Devices	Systems Analysis and Design	Project Management

TYPICAL TECHNICAL ELECTIVE SUBJECTS		
Assembly Language Programming	Software Engineering	Industrial Safety
High-Level Structured Language	Microprocessor Interfacing	Computer Programming
Digital Systems Design II	Computer-Based Robotics	CAD
Advanced Digital Electronics	Statistical Quality Control	Engineering Graphics
Computer Graphics	Control Theory	Computer Security
Computer Integrated Manufacturing	Blueprint Reading	

Electronic/Instrumentation Technologies

A technical discipline centered around the design, materials development, manufacture, and maintenance of devices that adapt and use electrical energy economically.

TYPICAL AREA OF FOCUS SUBJECTS

AC Circuit Theory	Electronic Communications	Control Systems
Electronics	Electronic Devices	Data Communications
DC Circuit Theory	Machines and Power Systems	Computer Architecture
Digital Circuits	Microprocessors	

TYPICAL TECHNICAL ELECTIVE SUBJECTS

Computer Network Analysis	Engineering Economics	Switching Circuit Design
Electrical Instrumentation	Industrial Electronics	Blueprint Reading
Electromagnetics	Optoelectronics	Industrial Safety
Electronic Design and Fabrication	Linear Amplifier Design	CAD
Electronic Design Project	Power Amplifier Design	Computer Programming
Electronic Systems Design	Power Systems Analysis	Engineering Graphics
Energy Conversion	Programmable Controllers	

Nuclear Technologies/Power Plant Technologies

A technical discipline centered on providing students with a foundational knowledge of nuclear technologies/power plant technologies in support of technician/operator positions at nuclear facilities. The nuclear technologies/power plant technologies is a technical discipline centered on the design, materials, operations, and maintenance associated with radiation shielding, radiation detection instrumentation, and emergency planning for nuclear research and power generation facilities.

TYPICAL AREA OF FOCUS SUBJECTS		
Applied Health Physics I	Reactor Chemistry	Plant Management
Emergency Planning	Materials	Fluids
Introduction to Reactor Systems	Electrical Theory	Electrical Power Distribution
Radiation Instrumentation	Environmental Compliance	AC/DC Theory and Circuits
Environmental Compliance	Digital Electronics	Instrumentation and Control Systems
Thermodynamics	Heat Transfer	Project Management
AC/DC Theory and Circuits	Power Plant Components	Engineering Economics (Economic Analysis for Technologist)
Radiation Instrumentation	Thermodynamics	

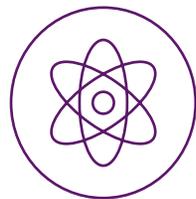
TYPICAL TECHNICAL ELECTIVE SUBJECTS		
Advanced Instrumentation	Instrument Calibration	Generator Design and Operation
Applied Analytical Chemistry	Interaction of Radiation with Matter	Transformer Design and Operation
Applied Health Physics II	Metrology	Electronics Theory and Application
Applied Instrumental Analysis	Quality Assurance	Electronic Instrumentation
Applied Radiation Biology	Radiation Shielding II	Strength of Materials
Applied Radiochemistry	Reliability Analysis	Materials (with Corrosion)
Applied Water Chemistry	Blueprint Reading	Lubrication
Corrosion Science	Industrial Safety	Plant Efficiency
Digital Electronics	Computer Programming	Predictive Maintenance
Health Physics Regulations	Welding	Protective Relays
Industrial Electronics	Turbine Design and Operation	

BACHELOR'S DEGREE PROGRAMS IN TECHNOLOGY

BACHELOR OF SCIENCE



For the technology student, the Excelsior College School of Business & Technology offers a number of programs at the baccalaureate degree level focused specifically on high-growth industries with exciting career opportunities. You may apply workplace and military training as credit, accelerating the path to your degree.



IEEE



Excelsior College offers virtual student chapters of the Association of Computing Machinery (ACM), Institute of Electrical and Electronic Engineers (IEEE), and the American Nuclear Society (ANS). Memberships are open to currently enrolled Excelsior College students.

Visit www.excelsior.edu for more information about these chapters.

Requirements and Policies for the Bachelor's Degrees in Technology

Every Excelsior College technology degree program requires a specific number of semester hours of credit in each of its component areas. These areas include an arts and sciences component, a technology or professional component, and a free elective component in which you may earn credits through applicable coursework or examinations in subject areas of interest to you.

The chart relevant to your degree program shows a graphic representation of the credit needed to fulfill all the requirements for your chosen degree.

You are a good candidate for a bachelor's-level technology degree program if you:

- ▶ have a two-year technology degree or a significant number of credits in a technology discipline from a regionally accredited college.
- ▶ are prepared to complete coursework in mathematics at the level of college algebra or above, which may include Discrete Math, Calculus I and II, and/or Differential Equations, if required for your degree program.
- ▶ have completed or have access to professional courses that have been evaluated for college-level credit by either the American Council on Education (ACE) College Credit Recommendation Service of the Center for Adult Learning and Educational Credentials or the New York State Board of Regents National College Credit Recommendation Service (formerly known as National PONSI).
- ▶ have completed military training that has been evaluated by the American Council on Education. Based on its content and your degree program, this credit may apply toward the technology or professional component, arts and sciences component, or free elective component.

Requirements for All Bachelor's Degrees in Technology

Level Requirement

Excelsior College bachelor's-level technology degree programs require 15 or 16 upper-level credits within the technology or professional component, depending on the discipline selected. A course is considered upper level if it is offered at the junior or senior level and is not introductory in content. Course credits from two-year institutions may not be used to satisfy upper-level requirements. Acceptance of course credits toward the upper-level requirement is subject to faculty approval.

Free Elective Credits

All Excelsior College technology bachelor's degree programs allow you the flexibility of using free elective credits to meet degree requirements beyond the required credits in arts and sciences and general education. Free elective credits can be earned in disciplines including, but not limited to: agriculture, architecture, business, criminal justice, education, graphic design, law, library science, medicine, and nutrition.

BACHELOR OF PROFESSIONAL STUDIES IN TECHNOLOGY MANAGEMENT

The Bachelor of Professional Studies in Technology Management is a flexible career-oriented program developed for students who want to build upon their knowledge and earn a bachelor's degree within their technical field. The program puts special emphasis on developing the knowledge, skills, attitudes, and values required for a technical person to meet the demands of a 21st-century workforce. To do this, the program has identified 10 different outcomes, which provide students with a broad professional foundation in the various functional components of technology and management, as well as with a strong liberal base to ensure students have academic breadth and the commitment to lifelong learning needed to adapt to and succeed in an ever-changing world. Additionally, the program has identified four technical concentrations that provide students with a broad professional and technical foundation in the various functional components of technology. The concentrations are a group of related college-level courses within a technical component that combine depth and breadth of study in a recognized math/science-based technology discipline. The goal of the degree program in specific concentrations is to foster the ability of students to apply what they have learned within the degree program to the real-world contexts of a technology-based industry.

The four concentrations are:

▶ **Electrical Technology** ▶ **Information Technology** ▶ **Nuclear Technology** ▶ **Renewable Energy Technology**

Student progress within the degree program is based on the demonstration of proficiency, and is attainable through multiple, flexible pathways—offering course-based, prior learning assessment, and credit aggregation pathways to degree completion. In this way, the program is customizable and tailored to each student's need and learning style. The Bachelor of Professional Studies in Technology Management is an option for students who seek to apply credit for military and other training toward a bachelor degree.

Program (Student) Outcomes

The outcomes are geared toward providing students with a foundational knowledge of professional studies in technology management and the discipline of effective decision making in the technology industry. Upon successful completion of the degree program, students will be able to:

1. Apply knowledge of mathematics and natural sciences to problem-solving in technology management contexts.
2. Develop cohesive written and oral arguments in your technical concentration using appropriate supporting evidence.
3. Critically evaluate and propose solutions for technology management problems.
4. Critically evaluate the ethical, legal, and social implications associated with the management of technology in your concentration field.
5. Participate effectively in diverse teams to address technical issues in your technology concentration.

6. Apply project management tools and techniques to plan, manage, and close a project in the applicable technology field.
7. Apply computer applications or computer software packages to solve technical problems in your technical concentration.
8. Apply technological and management concepts in an integrated manner using both a local and global perspective.
9. Employ critical thinking skills to interpret and analyze competing arguments and multiple perspectives in a technology environment.
10. Evaluate your individual strengths and weaknesses with the desire to update skills and continuously improve.

Degree Requirements

The Excelsior College Bachelor of Professional Studies in Technology Management program requires a total of 120 credits and comprises three major components — arts and sciences, professional, and additional credit. The three components and their respective requirements are explained in the following sections.

- ▶ **30 credits** minimum required in the arts and sciences
- ▶ **45 credits** minimum required in the professional component
- ▶ **45 credits** required in the additional credit component (to include information literacy)

Arts and Sciences Component (30 credits, including 9 upper-level)

Excess credits in arts and science may be applied toward the additional credit component as electives.

A. Written English Requirement

At least 6 credits must come from courses or exams that satisfy the written English requirement (see page 3) [ENGx111 English Composition, ENG 101 English Composition, ENG 102 English Composition II, ENG 201 Writing for the Professions, TECH 200 Technical Writing].

B. Humanities

You must successfully complete at least 9 credits in the humanities, including ethics [BUS 323 Business Ethics, BUSx310 Ethics: Theory and Practice]. Humanities subjects include, but are not limited to, art, music, literature, foreign language, philosophy, religion, speech, creative writing, and advanced writing. Examinations or courses used to satisfy the written English requirement may not be applied toward the humanities requirement.

C. Social Sciences/History

You must successfully complete a minimum of 6 credits in social sciences/history. Social sciences and history subjects include, but are not limited to, anthropology, sociology, government, political science, psychology, geography, history, and economics.

D. Natural Sciences/Mathematics

You must successfully complete a minimum of 6 credits in mathematics to include a 3-credit course in college algebra [MAT 116 Precalculus Algebra] or Statistics [BUS 233 Business Statistics].

E. You must successfully complete a minimum of 3 credits in natural sciences [BIO 110 Biology (Non-Lab), GEOL 108 Earth Science and Society, GEOL 114 Introduction to Oceanography, PHYS 201–203 Physics I–II]. Natural sciences subjects include, but are not limited to, astronomy, geology, oceanography, anatomy and physiology, microbiology, chemistry, biology, genetics, zoology, and physics. Mathematics courses include intermediate algebra, precalculus, calculus, etc.

F. Only three college-level math courses below the level of calculus may be applied to degree requirements.

Professional Component (45 credits, including 15 upper-level)

The professional component includes a professional core that helps you gain basic knowledge in business administration and the underlying discipline of decision making, and a technology management core and professional component electives that allow you to apply and synthesize your technical knowledge in one of four concentration areas—electrical technology, information technology, nuclear technology, and renewable energy technology. A minimum of 15 credits is required in the concentration areas.

At least 15 credits at the upper (junior/senior) level must be completed in the professional component; 9 of these upper-level credits must be in the technology management core and/or professional component electives. Credits may be earned through Excelsior College courses and examinations and other approved sources, as well as approved military, business, and industry training. A grade of C or better is required for applicable credit.

Professional Core Requirements

One course required in each professional core area below.

1. General Management
[BUS 341 Management Concepts and Applications]
2. Leadership
[BUS 452 Business Leadership]
3. Accounting
[ACC 211 Financial Accounting]
4. Computer Applications
[IT 221 Introduction to Computers]
5. Project Management
[IT 390 Project Management]

Technology Management Core Requirements

One 3-credit course required in each technology management core area below.

1. Technology and Society
[TECH 230 Technology and Society]
2. Engineering Economics
[TECH 330 Economic Analysis for Technologists]
3. Introduction to Energy Utilization
[TECH 340 Intro to Energy Utilization]
4. Integrated Technology Assessment (capstone)
[TECH 490 Technology Management Capstone: Integrated Technology Assessment—the capstone course is required and must be taken through Excelsior College and cannot be transferred in.]

Concentration Areas

- ▶ **Electrical Technology**
- ▶ **Information Technology**
- ▶ **Nuclear Technology**
- ▶ **Renewable Energy Technology**

Students must select a concentration area in one of four areas: electrical technology, information technology, nuclear technology and renewable energy technology. A minimum of 15 credits must be earned in the concentration area.

Concentrations

Electrical Technology

A concentration in electrical technology focuses on training and preparing students with the knowledge and practical skills in electrical technology along with electrical circuits, electrical systems, and electrical equipment. It is centered on design, assembly, testing, maintenance, repairing, and upgrading of electrical circuits, components, and equipment. The electrical technology outcomes are geared toward providing students with fundamental as well as applied knowledge in electrical systems, electrical equipment, and processes. These will prepare the students for positions in operating, repairing, and upgrading electrical circuits, electrical systems, and electrical equipment. Upon successful completion of the Excelsior College Bachelor of Professional Studies with an Electrical Technology concentration, the student will be able to:

1. Identify, formulate, and present solutions to a variety of technical problems in the area of electrical technology.
2. Demonstrate competency in the analysis, interpretation, and application of data in the area of electrical technology.

Information Technology

A concentration in information technology focuses on training and preparing students to stay up-to-date with the rapidly changing technical environment. The information technology concentration is a technical discipline centered on the design, assembly, testing, and maintenance of computer circuitry and peripheral hardware. The concentration also emphasizes the information system concepts, principles, and practices, and problem solving of information technology domains. The information technology outcomes are geared toward providing students with a foundational knowledge of information technology in a wide variety of subject areas and preparing students for positions including information technicians, database management systems, software management, data communications, information security, and network management. Upon successful completion of the Excelsior College Bachelor of Professional Studies with an Information Technology concentration, the student will be able to:

1. Analyze and apply a range of information system concepts, principles, and practices in the context of solving problems across a spectrum of information technology domains.
2. Develop computer-based applications using appropriate information technology concepts and principles.

Nuclear Technology

A concentration in nuclear technology focuses on preparing students for technical background in the nuclear industry. The nuclear technology concentration is a technical discipline centered on the design, materials, operations, and maintenance associated with radiation shielding, radiation detection instrumentation, and emergency planning for nuclear research and power generation facilities. The nuclear technology concentration is geared toward providing students with a foundational knowledge of nuclear technology for positions at nuclear facilities. Upon

completion of the Excelsior College Bachelor of Professional Studies with a Nuclear Technology concentration, the students will be able to:

1. Demonstrate a proficiency in the operation and maintenance of nuclear processes and systems.
2. Demonstrate a proficiency in the applicable rules, regulations, and procedures pertaining to radiological safety and radiation protection.
3. Identify the key principles in the proper operation, testing, and troubleshooting of turbines, electric generators, pumps, and other auxiliary plant equipment.

Renewable Energy Technology

A concentration in renewable energy technology focuses on training and preparing students to stay current with the renewable energy industry. The renewable energy technology concentration is a technical discipline centered on renewable energies such as solar, wind, water, and geothermal. The concentration also emphasizes the political and economic influences on the renewable energy business. The renewable energy technology outcomes are geared toward providing students with a foundational knowledge of renewable energy in a wide variety of subject areas and preparing students for positions in the renewable energy industry including an understanding of economics and politics associated with renewable energy. Upon successful completion of the Excelsior College Bachelor of Professional Studies with a Renewable Energy Technology concentration, the student will be able to:

1. Identify and discuss renewable energy technologies being used commercially and residentially.
2. Perform an analysis of political and economic influences on the renewable energy business.

Renewable Energy Technology Requirements

- ▶ NUC 255 AC/DC Theory
- ▶ TECH 225 Applied Instrumentation and Control
- ▶ TECH 233 Electrical Power Distribution
- ▶ TECH 250 Renewable Energy Overview I
- ▶ TECH 251 Renewable Energy Overview II

Professional Component Electives

Any technology-related credits outside the core are applied as professional component electives. Technology management credits in excess of the professional component maximum of 45 may be applied to the additional credit component.

Additional Credit Component (45 credits, including 6 upper-level)

Although you may have already fulfilled the minimum credit requirements in the arts and sciences and professional components of your degree, you may still need to earn additional credit to fulfill the total credit requirement of your Bachelor of Professional Studies in Technology Management. To do this, you may apply any of the following: arts and sciences credit above the minimum required, professional component credit (technology/management) above the minimum required, or free elective credit.

Free elective credit may be earned in any field of collegiate study, including business and other professional, technical, or vocational areas as well as the arts and sciences. Examples include military science, health, nursing, engineering, education, computer science, home economics, secretarial science, architecture, drafting, auto mechanics, law, social work, and criminal justice. A maximum of 2 credits for physical education activity courses may be applied.

Information Literacy Requirement (1 credit)

Students are expected to demonstrate competency in information literacy [INL 102 Information Literacy]. See page vi or visit our website for more information about this requirement. The information literacy requirement is applied to the additional credit component.



Bachelor of Professional Studies in Technology Management

120
CREDITS

ARTS AND SCIENCES COMPONENT	CREDIT HOURS
Minimum of 9 upper-level credits	
▶ Written English Requirement	6
▶ Humanities	6
▶ Ethics	3
▶ Social Sciences/History	6
▶ College Algebra or Statistics	3
▶ Mathematics Elective	3
▶ Natural Science	3
TOTAL (MINIMUM) CREDITS FOR ARTS AND SCIENCES COMPONENT	30
PROFESSIONAL COMPONENT	CREDIT HOURS
Minimum of 15 upper-level credits; a minimum of 9 upper-level credits must be in the Technology Management Core or Professional Electives	
▶ Professional Core	
General Management	
Leadership	
Accounting	
Computer Applications	
Project Management	
▶ Technology Management Core	
Technology and Society	
Engineering Economics	
Introduction to Energy Utilization	
TECH 490 Technology Management Capstone: Integrated Technology Assessment ^①	
▶ Professional Component Electives	
Approved technology-related courses; includes 15 credits in the concentration area. ^②	
TOTAL (MINIMUM) CREDITS FOR PROFESSIONAL COMPONENT	45
ADDITIONAL CREDIT COMPONENT	CREDIT HOURS
Minimum of 6 upper-level credits	
▶ Any Collegiate-Level Study	
May include any excess credit in Arts and Sciences, Business, or any approved free elective area	
▶ Information Literacy	1
TOTAL CREDITS FOR ADDITIONAL CREDIT COMPONENT	45
TOTAL DEGREE CREDITS REQUIRED	120

^① Fifteen credits of Professional Component Electives must be in one of the following areas: Electrical Technology, Information Technology, Nuclear Technology, Renewable Energy Technology

^② TECH 490 Technology Management Capstone: Integrated Technology Assessment is the required capstone course and must be taken through Excelsior College and cannot be transferred in.

BACHELOR OF SCIENCE IN TECHNOLOGY

The Bachelor of Science in Technology program focuses on preparing students for positions in technology-related industries such as nuclear, energy, computer, electronics, and electrical. The program is designed specifically to advance job skills by ensuring a breadth of knowledge in technology concepts as well as a depth of understanding and skill in a chosen concentration area. Specifically, the program has identified five technical areas of focus that provide students with a broad professional and technical foundation in the various functional components of technology. The areas of focus are a group of related college-level courses within a technical component that combine depth and breadth of study in a recognized math/science-based technology discipline. The goal of the degree program in specific areas of focus is to foster the ability of students to apply what they have learned within the degree program to the real-world contexts of a technology-based industry.

The five areas of focus are:

- ▶ **Computer Technologies**
 - ▶ **Electromechanical Technologies**
 - ▶ **Electronic/Instrumentation Technologies**
 - ▶ **Nuclear Technologies**
 - ▶ **Power Plant Technologies**
-

Student progress within the degree program is based on the demonstration of proficiency, and is attainable through multiple, flexible pathways—offering course-based, prior learning assessment, and credit aggregation pathways to degree completion. In this way, the program is customizable and tailored to each student's need and learning style.

Program (Student) Outcomes

The outcomes are geared toward providing students with a foundational knowledge of technology in a specific concentration area and provide an opportunity for advancement in the technology industry. Upon completion of the degree program, students will be able to:

1. Demonstrate the ability to understand and use quantitative expressions in the natural sciences.
2. Demonstrate the application of algebra and higher mathematics to problem solving in technology areas.
3. Demonstrate proficiency in oral and written communications.
4. Demonstrate an ability to understand professional, ethical, and social responsibilities, including the impacts of culture, diversity, and interpersonal relations.
5. Demonstrate computer usage in the concentration area, including technical problem solving in the global environment.
6. Demonstrate the ability to identify, analyze, and solve problems in the concentration area.

Areas of Focus Outcomes

The Bachelor of Science in Technology program allows you to earn a technology degree with an area of focus from one of five technical areas.

Computer Technologies

An area of focus in computer technologies emphasizes training and preparing students to stay up-to-date with the rapidly changing technology environment. The computer technologies concentration is a technical discipline centered on the design, assembly, testing, and maintenance of computer circuitry and peripheral hardware. The concentration also emphasizes the design, development, operation, and troubleshooting of computer, database, and network systems. The computer technologies outcomes are geared toward providing students with a foundational knowledge of computer technologies in a wide variety of subject areas and preparing students for positions including circuit design engineer, hardware technician, software developer, database specialist, or network engineer. Upon successful completion of the Excelsior College Bachelor of Science in Technology with a Computer Technologies area of focus, the student will be able to:

1. Identify, formulate, and solve computer technology problems including the specification, operation, and troubleshooting of computer systems.
2. Demonstrate an ability to design, fabricate, and test systems containing computer hardware and software components.

Electromechanical Technologies

An area of focus in electromechanical technologies focuses on training and preparing the students with the knowledge in mechanical technology along with electrical and electronic circuits. It is centered on design, assembly, testing, maintenance, and upgrading of electronic and computer integrated mechanical components and systems, such as automated manufacturing tools and engineering service equipment. The electromechanical technologies' outcomes are geared towards providing students with fundamental as well as applied knowledge in automated, servo-mechanical, or electromechanical tools, equipment, and processes. These will prepare the students for positions in operating, repairing, and upgrading of unmanned submarines, aircraft, robots, or such automated equipment. Upon successful completion of the Excelsior College Bachelor of Science in Technology with an Electromechanical Technologies concentration, the student will be able to:

1. Use electrical/electronic devices, computers, and instrumentation for applied design, operation, analysis, and troubleshooting of electromechanical systems.
2. Use applied mechanics, strength of materials, engineering materials and standards, and fluid mechanics for applied design, analysis, operation, and troubleshooting of electromechanical systems.

Electronic/Instrumentation Technologies

An area of focus in electronic/instrumentation technologies emphasizes training and preparing the students with the knowledge and practical skills in electrical/electronic circuits and process instrumentation. It is centered on design, assembly, testing, maintenance, and upgrading of electrical and electronic components and systems used in analytical instruments and measurements, medical technology, communications, and industrial process control. The electronic/instrumentation technologies' outcomes are geared towards providing students with fundamental as well as applied knowledge in AC, DC, and digital circuits, microprocessors, and programmable controllers. These will prepare the students for positions in operating, repairing, and upgrading process instrumentation tools, equipment, and systems. Upon successful completion of the Excelsior College

Associate in Science in Technology with an Electronic/Instrumentation Technologies concentration, the student will be able to:

1. Design, prototype, fabricate, calibrate, test, maintain, and upgrade electronic instrumentation equipment or processes.
2. Install, update, and configure instrumentation software, industrial control and automation programs, and enterprise resource software.
3. Assist engineers and researchers in testing and designing advanced electronic instrumentation tools, equipment, or processes.
4. Apply the concepts of automatic control, measurements, and sensor selection for the operation and testing of continuous and discrete systems.

Nuclear Technologies

An area of focus in nuclear technologies emphasizes preparing students for technology-related positions in the nuclear industry. The nuclear technologies concentration is a technical discipline centered on design, materials, operations, and maintenance associated with radiation shielding, radiation detection instrumentation, and emergency planning for nuclear research and power generation facilities. The nuclear technologies outcomes are geared towards providing students with a foundational knowledge of nuclear technologies in support of potential advancement in the nuclear industry. Upon completion of the Excelsior College Bachelor of Science in Technology with an area of focus in Nuclear Technologies, the students will be able to:

1. Apply the concepts of reactor chemistry, reactor systems, nuclear materials, and instrumentation to the operation and design of nuclear systems and processes.
2. Apply the concepts of radiation protection, radiological science, radiation measurement and shielding, and instrumentation for the measurement and shielding, and instrumentation for the design, operation, and maintenance of radiological safety systems.

Power Plant Technologies

An area of focus in power plant technologies focuses on preparing students for technology related positions at power plants. The power plant technologies concentration is a technical discipline centered on the design, materials, operations, and maintenance associated with power generation facilities. The power plant technologies outcomes are geared towards providing students with a foundational knowledge of power plant operations in support of potential advancement in the nuclear industry. Upon completion of the Excelsior College Bachelor of Science in Technology with an area of focus in power plant technologies, the students will be able to:

1. Describe the theories in power plant operations, turbine and generator operations, and power plant instrumentation.
2. Identify and use appropriate methods for installation, maintenance, testing, and troubleshooting of power plant mechanical and electrical equipment.

Degree Requirements

The Bachelor of Science in Technology requires a minimum of 120 credits distributed as follows:

- ▶ 60 credits minimum required in the arts and sciences component
- ▶ 48 credits minimum required in the technology component
- ▶ 12 credits required in the free elective component (to include information literacy)

Arts and Sciences Component (60 credits)

The Bachelor of Science in Technology requires a minimum of 60 credits in the arts and sciences distributed as follows:

A. Humanities and Social Science/History

At least 24 credits must be earned in humanities and social sciences/history and are distributed as follows:

1. *Communications*

At least 9 credits must be earned in communications, including 6 credits to satisfy the written English requirement [ENGx111 English Composition, ENG 101 English Composition, ENG 102 Composition II, ENG 201 Writing for the Professions, TECH 200 Technical Writing] (see page 3). Courses in

speech, technical writing, or a similar course either in written or oral communications are applicable toward the communications requirement.

2. *Humanities*

At least 6 credits must be earned in humanities, including a course in ethics [BUS 323 Business Ethics]. Humanities subjects include, but are not limited to, advanced writing, literature, foreign languages, religion, philosophy, art, and music.

B. Social Sciences/History

At least 9 credits must be earned in social sciences/history. Social sciences/history subjects include, but are not limited to, political science, anthropology, economics, geography, history, psychology, and sociology.

C. Natural Sciences

At least 9 credits must be earned in natural sciences. Some sample natural science courses are biology, chemistry, astronomy, oceanography, and geology.

D. Mathematics

At least 12 credits must be earned in mathematics at the level of College Algebra or above [MAT 116 Precalculus Algebra, MAT 118 Trigonometry, TECH 201–202 Foundations of Technology Problem Solving I – II].

E. Arts and Sciences Electives

The remaining 15 credits needed to satisfy the 60-credit requirement may be earned in any area of the arts and sciences.

Technology Component (48 credits)

The Bachelor of Science in Technology requires a grade of C or better for applicable credit, and a minimum of 48 credits in technology distributed as follows:

A. Area of Focus

At least 24 credits, including 9 upper-level credits, must be earned in a chosen area of focus. See page 15–18 for a list of sample focus area subjects (the Integrated Technology Assessment is part of the area of focus.).

1. *Integrated Technology Assessment Capstone* [TECH 495 Integrated Technology Assessment (capstone)]—the capstone course is required and must be taken through Excelsior College and cannot be transferred in.

B. Technical Electives

A maximum of 24 credits in technical electives, including 6 upper-level credits, may be applied toward the Bachelor of Science in Technology. This includes 3 credits in computer applications or computer programming [IT 221 **Introduction to Computers**]. See pages 15–18 for a list of sample technical electives for each concentration.

C. Level Requirement

Of the 48 credits required for the technology component, at least 15 credits must be upper level (9 upper-level credits in the area of focus and 6 upper-level credits in technical electives). A course is generally considered upper level if it is offered at the junior or senior level and clearly not introductory in content. Courses taken at two-year institutions may not be used to satisfy upper-level requirements. The acceptance of coursework for credit toward the upper-level requirement is subject to faculty review.

Free Elective Component (12 credits)

The Bachelor of Science in Technology allows room for up to 12 credits in free electives. Applied to this component is the 1 credit for Excelsior College's information literacy requirement [INL 102 **Information Literacy**]. See page vi or visit our website for more information about information literacy.

Degree-Specific Policy

Time Limit on Courses and Exams

Because of the rapidly changing nature of technology, Excelsior College has established a time-related restriction on the application of credit from previous computer- and electronics-related coursework. To meet this requirement, relevant coursework must have been completed more recently than 10 years prior to entrance into the Bachelor of Science in Technology, with the exception of Circuit Theory I and Circuit Theory II. The time limit may be appealed with verification of appropriate and current professional and/or academic experience.



Bachelor of Science in Technology

120
CREDITS

ARTS AND SCIENCES COMPONENT	CREDIT HOURS
▶ Communications Must include 6 credits in the Written English Requirement	9
▶ Humanities	3
▶ Ethics	3
▶ Social Sciences/History	9
▶ Natural Sciences	9
▶ Mathematics At the level of College Algebra or above	12
▶ Arts and Sciences Electives	15
TOTAL CREDITS FOR ARTS AND SCIENCES COMPONENT	60
TECHNOLOGY COMPONENT	CREDIT HOURS
▶ Areas of Focus 24 credits must be earned in one of the areas of focus listed below: TECH 495 Integrated Technology Assessment (capstone) is the required capstone course. ①	24
Computer Technologies	
Electromechanical Technologies	
Electronic/Instrumentation Technologies	
Nuclear Technologies	
Power Plant Technologies	
▶ Technical Electives Must include one course in computer applications or programming.	24
TOTAL CREDITS FOR TECHNOLOGY COMPONENT 15 credits must be upper level, including 9 credits in the area of focus	48
FREE ELECTIVE COMPONENT	CREDIT HOURS
▶ Must include Information Literacy Requirement	1
TOTAL CREDITS FOR FREE ELECTIVE COMPONENT	12
TOTAL DEGREE CREDITS REQUIRED	120

① TECH 495 Integrated Technology Assessment is the required capstone course and must be taken through Excelsior College. It cannot be transferred in.

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING TECHNOLOGY

The Bachelor of Science in Electrical Engineering Technology degree program focuses on preparing students for electrical and allied engineering technology positions in technology-related industries such as electronics, electrical power, semiconductors and computers, and nanotechnology. The program is designed specifically to advance job skills by ensuring a breadth of knowledge in technology concepts as well as a depth of understanding and skill in a chosen concentration area. Specifically, the program has three technical concentrations that provide students with a broad professional and technical foundation in the various functional components of electrical engineering technology. Each concentration is a group of related college-level courses within electrical engineering technology that combines depth and breadth of study in a recognized math/science-based technology discipline. The goal of the degree program in specific concentrations is to foster the ability of students to apply what they have learned within the degree program to the real-world contexts of a technology-based industry. The three concentrations are: ► **Electronics** ► **Nanotechnology** ► **Power Systems**

Student progress within the degree program is based on the demonstration of proficiency, and is attainable through multiple, flexible pathways—offering course-based, prior learning assessment, and credit aggregation pathways to degree completion. In this way, the program is customizable and tailored to each student’s need and learning style.

The Bachelor of Science in Electrical Engineering Technology is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org, telephone: 410-347-7700. ABET is a specialized accrediting agency recognized by the Council for Higher Education Accreditation (CHEA).

Program Educational Objectives

As an Excelsior College bachelor’s-level electrical engineering technology graduate, within a few years of graduation, you are expected to:

1. Apply general and discipline-specific concepts and methodologies to identify, analyze, and solve technical problems in the electrical discipline.
2. Demonstrate an individual desire and commitment to remain technically current with, and adaptive to, changing technologies through continuous learning and self-improvement.
3. Demonstrate independent thinking, function effectively in team-oriented settings, and maintain a high level of performance in a professional/ industrial environment.
4. Communicate effectively in a professional/ industrial environment.
5. Perform ethically and professionally in business, industry, and society.
6. Demonstrate and utilize leadership principles in the field of electrical engineering technology.

Program (Student) Outcomes

Upon successful completion of the Excelsior College Bachelor of Science in Electrical Engineering Technology program, the graduate will be able to:

1. Select and apply appropriate knowledge, techniques, skills, and modern tools of mathematics, engineering technology, and natural sciences, including physics, to solve problems in the electrical engineering technology area.
2. Demonstrate the ability to test, measure, and provide quantitative expressions of natural science phenomena through methodologies including experimentation, observation, and accurate measurement.
3. Apply the fundamentals of algebra, trigonometry, and calculus to problem solving in electrical engineering technology areas.
4. Make oral technical presentations in Standard English using graphics and language appropriate to the audience.
5. Demonstrate proficiency in the written and graphical communication of technical information supported by appropriate technical references using Standard English.
6. Demonstrate a working knowledge of computer usage, including knowledge of one or more computer languages or documentation of the use of one or more computer software packages for technical problem solving appropriate to the electrical engineering technology discipline.
7. Demonstrate technical competency in the core electrical engineering technologies including electronics, circuit analysis, and digital systems, and in the student’s chosen concentration such as electronics, power systems, or nanotechnology.

8. Integrate knowledge of the functional areas of electrical engineering technology from a variety of resources.
9. Demonstrate the ability to analyze, apply design concepts, and implement systems as appropriate to electrical engineering technology and consider their societal and global impact.
10. Participate effectively in groups, as a member or leader, and apply project management techniques as appropriate to complete assignments.
11. Demonstrate understanding and commitment to professional, ethical, and social responsibilities, including the effects of culture, diversity, and interpersonal relations.
12. Demonstrate a commitment and ability to continue to engage in self-directed continuing professional development.
13. Demonstrate a commitment to quality, timeliness, and continuous improvement.

Degree Requirements

The Bachelor of Science in Electrical Engineering Technology requires a minimum of **124 credits** distributed as follows:

- ▶ **60 credits** minimum required in the arts and sciences component
- ▶ **57 credits** minimum required in the electrical engineering technology component
- ▶ **7 credits** required in the free elective component (to include information literacy)

Arts and Sciences Component (60 credits)

The distribution requirement ensures basic college-level competence in three arts and sciences areas: humanities, social sciences/history, and natural sciences/mathematics.

A. Humanities and Social Sciences/History

At least 24 credits must be earned in the humanities and social sciences/history and are distributed as follows:

1. *Communications*

At least 9 credits must be earned in communications courses, including 6 credits to satisfy the written English requirement [ENGx111 **English Composition**, ENG 101

English Composition, ENG 102 **Composition II**, ENG 201 **Writing for the Professions**]. Courses in speech, written composition, technical writing, or similar courses in either written or oral communications are applicable toward the communications requirement.

2. *Ethics*

At least 3 credits must be earned in ethics [BUS 323 **Business Ethics**].

3. *Humanities Electives*

At least 3 credits must be earned in a humanities elective such as art, music, literature, foreign language, philosophy, and speech.

4. *Social Sciences/History*

At least 9 credits must be earned in subjects such as sociology, economics, history, psychology, and anthropology.

B. Mathematics and Natural Sciences

Students are required to complete at least 24 semester hours of credit in the combined areas of mathematics and natural sciences, with at least 12 credit hours in math at the level of college algebra or above [MAT 116 **Precalculus Algebra**, MAT 118 **Trigonometry**], including Calculus I [TECH 201 **Foundations of Technology Problem Solving I**], Calculus II [TECH 202 **Foundations of Technology Problem Solving II**], and Differential Equations [TECH 202 **Foundations of Technology Problem Solving II**]^①.

There is no minimum credit hour requirement for natural sciences. Rather, students must complete specific required courses in the natural sciences: Physics I, Physics II, and Chemistry I (with at least one physics lab) [PHYS 201 **Physics I**, PHYS 203 **Physics II**, PHYS 202 **Physics I Laboratory**, PHYS 204 **Physics II Laboratory**, CHE 101 **General Chemistry I** or equivalent].

C. Arts and Sciences Electives

The remaining 12 credits needed to satisfy the 60-credit requirement may be earned in any arts and sciences subjects.

^① TECH 202 **Foundations of Problem Solving II** satisfies Calculus II and Differential Equations.

Electrical Engineering Technology Component (57 credits)

The electrical engineering technology component ensures college-level competence in the major functional areas of electrical engineering technology. A grade of C or better is required for applicable credit.

A. Core Requirements

The following core requirements must be completed:

- ▶ DC Circuits
[ELEC 152 Circuit Theory I]
- ▶ AC Circuits
[ELEC 153 Circuit Theory II]
- ▶ Electronics I
[ELEC 160 Electronics I]
- ▶ Electronics II
[ELEC 161 Electronics II]
- ▶ Digital Electronics
[ELEC 201 Digital Electronics]
- ▶ Microprocessors
[ELEC 202 Microprocessors]
- ▶ Computer Programming
[IT 210 Object-Oriented Programming]
- ▶ Project Management
[IT 390 Project Management]
- ▶ Integrated Technology Assessment (capstone)
[ELEC 495 Integrated Technology Assessment (capstone)]—The capstone course is required and must be taken through Excelsior College. It cannot be transferred in.
- ▶ Four labs from the following core courses must be completed:
 - ▶ DC Circuits
 - ▶ AC Circuits, Electronics I
 - ▶ Electronics II
 - ▶ Digital Electronics, Microprocessors

B. Concentration Requirements

One of the following concentrations must be declared:

- ▶ **Electronics**
- ▶ **Nanotechnology**
- ▶ **Power Systems**

Concentrations

Electronics

A concentration in Electronics focuses on training and preparing students to stay up-to-date with the rapidly changing electronics hardware and software technology environment. This concentration is a technical discipline centered on the analysis, design, assembly, testing, upgrading, and maintenance of electronics, computers, and communications hardware. The concentration also emphasizes the analysis, design, development, operation, and troubleshooting of control systems, software, and computer-based process controls. This concentration's outcomes are geared toward providing students with a foundational knowledge of electronics hardware and software in a wide variety of subject areas and preparing students for positions including circuit design engineer, hardware technician, communications engineer, software developer, or network engineer. Upon successful completion of the Excelsior College Bachelor of Science in Electrical Engineering Technology with an Electronics concentration, the student will be able to:

1. Analyze and design different types of digital and analog electronic communication systems.
2. Design, integrate, and analyze digital and analog control systems.
3. Use high-level computer languages to develop techniques for designing and modeling electronic systems.

Requirements

Minimum of 15 credits, including 9 upper-level.
At least three courses must have labs.

Concentration Requirements

- ▶ Electronic Communications
[ELEC 331 Digital and Analog Communications]
- ▶ Advanced Digital Electronics
[ELEC 306 Advanced Digital Design]
- ▶ Data Communications
[IT 250 Business Data Communications]
- ▶ Control Systems
[ELEC 321 Control Systems]
- ▶ Microprocessors II
[ELEC 307 Microcontrollers]

Nanotechnology

A concentration in Nanotechnology focuses on training and preparing students to stay up-to-date with the rapidly changing micro- and nano-electronics R&D and manufacturing, nano-materials, and nano-medicine technology environment. This concentration is a technical discipline centered on the analysis, design, assembly, testing, upgrading, and maintenance of nanotechnology processes and equipment, developing highly functional nano-materials, and grasping/shaping societal implications of nanotechnology. This concentration's outcomes are geared toward providing students with a foundational knowledge of nanotechnology processes, equipment, and hardware in a wide variety of subject areas and preparing students for positions including semiconductor and nano-electronics manufacturing engineer, nanotechnology hardware technician, or software developer for nanotechnology processes. Upon successful completion of the Excelsior College Bachelor of Science in Electrical Engineering Technology with a Nanotechnology concentration, the student will be able to:

1. Identify, analyze, and discuss the processes and equipment used in nanotechnology fabrication.
2. Identify and discuss nanotechnology applications and their societal and ethical implications.
3. Analyze the relationship between the material scale (nanostructure) and the properties/functionality of materials.

Requirements

Minimum of 15 credits, including 9 upper-level. At least three courses must have labs.

Concentration Requirements

- ▶ Introduction to Nanotechnology
[ELEC 305 Introduction to Nanotechnology]
- ▶ Basic Nanofabrication Process
[ELEC 310 Basic Nanofabrication Process]
- ▶ Nanotechnology Process Equipment
[ELEC 410 Nanotechnology Process Equipment]
- ▶ Introduction to Nanofabrication Manufacturing Technology
[ELEC 415 Introduction to Nanofabrication Manufacturing Technology]
- ▶ Micro-electro-mechanical Systems (MEMS)
[ELEC 420 Micro-Electro Mechanical Systems]

Power Systems

A concentration in Power Systems focuses on training and preparing students to stay up-to-date with the rapidly modernizing power electronics and power systems technology environment. This concentration is a technical discipline centered on the analysis, design, assembly, testing, upgrading, and maintenance of DC/AC power conversion systems, electric power generation and distribution, and power control technologies. The concentration also emphasizes the analysis, design, development, operation, and troubleshooting of single-phase and three-phase electric motors and electric machines, data acquisition, and instrumentation. This concentration's outcomes are geared towards providing students with a foundational knowledge of electric power systems in a wide variety of subject areas and preparing students for positions including power electronics design engineer, electrical power generation and grid maintenance technician, HVDC maintenance engineer, or instrumentation engineer. Upon successful completion of the Excelsior College Bachelor of Science in Electrical Engineering Technology with a Power Systems concentration, the student will be able to:

1. Identify, analyze, and discuss methods used for generation, transmission, and control of electric power.
2. Design, integrate, and analyze DC/AC power conversion systems and related instrumentation.
3. List and describe techniques for analysis and design of power electronics systems.

Requirements

Minimum of 15 credits, including 9 upper-level. At least three courses must have labs.

Concentration Requirements

- ▶ Programmable Logic Controllers
[ELEC 210 Programmable Logic Controllers]
- ▶ Generation and Transmission of Electric Power
[ELEC 360 Generation and Transmission of Electric Power]
- ▶ Power Electronics
[ELEC 350 Power Electronics]
- ▶ Electrical Machines/Energy Conversion
[ELEC 345 Electrical Machines]
- ▶ Instrumentation and Data Acquisition
[ELEC 370 Instrumentation and Data Acquisition]

A. Electrical Engineering Technology Electives

Any remaining credits in the electrical engineering technology component may be satisfied by approved electrical/computer technology electives. Please note that only two of these electives may be approved computer courses. Please check with your academic advisor for approval prior to registering for electrical engineering technology electives.

B. Laboratory Requirement

The degree requires at least eight laboratories. Of those eight, one physics laboratory is required in the natural sciences/mathematics area and the remaining seven must be in the electrical engineering technology component. Of the seven technology labs, four must be in the following electrical engineering technology core content areas: DC Circuits, AC Circuits, Electronics I, Electronics II, Digital Electronics, and Microprocessors. The remaining three laboratories must be in your area of concentration.

Students must be able to demonstrate competence in the use of standard design practices, tools, techniques, and computer hardware and software appropriate to the electrical discipline and the program goals.

C. Level Requirement

Of the 57 credits required for the electrical engineering technology component, at least 16 must be upper level. Nine of the upper-level credits must be in the area of concentration. A course is generally considered upper level if it is offered at the junior or senior level and clearly not introductory in content. Courses taken at two-year institutions may not be used to satisfy upper-level requirements. No upper-level credit is awarded for introductory coursework in computer languages. The acceptance of coursework for credit toward the upper-level requirement is subject to faculty review.

A grade or "C" or higher is needed for all core requirements.

Free Elective Component (7 credits)

The Bachelor of Science in Electrical Engineering Technology allows room for up to 7 credits in free electives. Applied to this component is the 1 credit for Excelsior College's information literacy requirement [INL 102 **Information Literacy**]. See [page vi](#) or refer to our website for more information about information literacy.

You may earn the remaining 6 credits in any field of college study, including professional or technical subjects

as well as in the arts and sciences. A maximum of 2 credits in physical education activity courses may be applied to the degree.

Degree-Specific Policies

Policies and procedures that apply specifically to the Bachelor of Science in Electrical Engineering Technology follow. Refer to your [Student Policy Handbook](#) for academic and administrative policies that apply to all students and programs.

Time Limit on Courses and Exams

Due to the rapidly changing nature of technology, Excelsior College has established a time-related restriction on the application of certain subject areas meeting requirements in the Bachelor of Science in Electrical Engineering Technology. Previous computer- and electrical/electronic-related coursework must have been completed more recently than 10 years prior to entrance into the Bachelor of Science in Electrical Engineering Technology (except DC and AC Circuits). Please note that course content in these areas is subject to faculty approval. The time limit may be appealed with verification of appropriate and current professional and/or academic experience.

Time Limit for Degree Completion

Excelsior College degree programs are designed, within limits, to be completed at a student's own pace. However, students must make continuous progress toward their academic goals. Students will be dismissed if they do not complete the Bachelor of Science in Electrical Engineering Technology at the conclusion of 10 years from their entrance into the program. Students may seek an extension of the time limit by completing an appeal form, which will outline a plan for completion. Students must submit this appeal no less than one trimester before reaching the 10-year degree completion time limit.

Course Materials Policy

The faculty requires that students submit course materials for all math, science, and technology component courses taken outside of Excelsior College after enrollment in the program. Course materials should include graded homework, quizzes, tests, lab reports, papers, and other student work as appropriate. Course outlines/syllabi should be included as well. This material is required for curriculum review and accreditation purposes. Once we have received your transcript indicating completion of a course and the corresponding student work materials, credit for the course will be added to your evaluation.



Bachelor of Science in Electrical Engineering Technology

124
CREDITS

ARTS AND SCIENCES COMPONENT		CREDIT HOURS
▶ Communications Must include 6 credits in the Written English Requirement		9
▶ Humanities		3
▶ Ethics		3
▶ Social Sciences/History		9
▶ Mathematics and Natural Sciences		
Mathematics 12 credits at the level of college algebra and above, including Calculus I and II and Differential Equations		24
Natural Science Physics I, Physics II, and Chemistry I with at least one physics lab		
▶ Arts and Sciences Electives		12
TOTAL CREDITS FOR ARTS AND SCIENCES COMPONENT		60
ELECTRICAL ENGINEERING TECHNOLOGY COMPONENT		CREDIT HOURS
▶ Core Requirements		
DC Circuits	Microprocessors	
AC Circuits	Computer Programming	
Electronics I	Project Management	
Electronics II	ELEC 495 Integrated Technology Assessment (capstone) ^①	
Digital Electronics		
▶ Concentration Requirements One of the following concentrations must be declared (see page 33 for concentration requirements)		57
Electronics		
Nanotechnology		
Power Systems		
▶ Electrical Technology Electives		
▶ Lab Requirement Seven labs are required. ^②		
TOTAL CREDITS FOR TECHNOLOGY COMPONENT 16 credits must be upper level, including 9 credits in the concentration		57
FREE ELECTIVE COMPONENT		CREDIT HOURS
TOTAL CREDITS FOR FREE ELECTIVE COMPONENT Must include 1-credit Information Literacy Requirement		7
TOTAL DEGREE CREDITS REQUIRED		124

^① ELEC 495 Integrated Technology Assessment is the required capstone course and must be taken through Excelsior College. It cannot be transferred in.

^② Seven technology labs are required. Four must be from the following: DC Circuits, AC Circuits, Digital Electronics, Electronics I, Electronics II, Microprocessors. The other three must be in the concentration area.

BACHELOR OF SCIENCE IN CYBERSECURITY

The Bachelor of Science in Cybersecurity program is aligned with the academic requirements for cybersecurity set by the National Security Agency (NSA) and will provide students with the ability to enhance technical knowledge and skills in cybersecurity. The program is designed to prepare learners for cybersecurity-related jobs in the U.S. Cyber Command, the NSA's signal intelligence operations, the Federal Bureau of Investigation, law enforcement agencies, and corporate environments. As Excelsior is a Center for Academic Excellence in Information Assurance and Cyber Defense (CAE IA-CD), the program supports the belief of the NSA that cybersecurity should be integrated in all aspects of a person's career. The degree will prepare the student to take several industry certification exams such as CISP, CEH, Security+, Network+, CHFI, SSCP, and ESCP. Typical occupational areas associated with cybersecurity include incident response analyst, cyber compliance analyst, cyber threat management, cyber network operations planner, cyber systems analyst, systems administrator, and cyber systems and operations engineer.

The three concentrations are: ► **General** ► **Cyber Operations** ► **Health Care Cybersecurity**

Program Educational Objectives

1. Apply general and discipline-specific concepts and methodologies to identify, analyze and solve problems in the cyber technology discipline.
2. Demonstrate an individual desire and commitment to remain technically current with, and adaptive to, changing technologies through continuous learning and self-improvement.
3. Demonstrate independent thinking, function effectively in team-oriented settings, and maintain a high level of performance in a professional/industrial environment.
4. Communicate effectively in a professional/industrial environment.
5. Perform ethically and professionally in business, industry and society.
6. Attain increasing levels of responsibility and leadership in the cyber technology field.

Program (Student) Outcomes

1. Describe defensive network architecture that use multiple layers of protection.
2. Analyze technologies and processes that monitor, maintain, and protect the data of an institution.
3. Evaluate and apply Industry Tools to respond to cyber incidents.
4. Create and disseminate cyber security reports to stakeholders.
5. Conduct risk and vulnerability assessments of existing and proposed security systems.
6. Develop and implement organizational cybersecurity policies and procedures.
7. Demonstrate the ability to understand professional,

ethical, and social responsibility, including the effect of culture, diversity, and interpersonal relations.

8. Demonstrate proficiency in communicating technical information in formal reports, documentation, and oral presentations to users and information technology professionals.
9. Demonstrate a commitment to professional development and to continue to engage in lifelong learning.

Degree Requirements

The Bachelor of Science in Cybersecurity requires 120 semester hours of credit distributed as follows:

- **60 credits** minimum required in the arts and sciences component
- **52 credits** minimum required in the cybersecurity component with at least 15 credits at the upper level
- **8 credits** maximum allowed in the free elective component (to include information literacy)

Arts and Sciences Component (60 credits)

The Bachelor of Science in Cybersecurity requires a minimum of 60 credits in the arts and sciences distributed as follows:

A. Humanities and Social Sciences

At least 24 credits must be earned in the humanities and social sciences and are distributed as follows:

1. *Communications*

At least 9 credits must be earned in communications courses, including 6 credits to satisfy the written English requirement [ENGx111 English Composition, ENG 101 English Composition, ENG 102 Composition II,

ENG 201 Writing for the Professions]. Courses in speech, written composition, technical writing, or similar courses in either written or oral communications are applicable toward the communications requirements.

2. *Ethics*

At least 3 credits must be earned in ethics [BUS 323 Business Ethics].

3. *Humanities Elective*

At least 3 credits must be earned in a humanities elective. Humanities subjects include, but are not limited to, advanced writing, literature, foreign languages, religion, philosophy, art, and music.

4. *Social Sciences/History*

At least 9 credits must be earned in such subjects as sociology, economics, history, psychology, and anthropology.

B. **Natural Sciences/Mathematics**

At least 15 credits must be earned in natural sciences/mathematics and include 3 credits in a natural science and the following four math courses:

- ▶ Discrete Math [TECH 205 Discrete Structures]
- ▶ Calculus I [TECH 201 Foundations of Technology Problem Solving I]
- ▶ Calculus II [TECH 202 Foundations of Technology Problem Solving II]
- ▶ Statistics [BUS 233 Business Statistics, MAT 201 Statistics]

Sample natural sciences subjects include biology, chemistry, geology, physics, and genetics.

C. **Arts and Sciences Electives**

At least 21 additional credits in any arts and sciences areas must be completed.

Cybersecurity Component (52 credits)

The Bachelor of Science in Cybersecurity requires a grade of C or better for applicable credit, and a minimum of 51 credits in the area of cybersecurity distributed as follows:

The following core requirements must be met:

- ▶ Microprocessors or Computer Architecture [CYS 203 Introduction to Microprocessors or IT 321 Computer Systems Architecture]
- ▶ Introduction to Cybersecurity [CYS 245 Introduction to Cybersecurity]
- ▶ Governance, Legal and Compliance [CYS 260 Governance, Legal and Compliance]
- ▶ Cybersecurity Defense in Depth [CYS 345 Cybersecurity Defense in Depth]
- ▶ Cyber Attacks and Defense [CYS 426 Cyber Attacks and Defense]
- ▶ Security Focused Risk Management [CYS 450 Security Focused Risk Management]
- ▶ Data Communications and Networking [IT 250 Business Data Communications]
- ▶ Operating Systems [IT 360 Operating Systems]
- ▶ Overview of Computer Security [IT 380 Overview of Computer Security]
- ▶ Network and Application Security [IT 403 Network and Application Security]
- ▶ Computer Forensics [IT 406 Computer Forensics]
- ▶ System Administration [IT 460 System Administration]
- ▶ Cybersecurity Capstone [CYS 496 Cybersecurity Capstone]

Concentrations

General

Recognizing that the cybersecurity field is continuously evolving, the Bachelor of Science in Cybersecurity program offers the general option concentration. This customizable concentration provides flexibility in designing students' area of specialization in order to meet ever-changing job demands and also to build upon student's current achievements. Students of this concentration can choose from approved technical electives to meet the degree requirements. Our courses cover a wide range of technical electives which help students stay competitive in today's job market. The courses for the program are as follows:

Requirements

Up to 15 credits.

Concentration Requirements

- ▶ Approved technical electives

Cyber Operations

Cyber Operations as part of cybersecurity is defined as organized activities in cyberspace to gather, prepare, disseminate, report, or process information to achieve a goal (Godwin III; et al.). The Cyber Operations concentration in the cybersecurity degree provides the learner the ability to specialize their skills on the front line of cybersecurity. The courses selected prepare the students to handle cyber incidents and respond to incidents that happen as part of a cyber team.

Requirements

Minimum of 15 credits.

Concentration Outcomes:

1. Identify fundamental security design principles that lead to system vulnerabilities.
2. Conduct exploits as part of an offensive cyber operation.
3. Apply fundamental security design principles during system design, development, and implementation to minimize vulnerabilities.

Concentration Requirements

- ▶ Programming
[IT 210 Object-Oriented Programming
or IT 240 Introduction to Programming]

- ▶ Introduction to Homeland Security
[CJ 125 Introduction to Homeland Security]
- ▶ Reverse Engineering
[CYS 400 Reverse Engineering]
- ▶ Secure Software Development
[CYS 470 Secure Software Development]
- ▶ Large-scale Cybercrime and Terrorism
[CYS 475 Large-scale Cybercrime and Terrorism]

Health Care Cybersecurity

Health Care as part of cybersecurity is a field that has no limit. With the growing number of patient records and the reliance of IT needs with the medical field, the adaptation of cybersecurity as it pertains to health care is a perfect fit. The Health Care concentration in the cybersecurity degree provides the learner the ability to specialize their skills as they pertain to health care. The courses selected prepare the students to handle cyber incidents and respond to incidents that happen as part of a cyberteam.

Requirements

Minimum of 15 credits.

Concentration Outcomes:

1. Evaluate and associate information systems and data within health care and lead other team members in the data analysis process.
2. Develop and implement security policies that pertain to health care.
3. Evaluate cybersecurity best practices within the health care field.

Concentration Requirements

- ▶ Introduction to Health Care Cybersecurity
[CYS 270 Introduction to Health Care Cybersecurity]
- ▶ Managing Health Care Technology
[CYS 435 Managing Health Care Technology]
- ▶ Foundations of Healthcare Management
[HSC 301 Foundations of Health Care Management]
- ▶ Data Analytics in Healthcare
[CYS 436 Data Analytics in Healthcare]
- ▶ Cybersecurity or Health Science elective

Level Requirement

Of the 52 credits required for the cybersecurity component, at least 15 must be upper level. No upper-level credit is awarded for introductory coursework in computer languages. A course is generally considered upper level if it is offered at the junior or senior level and clearly not introductory in content. Courses taken at two-year institutions may not be used to satisfy upper-level requirements. The acceptance of coursework for credit toward the upper-level requirements is subject to faculty review.

A grade of “C” or higher is needed for all core requirements.

Free Elective Component (8 credits)

The Bachelor of Science in Cybersecurity allows room for up to 8 credits in free electives. Applied to this component is the 1 credit for Excelsior College’s information literacy requirement [INL 102 Information Literacy]. See page vi or visit our website for more information about information literacy.

You may earn the remaining 7 credits in any field of college study, including professional or technical subjects as well as in the arts and sciences.

A maximum of 2 credits in physical education activity courses may be applied to the degree.

Degree-Specific Policies

Policies and procedures that apply specifically to the Bachelor of Science in Cybersecurity follow. Refer to your Student Policy Handbook for academic and administrative policies that apply to all students and programs.

Programming Language Cap

The College has placed a 9-credit cap on introductory programming language courses in the cybersecurity component, which includes the following languages:

- ▶ JAVA
- ▶ PYTHON
- ▶ Visual Basic
- ▶ C
- ▶ C++
- ▶ C#

No upper-level credit is awarded for coursework in introductory computer languages.

Credit for Vendor Examinations

Excelsior College awards credit for certain examinations from vendors/professional organizations such as Cisco, CompTIA, (ISC)², Microsoft, and the Project Management Institute. Subject to faculty approval, you may apply up to 21 credits from vendor certification examinations toward the Cybersecurity Component of your degree; additional credits from such examinations may apply toward the Free Elective Component. Please contact an academic advisor about the possibility of receiving college-level credit toward your degree requirements.

Time Limit on Courses and Exams

Due to the rapidly changing nature of technology, Excelsior College has established a time-related restriction on the application of credits applied to the Cybersecurity Component of the Bachelor of Science in Cybersecurity. To meet this requirement, relevant coursework must have been completed more recently than 5 years prior to entrance into the Bachelor of Science in Cybersecurity degree program. Please note that course content in these areas is subject to faculty approval. The time limit may be appealed by completing an appeal form which verifies appropriate and current professional and/or academic experience.

Time Limit for Degree Completion

Excelsior College degree programs are designed, within limits, to be completed at a student’s own pace. However, students must make continuous progress toward their academic goals. Students will be dismissed if they do not complete the Bachelor of Science in Cybersecurity at the conclusion of 7 years from their entrance into the program. Students may seek an extension of the time limit by completing an appeal form, which will outline a plan for completion. Students must submit this appeal no less than one trimester before reaching the 7-year degree completion time limit.



Bachelor of Science in Cybersecurity

120
CREDITS

ARTS AND SCIENCES COMPONENT			CREDIT HOURS
▶ Communications Must include 6 credits in the Written English Requirement			9
▶ Humanities			3
▶ Ethics			3
▶ Social Sciences/History			9
▶ Mathematics and Natural Sciences			15
Natural Science			
Discrete Math			
Calculus I			
Calculus II			
▶ Arts and Sciences Electives May be taken from any areas of humanities, social sciences/history, natural sciences, or math			21
TOTAL CREDITS FOR ARTS AND SCIENCES COMPONENT			60
CYBERSECURITY COMPONENT			CREDIT HOURS
Microprocessors or Computer Architecture	Security Focused Risk Management	Network and Application Security	52
Introduction to Cybersecurity	Data Communications and Networking	Computer Forensics	
Governance, Legal and Compliance	Operating Systems	System Administration	
Cybersecurity Defense in Depth	Overview of Computer Security	CYS 496 Cybersecurity Capstone ^①	
Cyber Attacks and Defense			
▶ Concentration Requirements One of the following concentrations must be declared (see page 38 for requirements)			52
General			
Cyber Operations			
Health Care Cybersecurity			
TOTAL CREDITS FOR CYBERSECURITY COMPONENT 15 CREDITS MUST BE UPPER LEVEL			52
FREE ELECTIVE COMPONENT			CREDIT HOURS
Must include 1-credit Information Literacy Requirement			8
TOTAL CREDITS FOR FREE ELECTIVE COMPONENT			8
TOTAL DEGREE CREDITS REQUIRED			120

^① CYS 496 Cybersecurity Capstone is the required capstone course. It must be taken through Excelsior College and cannot be transferred in.

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

The Bachelor of Science in Information Technology program focuses on preparing students to stay at the forefront of the rapidly changing technical environment, and training students to be the leaders in the Information Technology field. To accomplish this goal, the program is centered on the fundamental concepts, skills, applications, and practices across a wide variety of information technology domains, including software and web development, computer systems, database management, data communication, information security, and project management. Built upon this core knowledge foundation, our program has identified three technical concentrations: **Cybersecurity Technology**, **Information Security**, and **Network Operations**. These concentrations represent the high-demand job areas in the IT industry, and equip students with in-depth specialties in order for them to excel in the workplace. To allow students the flexibility to design a study plan that meets their career goals, a **General Option** concentration is also available, in which students can compile their own course milestones toward the degree.

In addition to the necessary technical knowledge and skills, the strong liberal arts component of our program helps students maintain academic breadth and prepare students with quantitative, communication, and interpersonal skills, as well as with an awareness of business ethics and social responsibility. Our goal is to prepare students to be critical thinkers and problem solvers, and to become committed lifelong learners.

Student progress within the degree program is based on the demonstration of proficiency, and is attainable through multiple, flexible pathways—offering course-based, direct assessment, and credit aggregation pathways to degree completion. In this way, the program is customizable and tailored to each student's need and learning style.

The four concentrations are:

► **Cybersecurity Technology** ► **General Option** ► **Information Security** ► **Network Operations**

The Bachelor of Science in Information Technology is accredited by the Computing Accreditation Commission of ABET, www.abet.org, telephone: 410-347-7700. ABET is a specialized accrediting agency recognized by the Council for Higher Education Accreditation (CHEA).

Program Educational Objectives

As an Excelsior College bachelor's-level information technology graduate, within a few years of graduation, you are expected to:

1. Apply general and discipline-specific concepts and methodologies to identify, analyze, and solve technical problems in the information technology discipline.
2. Demonstrate an individual desire and commitment to remain technically current with, and adaptive to, changing technologies through continuous learning and self-improvement.
3. Demonstrate independent thinking, function effectively in team-oriented settings, and maintain a high level of performance in a professional/industrial environment.
4. Communicate effectively in a professional/industrial environment.
5. Perform ethically and professionally in business, industry, and society.
6. Attain increasing levels of responsibility and leadership in the information technology field.

Program (Student) Outcomes

Upon successful completion of the Excelsior College Bachelor of Science in Information Technology program, the graduate will be able to:

1. Apply knowledge of computing and mathematics for problem solving in the field of information technology.
2. Demonstrate the ability to identify and analyze user needs to define and create appropriate computing requirements and solutions.
3. Demonstrate the ability to effectively select, evaluate, and integrate information technology-based solutions in a user environment.
4. Demonstrate the ability to participate effectively in groups or team projects.
5. Demonstrate an ability to understand professional, ethical, and social responsibilities, including the impacts of culture, diversity, and interpersonal relations.
6. Demonstrate proficiency in communicating technical information in formal reports, documentation, and oral presentations to users and information technology professionals.

7. Demonstrate the ability to identify and analyze the impacts of information technologies and computing on individuals, organizations, society, and the global community.
8. Demonstrate the ability to identify and apply current and emerging technologies and tools for information technologies solutions.
9. Demonstrate expertise in the core information technologies, including web technologies, database management, information management and security, object-oriented programming, computer architecture, systems architecture, operating systems, networking, and system administration.
10. Demonstrate the ability to analyze computing and information security requirements and risks, and apply the appropriate tools and techniques to protect organizational data assets in an ethically responsible manner.
11. Demonstrate the ability to apply best practices and standards for information technology applications.
12. Demonstrate the ability to assist in the creation of an effective project plan.
13. Demonstrate a commitment to professional development and to continue to engage in lifelong learning.

Degree Requirements

The Bachelor of Science in Information Technology requires 120 semester hours of credit distributed as follows:

- ▶ 60 credits minimum required in the arts and sciences
- ▶ 48 credits minimum required in the information technology component with at least 15 credits at the upper level
- ▶ 12 credits required in the free elective component (to include information literacy)

Arts and Sciences Component (60 credits)

The Bachelor of Science in Information Technology requires a minimum of 60 credits in the arts and sciences distributed as follows:

A. Humanities and Social Sciences

At least 24 credits must be earned in the humanities and social sciences and are distributed as follows:

1. Communications

At least 9 credits must be earned in communications courses, including 6 credits to satisfy the written English requirement [ENGx111 English Composition, ENG 101 English Composition, ENG 102 Composition II, ENG 201 Writing for the Professions]. Courses in speech, written composition, technical writing, or similar courses in either written or oral communications are applicable toward the communications requirements.

2. Ethics

At least 3 credits must be earned in ethics [BUS 323 Business Ethics].

3. Humanities Electives

At least 3 credits must be earned in humanities electives. Humanities subjects include, but are not limited to, advanced writing, literature, foreign languages, religion, philosophy, art, and music.

4. Social Sciences/History

At least 9 credits must be earned in such subjects as sociology, economics, history, psychology, and anthropology.

B. Natural Sciences/Mathematics

At least 12 credits must be earned in natural sciences/mathematics and include 3 credits in a natural science, a course in discrete mathematics [TECH 205 Discrete Structures], and one course from the following list:

1. Calculus I

[TECH 201 Foundations of Technology Problem Solving I]

2. Statistics and Probability

[BUS 233 Business Statistics, MAT 201 Statistics]

3. Quantitative Methods

[BUS 430 Quantitative Methods]

4. Finite Math

5. Mathematical Logic

Sample natural sciences subjects include biology, chemistry, geology, physics, and genetics.

C. Arts and Sciences Electives

At least 24 additional credits in any arts and sciences areas must be completed.

Information Technology Component (48 credits)

The Bachelor of Science in Information Technology requires a grade of C or better for applicable credit, and a minimum of 48 credits in the area of information technology distributed as follows:

Core Requirements

The following core requirements must be met:

- ▶ Object-Oriented Programming
[IT 210 Object-Oriented Programming]
- ▶ Data Communications and Networking
[IT 250 Business Data Communications]
- ▶ Computer Systems Architecture
[IT 321 Computer Systems Architecture]
- ▶ Operating Systems
[IT 360 Operating Systems]
- ▶ Database Concepts
[IT 370 Database Management Systems]
- ▶ Web Design and Development
[IT 371 Web Design and Development]
- ▶ Human-Computer Interaction
[IT 375 Human-Computer Interactive Design]
- ▶ Overview of Computer Security
[IT 380 Overview of Computer Security]
- ▶ Project Management
[IT 390 Project Management]
- ▶ System Administration
[IT 460 System Administration]
- ▶ Integrated Technology Assessment Capstone
[IT 495 Integrated Technology Assessment (capstone)]—The capstone course is required and must be taken through Excelsior College. It cannot be transferred in.

Level Requirement

Of the 48 credits required for the information technology component, at least 15 must be upper level. No upper-level credit is awarded for introductory coursework in computer languages. A course is generally considered upper level if it is offered at the junior or senior level and clearly not introductory in content. Courses taken at two-year institutions may not be used to satisfy upper-level requirements. The acceptance of coursework for credit toward the upper-level requirement is subject to faculty review.

A grade of “C” or higher is needed for all core requirements.

Concentrations

One of the following concentrations must be declared. See below for specific requirements for each Information Technology concentration. A minimum of 15 credits is required for each concentration.

- ▶ **Cybersecurity Technology**
- ▶ **General Option**
- ▶ **Information Security**
- ▶ **Network Operations**

Cybersecurity Technology

The Cybersecurity Technology concentration focuses on providing broad coverage on the technical, operational, and legal dimensions of cybersecurity. Students of this concentration will attain a holistic view of implementing effective cybersecurity programs appropriate to the environment. The curriculum focuses on areas such as organizational, network, application security issues as well as penetration testing, incident response, and digital forensics. This will enable students to utilize a variety of cybersecurity tools and techniques in protecting information assets in organizations. The Cybersecurity Technology concentration will prepare students to pursue careers in cybersecurity in positions such as security analyst, security architect, IT security coordinator, data protection analyst, incident responder, or penetration tester. Upon successful completion of the Excelsior College Bachelor of Science in Information Technology with a concentration in Cybersecurity Technology, the learner will be able to:

1. Apply cybersecurity best practices in managing various computing environments comprised of heterogeneous devices and services.
2. Define and protect data assets in organizations by mitigating risks and integrating business continuity.
3. Identify and analyze the impact of large scale cyber-crime incidents on international security and terrorism.

Concentration Requirements

Minimum of 15 credits

- ▶ Computer Forensics
[IT 406 Computer Forensics]
- ▶ Cyber Attacks and Defenses
[CYS 426 Cyber Attacks and Defenses]

- ▶ Business Continuity
[CYS 455 Business Security and Continuity]
- ▶ Network and Application Security
[CYS 403 Network and Application Security]
- ▶ Organizational Information Security
[CYS 401 Organizational Information Security]

General Option

Recognizing that the Information Technology field is continuously evolving, the Bachelor of Science in Information Technology program offers the general option concentration. This customizable concentration provides flexibility in designing students' area of focus in order to meet ever-changing job demands and also to build upon students' current achievements. Students of this concentration can choose from approved IT electives to meet the degree requirements. Our course offerings cover a wide range of IT specialties, which help students stay competitive in today's job market.

Concentration Requirements

- ▶ Approved IT Electives

Information Security

The Information Security concentration focuses on providing comprehensive knowledge in aspects of information security management and operations. This includes identifying and mitigating risk in computer networks and Web applications. The curriculum covers information security areas such as network, Web, digital forensics, information assurance management and cryptography. The information security concentration will prepare students to pursue careers in information security in positions such as Network Security Engineer, Security Analyst, IT Security Officer, or Data Security specialist. Upon successful completion of the Excelsior College Bachelor of Science in Information Technology with a concentration in Information Security, the learner will be able to:

1. Apply security principles toward the design and management of secure networks and Web applications.
2. Perform computer forensic analysis on network-based and stored information.
3. Integrate information assurance principles into the management of networks and Web applications.

Concentration Requirements

Minimum of 15 credits

- ▶ Network Security
[IT 402 Network Security]
- ▶ Web Security
[IT 404 Web Security]
- ▶ Computer Forensics
[IT 406 Computer Forensics]
- ▶ Information Assurance Management
[IT 408 Information Assurance Management]
- ▶ Fundamentals of Cryptography
[IT 410 Fundamentals of Cryptography]

Network Operations

The Network Operations concentration focuses on providing students with the critical knowledge and skills in telecommunications and networking, and preparing students for careers including, but not limited to, network technician, network administrator, network engineer, and network architect. Our curriculum incorporates courses in network design and network project management, network operating systems and network administration, wireless systems, RFID technology, and network security, which is designed to guide students through the process of planning, designing, managing, and securing network and telecommunications systems. Upon successful completion of the Excelsior College Bachelor of Science in Information Technology with a Network Operation concentration, the student will be able to:

1. Apply advanced networking techniques and network operating system principles toward the operation of a robust network.
2. Integrate wireless technology solutions into the network infrastructure.
3. Apply telecommunication management principles into the management of networks.

Concentration Requirements

Minimum of 15 credits

- ▶ Advanced Networking
[IT 422 Advanced Networking]
- ▶ Network Operating Systems
[IT 424 Network Operating Systems]
- ▶ Wireless Technology
[IT 426 Wireless Technology]

- ▶ Telecommunication Management
[IT 428 Telecommunications Management]
- ▶ Network Systems Design and Management
[IT 430 Network Systems Design and Management]

Free Elective Component (12 credits)

The Bachelor of Science in Information Technology allows room for up to 12 credits in free electives. Applied to this component is the 1 credit for Excelsior College's information literacy requirement [INL 102 Information Literacy]. See [page vi](#) or visit our website for more information about information literacy.

You may earn the remaining 11 credits in any field of college study, including professional or technical subjects as well as in the arts and sciences.

A maximum of 2 credits in physical education activity courses may be applied to the degree.

Degree-Specific Policies

Policies and procedures that apply specifically to the Bachelor of Science in Information Technology follow. Refer to your Student Policy Handbook for academic and administrative policies that apply to all students and programs.

Programming Language Cap

The College has placed a 9-credit cap on introductory programming language courses in the information technology component, which includes the following languages:

- ▶ JAVA
- ▶ PYTHON
- ▶ Visual Basic
- ▶ C
- ▶ C++
- ▶ C#

No upper-level credit is awarded for coursework in introductory computer languages.

Credit for Vendor Examinations

Excelsior College awards credit for certain examinations from vendors/professional organizations such as Cisco, CompTIA, (ISC)², Microsoft, and the Project Management Institute. Subject to faculty approval, you may apply up to 21 credits from vendor certification examinations toward the Information Technology Component of your degree; additional credits from such examinations may apply toward the Free Elective Component. Please contact an academic advisor about the possibility of receiving college-level credit toward your degree requirements.

Time Limit on Courses and Exams

Due to the rapidly changing nature of technology, Excelsior College has established a time-related restriction on the application of credits applied to the Information Technology Component of the Bachelor of Science in Information Technology. To meet this requirement, relevant coursework must have been completed more recently than 5 years prior to entrance into the Bachelor of Science in Information Technology degree program. Please note that course content in these areas is subject to faculty approval. The time limit may be appealed by completing an appeal form which verifies appropriate and current professional and/or academic experience.

Time Limit for Degree Completion

Excelsior College degree programs are designed, within limits, to be completed at a student's own pace. However, students must make continuous progress toward their academic goals. Students will be dismissed if they do not complete the Bachelor of Science in Information Technology at the conclusion of 7 years from their entrance into the program. Students may seek an extension of the time limit by completing an appeal form, which will outline a plan for completion. Students must submit this appeal no less than one trimester before reaching the 7-year degree completion time limit.

Course Materials Policy

The faculty requires that students submit course materials for all math, science, and technology component courses taken outside of Excelsior College after enrollment in the program. Course materials should include graded homework, quizzes, tests, lab reports, papers, and other student work as appropriate. Course outlines/syllabi should be included as well. This material is required for curriculum review and accreditation purposes. Once we have received your transcript indicating completion of a course and the corresponding student work materials, credit for the course will be added to your evaluation.



Bachelor of Science in Information Technology

120
CREDITS

ARTS AND SCIENCES COMPONENT	CREDIT HOURS
▶ Communications Must include 6 credits in the Written English Requirement	9
▶ Humanities elective	3
▶ Ethics	3
▶ Social Sciences/History	9
▶ Mathematics and Natural Sciences	
Natural Science	
Discrete Math	12
One course from the following: Calculus I, Statistics and Probability, Quantitative Methods, Finite Math, or Mathematical Logic	
▶ Arts and Sciences Electives	24
TOTAL CREDITS FOR ARTS AND SCIENCES COMPONENT	60
INFORMATION TECHNOLOGY COMPONENT	CREDIT HOURS
▶ Core Requirements	
Object-Oriented Programming ^①	
Computer Systems Architecture ^①	
Operating Systems ^①	
Database Concepts	
Data Communications and Networking	
Web Design and Development	
Human-Computer Interaction	
Overview of Computer Security	
Project Management	
System Administration	
IT 495 Integrated Technology Assessment (capstone) ^②	
▶ Concentration Requirements One of the following concentrations must be declared (see page 43 for requirements)	
Cybersecurity Technology	
General Option	
Information Security	
Network Operations	
TOTAL CREDITS FOR TECHNOLOGY COMPONENT 15 credits must be upper level	48
FREE ELECTIVE COMPONENT	CREDIT HOURS
Must include 1-credit Information Literacy Requirement	12
TOTAL CREDITS FOR FREE ELECTIVE COMPONENT	12
TOTAL DEGREE CREDITS REQUIRED	120

① The core requirements should be completed in the order listed.

② IT 495 Integrated Technology Assessment (capstone) is the required capstone course. It must be taken through Excelsior College and cannot be transferred in.

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY TO MASTER OF BUSINESS ADMINISTRATION (DUAL DEGREE TRACK)

The dual degree track requires a total of 150 credits. Students achieve graduate status by completing 60 credits in the arts and sciences component, 48 credits in the information technology component, and 6 credits in the additional credit component. The graduate phase requires a total of 36 graduate credits including the bridge component and the graduate course component. Students receive the baccalaureate and graduate degrees after completion of the dual degree program in its entirety.

The BSIT-MBA dual degree program is designed to provide a streamlined path for learners to blend their technical skills with managerial skills. The dual degree track is designed with bridge components that enable learners to transition to the MBA program. The BSIT-MBA dual degree prepares learners to leverage their technical skills to pursue leadership and managerial positions in the industry.

You are subject to the degree requirements in effect at the time of your enrollment or program/degree transfer (program transfer refers to changes from one school to another; degree transfer refers to changing degrees within the same school).

The faculty reserves the right to make changes in curricular requirements as necessary to reflect current professional practice. Changes may affect both enrolled and prospective students. It is your responsibility to keep informed of such changes. We make every effort to inform you of changes as they occur. Current information about degree requirements is posted on our website. Information about changes to degree requirements is also made available on our website.

The Bachelor of Science in Information Technology is accredited by the Computing Accreditation Commission of ABET, www.abet.org, telephone: 410-347-7700. ABET is a specialized accrediting agency recognized by the Council for Higher Education Accreditation (CHEA).

Program Educational Objectives

As an Excelsior College bachelor's-level information technology graduate, within a few years of graduation, you are expected to:

1. Apply general and discipline-specific concepts and methodologies to identify, analyze, and solve technical problems in the information technology discipline.
2. Demonstrate an individual desire and commitment to remain technically current with, and adaptive to, changing technologies through continuous learning and self-improvement.
3. Demonstrate independent thinking, function effectively in team-oriented settings, and maintain a high level of performance in a professional/industrial environment.
4. Communicate effectively in a professional/industrial environment.
5. Perform ethically and professionally in business, industry, and society.
6. Attain increasing levels of responsibility and leadership in the information technology field.

Program (Student) Outcomes

Upon successful completion of the Excelsior College Bachelor of Science in Information Technology program, the graduate will be able to:

1. Apply knowledge of computing and mathematics for problem solving in the field of information technology.
2. Demonstrate the ability to identify and analyze user needs to define and create appropriate computing requirements and solutions.
3. Demonstrate the ability to effectively select, evaluate, and integrate information technologies-based solutions in a user environment.
4. Demonstrate the ability to participate effectively in groups or team projects.
5. Demonstrate an ability to understand professional, ethical, and social responsibilities, including the impacts of culture, diversity, and interpersonal relations.
6. Demonstrate proficiency in communicating technical information in formal reports, documentation, and oral presentations to users and information technology professionals.

7. Demonstrate the ability to identify and analyze the impacts of information technologies and computing on individuals, organizations, society, and the global community.
8. Demonstrate the ability to identify and apply current and emerging technologies and tools for information technologies solutions.
9. Demonstrate expertise in the core information technologies, including Web technologies, database management, information management and security, object-oriented programming, computer architecture, systems architecture, operating systems, and system administration.
10. Demonstrate the ability to analyze computing and information security requirements and risks, and apply the appropriate tools and techniques to protect organizational data assets in an ethically responsible manner.
11. Demonstrate the ability to apply best practices and standards for information technology applications.
12. Demonstrate the ability to assist in the creation of an effective project plan.
13. Demonstrate a commitment to professional development and to continue to engage in lifelong learning.

Upon successful completion of the Excelsior College MBA program, the graduate will be able to:

1. Analyze real-world business problems and generate recommendations for action.
2. Integrate accounting, marketing, finance, management, and economics into a strategic business analysis.
3. Assess the impact of the global business environment on business situations.
4. Apply quantitative methods to analysis of business situations.
5. Perform ethically and professionally in business and society.
6. Communicate effectively to relevant audiences in written materials.
7. Collaborate in teams to produce required deliverables.
8. Apply project management skills to business situations.
9. Assess the ethical implications of actions for diverse stakeholders.

DUAL DEGREE TRACK REQUIREMENTS

Arts and Sciences Component (60 credits)

A. Humanities and Social Sciences

At least 24 credits must be earned in the humanities and social sciences and are distributed as follows:

1. *Communications*

At least 9 credits must be earned in communications courses, including 6 credits to satisfy the written English requirement [ENGx111 **English Composition**, ENG 101 **English Composition**, ENG 102 **Composition II**, ENG 201 **Writing for the Professions**]. Courses in speech, technical writing, or similar courses in either written or oral communications are applicable toward the communications requirements.

2. *Ethics*

At least 3 credits must be earned in ethics^① [BUS 323 **Business Ethics**]

3. *Humanities Electives*

At least 3 credits must be earned in humanities electives. Humanities subjects include, but are not limited to, advanced writing, literature, foreign languages, religion, philosophy, art, and music.

4. *Social Sciences/History*

3 credits must be earned in Organizational Behavior [BUS 311 **Organizational Behavior**]^① 3 credits must be earned in Economics [ECON 360 **International Economics**]^① and 3 credits must be earned in additional subjects such as sociology, economics, history, psychology, and anthropology.

B. Natural Sciences/Mathematics

At least 12 credits must be earned in natural sciences/mathematics and include 3 credits in a natural science, a course in discrete mathematics [TECH 205 **Discrete Structures**], and one course from the following list:

1. *Calculus I*

[TECH 201 **Foundations of Technology Problem Solving I**]

^① Must be taken at the upper level with a grade of B or above within the last 10 years to satisfy MBA foundation requirement.

2. *Statistics and Probability*
[BUS 233 Business Statistics, MAT 201 Statistics]
3. *Quantitative Methods*^②
[BUS 430 Quantitative Methods]
4. *Finite Math*
5. *Mathematical Logic*
6. Sample natural sciences subjects include biology, chemistry, geology, physics, and genetics.

C. Arts and Sciences Electives

At least 24 additional credits in any arts and sciences areas must be completed.

Information Technology Component (48 credits)

The Bachelor of Science in Information Technology requires a grade of C or better for applicable credit, and a minimum of 48 credits in the area of information technology distributed as follows:

A. IT Core Requirements:

The following core requirements must be met:

1. Object-Oriented Programming
[IT 210 Object Oriented Programming]
2. Data Communications and Networking
[IT 250 Business Data Communications]
3. Computer Systems Architecture
[IT 321 Computer Systems Architecture]
4. Operating Systems
[IT 360 Operating Systems]
5. Database Concepts
[IT 370 Database Management Systems]
6. Web Design and Development
[IT 371 Web Design and Development]
7. Human-Computer Interaction
[IT 375 Human-Computer Interactive Design]
8. Overview of Computer Security
[IT 380 Overview of Computer Security]
9. Project Management
[IT 390 Project Management]

① Must be taken at the upper level with a grade of B or above within the last 10 years to satisfy MBA foundation requirement.

② Quantitative Methods may be taken to waive the MBA foundation requirement as part of this dual degree; however, Statistics is a prerequisite for Quantitative Methods. Please consult your academic advisor with any concerns about completing Quantitative Methods in the undergraduate portion of this program.

10. System Administration
[IT 460 System Administration]
11. Integrated Technology Assessment Capstone
[IT 495 Integrated Technology Assessment (capstone)]—The capstone course is required and must be taken through Excelsior College. It cannot be transferred in.]

B. Concentration Requirements:

A concentration must be declared. A minimum of 15 credits is required for each concentration (see concentration requirements on page 45).

C. Approved IT Electives

D. Level Requirement

Of the 48 credits required for the information technology component, at least 15 must be upper level. No upper-level credit is awarded for introductory coursework in computer languages.

A course is generally considered upper level if it is offered at the junior or senior level and clearly is not introductory in content. Courses taken at two-year institutions may not be used to satisfy upper-level requirements. The acceptance of coursework for credit toward the upper-level requirement is subject to faculty review.

Free Elective Component (6 credits)

A. Information Literacy

A minimum of 1 credit must be earned in information literacy. See the information literacy requirement explanation on page vi for more information.

B. Any collegiate level study

May include excess credits in the Arts and Sciences, Information Technology or any applied professional area.

Bridge Component

A grade of B or above is required.

A. Information Technology

[BUS 570 Information Technology]

B. Global Business Environment

[BUS 502 Global Business Environment]

Graduate Component

- A. Accounting for Managers
[BUS 500 Accounting for Managers]
- B. Managerial Finance
[BUS 505 Finance]
- C. Marketing
[BUS 506 Marketing]
- D. Operations Management
[BUS 520 Operations Management]
- E. Project Management and Applications
[BUS 530 Project Management Principles and Applications]
- F. Leadership
[BUS 552 Leadership]
- G. Policy and Strategy (Capstone)
[BUS 511 Strategy and Policy (capstone)]
- H. 9 credits in Business Electives or Concentration
(see concentration requirements on page 45).

Degree-Specific Policies

Programming Language Cap

The College has placed a 9-credit cap on introductory programming language courses in the information technology component, which includes the following languages:

- ▶ JAVA
- ▶ PYTHON
- ▶ Visual Basic
- ▶ C
- ▶ C++
- ▶ C#

No upper-level credit is awarded for coursework in introductory computer languages.

Credit for Vendor Examinations

Excelsior College awards credit for certain examinations from vendors/professional organizations such as Cisco, CompTIA, (ISC)², Microsoft, and the Project Management Institute. Subject to faculty approval, you may apply up to 21 credits from vendor certification examinations toward the Information Technology Component of your degree; additional credits from such examinations may apply toward the Free Elective Component. Please contact an academic advisor about

the possibility of receiving college-level credit toward your degree requirements.

Time Limit on Courses and Exams

Due to the rapidly changing nature of technology, Excelsior College has established a time-related restriction on the application of credits applied to the Information Technology Component of the Bachelor of Science in Information Technology. To meet this requirement, relevant coursework must have been completed more recently than 5 years prior to entrance into the Bachelor of Science in Information Technology degree program. Please note that course content in these areas is subject to faculty approval. The time limit may be appealed by completing an appeal form which verifies appropriate and current professional and/or academic experience.

Time Limit for Degree Completion

Excelsior College degree programs are designed, within limits, to be completed at a student's own pace. However, students must make continuous progress toward their academic goals. Students will be dismissed if they do not complete the Bachelor of Science in Information Technology at the conclusion of 7 years from their entrance into the program. Students may seek an extension of the time limit by completing an appeal form, which will outline a plan for completion. Students must submit this appeal no less than one trimester before reaching the 7-year degree completion time limit.

Course Materials Policy

The faculty requires that students submit course materials for all math, science, and technology component courses taken outside of Excelsior College after enrollment in the program. Course materials should include graded homework, quizzes, tests, lab reports, papers, and other student work as appropriate. Course outlines/syllabi should be included as well. This material is required for curriculum review and accreditation purposes. Once we have received your transcript indicating completion of a course and the corresponding student work materials, credit for the course will be added to your evaluation.

Policies Specific to the MBA

The Excelsior College Student Policy Handbook is your resource for understanding the academic and administrative policies that are important to your academic success. It includes a wide range of information from important federal policies, including your right to privacy, to grading policies and policies and procedures concerning refunds, withdrawals, and other administrative issues. It is your responsibility to be familiar with these policies.

Policies and procedures that apply specifically to the MBA program are listed on the following pages. File your handbook with this program catalog and your other important academic papers for easy reference.

Admissions Policy

Students with a bachelor's degree from an accredited institution may be admitted into the Excelsior College MBA program. Students who have completed an undergraduate degree program outside the U.S. are required to submit transcripts of undergraduate and graduate work to Education Credential Evaluators Inc. (ECE). Evaluators will review your undergraduate degree program to verify that it is the equivalent to a bachelor's-level degree in the United States. Students choosing to work with ECE should request that a Course by Course Report, indicating the completion of their bachelor's degree, be conducted and forwarded to Excelsior College. In addition, any graduate courses submitted for transfer require a Subject Analysis Report. More information about ECE is available on its website at www.ece.org/excelsior.

The GMAT is not required.

Application Process

You are required to apply for admission into the Excelsior College MBA program. Visit our website at www.excelsior.edu/apply to apply. Please submit an official college transcript verifying completion of a baccalaureate degree along with official transcripts of any graduate-level study you wish to be considered for transfer toward the MBA requirements. Upon review of the transcripts and application, if qualified, you will receive an admittance letter.

Acceptance of Transfer Credit

Graduate-level coursework that has been completed within 10 years of the date of enrollment may be used to satisfy the requirements of the MBA program if

approved by Excelsior College faculty. Students may transfer up to 24 credits. Excelsior College will require a minimum grade of B- for any approved graduate course accepted for transfer credit. Excelsior College does not use pluses or minuses, so such grades will be converted to the full letter grade. To accept a course that is transferring in with a P grade, the college/department/faculty member issuing the P grade must verify that it is equivalent to a B- or better. Waivers for foundation courses will apply toward the 24 credits allowed in transfer.

Maximum Time to Complete the MBA Program

Students pursuing the MBA have a maximum of 10 years from the date of enrollment to complete the program.

Grade Point Average

Excelsior College requires an overall 3.0 cumulative GPA for completion of the MBA. Refer to the Student Policy Handbook for complete information.



Bachelor of Science in Information Technology to Master of Business Administration (Dual Degree Track)

**150
CREDITS**

ARTS AND SCIENCES COMPONENT		CREDIT HOURS
▶ Communications (Must include 6 credits in the Written English Requirement)		9
▶ Humanities		3
▶ Ethics		3
▶ Social Sciences/History		
Organizational Behavior ^①		9
Economics ^①		
▶ Mathematics and Natural Sciences		
Natural Science (at least 3 credits)		12
Discrete Math		
One course from the following: Calculus I, Statistics and Probability, Quantitative Methods ^① (prerequisite is Statistics and Probability), Finite Math or Mathematical Logic		
▶ Arts and Sciences Electives		24
TOTAL CREDITS FOR ARTS AND SCIENCES COMPONENT		60

INFORMATION TECHNOLOGY COMPONENT		CREDIT HOURS
▶ Core Requirements		
Object-Oriented Programming ^②	Data Communications and Networking	Project Management
Computer Systems Architecture ^②	Web Design and Development	System Administration
Operating Systems ^②	Human-Computer Interaction	IT 495 Integrated Technology Assessment (capstone) ^③
Database Concepts	Overview of Computer Security	
▶ Concentration Requirements		
One of the following concentrations must be declared (see page 43)		
Cybersecurity Technology	General Option	Information Security
		Network Operations
TOTAL CREDITS FOR INFORMATION TECHNOLOGY COMPONENT (15 credits must be upper level)		48

FREE ELECTIVE COMPONENT		CREDIT HOURS
▶ Information Literacy		1
▶ Free Electives		5
TOTAL CREDITS FOR FREE ELECTIVE COMPONENT		6

GRADUATE PHASE: (30 total graduate credits required)		CREDIT HOURS
Students achieve graduate status upon completion of the bridge component and all other undergraduate requirements.		
BRIDGE COMPONENT		
▶ Information Technology		3
▶ Global Business Environment		3
TOTAL CREDITS FOR BRIDGE COMPONENT		6
GRADUATE COURSE COMPONENT		
Accounting for Managers	Operations Management	Strategy and Policy (capstone) ^③
Marketing	Leadership	Electives (9 elective or concentration course credits)
Managerial Finance	Project Management and Applications	
TOTAL CREDITS FOR GRADUATE COURSE COMPONENT		30
TOTAL CREDITS FOR GRADUATE PHASE		36
TOTAL DEGREE CREDITS REQUIRED		150

^① Must be taken at the upper level and completed with a grade of B or above within the past 10 years.

^② The core requirements should be completed in the order listed.

^③ IT 495 Integrated Technology Assessment and BUS 511 Strategy and Policy are the required capstone courses and must be taken through Excelsior College. They cannot be transferred in.

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY TO MASTER OF SCIENCE IN CYBERSECURITY (DUAL DEGREE TRACK)

The dual degree track requires a total of 144 credits. The total amount of credits earned will vary depending on the concentration selected and the selection of graduate courses applied to baccalaureate concentration requirements. Students achieve graduate status by completing 60 credits in the arts and sciences component, 48 credits in the information technology component, and 6 credits in the additional credit component. The graduate phase requires a total of 30 graduate credits including the bridge component and the graduate course component. Students receive the baccalaureate and graduate degrees after completion of the dual degree program in its entirety.

The BSIT-MCY dual degree program is designed to provide a streamlined path for learners to obtain a solid foundation for a graduate degree in cybersecurity. The dual degree track is designed with a bridge component that enables learners to transition to the graduate degree program in cybersecurity. The BSIT-MCY dual degree track provides avenues for learners to leverage their knowledge and skills to pursue advanced career positions in cybersecurity through an effective and structured course plan.

The Bachelor of Science in Information Technology is accredited by the Computing Accreditation Commission of ABET, www.abet.org, telephone: 410-347-7700. ABET is a specialized accrediting agency recognized by the Council for Higher Education Accreditation (CHEA).

Program Educational Objectives

As an Excelsior College bachelor's-level information technology graduate, within a few years of graduation, you are expected to:

1. Apply general and discipline-specific concepts and methodologies to identify, analyze, and solve technical problems in the information technology discipline.
2. Demonstrate an individual desire and commitment to remain technically current with, and adaptive to, changing technologies through continuous learning and self-improvement.
3. Demonstrate independent thinking, function effectively in team-oriented settings, and maintain a high level of performance in a professional/industrial environment.
4. Communicate effectively in a professional/industrial environment.
5. Perform ethically and professionally in business, industry, and society.
6. Attain increasing levels of responsibility and leadership in the information technology field.

Program (Student) Outcomes

Upon successful completion of the Excelsior College Bachelor of Science in Information Technology program, the graduate will be able to:

1. Apply knowledge of computing and mathematics for problem solving in the field of information technology.
2. Demonstrate the ability to identify and analyze user needs to define and create appropriate computing requirements and solutions.
3. Demonstrate the ability to effectively select, evaluate, and integrate information technologies-based solutions in a user environment.
4. Demonstrate the ability to participate effectively in groups or team projects.
5. Demonstrate an ability to understand professional, ethical, and social responsibilities, including the impacts of culture, diversity, and interpersonal relations.
6. Demonstrate proficiency in communicating technical information in formal reports, documentation, and oral presentations to users and IT professionals.
7. Demonstrate the ability to identify and analyze the impacts of information technologies and computing on individuals, organizations, society, and the global community.

8. Demonstrate the ability to identify and apply current and emerging technologies and tools for information technologies solutions.
9. Demonstrate expertise in the core information technologies, including web technologies, database management, information management and security, object-oriented programming, computer architecture, systems architecture, operating systems, networking, and system administration.
10. Demonstrate the ability to analyze computing and information security requirements and risks, and apply the appropriate tools and techniques to protect organizational data assets in an ethically responsible manner.
11. Demonstrate the ability to apply best practices and standards for information technology applications.
12. Demonstrate the ability to assist in the creation of an effective project plan.
13. Demonstrate a commitment to professional development and to continue to engage in lifelong learning.

Upon successful completion of the Excelsior College Master of Science in Cybersecurity program, the graduate will be able to:

1. Continuously monitor, maintain, and enhance the protection of enterprise-wide information assets through effective industry accepted information management and risk management techniques.
2. Detect, analyze, and respond to cyber-attacks on networks and computer systems.
3. Conduct risk and vulnerability assessments of existing and proposed information systems.
4. Utilize the best sources of information available related to cyber security issues, threats, and recovery.
5. Demonstrate the ability to understand professional, ethical, and social responsibility, including the effect of culture, diversity, and interpersonal relations.
6. Demonstrate proficiency in communicating technical information in formal reports, documentation, and oral presentations to users and information technology professionals.
7. Demonstrate a commitment to professional development and to continue to engage in lifelong learning.

DUAL DEGREE TRACK REQUIREMENTS

Arts and Sciences Component (60 credits)

A. Humanities and Social Sciences

At least 24 credits must be earned in the humanities and social sciences and are distributed as follows:

1. *Communications*

At least 9 credits must be earned in communications courses, including 6 credits to satisfy the written English requirement [ENGx111 **English Composition**, ENG 101 **English Composition**, ENG 102 **Composition II**, ENG 201 **Writing for the Professions**]. Courses in speech, technical writing, or similar courses in either written or oral communications are applicable toward the communications requirements.

2. *Ethics*

At least 3 credits must be earned in ethics [BUS 323 **Business Ethics**].

3. *Humanities Electives*

At least 3 credits must be earned in humanities electives. Humanities subjects include, but are not limited to, advanced writing, literature, foreign languages, religion, philosophy, art, and music.

4. *Social Sciences/History*

At least 9 credits must be earned in such subjects as sociology, economics, history, psychology, and anthropology.

B. Natural Sciences/Mathematics

At least 12 credits must be earned in natural sciences/mathematics and include 3 credits in a natural science, a course in discrete mathematics [TECH 205 **Discrete Structures**], and one course from the following list:

1. *Calculus I*

[TECH 201 **Foundations of Technology Problem Solving I**]

2. *Statistics and Probability*

[BUS 233 **Business Statistics**, MAT 201 **Statistics**]

3. *Quantitative Methods*

[BUS 430 **Quantitative Methods**]

4. *Finite Math*

5. *Mathematical Logic*

Sample natural sciences subjects include biology, chemistry, geology, physics, and genetics.

C. Arts and Sciences Electives

At least 24 additional credits in any arts and sciences areas must be completed.

Information Technology Component (48 credits)

The Bachelor of Science in Information Technology requires a grade of C or better for applicable credit, and a minimum of 48 credits in the area of information technology distributed as follows:

A. IT Core Requirements

The following core requirements must be met:

1. Object-Oriented Programming
[IT 210 Object Oriented Programming]
2. Data Communications and Networking
[IT 250 Business Data Communications]
3. Computer Systems Architecture
[IT 321 Computer Systems Architecture]
4. Operating Systems
[IT 360 Operating Systems]
5. Database Concepts
[IT 370 Database Management Systems]
6. Web Design and Development
[IT 371 Web Design and Development]
7. Human-Computer Interaction
[IT 375 Human-Computer Interactive Design]
8. Overview of Computer Security
[IT 380 Overview of Computer Security]
9. Project Management
[IT 390 Project Management]
10. System Administration
[IT 460 System Administration]
11. Integrated Technology Assessment Capstone
[IT 495 Integrated Technology Assessment (capstone)]—The capstone course is required and must be taken through Excelsior College. It cannot be transferred in.]

B. Concentration Requirements

A concentration must be declared. A minimum of 15 credits is required for each concentration (see concentration requirements on page 45).

C. Approved IT Electives

D. Level Requirement

Of the 48 credits required for the information technology component, at least 15 must be upper-level. No upper-level credit is awarded for introductory coursework in computer languages.

A course is generally considered upper level if it is offered at the junior or senior level and clearly is not introductory in content. Courses taken at two-year institutions may not be used to satisfy upper-level requirements. The acceptance of coursework for credit toward the upper-level requirement is subject to faculty review.

Free Elective Component (6 credits)

A. Information Literacy

A minimum of 1 credit must be earned in information literacy. See the information literacy requirement explanation on page vi for more information.

B. Other College-Level Credit

A minimum of 5 (determined by concentration) credits must be earned in other college-level credit. This essentially is an elective area that can be fulfilled with additional arts and sciences credits or applied professional credits.

Graduate Phase (Total graduate credits: 30)

Bridge Component

A grade of “B” or higher is required.

- ▶ Project Management
[BUS 530 Project Management Principles and Applications]
- ▶ Foundations of Cybersecurity
[CYS 500 Foundations of Cybersecurity]

Graduate Component

- A. Communications and Network Security
[CYS 504 Network and Communication Security]
- B. Ethics, Legal, and Compliance Issues in Cybersecurity
[CYS 541 Ethics, Legal, and Compliance Issues in Cybersecurity]
- C. Leadership and Communications in Cybersecurity
[CYS 550 Leadership and Communications in Cybersecurity]
- D. Information Assurance
[CYS 560 Information Assurance]
- E. 9 credits in concentration
[refer to concentration requirements on page 45]
- F. Capstone Project in Cybersecurity
[CYS 596 Capstone Project in Cybersecurity]
The capstone course is required and must be taken through Excelsior College. It cannot be transferred in.

Degree-Specific Policies

Programming Language Cap

The College has placed a 9-credit cap on introductory programming language courses in the information technology component, which includes the following languages:

- ▶ JAVA
- ▶ PYTHON
- ▶ Visual Basic
- ▶ C
- ▶ C++
- ▶ C#

No upper-level credit is awarded for coursework in introductory computer languages.

Credit for Vendor Examinations

Excelsior College awards credit for certain examinations from vendors/professional organizations such as Cisco, CompTIA, (ISC)², Microsoft, and the Project Management Institute. Subject to faculty approval, you may apply up to 21 credits from vendor certification examinations toward the Information Technology Component of your degree; additional credits from such examinations may apply toward the Free Elective Component. Please contact an academic advisor about the possibility of receiving college-level credit toward your degree requirements.

Time Limit on Courses and Exams

Due to the rapidly changing nature of technology, Excelsior College has established a time-related restriction on the application of credits applied to the Information Technology Component of the Bachelor of Science in Information Technology. To meet this requirement, relevant coursework must have been completed more recently than 5 years prior to entrance into the Bachelor of Science in Information Technology degree program. Please note that course content in these areas is subject to faculty approval. The time limit may be appealed by completing an appeal form which verifies appropriate and current professional and/or academic experience.

Time Limit for Degree Completion

Excelsior College degree programs are designed, within limits, to be completed at a student's own pace. However, students must make continuous progress toward their academic goals. Students will be dismissed if they do not complete the Bachelor of Science in

Information Technology at the conclusion of 7 years from their entrance into the program. Students may seek an extension of the time limit by completing an appeal form, which will outline a plan for completion. Students must submit this appeal no less than one trimester before reaching the 7-year degree completion time limit.

Please see [page 78](#) for degree-specific policies for the MS in Cybersecurity.

Course Materials Policy

The faculty requires that students submit course materials for all math, science, and technology component courses taken outside of Excelsior College after enrollment in the program. Course materials should include graded homework, quizzes, tests, lab reports, papers, and other student work as appropriate. Course outlines/syllabi should be included as well. This material is required for curriculum review and accreditation purposes. Once we have received your transcript indicating completion of a course and the corresponding student work materials, credit for the course will be added to your evaluation.



Bachelor of Science in Information Technology to Master of Science in Cybersecurity (Dual Degree Track)

**144
CREDITS**

ARTS AND SCIENCES COMPONENT			CREDIT HOURS
▶ Communications (Must include 6 credits in the Written English Requirement)			9
▶ Humanities			3
▶ Ethics			3
▶ Social Sciences/History			9
▶ Mathematics and Natural Sciences			
Natural Science (at least 3 credits)			12
Discrete Math			
One course from the following: Calculus I, Statistics and Probability, Quantitative Methods (prerequisite is Statistics and Probability), Finite Math or Mathematical Logic			
▶ Arts and Sciences Electives			24
TOTAL CREDITS FOR ARTS AND SCIENCES COMPONENT			60
INFORMATION TECHNOLOGY COMPONENT			CREDIT HOURS
▶ Core Requirements			
Object-Oriented Programming ^①	Data Communications and Networking	Project Management	
Computer Systems Architecture ^①	Web Design and Development	System Administration	
Operating Systems ^①	Human-Computer Interaction	IT 495 Integrated Technology Assessment (capstone) ^②	
Database Concepts	Overview of Computer Security		
▶ Concentration Requirements			
One of the following concentrations must be declared (see page 45 for requirements)			
Cybersecurity Technology	General Option	Information Security	Network Operations
TOTAL CREDITS FOR INFORMATION TECHNOLOGY COMPONENT (15 Credits must be upper level)			48
FREE ELECTIVE COMPONENT			CREDIT HOURS
▶ Information Literacy			1
▶ Free electives			5
TOTAL CREDITS FOR FREE ELECTIVE COMPONENT			6
GRADUATE PHASE: (30 total graduate credits required)			
Students achieve graduate status upon completion of the bridge component and all other undergraduate requirements.			
BRIDGE COMPONENT (MCY requirements; credits apply toward the BS)			CREDIT HOURS
▶ Project Management			3
▶ Foundations of Cybersecurity			3
TOTAL CREDITS FOR BRIDGE COMPONENT			6
GRADUATE COURSE COMPONENT			CREDIT HOURS
Network and Communications Security	Information Assurance		
Ethics, Legal and Compliance Issues	Electives (9 elective or concentration course credits)		
Leadership and Communications in Cybersecurity	CYS 596 Capstone Project in Cybersecurity ^②		
TOTAL CREDITS FOR GRADUATE COURSE COMPONENT			24
TOTAL CREDITS FOR GRADUATE PHASE			30
TOTAL DEGREE CREDITS REQUIRED			144

^① The core requirements should be completed in the order listed.

^② IT 495 Integrated Technology Assessment and CYS 596 Capstone in Cybersecurity are the required capstone courses and must be taken through Excelsior College. They cannot be transferred in.

BACHELOR OF SCIENCE IN NUCLEAR ENGINEERING TECHNOLOGY^①

The Bachelor of Science in Nuclear Engineering Technology program focuses on preparing students for technical positions in the nuclear industry. The BSNET program is designed specifically to advance job skills by ensuring a breadth of knowledge in nuclear engineering technology concepts. The program emphasizes the practical applications of engineering technology principles related to the nuclear industry. The program provides students with knowledge in areas such as reactor operations, health physics, quality assurance, chemistry, and instrumentation and control related to the nuclear engineering technology field. The goal of the BSNET program is to foster the ability of students to apply what they have learned within the degree program to the real-world contexts of the nuclear industry.

Student progress within the degree program is based on the demonstration of proficiency, and is attainable through multiple, flexible pathways—offering course-based, prior learning assessment, and credit aggregation pathways to degree completion. In this way, the program is customizable and tailored to each student's need and learning style.

The three concentrations are: ► **General Option** ► **Nuclear Cybersecurity** ► **Nuclear Leadership**

Program Educational Objectives

As an Excelsior College bachelor's level nuclear engineering technology graduate, within a few years of graduation, you are expected to:

1. Apply general and discipline-specific concepts and methodologies to identify, analyze, and solve technical problems in the nuclear discipline, including understanding and addressing the societal and institutional issues related to nuclear technology.
2. Demonstrate an individual desire and commitment to remain technically current with, and adaptive to, changing technologies through continuous learning and self-improvement.
3. Demonstrate independent thinking, function effectively in team-oriented settings, and maintain a high level of performance in a professional/industrial environment.
4. Communicate effectively in a professional/industrial environment, including communicating effectively to stakeholders external to the nuclear industry.
5. Perform ethically and professionally in business, industry, and society.
6. Demonstrate and utilize leadership principles in the field of nuclear engineering technology.

Program (Student) Outcomes

Upon successful completion of the Excelsior College Bachelor of Science in Nuclear Engineering Technology program, the graduate will be able to:

1. Select and apply appropriate knowledge, techniques, skills, and modern tools of the natural sciences, including physics, chemistry, thermodynamics, atomic physics, and nuclear physics to solving problems in nuclear engineering technology areas.
2. Demonstrate the ability to understand, measure, and provide quantitative expressions for natural phenomena, including observation, standard tests, experimentation, and accurate measurement.
3. Select and apply appropriate knowledge, techniques, skills, and modern tools of algebra, trigonometry, and calculus to solving problems in nuclear engineering technology areas.
4. Make oral technical presentations in Standard English using graphics and language appropriate to the audience.
5. Demonstrate proficiency in the written and graphical communication of technical information supported by appropriate technical references using Standard English.
6. Demonstrate a working knowledge of computer applications or documentation of the use of one or more computer software packages for technical problem solving appropriate to the nuclear engineering technology discipline.

^① **Specialized Accreditation/Recognition:** The Bachelor of Science in Nuclear Engineering Technology is accredited by the Engineering Technology Accreditation Commission of ABET (www.abet.org). ABET is a specialized accrediting agency recognized by the Council for Higher Education Accreditation (CHEA).

7. Demonstrate technical competency in the electrical theory, nuclear and engineering materials, reactor core fundamentals, power plant systems, heat transfer, fluids, health physics/radiation protection, and radiation measurement.
8. Demonstrate comprehension of currently applicable rules and regulations in the areas of radiation protection, operations, maintenance, quality control, quality assurance, and safety.
9. Integrate and apply knowledge of the functional areas of nuclear engineering technology to the safe operation and maintenance of nuclear systems.
10. Design systems, components, or processes while demonstrating a commitment to quality, timeliness, and continuous improvement of the design and operation of nuclear systems.
11. Participate effectively as a member or a leader of technical teams
12. Demonstrate an understanding of and commitment to professional, ethical, and social responsibilities, including the effects of culture, diversity, and interpersonal relations.
13. Demonstrate a commitment and ability to engage in self-directed continuing professional development.

DEGREE REQUIREMENTS

The Bachelor of Science in Nuclear Engineering Technology requires **124 semester hours of credit** distributed as follows:

- ▶ **60 credits** minimum required in the arts and sciences component
- ▶ **48 credits** minimum required in the nuclear engineering technology component
- ▶ **16 credits** required in the concentration or free elective component (to include information literacy)

Arts and Sciences Component (60 credits)

This distribution requirement ensures basic college-level competence in three arts and sciences areas: humanities, social sciences/history, and natural sciences/mathematics.

A. Humanities and Social Sciences

At least 24 credits must be earned in the humanities and social sciences and are distributed as follows:

1. *Communications*

At least 9 credits must be earned in communications courses, including 6 credits to satisfy the written English requirement [ENGx111 **English Composition**, ENG 101 **English Composition**, ENG 102 **Composition II**, ENG 201 **Writing for the Professions**, TECH 200 **Technical Writing**]. Courses in speech, written composition, technical writing, or similar courses in either written or oral communications are applicable toward the communications requirement.

2. *Ethics*

At least 3 credits must be earned in ethics [BUS 323 **Business Ethics**].

3. *Humanities Elective*

At least 3 credits must be earned in a humanities elective. Humanities subjects include, but are not limited to, advanced writing, literature, foreign languages, religion, philosophy, art, and music.

4. *Social Sciences/History*

At least 9 credits must be earned in such subjects as sociology, economics, history, psychology, and anthropology.

B. Mathematics and Natural Sciences

Students are required to complete at least 26 semester hours of credit in the combined areas of mathematics and natural sciences, with at least 12 credit hours in math at the level of college algebra or above, including Calculus I and II [TECH 201–202 **Foundations of Technology Problem Solving I and II**].

There is no minimum credit hour requirement for natural sciences. Rather, students must complete specific required courses in the natural sciences:

1. Chemistry (with lab)

[CHE 101L **General Chemistry Laboratory I**]

2. Physics I and II (with at least one physics lab)
[PHYS 201–203 Physics I and II, PHYS 202–204 Physics Laboratory I and II]
3. Atomic Physics
[NUC 240 Atomic and Nuclear Physics]
(also satisfies *Nuclear Physics*)
4. Nuclear Physics
[NUC 240 Atomic and Nuclear Physics]
(also satisfies *Atomic Physics*)
5. Thermodynamics
[NUC 245 Thermodynamics]

C. Arts and Sciences Electives

The remaining 10 credits needed to satisfy the 60-credit requirement may be earned in any arts and sciences subjects.

Nuclear Engineering Technology Component (48 credits)

A. Core Requirements

The nuclear engineering technology component ensures basic college-level competence in the major functional areas of nuclear engineering technology. A grade of C or better is required for applicable credit.

The following core requirements must be completed:

1. Electrical Theory
[ELEC 152–153 Circuit Theory I and II]
(Both courses must be completed.)
OR
[NUC 255 Electrical Theory]
2. Computer Applications
[IT 221 Introduction to Computers, TECH 221 Business Communications and Information Systems]
3. Fundamentals of Reactor Safety
[NUC 271 Fundamentals of Reactor Safety]
4. Material Science
[NUC 323 Material Science]
5. Health Physics/Radiation Protection
[NUC 210 Health Physics and Radiation Protection]
6. Radiation Measurement Lab
[NUC 211 Radiation Measurement Lab]
7. Plant Systems Overview
[NUC 350 Plant Systems Overview]
8. Reactor Core Fundamentals
[NUC 330 Reactor Core Fundamentals]
9. Fluids
[NUC 250 Introduction to Heat Transfer and Fluid Mechanics] (Also satisfies *Heat Transfer*)
10. Heat Transfer
[NUC 250 Introduction to Heat Transfer and Fluid Mechanics] (also satisfies *Fluids*)
11. Integrated Technology Assessment (capstone)
[NUC 495 Integrated Technology Assessment] — The capstone course is required and must be taken through Excelsior College. It cannot be transferred in.

B. Nuclear Engineering Technology Electives

You may apply electives from nuclear and related subject areas toward completion of the 48-credit requirement of the technology component. Sample titles include Instruments and Controls, Reactor Safety, Quality Assurance Regulations, Radiation Biology, Radiochemistry, Radiation Waste Processing, and others, as approved. Be sure to contact your academic advisor for approval before registering for courses.

C. Laboratory Requirement

Your bachelor's degree program must include a minimum of five laboratories. Three of these must be in physics, chemistry, and radiation measurement. The remaining two may be in the natural sciences or in nuclear engineering technology subjects.

D. Level Requirement

Of the 48 credits required for the nuclear engineering technology component, at least 16 must be upper level. A course is generally considered upper level if it is offered at the junior or senior level and is clearly not introductory in content. Courses taken at two-year institutions cannot be used to satisfy upper-level requirements. Upper-level credit is not given for Navy Enlisted Ratings or military service school courses with the exception of those offered by the Navy Nuclear Power School. The acceptance of courses toward the upper-level requirement is subject to faculty review.

A grade of "C" or higher is needed for all core requirements.

Concentration or Free Elective Component (16 credits)

One of the following concentrations must be declared. See below for specific requirements for each Nuclear Engineering Technology concentration. A minimum of 16 credits is required for each concentration.

- ▶ **General Concentration**
- ▶ **Nuclear Cybersecurity**
- ▶ **Nuclear Leadership**

General Concentration

The General Concentration allows room for up to 16 credits in free electives. These credits may be earned in any field of college study, including professional or technical subjects as well as in the arts and sciences. A maximum of 2 credits in physical education activity courses may be applied to the degree.

- ▶ **Information Literacy Requirement**
Applied to this component is 1 credit for Excelsior College's information literacy requirement [INL 102 Information Literacy]. See [page vi](#) or visit our website for more information about information literacy.

Nuclear Cybersecurity

With the rising number of cybersecurity threats on our nation's infrastructure, the Cybersecurity Technology concentration is designed to enable students to earn a bachelor's degree that focuses on cybersecurity within the nuclear industry. The concentration emphasizes the concepts associated with governance, legal, and compliance of cybersecurity pertaining to the nuclear industry. With completion of this degree, students will gain foundational knowledge of cybersecurity, the impacts of cyber-attacks on nuclear facilities, and preparing them for cybersecurity positions in the nuclear industry. The cybersecurity concentration will prepare students for a variety of positions in engineering technology and security.

Upon successful completion of the Excelsior College Bachelor of Science in Nuclear Engineering Technology with a Cybersecurity concentration, the student will be able to:

1. Assess security risk and vulnerability of existing and proposed information systems in the nuclear industry.

2. Explain incident response handling, incident coordination, and ethical and legal issues.
3. Assess the effect of cyber-attacks in the nuclear industry and the impact on nuclear facilities.
4. Utilize the best sources of information available related to cybersecurity issues, threats, and recovery.

Concentration Requirements

Minimum of 16 credits.

- ▶ Computer Security
[IT 380 Overview of Computer Security]
- ▶ Governance, Legal, and Compliance
[CYS 260 Governance, Legal, and Compliance]
- ▶ Cybersecurity Defense
[CYS 350 Cybersecurity Defense in Depth for the Nuclear Industry]
- ▶ Business Continuity
[CYS 455 Business Continuity]
- ▶ Cybersecurity Investigation
[CYS 465 Cybersecurity Investigation and Case Studies for the Nuclear Industry]
- ▶ **Information Literacy Requirement**
Applied to this component is 1 credit for Excelsior College's information literacy requirement [INL 102 Information Literacy]. See [page vi](#) or visit our website for more information about information literacy.

Nuclear Leadership

The Bachelor of Science in Nuclear Engineering Technology—Nuclear Leadership concentration is designed to prepare students to earn a bachelor's degree related to nuclear engineering technology with an emphasis on nuclear leadership. The concentration emphasizes leadership topics such as business leadership, organizational behavior, change management, leadership communications, and leadership courage/risk management. The nuclear leadership concentration will prepare students for a variety of leadership positions in the nuclear industry. Upon successful completion of the Excelsior College Bachelor of Science in Nuclear Engineering Technology with a Nuclear Leadership concentration, the student will be able to:

1. Apply strategies in effective leadership, diverse work environments, and resolving conflicts.
2. Demonstrate an understanding of ethical and unethical leadership behaviors in regard to the nuclear industry.
3. Explain the roles of leaders in leading change, risk management, and communicating effectively in the nuclear industry.
4. Summarize leadership challenges in the nuclear industry including risk management perspectives.
5. Integrate leadership theories to improve an organization's behaviors and organizational standards in support of management priorities.

Concentration Requirements

Minimum of 16 credits.

- ▶ Organizational Behavior
[BUS 311 Organizational Behavior]
- ▶ Business Leadership
[BUS 452 Business Leadership]
- ▶ [NUC 280 Leading Change in the Nuclear Industry]
- ▶ [NUC 285 Leadership Communication in the Nuclear Industry]
- ▶ [NUC 360 Nuclear Leadership—Leadership Courage/Risk Management]
- ▶ Information Literacy Requirement
Applied to this component is 1 credit for Excelsior College's information literacy requirement [INL 102 Information Literacy]. See [page vi](#) or visit our website for more information about information literacy.

Degree-Specific Policies

Policies and procedures that apply specifically to the Bachelor of Science in Nuclear Engineering Technology follow. Refer to your Student Policy Handbook for academic and administrative policies that apply to all students and programs.

Time Limit on Courses and Exams

Due to the rapidly changing nature of technology, Excelsior College has established a time-related restriction on the application of certain subject areas meeting requirements in the Bachelor of Science in Nuclear Engineering Technology. The following subject areas must have been completed more recently than 10 years prior to entrance into the Bachelor of Science in Nuclear Engineering Technology degree program: calculus I, calculus II, natural science, computers, nuclear engineering technology, and electrical/electronics (except DC and AC Circuits). Please note that course content in these areas is subject to faculty approval. The time limit may be appealed with verification of relevant and current coursework or continuous employment in the nuclear industry (Navy, Government, or Commercial).

Navy personnel who are currently active in the nuclear field may be exempt from submitting the Time Limit Appeal if their current Joint Services Transcript lists any of the following ratings: Electrician's Mate, Nuclear Power—EMN, Electronics Technician, Nuclear Power—ETN, or Machinist's Mate, Nuclear Power—MMN. The Time Limit Appeal will be waived for credit earned from Navy Nuclear Power School, Prototype School, and other related military training. Any other credit will require an appeal per the policy stated above.

Time Limit for Degree Completion

Excelsior College degree programs are designed, within limits, to be completed at a student's own pace. However, students must make continuous progress toward their academic goals. Students will be dismissed if they do not complete the Bachelor of Science in Nuclear Engineering Technology at the conclusion of 10 years from their entrance into the program. Students may seek an extension of the time limit by completing an appeal form, which will outline a plan for completion. Students must submit this appeal no less than one trimester before reaching the 10-year degree completion time limit.

Course Materials Policy

The faculty requires that students submit course materials for all math, science, and technology component courses taken outside of Excelsior College after enrollment in the program. Course materials should include graded homework, quizzes, tests, lab reports, papers, and other student work as appropriate. Course outlines/syllabi should be included as well. This material is required for curriculum review and accreditation purposes. Once we have received your transcript indicating completion of a course and the corresponding student work materials, credit for the course will be added to your evaluation.

Credit for the National Registry of Radiation Protection Technologists (NRRPT)^①

The American Council on Education (ACE) College Credit Recommendation Service recommends the awarding of between 24 and 30 college credits for members accepted to the National Registry of Radiation Protection Technologists (NRRPT) from November 1978 to the present. Excelsior College recognizes the credit recommendations of the ACE College Credit Recommendation Service.

The Excelsior College faculty has reviewed the ACE credit recommendation toward the nuclear engineering technology requirement and will award 6 or 8 upper level credits toward the health physics/radiation protection requirement, depending on when the credit was earned. The remaining credits will be applied toward the nuclear engineering technology electives. Credit will be awarded upon receipt of official documentation from the NRRPT.

Credits from Training Programs Completed at United States Nuclear Power Plants That Are Accredited by the National Academy for Nuclear Training (NANT)^①

The Excelsior College Nuclear Engineering Technology Faculty evaluated several of the standardized training programs at nuclear power facilities that are accredited by NANT. The 10 utility training programs that have been evaluated for college credit are:

- ▶ Shift Technical Advisor
- ▶ Senior Reactor Operator

^① Students may earn between 24 and 52 credits, depending on the utility training program completed. Contact a technology academic advisor for details.

- ▶ Reactor Operator
- ▶ Non-licensed Operator
- ▶ Engineering Support Personnel
- ▶ Radiation Protection Technician
- ▶ Chemistry Technician
- ▶ Electrical Maintenance Technician
- ▶ Instrumentation and Controls Technician
- ▶ Mechanical Maintenance Technician

Credits from Training Programs Completed at the United States Navy Nuclear Power School and Prototype^②

The Excelsior College Nuclear Engineering Technology Faculty evaluated several of the standardized training programs at the United States Navy Nuclear Power School and Prototype, and Excelsior College recognizes the credit recommendations of the ACE College Credit Recommendation Service. The standardized training programs that have been evaluated for college credit are:

Nuclear Field 'A' School	
MM, January 2007–present	12–27 credits
EM and ET, January 2004–present	
Navy Nuclear Power School	
January 2007–present	32–34 credits
Prototype Training	
January 2007–present	15 credits

^② Graduates of the United States Navy Nuclear Power School and Prototype may earn between 59 and 76 credits, depending on the specific training program completed. Contact a technology academic advisor for details.



Bachelor of Science in Nuclear Engineering Technology

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CREDITS

ARTS AND SCIENCES COMPONENT		CREDIT HOURS	
▶ Communications Must include 6 credits in the Written English Requirement		9	
▶ Humanities		3	
▶ Ethics		3	
▶ Social Sciences/History		9	
▶ Mathematics and Natural Sciences			
Mathematics 12 credits at the level of College algebra or above, including Calculus I and II.		26	
Natural Sciences Physics I and II with at least one lab, Chemistry with lab, Atomic Physics, Nuclear Physics, and Thermodynamics			
▶ Arts and Sciences Electives		10	
TOTAL CREDITS FOR ARTS AND SCIENCES COMPONENT		60	
NUCLEAR ENGINEERING TECHNOLOGY COMPONENT		CREDIT HOURS	
▶ Core Requirements			
Electrical Theory	Reactor Core Fundamentals	48	
Computer Applications	Fluids		
Fundamentals of Reactor Safety	Heat Transfer		
Material Science	NUC 495 Integrated Technology Assessment (capstone) ^①		
Health Physics/Radiation Protection			
Radiation Measurement Lab	Nuclear Technology Electives		
Plant Systems Overview			
▶ Required Labs			
Chemistry	Physics	48	
Radiation Measurement	2 Technology or Natural Science Labs		
TOTAL CREDITS FOR NUCLEAR ENGINEERING TECHNOLOGY COMPONENT 16 CREDITS MUST BE UPPER LEVEL		48	
CONCENTRATION OR FREE ELECTIVE COMPONENT		CREDIT HOURS	
▶ One of the following concentrations must be declared (see page 62 for requirements):			
General	Nuclear Cybersecurity	Nuclear Leadership	15
If the General concentration is selected, the 15 required credits may be completed with Free Electives.			
▶ Information Literacy Requirement			1
TOTAL CREDITS FOR CONCENTRATION OR FREE ELECTIVE COMPONENT		16	
TOTAL DEGREE CREDITS REQUIRED		124	

^① NUC 495 Integrated Technology Assessment is the required capstone course. It must be taken through Excelsior College and cannot be transferred in.

BACHELOR OF SCIENCE IN NUCLEAR ENGINEERING TECHNOLOGY WITH A DUAL DEGREE OPTION FOR AN MBA^①

This dual degree track program allows students to complete the bachelor's degree component to meet Bachelor of Science in Nuclear Engineering Technology requirements and then move forward to completion of the MBA. The program is framed to increase academic understanding of nuclear engineering technology topics, improve career prospects, and expand individual horizons. Students can capitalize upon their existing work-based knowledge while engaging in a process of reflective learning. This program will equip students to further their careers through enhanced knowledge, understanding, and application to the nuclear engineering and business environments.

A 6-credit bridge component consisting of subjects in business communications and global business environment completes the bachelor's degree with the student then achieving graduate status. The student is then eligible to move on to complete the graduate course component consisting of subjects such as accounting for managers, human resources management, operations management, leadership, and change management.

Program Educational Outcomes

As an Excelsior College baccalaureate-level nuclear engineering technology graduate you will be able to:

1. Apply general and discipline-specific concepts and methodologies to identify, analyze, and solve technical problems in the nuclear discipline.
 2. Demonstrate an individual desire and commitment to remain technically current with, and adaptive to changing technologies through continuous learning and self-improvement.
 3. Demonstrate independent thinking, function effectively in team-oriented settings, and maintain a high level of performance in a professional/ industrial environment.
 4. Communicate effectively in a professional/ industrial environment.
 5. Perform ethically and professionally in business, industry, and society.
 6. Attain increasing levels of responsibility and leadership in the nuclear field.
1. Select and apply appropriate knowledge, techniques, skills, and modern tools of the natural sciences, including physics, chemistry, thermodynamics, atomic physics, and nuclear physics to solving problems in nuclear engineering technology areas.
 2. Demonstrate the ability to understand, measure, and provide quantitative expressions for natural phenomena, including observation, standard tests, experimentation, and accurate measurement.
 3. Select and apply appropriate knowledge, techniques, skills, and modern tools of algebra, trigonometry, and calculus to solving problems in nuclear engineering technology areas.
 4. Make oral technical presentations in Standard English using graphics and language appropriate to the audience.
 5. Demonstrate proficiency in the written and graphical communication of technical information supported by appropriate technical references using Standard English.
 6. Demonstrate a working knowledge of computer applications or documentation of the use of one or more computer software packages for technical problem solving appropriate to the nuclear engineering technology discipline.
 7. Demonstrate technical competency in the electrical theory, nuclear and engineering materials, reactor core fundamentals, power plant systems, heat transfer, fluids, health physics/ radiation protection, and radiation measurement.
 8. Demonstrate comprehension of currently applicable rules and regulations in the areas of radiation protection, operations, maintenance, quality control, quality assurance, and safety.
 9. Integrate and apply knowledge of the functional areas of nuclear engineering technology to the safe operation and maintenance of nuclear systems.
 10. Design systems, components, or processes while demonstrating a commitment to quality, timeliness, and continuous improvement of the

Program (Student) Outcomes

We expect the graduate of an Excelsior College baccalaureate program in nuclear engineering technology will be able to:

design and operation of nuclear systems.

11. Participate effectively as a member or a leader of technical teams
12. Demonstrate an understanding of and commitment to professional, ethical, and social responsibilities, including the effects of culture, diversity, and interpersonal relations.
13. Demonstrate a commitment and ability to engage in self-directed continuing professional development.

Upon successful completion of the Excelsior College MBA program, the graduate will be able to:

1. Analyze real-world business problems and generate recommendations for action.
2. Integrate accounting, marketing, finance, management, and economics into a strategic business analysis.
3. Assess the impact of the global business environment on business situations.
4. Apply quantitative methods to analysis of business situations.
5. Perform ethically and professionally in business and society.
6. Communicate effectively to relevant audiences in written materials.
7. Collaborate in teams to produce required deliverables.
8. Apply Project Management skills to business situations.
9. Assess the ethical implications of actions for diverse stakeholders.

Dual Degree Track Requirements

Arts and Sciences Component (60 credits)

This distribution requirement ensures basic college-level competence in three arts and sciences areas: humanities, social sciences/history, and natural sciences/mathematics.

A. Humanities and Social Sciences

At least 24 credits must be earned in the humanities and social sciences and are distributed as follows:

1. Communications

At least 9 credits must be earned in communications courses, including 6 credits to satisfy the written English requirement [ENGx111 English Composition, ENG 101 English Composition, ENG 102 Composition II, ENG 201 Writing for the Professions, TECH 200 Technical Writing]. Courses in speech, written composition, technical writing, or similar courses in either written or oral communications are applicable toward the communications requirement.

2. Ethics

At least 3 credits must be earned in ethics at the upper level with a minimum grade of B. [BUS 323 Business Ethics].

3. Humanities Elective

At least 3 credits must be earned in a humanities elective. Humanities subjects include, but are not limited to, advanced writing, literature, foreign languages, religion, philosophy, art, and music.

4. Social Sciences/History

A minimum of 3 credits must be earned in Economics [TECH 330 Economic Analysis for Technologists] at the upper level with a minimum grade of B, 3 credits in Organizational Behavior [BUS 311 Organizational Behavior] at the upper level, with a minimum grade of B, and 3 credits must be earned in such subjects as sociology, economics, history, psychology, and anthropology.

B. Mathematics and Natural Sciences

Students are required to complete at least 26 semester hours of credit in the combined areas of mathematics and natural sciences, with at least 12 credit hours in math at the level of college algebra or above, including Calculus I and II [TECH 201–202 Foundations of Technology Problem Solving I and II].

There is no minimum credit hour requirement for natural sciences. Rather, students must complete specific required courses in the natural sciences:

1. Chemistry (with lab)
[CHE 101L General Chemistry Laboratory I]
2. Physics I and II (with at least one physics lab)
[PHYS 201–203 Physics I and II,
PHYS 202–204 Physics Laboratory I and II]

① **Specialized Accreditation/Recognition:** The Bachelor of Science in Nuclear Engineering Technology is accredited by the Engineering Technology Accreditation Commission of ABET (www.abet.org). ABET is a specialized accrediting agency recognized by the Council for Higher Education Accreditation (CHEA).

3. Atomic Physics
[NUC 240 Atomic and Nuclear Physics]
(also satisfies *Nuclear Physics*)
4. Nuclear Physics
[NUC 240 Atomic and Nuclear Physics]
(also satisfies *Atomic Physics*)
5. Thermodynamics
[NUC 245 Thermodynamics]

C. Arts and Sciences Electives

The 10 credits in Arts and Sciences Electives must include **BUS 430 Quantitative Methods** (at the upper level, with a grade of B) and any arts and sciences subjects.

Nuclear Engineering Technology Component (48 credits)

A. Core Requirement

The nuclear engineering technology component ensures basic college-level competence in the major functional areas of nuclear engineering technology. A grade of C or better is required for applicable credit.

The following core requirements must be completed:

1. Electrical Theory
[ELEC 152–153 Circuit Theory I and II]
Both courses must be completed.
OR
[NUC 255 Electrical Theory]
2. Computer Applications
[IT 221 Introduction to Computers, TECH 221 Business Communications and Information Systems]
3. Fundamentals of Reactor Safety
[NUC 271 Fundamentals of Reactor Safety]
4. Material Science
[NUC 323 Material Science]
5. Health Physics/Radiation Protection
[NUC 210 Health Physics and Radiation Protection]
6. Radiation Measurement Lab
[NUC 211 Radiation Measurement Lab]
7. Plant Systems Overview
[NUC 350 Plant Systems Overview]
8. Reactor Core Fundamentals
[NUC 330 Reactor Core Fundamentals]
9. Fluids
[NUC 250 Introduction to Heat Transfer and Fluid Mechanics] (also satisfies *Heat Transfer*)

10. Heat Transfer
[NUC 250 Introduction to Heat Transfer and Fluid Mechanics] (also satisfies *Fluids*)

11. Integrated Technology Assessment (capstone) [NUC 495 Integrated Technology Assessment]—The capstone course is required and must be taken through Excelsior College. It cannot be transferred in.]

B. Nuclear Engineering Technology Electives

You may apply electives from nuclear and related subject areas toward completion of the 48-credit requirement of the technology component. Sample titles include Instruments and Controls, Reactor Safety, Quality Assurance Regulations, Radiation Biology, Radiochemistry, Radiation Waste Processing, and others, as approved. Be sure to contact your academic advisor for approval before registering for courses.

C. Laboratory Requirement

Your bachelor's degree program must include a minimum of five laboratories. Three of these must be in physics, chemistry, and radiation measurement. The remaining two may be in the natural sciences or in nuclear engineering technology subjects.

D. Level Requirement

Of the 48 credits required for the nuclear engineering technology component, at least 16 must be upper level. A course is generally considered upper level if it is offered at the junior or senior level and is clearly not introductory in content. Courses taken at two-year institutions cannot be used to satisfy upper-level requirements. Upper-level credit is not given for Navy Enlisted Ratings or military service school courses with the exception of those offered by the Navy Nuclear Power School. The acceptance of courses toward the upper-level requirement is subject to faculty review.

Concentration or Free Elective Component (10 credits)

One of the following concentrations must be declared. See below for specific requirements for each Nuclear Engineering Technology concentration. The number of credits applied toward the Concentration or Free Elective Component depends on the concentration chosen.

- ▶ **General Concentration**
- ▶ **Nuclear Cybersecurity**
- ▶ **Nuclear Leadership**

General Concentration

The General Concentration allows room for up to 10 credits in free electives. These credits may be earned in any field of college study, including professional or technical subjects as well as in the arts and sciences. A maximum of 2 credits in physical education activity courses may be applied to the degree.

- ▶ **Information Literacy Requirement**
Applied to this component is 1 credit for Excelsior College's information literacy requirement [INL 102 **Information Literacy**]. See [page vi](#) or visit our website for more information about information literacy.
- ▶ **Marketing Requirement**
[BUS 351 **Marketing Concepts and Applications**]

Nuclear Cybersecurity

With the rising number of cybersecurity threats on our nation's infrastructure, the Cybersecurity Technology concentration is designed to enable students to earn a bachelor's degree that focuses on cybersecurity within the nuclear industry. The concentration emphasizes the concepts associated with governance, legal, and compliance of cybersecurity pertaining to the nuclear industry. With completion of this degree, students will gain foundational knowledge of cybersecurity, the impacts of cyber-attacks on nuclear facilities, and preparing them for cybersecurity positions in the nuclear industry. The cybersecurity concentration will prepare students for a variety of positions in engineering technology and security.

Upon successful completion of the Excelsior College Bachelor of Science in Nuclear Engineering Technology with a Cybersecurity concentration, the student will be able to:

1. Assess security risk and vulnerability of existing and proposed information systems in the nuclear industry.
2. Explain incident response handling, incident coordination, and ethical and legal issues.
3. Assess the effect of cyber-attacks in the nuclear industry and the impact on nuclear facilities.
4. Utilize the best sources of information available related to cybersecurity issues, threats, and recovery.

Concentration Requirements (13 credits)

Some requirements listed below will apply toward the technical electives in the Nuclear Engineering Technology Component.

- ▶ Computer Security
[IT 380 **Overview of Computer Security**]
- ▶ Governance, Legal, and Compliance
[CYS 260 **Governance, Legal, and Compliance**]
- ▶ Cybersecurity Defense
[CYS 350 **Cybersecurity Defense in Depth for the Nuclear Industry**]
- ▶ Business Continuity
[CYS 455 **Business Continuity**]
- ▶ Cybersecurity Investigation
[CYS 465 **Cybersecurity Investigation and Case Studies**]
- ▶ **Information Literacy Requirement**
Applied to this component is 1 credit for Excelsior College's information literacy requirement [INL 102 **Information Literacy**]. See [page vi](#) or visit our website for more information about information literacy.
- ▶ **Marketing Requirement**
[BUS 351 **Marketing Concepts and Applications**]

Nuclear Leadership

The Bachelor of Science in Nuclear Engineering Technology—Nuclear Leadership concentration is designed to prepare students to earn a bachelor's degree related to nuclear engineering technology with an emphasis on nuclear leadership. The concentration emphasizes leadership topics such as business leadership, organizational behavior, change management, leadership communications, and leadership courage/risk management. The nuclear leadership concentration will prepare students for a variety of leadership positions in the nuclear industry.

Upon successful completion of the Excelsior College Bachelor of Science in Nuclear Engineering Technology with a Nuclear Leadership concentration, the student will be able to:

1. Apply strategies in effective leadership, diverse work environments, and resolving conflicts.
2. Demonstrate an understanding of ethical and unethical leadership behaviors in regard to the nuclear industry.
3. Explain the roles of leaders in leading change, risk management, and communicating effectively in the nuclear industry.

4. Summarize leadership challenges in the nuclear industry including risk management perspectives.
5. Integrate leadership theories to improve an organization's behaviors and organizational standards in support of management priorities.

Concentration Requirements (13 credits)

Some requirements listed below will apply toward the technical electives in the Arts and Sciences Component.

- ▶ Organizational Behavior
[BUS 311 Organizational Behavior]
- ▶ Business Leadership
[BUS 452 Business Leadership]
- ▶ [NUC 280 Leading Change in the Nuclear Industry]
- ▶ [NUC 285 Leadership Communication in the Nuclear Industry]
- ▶ [NUC 360 Nuclear Leadership—Leadership Courage/Risk Management]
- ▶ Information Literacy Requirement
Applied to this component is 1 credit for Excelsior College's information literacy requirement [INL 102 Information Literacy]. See page vi or visit our website for more information about information literacy.
- ▶ Marketing Requirement
[BUS 351 Marketing Concepts and Applications]

Bridge Component (6 credits)

- ▶ Global Business Environment
[BUS 502 Global Business Environment]
- ▶ Information Technology
[BUS 570 Information Technology]

Graduate Component (36 credits)

- ▶ Accounting for Managers
[BUS 500 Accounting for Managers]
- ▶ Managerial Finance
[BUS 505 Finance]
- ▶ Marketing
[BUS 506 Marketing]
- ▶ Operations Management
[BUS 520 Operations Management]
- ▶ Project Management and Applications
[BUS 530 Project Management Principles and Applications]

- ▶ Leadership
[BUS 552 Leadership]
- ▶ Strategy and Policy (capstone)
[BUS 511 Strategy and Policy] (capstone)
The capstone course is required and must be taken through Excelsior College.
- ▶ 9 credits in Business Electives or Concentration
(see concentration requirements on page 68).

Degree-Specific Policies

Policies and procedures that apply specifically to the Bachelor of Science in Nuclear Engineering Technology follow. Refer to your Student Policy Handbook for academic and administrative policies that apply to all students and programs.

Time Limit on Courses and Exams

Due to the rapidly changing nature of technology, Excelsior College has established a time-related restriction on the application of certain subject areas meeting requirements in the Bachelor of Science in Nuclear Engineering Technology. The following subject areas must have been completed more recently than 10 years prior to entrance into the Bachelor of Science in Nuclear Engineering Technology degree program: calculus I, calculus II, natural science, computers, nuclear engineering technology, and electrical/electronics (except DC and AC Circuits). Please note that course content in these areas is subject to faculty approval. The time limit may be appealed with verification of relevant and current coursework or continuous employment in the nuclear industry (Navy, Government, or Commercial).

Navy personnel who are currently active in the nuclear field may be exempt from submitting the Time Limit Appeal if their current Joint Services Transcript lists any of the following ratings: Electrician's Mate, Nuclear Power—EMN, Electronics Technician, Nuclear Power—ETN, or Machinist's Mate, Nuclear Power—MMN. The Time Limit Appeal will be waived for credit earned from Navy Nuclear Power School, Prototype School, and other related military training. Any other credit will require an appeal per the policy stated above.

Time Limit for Degree Completion

Excelsior College degree programs are designed, within limits, to be completed at a student's own pace. However, students must make continuous progress toward their academic goals. Students will be dismissed if they do not complete the Bachelor of Science in Nuclear Engineering Technology at the conclusion of 10 years from their entrance into the program. Students may seek an exten-

sion of the time limit by completing an appeal form, which will outline a plan for completion. Students must submit this appeal no less than one trimester before reaching the 10-year degree completion time limit.

Course Materials Policy

The faculty requires that students submit course materials for all math, science, and technology component courses taken outside of Excelsior College after enrollment in the program. Course materials should include graded homework, quizzes, tests, lab reports, papers, and other student work as appropriate. Course outlines/syllabi should be included as well. This material is required for curriculum review and accreditation purposes. Once we have received your transcript indicating completion of a course and the corresponding student work materials, credit for the course will be added to your evaluation.

Policies Specific to the MBA

The Excelsior College Student Policy Handbook is your resource for understanding the academic and administrative policies that are important to your academic success. It includes a wide range of information from important federal policies, including your right to privacy, to grading policies and policies and procedures concerning refunds, withdrawals, and other administrative issues. It is your responsibility to be familiar with these policies.

Policies and procedures that apply specifically to the MBA program are listed on the following pages. File your handbook with this program catalog and your other important academic papers for easy reference.

Admissions Policy

Students with a bachelor's degree from an accredited institution may be admitted into the Excelsior College MBA program. Students who have completed an undergraduate degree program outside the U.S. are required to submit transcripts of undergraduate and graduate work to Education Credential Evaluators Inc. (ECE). Evaluators will review your undergraduate degree program to verify that it is the equivalent to a bachelor's-level degree in the United States. Students choosing to work with ECE should request that a Course by Course Report, indicating the completion of their bachelor's degree, be conducted and forwarded to Excelsior College. In addition, any graduate courses

submitted for transfer require a Subject Analysis Report. More information about ECE is available on its website at www.ece.org/excelsior. The GMAT is not required.

Application Process

You are required to apply for admission into the Excelsior College MBA program. Visit our website at www.excelsior.edu/apply. Please submit an official college transcript verifying completion of a baccalaureate degree along with official transcripts of any graduate-level study you wish to be considered for transfer toward the MBA requirements. Upon review of the transcripts and application, if qualified, you will receive an admittance letter.

Acceptance of Transfer Credit

Graduate-level coursework that has been completed within 10 years of the date of enrollment may be used to satisfy the requirements of the MBA program if approved by Excelsior College faculty. Students may transfer up to 24 credits. Excelsior College will require a minimum grade of B- for any approved graduate course accepted for transfer credit. Excelsior College does not use pluses or minuses, so such grades will be converted to the full letter grade. To accept a course that is transferring in with a P grade, the college/department/faculty member issuing the P grade must verify that it is equivalent to a B- or better. Waivers for foundation courses will apply toward the 24 credits allowed in transfer.

Maximum Time to Complete the MBA Program

Students pursuing the MBA have a maximum of 10 years from the date of enrollment to complete the program.

Grade Point Average

Excelsior College requires an overall 3.0 cumulative GPA for completion of the MBA. Refer to the Student Policy Handbook for complete information.

Credit for the National Registry of Radiation Protection Technologists (NRRPT)^①

The American Council on Education (ACE) College Credit Recommendation Service recommends the awarding of between 24 and 30 college credits for members accepted to the National Registry of Radiation Protection Technologists (NRRPT) from November 1978 to the present. Excelsior College recognizes the credit recommendations of the ACE College Credit Recommendation Service.

The Excelsior College faculty has reviewed the ACE credit recommendation toward the nuclear engineering technology requirement and will award 6 or 8 upper level credits toward the health physics/ radiation protection requirement, depending on when the credit was earned. The remaining credits will be applied toward the nuclear engineering technology electives. Credit will be awarded upon receipt of official documentation from the NRRPT.

Credits from Training Programs Completed at United States Nuclear Power Plants That Are Accredited by the National Academy for Nuclear Training (NANT)^①

The Excelsior College Nuclear Engineering Technology Faculty evaluated several of the standardized training programs at nuclear power facilities that are accredited by NANT. The 10 utility training programs that have been evaluated for college credit are:

- ▶ Shift Technical Advisor
- ▶ Senior Reactor Operator
- ▶ Reactor Operator
- ▶ Non-licensed Operator
- ▶ Engineering Support Personnel
- ▶ Radiation Protection Technician
- ▶ Chemistry Technician
- ▶ Electrical Maintenance Technician
- ▶ Instrumentation and Controls Technician
- ▶ Mechanical Maintenance Technician

^① Students may earn between 24 and 52 credits, depending on the utility training program completed. Contact a technology academic advisor for details.

Credits from Training Programs Completed at the United States Navy Nuclear Power School and Prototype^②

The Excelsior College Nuclear Engineering Technology Faculty evaluated several of the standardized training programs at the United States Navy Nuclear Power School and Prototype, and Excelsior College recognizes the credit recommendations of the ACE College Credit Recommendation Service. The standardized training programs that have been evaluated for college credit are:

Nuclear Field 'A' School	
MM, January 2007–present	12–27 credits
EM and ET, January 2004–present	
Navy Nuclear Power School	
January 2007–present	32–34 credits
Prototype Training	
January 2007–present	15 credits

^② Graduates of the United States Navy Nuclear Power School and Prototype may earn between 59 and 76 credits, depending on the specific training program completed. Contact a technology academic advisor for details.



Bachelor of Science in Nuclear Engineering Technology to Master of Business Administration (Dual Degree Track)

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CREDITS**

ARTS AND SCIENCES COMPONENT			CREDIT HOURS
▶ Communications (Must include 6 credits in the Written English Requirement)			9
▶ Humanities			3
▶ Ethics			3
▶ Social Sciences/History			
Organizational Behavior ^①	Economics ^①		9
▶ Mathematics and Natural Sciences			
Mathematics: 12 credits at the level of College algebra or above, including Calculus I and II			26
Natural Sciences: Physics I and II with at least one lab, Chemistry with lab, Atomic Physics, Nuclear Physics, and Thermodynamics			
▶ Arts and Sciences Electives			
Quantitative Methods ^① (Statistics is a prerequisite)			10
TOTAL CREDITS FOR ARTS AND SCIENCES COMPONENT			60
NUCLEAR ENGINEERING TECHNOLOGY COMPONENT			CREDIT HOURS
▶ Core Requirements			
Electrical Theory	Health Physics/Radiation Protection	Fluids	48
Computer Applications	Radiation Measurement Lab	Heat Transfer	
Fundamentals of Reactor Safety	Plant Systems Overview	NUC 495 Integrated Technology Assessment (capstone) ^②	
Material Science	Reactor Core Fundamentals	Nuclear Technology Electives	
▶ Required Labs			
Chemistry	Physics	Radiation Measurement	2 Technology or Natural Science Labs
▶ Concentration Requirements: One of the following concentrations must be declared (see page 71)			
General Concentration	Nuclear Cybersecurity	Nuclear Leadership	
TOTAL CREDITS FOR NUCLEAR ENGINEERING TECHNOLOGY COMPONENT (16 CREDITS MUST UPPER LEVEL)			48
FREE ELECTIVE COMPONENT			CREDIT HOURS
▶ Any concentration requirement of free electives: May include any excess credit in Arts and Sciences, Business, or any applied professional area.			9
▶ Information Literacy			1
TOTAL CREDITS FOR FREE ELECTIVE COMPONENT			10
GRADUATE PHASE: (30 total graduate credits required)			
Students achieve graduate status upon completion of the bridge component and all other undergraduate requirements.			
BRIDGE COMPONENT			CREDIT HOURS
▶ Information Technology			3
▶ Global Business Environment			3
TOTAL CREDITS FOR BRIDGE COMPONENT			6
GRADUATE COURSE COMPONENT			CREDIT HOURS
Accounting for Managers	Operations Management	Strategy and Policy (capstone) ^②	30
Marketing	Leadership	Electives (9 elective or concentration course credits)	
Managerial Finance	Project Management Principles and Applications		
TOTAL CREDITS FOR GRADUATE COURSE COMPONENT			30
TOTAL CREDITS FOR GRADUATE PHASE			36
TOTAL DEGREE CREDITS REQUIRED			154

^① Must be taken at the upper level and completed with a grade of B or above within the past 10 years.

^② NUC 495 Integrated Technology Assessment and BUS 511 Strategy and Policy are the required capstone courses and must be taken through Excelsior College. They cannot be transferred in.

GRADUATE DEGREE PROGRAM IN TECHNOLOGY

MASTER OF SCIENCE IN CYBERSECURITY

The Master of Science in Cybersecurity is designed to enable students to pursue their career goals within critically important cybersecurity field. This program provides professionals with the techniques and knowledge to protect the organization's cyber assets by focusing on prevention, detection, countering, and recovering from cyber incidents. The curriculum focuses on aspects of cyber security, including strategies, policy, ethics and legal compliance, operational process, and technology to secure and defend an organization's cyber assets. This program is suited for professionals who aim to pursue senior-level technical or managerial positions in cybersecurity such as information security officer, cybersecurity manager, senior security analyst, security and compliance manager, director IT security and governance, digital crime investigator, or penetration tester.



Program (Student) Outcomes

Upon successful completion of the Excelsior College Master of Science in Cybersecurity program, the graduate will be able to:

1. Continuously monitor, maintain, and enhance the protection of enterprise-wide information assets through effective industry accepted information management and risk management techniques.
2. Detect, analyze, and respond to cyber-attacks on networks and computer systems.
3. Conduct risk and vulnerability assessments of existing and proposed information systems.
4. Utilize the best sources of information available related to cyber security issues, threats, and recovery.
5. Demonstrate the ability to understand professional, ethical, and social responsibility, including the effect of culture, diversity, and interpersonal relations.
6. Demonstrate proficiency in communicating technical information in formal reports, documentation, and oral presentations to users and information technology professionals.
7. Demonstrate a commitment to professional development and to continue to engage in lifelong learning.

Concentrations

General

The General concentration allows students to develop a personalized specialization that spans multiple cybersecurity concentrations. Student can tailor their concentration to their specific career goals, providing them with flexibility in developing their specialized knowledge and skills in cybersecurity.

Concentration Requirements

9 credits of approved technical electives

Information Assurance

The Information Assurance concentration is designed as a specialization for an individual who wishes to be hands-on while combating cybersecurity threats. The focus will be on software control management tools, software integration, cyber defense mitigation, and digital forensics. The three classes within this concentration will allow students to gain the needed knowledge of both hardware and software issues. Individuals who specialize in cyber operations will be prepared to be on the front line of defense for companies.

Concentration Outcomes

1. Develop a secure coding environment to maintain and protect source code for securing applications.
2. Recommend software appropriate for defending against cyber attacks.
3. Demonstrate knowledge of digital forensics and how it can be used to assist with an investigation.

Concentration Requirements (3 credits each)

- ▶ CYS 523 Software and Application Security (3 credits)
- ▶ CYS 526 Cyber Attacks and Defense (3 credits)
- ▶ CYS 586 Digital Forensics and Investigations (3 credits)

Medical Data Security

The Medical Data Security concentration of the Master of Science in Cybersecurity is designed for the individual who wants a specialization in the medical aspect of cybersecurity. The focus will be on identification, application, and integration of cybersecurity issues within the medical field. The three classes in the concentration will allow students to have specialized knowledge in the specific risks and policies that preside over health care cybersecurity. Individuals who specialize in Medical Data Security will be prepared to help defend against security breaches while implementing policies, helping the other employees be more secure.

Concentration Outcomes

1. Work with team members to evaluate and associate information systems in the data analysis process.
2. Develop and implement security policies that pertain to health care.
3. Evaluate cybersecurity best practices within the health care field.

Concentration Requirements (3 credits each)

- ▶ CYS 555 Cybersecurity in Healthcare
- ▶ CYS 556 Healthcare Information Systems
- ▶ CYS 557 Healthcare Standards and Policy

Policy Administration

The Policy Administration concentration of the Master of Science in Cybersecurity is designed for the individual who wants specialized knowledge of security policies creation and integration into organizations. The focus will be on security policies and governance, global cybersecurity issues, risk analysis, and assessment. The three classes in the track will allow students to have a specialized knowledge in cybersecurity policy creation, development, and governance. Individuals who specialize in policy administration will be able to apply this knowledge to perform proper risk analysis and help determine the best course of action for risk mitigation.

Concentration Outcomes

1. Effectively communicate cybersecurity information, including development and implementation of organizational cybersecurity policies and procedures.

2. Develop and implement organizational cybersecurity policies and procedures.
3. Integrate cybersecurity policies into common business process.

Concentration Requirements (3 credits each)

- ▶ CYS 545 Security Policy and Governance
- ▶ CYS 575 IT Risk Analysis and Management
- ▶ CYS 577 Global Cybersecurity

Policies Specific to the Master of Science in Cybersecurity

The Excelsior College Student Policy Handbook is your resource for understanding the academic and administrative policies that are important to your academic success. It includes a wide range of information from important federal policies, including your right to privacy, to grading policies and policies and procedures concerning refunds, withdrawals, and other administrative issues. It is your responsibility to be familiar with these policies. File your handbook with the program catalog and your other important academic papers for easy reference.

Time Limit on Courses and Exams

Due to the rapidly changing nature of technology, Excelsior College has established a time-related restriction on the application of credits applied to the Master of Science in Cybersecurity. To meet this requirement, relevant coursework must have been completed more recently than 5 years prior to entrance into the Master of Science in Cybersecurity degree program. Please note that course content in these areas is subject to faculty approval. The time limit may be appealed by completing an appeal form which verifies appropriate and current professional and/or academic experience.

Time Limit for Degree Completion

Excelsior College degree programs are designed, within limits, to be completed at a student's own pace. However, students must make continuous progress toward their academic goals. Students will be dismissed if they do not complete the Master of Science in Cybersecurity at the conclusion of 5 years from their entrance into the program. Students may seek an extension of the time limit by completing an appeal form, which will outline a plan for completion. Students must submit this appeal no less than one trimester before reaching the 5-year degree completion time limit.

Grade Point Average

Excelsior College requires an overall 3.0 cumulative GPA for completion of the Master of Science in Cybersecurity. No more than two Excelsior College courses with C grades can be applied toward the degree; these C grades must be offset by A grades in other Excelsior College courses. Refer to the Student Policy Handbook for complete information.

Application and Admissions Information for Master of Science in Cybersecurity

Admissions Policy

Students with a bachelor's degree from a regionally accredited institution, or the foreign equivalent, may be admitted into the Excelsior College Master of Science in Cybersecurity program.

Application Process

You are required to apply for admission to the Excelsior College Master of Science in Cybersecurity program. Visit our website at www.excelsior.edu/apply. Please submit an official college transcript verifying completion of a baccalaureate degree along with official transcripts of any graduate-level study you wish to be considered for transfer toward the Master of Science in Cybersecurity requirements. Upon review of the transcripts and application, if qualified, you will receive an admittance letter.

Acceptance of Transfer Credit

Graduate-level coursework that has been completed within five years of the date of enrollment may be used to satisfy the requirements of the Master of Science in Cybersecurity program if approved by Excelsior College faculty. Students may transfer up to 15 credits. Excelsior College will require a minimum grade of B- for any approved graduate course accepted for transfer credit. Excelsior College does not use pluses or minuses, so such grades will be converted to the full letter grade. To accept a course that is transferring in with a P grade, the college/department/faculty member issuing the P grade must verify that it is equivalent to a B- or better.

Degree Requirements

The Master of Science in Cybersecurity program requires a minimum of 30 graduate-level credits, with 10 required courses. Students in this program are allowed to transfer in a maximum of 15 approved, graduate-level credits, thus, requiring a minimum of 15 credits to be taken directly at Excelsior College.

Required Subjects

- ▶ Foundations of Cybersecurity (3 credits)
[CYS 500 Foundations of Cybersecurity]
- ▶ Network and Communication Security (3 credits)
[CYS 504 Network and Communication Security]
- ▶ Project Management (3 credits)
[BUS 530 Project Management Principles and Application]
- ▶ Ethics, Legal, and Compliance Issues in Cybersecurity (3 credits)
[CYS 541 Ethics, Legal, and Compliance Issues in Cybersecurity]
- ▶ Leadership and Communication in Cybersecurity (3 credits)
[CYS 550 Leadership and Communication in Cybersecurity]
- ▶ Information Assurance (3 credits)
[CYS 560 Information Assurance]
- ▶ Cybersecurity Capstone (3 credits)
[CYS 596 Cybersecurity Capstone]—The capstone course is required and must be taken through Excelsior College. It cannot be transferred in.]



Master of Science in Cybersecurity

30
CREDITS

CORE REQUIREMENTS

CREDIT HOURS

- ▶ Foundations of Cybersecurity
- ▶ Network and Communication Security
- ▶ Project Management
- ▶ Ethics, Legal, and Compliance Issues in Cybersecurity
- ▶ Leadership and Communication in Cybersecurity
- ▶ Information Assurance
- ▶ Cybersecurity Capstone

CONCENTRATION REQUIREMENTS

One of the following concentrations must be declared (see page 77 for requirements)

General

Information Assurance

Medical Data Security

Policy Administration

TOTAL DEGREE CREDITS REQUIRED

30

CERTIFICATE PROGRAMS IN TECHNOLOGY



Certificate programs provide the opportunity to gain expertise in a particular field of study by concentrating on core elements within an accelerated framework. The career benefits from obtaining a certificate include, but are not limited to, promotion, salary increases, employee recognition, or simply personal achievement.

Our certificate programs can be completed in a relatively short period of time; therefore, for some, this approach may prove more practical and time efficient than a full degree program. Certificate programs are also a great way to help determine whether going back to school is right for you, because you are not committing to an entire degree program.



Credits earned for the undergraduate Cybersecurity certificate may transfer into the Bachelor of Science in Business or Information Technology programs, or the Bachelor of Science with a major in Criminal Justice from the School of Public Service.

Credits earned for the graduate Cybersecurity Management certificate may transfer into the MBA or Master of Science in Cybersecurity from the School of Business & Technology, or the Master of Science in Criminal Justice from the School of Public Service.

Contact your academic advisor for more information.

UNDERGRADUATE CERTIFICATE IN CYBERSECURITY

The undergraduate certificate in Cybersecurity focuses on providing learners with an overview of the basic principles, techniques, policies, and operational procedures in securing information assets and detecting cybersecurity attacks. The undergraduate certificate in Cybersecurity will prepare learners to pursue entry-level careers in information security technical support, incidence response, and digital crime investigation.

Program (Student) Outcomes

The undergraduate certificate in Cybersecurity is cross-listed between the School of Business & Technology and the School of Public Service. This 18-credit undergraduate certificate comprises introductory courses in cybersecurity technology and fundamental knowledge in cyber crime investigation.

All students will be required to complete the capstone course, **CYS 460 Security Investigations and Case Studies**, at Excelsior College. Approved courses from other institutions may be accepted in transfer for the remaining requirements.

Upon successful completion of the Excelsior College undergraduate certificate in Cybersecurity, the student will be able to:

1. Explain incident response handling, incident coordination, and ethical and legal issues.
2. Explain the process of building and coordinating a Security Incident Response team and a Product Security team.
3. Assess security risk and vulnerability of existing and proposed information systems.
4. Investigate cyber crime and apply best practices for managing attack situations with a Security Incident Response team.
5. Explain how to build relationships with other Incident Response teams, organizations, and law enforcement to improve incident response effectiveness.

Course Requirements

- ▶ **CYS 260 Governance, Legal and Compliance** (3 credits)
- ▶ **CYS 300 Computer System Security Fundamentals** (3 credits)
- ▶ **CYS 401 Organizational Information Security** (3 credits)
- ▶ **CYS 450 Security Focused Risk Management** (3 credits)
- ▶ **CYS/CJ 475 Large-Scale Cyber Crime and Terrorism** (3 credits)
- ▶ **CYS 460 Cybersecurity Investigations and Case Studies (capstone)** (3 credits)^①

TOTAL CREDITS: 18

^① **CYS 460 Cybersecurity Investigations and Case Studies (capstone)** is the required capstone course and must be taken through Excelsior College. It cannot be transferred in.

GRADUATE CERTIFICATE IN CYBERSECURITY MANAGEMENT

The graduate certificate in cybersecurity management provides professionals with the techniques and strategies to manage cybersecurity threats at enterprise, national and global levels. The graduate certificate program in cybersecurity management prepares learners to pursue careers in security compliance, legal, and risk management in positions such as security compliance officer, security risk analyst, security training manager, or IT security coordinator.

Program (Student) Outcomes

The 18-credit graduate certificate in Cybersecurity Management is a graduate-level certificate composed of five graduate-level courses. This certificate will serve as a lead-in to the MBA concentration in Cybersecurity Management or the Master of Science in Cybersecurity.

Depending on content, students may transfer up to 8 credits into the certificate program. All students must complete the capstone course, **CYS 591 Capstone Project in Cybersecurity**, at Excelsior College.

Upon successful completion of the graduate certificate in Cybersecurity Management, the student will be able to:

1. Apply effective information security techniques to monitor, maintain, and enhance the protection of enterprise-wide information assets.
2. Implement an Incident Response team that legally, ethically, and efficiently responds to cyber incidents.
3. Detect, analyze, and respond to cyber attacks on networks and computer systems.
4. Conduct risk and vulnerability assessments of existing and proposed information systems.
5. Utilize the best sources of information available related to cyber-security issues, threats, and recovery.
6. Apply strategies to build relationships with other Incident Response teams, organizations, and law enforcement to improve incident response effectiveness.

Course Requirements

- ▶ **CYS 500 Foundations of Cybersecurity**
- ▶ **CYS 504 Network and Communication Security**
- ▶ **CYS 541 Ethics, Legal and Compliance Issues in Cybersecurity**
- ▶ **CYS 550 Leadership and Communication in Cybersecurity**
- ▶ **CYS 560 Information Assurance**
- ▶ **CYS 591 Capstone Project in Cybersecurity^①**

TOTAL CREDITS: 18

^① **CYS 591 Capstone Project in Cybersecurity** is the required capstone course and must be taken through Excelsior College. It cannot be transferred in.

COURSES

All courses are delivered online. The following includes a list of all undergraduate and graduate level courses (refer to the Business Catalog for descriptions of the BUS courses).

Remember to contact your academic advisor for approval prior to registering for any courses to ensure that they will apply toward your degree. Not every course is offered every term. It is important that you work closely with your academic advisor before the start of each term to discuss course registration plans and options.

UNDERGRADUATE LEVEL

CYS 203 Introduction to Microprocessors 3 credits

The course introduces the fundamental principles, operations and applications of microprocessors. The architecture and organization of microprocessors including hardware, software and peripheral interfacing will be covered. In addition, the basic organization and function of microcontrollers will also be covered.

Principles and applications of microprocessors, including hardware and software, interfacing, assembly language programming, and microprocessor-based systems. Eight, 16, and 32-bit microprocessor technology and features are presented. This course contains a lab component.

CYS 245 Introduction to Cybersecurity 1 credit

The course provides students with an introduction to the basic and fundamental concepts of cyber security from both a technical and managerial perspective. Students will gain insight on common cyber-attacks and the techniques for identifying, detecting and defending against cyber security threats. The course will cover the basics of physical, network and web security as well as standards and laws in Cybersecurity. The knowledge gained in this course will provide students with a concrete foundation to further master the concepts of Cybersecurity.

CYS 260 Governance Legal and Compliance 3 credits

To minimize liabilities and reduce risks from cyber security threats and reduce the losses from legal action, the information security practitioner must understand governance, compliance, and the legal environment and stay informed of emerging laws and regulations. This course will introduce you to the challenges of governance, ethics, legal, and regulatory compliance through the eyes of information security professionals. We will examine compliance requirements in response to key mandates and laws, including Sarbanes-Oxley,

HIPAA, Privacy, Gramm-Leach-Bliley, the Foreign Corrupt Practices Act (FCA), and the Payment Card Industry Data Security Standards (PCI DSS). Lastly, we will examine some of the challenges of compliance and ethics in the practice of Information Security.

CYS 300 Computer System Security Fundamentals 3 credits

This course provides an introduction to all aspects of computer security. It describes threats and types of attacks against computers to enable students to understand and analyze security requirements and define security policies. In the course we will discuss major models in computer security such as Bell-La Padula, Biba, and Clark-Wilson, and compare their properties and roles in implementation. Security mechanisms and enforcement issues will be introduced and security features of major application systems will be discussed as practical examples. Other topics include cryptography, planning for security, risk management, security standards, law, and ethics.

CYS 345 Cybersecurity Defense in Depth 3 credits

This course examines the world of cybersecurity risks and defenses which pose significant threats to governments and businesses. This course will provide knowledge, skills, and techniques to identify and address the many cybersecurity threats facing our world today. This course will provide a framework for current and future cybersecurity threats by first examining the history of cybersecurity. The course will then apply lessons learned in the past to current cybersecurity risks and defenses. Lastly, the course will attempt to predict future cybersecurity concerns and the necessary preparations needed to defend against them. This course will examine how IT security threats are constantly evolving and provide insight into cybersecurity defenses from business and government perspectives using real-world scenarios to demonstrate actual cybersecurity threats and the strategies used to defend against those threats.

CYS 350 Cybersecurity Defense in Depth for the Nuclear Industry 3 credits

The course examines the world of cybersecurity risks and defenses which poses significant threats to the nuclear industry infrastructure. This course will provide knowledge, skills, and techniques to identify and address the many cybersecurity threats facing the nuclear industry today. This course will provide a framework for current and future cybersecurity threats by first examining the history of cybersecurity. The course will then apply lessons learned in the past to current cybersecurity risks and defenses. Lastly, the course will attempt to predict future cybersecurity concerns and the necessary preparations needed to defend against them. This course will examine how IT security threats are constantly evolving and provide insight into cybersecurity defenses from a nuclear industry perspective using real-world scenarios to demonstrate actual cybersecurity threats and the strategies used to defend against those threats.

This is a 3-credit course, requiring a minimum of 18 hours of course engagement each week in an 8-week term, or 9 hours per week in a 15-week term (refer to the *Credit Hours Calculation Policy* in the [Student Handbook](#)), Course engagement includes such activities as discussions, reading, study time, and assignments.

CYS 400 Reverse Engineering 3 credits

This course will focus on providing students the knowledge, skills, and hands-on experience in using reverse engineering to deduce the design of a software component to determine how it accomplishes its goals. Specific topics include reverse engineering software tools and techniques for software recovery such as malware analysis, de compilation of code, intellectual property protections such as digital rights management, and communication protocols utilizing static and dynamic techniques.

CYS 401 Organizational Information Security 3 credits

The course will provide learners with knowledge in the broad outlines of implementing information security initiatives in organizations. The course will cover the technical concepts as well as the managerial, operational and policy dimensions of information security. The learners will also examine the personnel and organizational skills required to manage information security initiatives in organization consisting of staffing, training, certifications and ethical responsibilities.

CYS 403 Network and Application Security 3 credits

This course covers the foundations of network security and provides an in-depth review of commonly used security mechanisms and techniques, security threats and network-based attacks, applications of cryptography, authentication, access control, intrusion detection and response, security protocols (IPsec, SSL, Kerberos), denial of service, viruses and worms, software vulnerabilities, Web security, wireless security, and privacy. Additionally the course covers important network security tools, applications, and methods for preventing breaches.

CYS 426 Cyber Attacks and Defense 3 credits

This course introduces ethics, laws, metrics, methodologies, project management, tools, techniques, purposes, and practices of penetration testing aka ethical hacking as a proactive measure to improving the overall security posture of a system or network. The students will learn to assess target systems and networks for vulnerabilities and exploits, detect security threats, and recommend and implement defensive, corrective, and preventative measures based on penetration test results.

CYS 450 Security Focused Risk Management 3 credits

This course will focus on providing you with insights, guidance and best practices in security focused risk management. Students will review the fundamental principles of security focused risk management. Students will utilize a disciplined and standard approach to risk management including risk identification, risk assessment, risk prioritization, and risk prevention or mitigation. Students will learn to identify classes of possible vulnerabilities, threats, attack vectors, consequences and mitigation strategies.

CYS 455 Business Continuity 3 credits

This course focuses on two important aspects of information security—data integrity and data availability. Malicious attacks, natural disasters, and unplanned events can threaten the availability and integrity of an organization's data assets. This course emphasizes the development of business continuity and disaster recovery plans that result in action plans to mitigate the effect of a breach in security or the occurrence of a disaster.

CYS 456 Securing Mobile and Cloud Computing Environments 3 credits

This course covers the secure design and management of ubiquitous computing environments formed by the convergence of fixed and mobile devices, shared services, cloud computing, and other Internet-based computing methods. Students learn best practices and challenges associated with managing these heterogeneous environments and ensuring their ability to communicate in a secure manner.

CYS 460 Cybersecurity Investigations and Case Studies 3 credits

This course is a capstone course for the Undergraduate Certificate in Cybersecurity. It provides a comprehensive analysis of the methods, tools, and best practices for handling, responding, and investigating cybersecurity incidents and product vulnerabilities. It covers building a security Incident Response Team (IRT) and a Product Security Team for security vulnerability handling. Students review legal issues from a variety of national perspectives and consider practical aspects of coordination with other organizations.

CYS 465 Cybersecurity Investigation and Case Studies in the Nuclear Industry 3 credits

This course provides a comprehensive analysis of the methods, tools, and best practices for responding to cyber security incidents and product vulnerabilities in the nuclear industry. It covers building a computer security incident response team (CSIRT) and a product security team (PST) for security vulnerability handling. It includes a discussion of the best practices on conducting a cybersecurity investigation, which minimizes potential damage while ensuring proper handling of electronic data collection. Students review legal issues from a variety of national perspectives and consider the practical aspects of coordination with other organizations.

CYS 470 Secure Software Development 3 credits

In today's environment, perimeter and infrastructure security is not enough to mitigate security attacks against data and information stored, transmitted, and processed by computer systems. In order to design and build secure IT systems, all elements of the system need to be secure. Unfortunately, more and more security vulnerabilities are exploited due to insecure software systems. This course gives insight, guidance, and best

practices in the design, development, and testing of secure software systems.

CYS 475 Large-Scale Cybercrime and Terrorism 3 credits

This course examines cyber crime and terrorism in a global context and focuses on large-scale incidents that effect international security. The foundation of the course emphasizes the evolution of cyber crime and terrorism within the context of globalization and the increasing complexity of cyber crime and international, nation-less decentralized terror networks. The course discusses the relationship of cyber crime and uses of information technology that cultivated and sustained current international terror networks. The course also discusses emerging trends and potential threats such as electromagnetic pulse attacks (EMPs) and methods (and limitations) to confront large-scale cyber crime and terrorism such as advanced data mining techniques by the intelligence community and use of fusion centers.

CYS 480 System Security Engineering 3 credit

The course will present a system engineering and management perspective of information security. Learners will examine what drives the requirements and specifications for information security and how it can be integrated in to the systems design process and life cycle management of information systems. The course will also cover the basics of U.S federal government information security policies and methodologies.

CYS 496 Cybersecurity Capstone 3 credits

This capstone course will examine computer security technologies and principles, including access control, authentication, external attacks, software security, security assessment and testing, and legal issues in cybersecurity. This course includes a final research project that will expose students to real-life scenarios in cybersecurity.

ELEC 152 Circuit Theory I 4 credits

This course is an introduction to the basic principles of DC electricity. Topics covered include: current, voltage, resistance (both linear and non-linear), Ohms Law, work and power, series and parallel resistance, resistance networks, Kirchhoff's Law, network theorems (Norton's, Thevenin's, superposition, and Millman's), mesh and nodal analysis, inductance, capacitance, and time constants. This course contains a lab component.

ELEC 153 Circuit Theory II 4 credits

This course presents the principles and applications of alternating current circuits, the sine wave, reactance, complex algebra and phasors, impedance, power in AC circuits, series and parallel impedances, impedance networks, and resonance. This course contains a lab component.

ELEC 160 Electronics I 4 credits

This course is an introduction to the study of semiconductor devices such as PN-junction diodes, Bipolar Junction Transistors (BJT), Field-Effect Transistors (FETs,) and Metal-Oxide Semiconductor Field-Effect Transistors (MOSFET), which enable students to perform analysis of DC transistors biasing; small-signal single and multi-stage amplifiers using BJTs, FETs, and MOSFETs; and frequency response of transistor single and multi-stage amplifiers. This course contains a lab component.

ELEC 161 Electronics II 4 credits

This course overviews the analysis and application of advanced electronic circuits. Topics include differential amplifiers, stage gain in decibels, input and output impedances, linear Integrated Circuit (IC) operational amplifiers, frequency response, Bode plots, active filters, D/A and A/D circuits, oscillators, and high frequency amplifiers. The course emphasizes troubleshooting of test circuits and analysis based on computer simulation. This course contains a lab component.

ELEC 201 Digital Electronics 4 credits

This course presents the principles and applications of digital circuits. Topics include number systems, binary arithmetic, logic gates and Boolean algebra, logic families, combinational and synchronous logic circuit design, logic minimization techniques (Karnaugh maps, Quine-McCluskey), counters, shift registers, encoders and decoders, multiplexors and demultiplexors, and interfacing. This course contains a lab component.

ELEC 202 Microprocessors 4 credits

This course presents the principles and applications of microprocessors, including hardware and software, interfacing, assembly language programming, and microprocessor-based systems. It presents 8, 16, and 32-bit microprocessor technology and features. This course contains a lab component.

ELEC 210 Programmable Logic Controllers 3 credits

This course introduces students to programmable logic controllers (PLCs) and their applications. Topics include PLC programming, troubleshooting, networking, and industrial applications. This course contains a lab component.

ELEC 305 Introduction to Nanotechnology 3 credits

This course is an introduction to the underlying principles of nanotechnology, nanoscience, and nano-engineering. It introduces scientific principles and laws relevant on the nanoscale and discusses applications in engineering, physics, chemistry, and biology.

ELEC 306 Advanced Digital Design 3 credits

This course builds on the student's background from a first course in logic design and microprocessors. Systematic design methods for synthesizing sequential digital circuits using hardware description language HDL are covered, while details of its associated languages too are brought to familiar ground. Specification, modeling, and design principles of sequential systems, as well as design implementation and testing using programmable logic devices and Computer Aided Design (CAD) tools are studied. The course includes laboratory experiments and a group project.

ELEC 307 Microcontrollers 3 credits

This course builds on the student's background from a first course in logic design and microprocessors. This course discusses various concepts used in the design of microprocessor/microcontroller based systems. It also provides a detailed study of microprocessor/microcontroller applications in data acquisition and process control systems. The course includes laboratory experiments and a group project.

ELEC 310 Basic Nanofabrication Process 3 credits

This course provides an introduction to the basic principles and methods of nanofabrication. It covers such topics as crystal growth, silicon wafer preparation, and the ten-step patterning process. It also includes detailed coverage of the challenges associated with contamination, productivity, and process yields as applied to the nanofabrication of integrated circuits.

ELEC 321 Control Systems 3 credits

This is an introductory course on continuous linear control systems covering analysis, design, and practical applications. Modeling first- and second-order dynamic physical systems, transient response and steady-state analyses, Routh-Hurwitz stability criteria, roles of feedback in controlling steady-state errors, frequency response design methods (Bode, Nyquist), etc. are covered. The course emphasizes the application of established methodology with the aid of examples, calculators, and computer programs such as MATLAB.

ELEC 331 Digital and Analog Communications 3 credits

This course introduces the principles and applications of communication circuits, Radio Frequency (RF) circuit theory (transmitters, receivers), modulation (AM, FM), transmission lines and media, wave propagation, analog versus digital communication techniques, protocols, and communication networks. This course contains a lab component.

ELEC 345 Electrical Machines 3 credits

In this course you will learn about principles and applications of DC motors and generators, ideal transformers and three-phase transformers, three-phase induction machines, equivalent circuit of the induction motor, synchronous generators, and motors.

ELEC 350 Power Electronics 3 credits

This course covers characteristics of power transistors and diodes. Switching-mode DC-DC converters, including buck and boost converters and regulation of DC-DC converters by PWM. Rectification using diodes. Power factor correction. Switch-mode DC power supplies. DC-AC inverters. Applications of power electronics in motor drives, UPS, and power systems.

ELEC 360 Generation and Transmission of Electric Power 3 credits

This course introduces the concept of generation of electrical energy using hydro, thermal, nuclear, and wind; transmission lines and equivalent circuits; power distribution systems including substations, protection, and low voltage distribution; the cost of electricity; direct current transmission; solid state controllers for power flow, and harmonics.

ELEC 370 Instrumentation and Data Acquisition 3 credits

This course provides an introduction to virtual instrumentation and data acquisition. Topics covered include virtual instruments, sub virtual instruments, structures, and data acquisition. This course contains a lab component.

ELEC 410 Nanotechnology Process Equipment 3 credits

This course presents the equipment used in nanofabrication processes at the manufacturing level as well as research and development stages. It covers nanotechnology, 300-mm wafer processing, "green" processes and devices, new fabrication advances and non-vacuum processing tools. Examples of equipment used in applications for micro/nanoelectronics and photovoltaics will be presented, including equipment for doping, layer deposition, device evaluation, and packaging. This course contains a lab component.

ELEC 415 Introduction to Nanofabrication Manufacturing Technology 3 credits

This course is an introduction to the fundamentals and applications of nanofabrication manufacturing technology. Topics include etching and micromachining, nanogrinding, laser-based nanofabrication, pulse water drop micromachining, diamond nanogrinding, and commercialization issues of nanotechnology. This course contains a lab component.

ELEC 420 Micro-Electro Mechanical Systems 3 credits

This course focuses on Micro Electromechanical Systems (MEMS) and Nano Electromechanical Systems (NEMS). Topics include MEMS and NEMS architecture, synthesis, modeling, and control. Micro-sensors, micro-actuators, micro-engines, and optical MEMS applications are explored. Electronic applications of MEMS, such as in data storage and biomedical sensors, are also covered. This course contains a lab component.

ELEC 495 (capstone) Integrated Technology Assessment 3 credits

This is the required capstone course for the Bachelor of Science in Electrical Engineering Technology program. It requires students to reflect on their past academic and professional experiences and use the information gained from this reflective exercise to develop learning statements related to the Bachelor of Science in

Electrical Engineering Technology outcomes. The learning statements must be supported by documented evidence that demonstrate that the outcomes have been met. All ELEC 495 students are required to complete an online examination designed to assess the basic knowledge and understanding achieved by senior undergraduates in electrical engineering technology.

IT 210 Object-Oriented Programming 3 credits

This course covers problem solving and algorithm development using the object-oriented programming language Java. Introduction to object-oriented features, including encapsulation, inheritance, and polymorphism. It examines the development of processes of design, coding, debugging, and documentation, and focuses on techniques of good programming style.

IT 221 Introduction to Computers 3 credits

This course provides students with a fundamental knowledge of the computer system and its components, including computer hardware and architecture, application software, operating systems, networks, and the Internet. Advanced topics such as information privacy and security, database and data warehouse, business intelligence, and human-computer interactions will also be introduced in this course. Additionally, students will participate in learning activities to develop the needed skills to work with Microsoft Office suite.

IT 240 Introduction to Programming 3 credits

This course is an introduction to the C++ programming language through a study of the concepts of program specification and design, algorithm development, and coding and testing using a modern software development environment. The student will grasp the basics of both procedural and non-procedural (Object Oriented) Programming. Topics covered include fundamentals of algorithms, problem solving, programming concepts, classes and methods, control structures, arrays, and strings. This course will serve not only as an introduction to programming in C++ but also as a preparation for a more advanced C++ course involving data structures and algorithmic development.

IT 250 Business Data Communications 3 credits

This course offers an overview of the current theory and practice of business data communications and networks. It places emphasis on the role of

the telecommunications industry in the growth of information societies and their reliance on knowledge and information services to stimulate economic growth. The course examines the seven-layered Open Systems Interconnection (OSI) reference model proposed by the International Standards Organization (ISO) and the notion of network architecture to manage information and communications.

IT 321 Computer Systems Architecture 3 credits

This course is an introduction to the basic components and structure of the computer. The course covers in detail basic Boolean algebra, fundamentals of computer design, instruction set principles, RISC/CISC processors, instruction and processor level parallelism, memory hierarchy, pipelining, assembly language, and parallel computer architectures. The course will also address the architecture and microprogramming of the processor.

IT 360 Operating Systems 3 credits

This course offers an introduction to the basic components and structure of a generic operating system. It considers in detail processes, process management and synchronization, threads, interrupts and interrupt handling, memory management, virtual memory management, resource allocation, and an introduction to file systems, protection, and security.

IT 370 Database Management Systems 3 credits

This course examines the technology and impact of the design of database systems on the organization. It covers the application, design, and implementation of database systems. Topics include an introduction to basic database concepts, database design principles including Entity-Relationship (E-R) diagrams and database normalization, SQL queries, transaction management, distributed databases, data warehousing, and database administration. The course focuses on the relational model.

IT 371 Web Design and Development 3 credits

This course will provide practical instruction on the design, creation and maintenance of web pages. The course will cover the fundamental principles of web programming and formatting. This will include learning the difference between client side and server side scripting technologies, effective use of web authoring tools and code development. The course will also cover web design standards and the need for integrating human-computer interaction principles in

web design. The final project in the course will enable learners to apply current development and production practices to design web pages.

IT 375 Human-Computer Interactive Design 3 credits

This course examines human-computer interaction (HCI) and focuses on all aspects of user interface (UI) and user experience (UX) design. Students will explore the fundamental concepts and methods involved in designing digital products, mobile applications, and websites. Students will be challenged to design and prototype a startup digital product in the form of a phone app or Web app/website. The course will be broken down into eight stages (modules) which will cover the concepts and processes that professional designers use every day to design the apps and/or websites that we love using today. For the term project students will begin with the conceptual model and end with a high fidelity prototype of their newly designed mobile app or website. Each module will include assignments, discussions, and other activities related directly to that module.

IT 380 Overview of Computer Security 3 credits

This course will focus on providing you with insights, guidance, and best practices on the principles of information security. Students develop an understanding of the technologies and methods utilized to defend systems and networks. They learn to describe, evaluate, and operate a defensive network architecture employing multiple layers of protection, using technology appropriate for secure mission accomplishment. Students will also examine the various types of vulnerabilities (design and implementation weaknesses), their underlying causes, their identifying characteristics, the ways in which they are exploited, and potential mitigation strategies.

IT 390 Project Management 3 credits

This class is designed to train students in the principles of project management. Students study the skills required of a project manager as well as learn the methodologies, tools and processes used to succeed in this field. Interactive and self-study methods are used to enhance the students' skills in planning and managing project scope, schedules, costs, quality, risks, communications, purchases, human resources and stakeholders.

IT 402 Network Security 3 credits

This course covers the foundations of network security and provides an in-depth review of commonly used security mechanisms and techniques, security threats and network-based attacks, applications of cryptography, authentication, access control, intrusion detection and response, security protocols (IPsec, SSL, Kerberos), denial of service, viruses and worms, software vulnerabilities, web security, wireless security, and privacy. Additionally the course covers important network security tools, applications, and methods for preventing breaches.

IT 404 Web Security 3 credits

This course provides an overview of both Web application security concepts and software security concepts in general, including the current top 10 most critical Web application vulnerabilities identified by the Open Web Application Security Project (OWASP). Additionally the course deals with principles of securing common areas of functionality of Web applications and presents concepts regarding secure development and deployment methodologies, including Microsoft's Security Development Lifecycle (SDL), OWASP's Comprehensive Lightweight Application Security Process (CLASP), the Software Assurance Maturity Model (SAMM), and Building Security In Maturity Model (BSIMM).

IT 406 Computer Forensics 3 credits

This course emphasizes the technical and legal aspects of electronic evidence and the computer forensic investigative process. Topics include the discovery and recovery of electronic evidence stored on or transmitted by computers, networks, and cellular devices.

IT 408 Information Assurance Management 3 credits

This course focuses on the protection of information systems against unauthorized access to or modification of information whether in storage, processing or transit, and against the denial of service to authorized users, including those measures necessary to detect, document, and counter such threats. Emphasizes importance of sensitivity to threats and vulnerabilities of information systems and the recognition of the need to protect data.

IT 410 Fundamentals of Cryptography 3 credits

In this course students will learn the history of cryptography and its role in information assurance. Students will examine the inner workings of various cryptographic models and techniques and will be able to identify the appropriate uses of symmetric and asymmetric encryption. Students will learn how to assign measures of strength based on cryptographic algorithms and keys. This course will focus on applied cryptography, and students will examine various situations and identify the level of cryptographic strength that is needed as well as the implementation factors related to its suitability for use. Lastly, students will understand the common pitfalls and weaknesses associated with the implementation of cryptography techniques, and will understand the challenges and limitations of various key management systems.

IT 422 Advanced Networking 3 credits

This course is a continuation of IT250 Business Data Communications. In this course, students will learn the concepts of routing and switching packets, the configuration and troubleshooting of static routing and dynamic routing scenarios using OSPF, and the configuration and securing of the LAN. LAN topics will include VLANs, Access Control Lists, DHCP, NAT and PAT. Hands-on labs will be used to practice network routing and switching techniques throughout the course.

IT 424 Network Operating Systems 3 credits

This course identifies the main functions of operating systems and network operating systems, and distinguishes between the two. Examines and compares the basic features of common network operating systems such as Novell NetWare, all versions of Windows, Unix, and Linux. It discusses the common examples of network utility software and Internet software, software licensing agreements, and network security and backup/recovery issues.

IT 425 Network Management 3 credits

This course will cover the essentials of network management and monitoring for enterprise networks. This includes the tools, protocols and operational procedures involved in administering and maintaining networks in organizations. The network management standards, technologies, security issues and best practices will be addressed. The knowledge gained will prepare learners

to effectively manage and monitor networks by considering performance and quality of service issues. The course will consist of practical hands-on-labs that will enable learners to apply the concepts of network management in real-time environments.

IT 426 Wireless Technology 3 credits

Describes the infrastructures, components and protocols of a wide range of wireless technologies. The course commences with a brief review of networking fundamentals including software and hardware used for interconnection of traditional wired networks. Examines existing wireless technologies such as global positioning satellite (GPS), cellular digital packet data (CDPD), general packet radio service (GPRS), infrared (IR), the operation and protocols for simplex tone and data paging systems, and local multi-point communication systems (LMCS). Addresses future technologies such as Bluetooth, digital audio broadcast (DAB) and IMT-2000.

IT 430 Network Systems Design and Management 3 credits

This course covers network design and management principles that network analysts, architects, engineers, and administrators must consider when planning, designing, implementing, and maintaining their network. Course topics include network management functions, network and system architectures, data and network communications technologies and protocols, server architectures and network operating systems, network security, and network and system administration. Additional topics covered that impact network design and management include network management tools and applications, wireless network architectures, interoperability, cloud computing, and virtualization.

IT 460 System Administration 3 credits

This course provides learners with the knowledge and hands-on skills necessary to administer systems and its resources. Topics covered include directory services, user account management, file and print services, load balancing, security and user/client administration. Students will setup and manage a fully functioning computer network of systems. Furthermore, through hands-on (labs) assignments, students deal with challenges designed to help them install, configure and manage servers.

IT 495 (capstone)
Integrated Technology Assessment 3 credits

This is the required capstone course for the Bachelor of Science in Information Technology program. It requires students to reflect on their past academic and professional experiences and use the information gained from this reflective exercise to develop learning statements related to the Bachelor of Science in Information Technology outcomes. The learning statements must be supported by documented evidence that demonstrate that the outcomes have been met. All IT 495 students are required to complete an online examination designed to assess the basic knowledge and understanding achieved by senior undergraduates in information technology.

NUC 210 Health Physics and Radiation Protection 3 credits

This course provides a fundamental grounding in the theory and principles of radiation protection relevant to nuclear power plant operations. The course covers the following broad topics: radioactivity & radiation interactions, biological effects of ionizing radiation, radiological approximations and calculations, radiation sources & detectors, radiation protection standards & 10 CFR 20, external & internal dosimetry, workplace & environmental monitoring, radiation protection principles, and handling radiological emergencies.

NUC 211 Radiation Measurement Lab 1 credit

This course provides experience in the use of instruments for the detection and analysis of radiation. Instruments included in the course are gas-filled detectors, scintillation counters, semiconductor detectors, radiation spectroscopy, neutron detectors, dosimetry, external dosimetry, and counting statistics.

NUC 212 Health Physics 3 credits

This course will prepare students for Part I of the Health Physics Certification Examination. Topics covered during the course are a math and science review, interaction with matter, radiation detection instrumentation, radiobiology, dosimetry, ALARA, shielding, standards and regulations, and non-ionizing radiation protection. Course assessments will be similar to questions and format on the Health Physics Certification Examination. It also provides the foundation to prepare the students for the Part II of the Health Physics Certification Examination which will focus on the problem solving skills in Health Physics.

NUC 240 Atomic and Nuclear Physics 4 credits

This course includes the study of the structure of the atom and of the nucleus, of atomic and nuclear energy states, wave-particle duality, electron and nucleon spin, multi-electron atoms, atomic spectra, atomic bonding, electron motion, nuclear reactions, radioactivity, fission, and fusion. It examines the theories postulated and proven that formed the branch of physics known as atomic physics in the late 19th century and early 20th century and became the foundation for the development of nuclear physics and electronics shortly thereafter. This course will enhance learning of reactor physics, radiation safety, electronics, materials science, and chemistry in future courses as well as in your professional and military career.

NUC 245 Thermodynamics 3 credits

This course presents basic thermodynamics concepts, including energy, temperature, specific heat, enthalpy, entropy, and pressure. Topics include the First and Second Laws of Thermodynamics, Rankine power cycles, use of steam tables and Mollier diagrams, and properties of gases, vapors, mixtures, and pure substances.

NUC 250 Introduction to Heat Transfer and Fluid Mechanics 3 credits

This course provides a fundamental grounding in the principles of heat, heat transfer, and fluid mechanics, as they apply to power plant operation. While designed to meet the requirements of the Nuclear Uniform Curriculum Program, specifically Section 1.1.5 Heat Transfer and Fluid Flow of ACAD 08-006 for Non-Licensed Nuclear Operators, this course has broad applicability for anyone interested in power plant technology, regardless of the heat source used. The course covers the following broad topics: temperature, its measurement, and pressure-temperature relationships in power plant steam and water systems; heat, its various forms, mechanisms and mechanics of heat transfer, and the related power plant components used to transfer heat; and fluid mechanics as they relate to heat and heat transport in power plant steam systems and power plant water systems.

NUC 255 AC/DC Electrical Theory 3 credits

This course is a basic concept course covering electrical charge: AC and DC current, voltage, capacitance, inductance, energy, power, Kirchhoff's laws, loop and nodal analysis, linear voltage-current characteristics, and AC and DC motor operation.

NUC 260 Power Plant Components 3 credits

This course will describe the theory, construction and application of mechanical components such as (but not limited to): air compressors, heat exchangers and condensers, pumps, filtration systems, valves, and turbines. This course will also describe the theory, construction, and application of the following as used in the industry: diesel engines, air conditioning, refrigeration, heating and ventilation systems, generators, electrical equipment, valve actuators and electronics and other systems and processes that are plant specific.

NUC 271 Fundamentals of Reactor Safety 3 credits

This course will explain basic concepts related to reactor plant protection, accident analysis, and transient prevention and mitigation of core damage and accident management, and examine and analyze information regarding major industry incidents.

NUC 280 Leading Change in the Nuclear Industry

This course provides learners with the theory and knowledge necessary to lead change in the nuclear industry. Topics include leadership theories associated with organizational change, visionary leadership, changing behaviors, resistance to change, and conflict. Furthermore, discussions will focus on change management processes relevant to the nuclear industry to ensure safe and efficient operation of nuclear facilities.

NUC 285 Leadership Communications in the Nuclear Industry 3 credits

This course will provide students with knowledge and skills to formulate strategies to effectively communicate with stakeholders in the nuclear industry. Students will be able to identify appropriate media and methods of communication as well as develop feedback and monitoring strategies to ensure that the communications are effective. Additionally, students analyze communication strategies and provide an oral presentation of a proposed strategy.

NUC 323 Material Science 3 credits

This course is a study of how materials are used in nuclear engineering applications. Topics include basic nuclear plant operation overview, atomic bonding, crystalline and non-crystalline structures, diffusion, phase diagrams, mechanical and thermal behavior, failure analysis and prevention, structural materials, ceramics, corrosion, radiation effects on materials,

materials commonly used in reactor core and nuclear plant design, and material problems associated with reactor core operation.

NUC 330 Reactor Core Fundamentals 3 credits

This course presents a study of the basics of neutron chain reaction systems. Topics include neutron cross sections, flux, reaction rates, fission processes, neutron production, neutron multiplication, six-factor formula, reactivity, subcritical multiplication, prompt and delayed neutron fractions, reactor period, reactivity coefficients, control rod worth, and fission product poisons.

NUC 350 Plant Systems Overview 3 credits

This course offers an overview of the basic aspects of design, layout, and function of all major systems associated with nuclear power plant designs typically used for U.S. power production. The approach to the course is to build a power plant system by system. Covers major system components, controls, and their design features. Emphasizes the systems' interconnection and functions. Systems are grouped/classified regarding their use and characteristics, e.g. production vs. safety, primary (nuclear interface) vs. balance of plant, active vs. passive. The course includes PWR and BWR web-based simulators to reinforce student knowledge on plant systems.

**NUC 360 Nuclear Leadership—
Leadership Courage/Risk Management** 3 credits

This course will provide students with the knowledge and skills necessary to integrate leadership into operational decisions associated with nuclear power. Students will be able to develop teams and integrate them into the framework of a commercial nuclear business. This will include developing and demonstrating appropriate business acumen as well as demonstrating an understanding of risk in decision making processes. In addition, the course will focus on helping students develop leadership styles appropriate to improving the effectiveness of their future organizations.

**NUC 495 (capstone)
Integrated Technology Assessment** 3 credits

The Nuclear Engineering Technology Capstone is an in-depth, student-centered course that requires the integration of theory and practical experience. Students will integrate and apply the theory, technical skills, and professional skills they have learned to offer solutions to a specific nuclear industry event. The project will

analyze the Fukushima Nuclear Accident event from an engineering technical problem, potential consequences if the primary containment failed, and provide a recommendation for a design that would mitigate or prevent future events in which the student will conduct research by exploring, evaluating, and theorizing a solution in a final paper. The capstone course is designed to develop the technical and non-technical competencies of students in an integrated fashion.

TECH 200 Technical Writing 3 credits

This course develops skills in technical writing and communication. The course will cover the basics of technical writing and communication through email, presentation, social media, and word processing.

TECH 201 Foundations of Technology Problem Solving I 4 credits

This course offers an introduction to the basic concepts of calculus and their applications in engineering technology. It discusses use of limits, derivatives, and integrals to solve problems related to different engineering technology disciplines.

TECH 202 Foundations of Technology Problem Solving II 4 credits

This course is a continuation of TECH 201. It focuses on the applications of calculus in engineering technology. Topics include sequences and series, polar coordinates, introduction to ordinary differential equations, eigenvalue solutions, and Laplace transform methods.

TECH 205 Discrete Structures 3 credits

This course provides the mathematical foundations for information technology, including set theory, patterns of inference, elementary combinatorics, automata theory and formal languages, cryptography, and graph theory.

TECH 225 Applied Instrumentation and Control 3 credits

This course focuses on instrumentation; temperature, pressure, and flow measurements; transducers; pneumatic and hydraulic systems; programmable logic controllers; and process control. In this course the students will have the opportunities to explore the characteristics and operations of different types of transducers and measuring instruments. The importance of system models as well as their relationship between process control will also be covered in this course.

TECH 230 Technology and Society 3 credits

This course considers technological change from historical, artistic, and philosophical perspectives and its effect on human needs and concerns. Emphasis is placed on the causes and consequences of technological change and the evaluation of the implications of technology.

TECH 233 Electrical Power Distribution 3 credits

This course provides an overview of the design, operation, and technical details of modern power distribution systems, including generating equipment, transmission lines, plant distribution, and protective devices. It includes calculations of fault current, system load analysis, rates, and power economics.

TECH 250 Renewable Energy Overview I: Solar and Geothermal 3 credits

This course offers an overview of solar (photovoltaic) energy, solar thermal energy, and geothermal energy. It also describes green building technologies (sustainable systems design). Political, economic, and environmental impact will also be discussed.

TECH 251 Renewable Energy II: Wind and Water 3 credits

This course offers an overview of wind energy and water energy in both commercial and noncommercial applications. It continues discussion from TECH 250 regarding sustainable system design regarding green building technologies. Political, economic, and environmental impact will also be discussed.

TECH 290 (capstone) Integrated Technology Assessment 3 credits

This is the required capstone course for the Associate in Applied Science in Technical Studies program. It requires students to reflect on their past academic and professional experiences and use the information gained from this reflective exercise to develop learning statements related to the Associate in Applied Science in Technical Studies outcomes. The learning statements must be supported by documented evidence that demonstrate that the outcomes have been met.

TECH 295 (capstone) Integrated Technology Assessment 3 credits

This is the required capstone course for the Associate in Science in Technology program. It requires students to reflect on their past academic and professional experiences and use the information gained from this

reflective exercise to develop learning statements related to the Associate in Science in Technology outcomes. The learning statements must be supported by documented evidence that demonstrates the outcomes have been met.

TECH 330 Economic Analysis for Technologists 3 credits

This course studies the application of economics and decision theory to the evaluation of engineering alternatives in planning, developing, constructing, and managing engineering projects.

TECH 340 Introduction to Energy Utilization 3 credits

This course details the high rate of fossil fuel consumption by developed and developing nations, the limited amounts of fossil fuels remaining, and the environmental damage due to their use. Renewable energy sources are encouraged, and renewable energy source data is presented as well as information regarding state-of-the-art renewable energy technologies for the electric power and transportation industries. Renewable energy sources include wind, photovoltaics, fuel cells, and biomass.

**TECH 490 (capstone)
Integrated Technology Assessment 3 credits**

This is the required capstone course for the Bachelor of Professional Studies in Technology Management program. It requires students to reflect on their past academic and professional experiences and use the information gained from this reflective exercise to develop learning statements related to the Bachelor of Science in Technology Management degree outcomes. The learning statements must be supported by documented evidence that demonstrates the outcomes have been met.

**TECH 495 (capstone)
Integrated Technology Assessment 3 credits**

This is the required capstone course for the Bachelor of Science in Technology program. It requires students to reflect on their past academic and professional experiences and use the information gained from this reflective exercise to develop learning statements related to the Bachelor of Science in Technology outcomes. The learning statements must be supported by documented evidence that demonstrates the outcomes have been met.

GRADUATE LEVEL

CYS 500 Foundations of Cybersecurity

This course provides students with knowledge and tools necessary to research cybersecurity threats, identify threats and take action to minimize, mitigate, or eliminate the threats. Additionally, the concepts of continuous training within the organization, and the company-wide impact of cybersecurity are addressed.

CYS 504 Network and Communication Security 3 credits

Prerequisite: CYS 500 Foundations of Cybersecurity

This course is an introduction to network security fundamentals. It is organized in four parts. The first part covers the basics of private key and public key cryptography, including the common encryption algorithms AES, RC4, and RSA. The second part builds on cryptography to design secure protocols for confidentiality, authentication, and data integrity. Examples will include IPSec, SSL/TLS, and VPNs. The third part covers how cyber attacks proceed from reconnaissance to exploits and intrusions. Particular emphasis is given on web attacks (such as phishing, SQL injection, drive-by downloads) and malware. The last part of the course will focus on intrusion prevention, detection, and response. Specific topics include firewalls, spam filters, intrusion detection systems, and risk management. Students will learn about protocols to communicate securely over unsecure networks, and about modern technologies for protecting computers from a wide range of threats. Throughout the course, real world cases are discussed, and students will gain hands-on experience in labs.

CYS 522 Advanced Networking 3 credits

Prerequisite: CYS 500 Foundations of Cybersecurity

This course will review several advanced networking topics, including wireless and mobile networking, satellite and near field communications, RFID (Radio Frequency Identification), and the use of cryptography and encryption in data transmission and networking. This course will also discuss privacy and security issues related to the use of these networking technologies.

CYS 523 Software and Application Security 3 credits

Prerequisite: CYS 500 Foundations of Cybersecurity

In this course students learn the key concepts of secure coding and how to plan, develop, and implement applications that are based on these principles. Concepts covered in this course include maintaining version

control and limiting access to the source code. Students will learn how to evaluate a program for safe usage and implementation within an organization.

CYS 526 Cyber Attacks and Defense 3 credits

Prerequisite: **CYS 500 Foundations of Cybersecurity**

This course investigates security issues, vulnerabilities, and mechanisms to identify, respond to and prevent cyber attacks and to build active defense systems. The course will follow the formal ethical hacking methodology including reconnaissance, scanning and enumeration, gaining access, escalation of privilege, maintain access and reporting. Ethical Hackers are computer and network experts who attack security systems on behalf of its owners, seeking vulnerabilities that a malicious hacker could exploit.

CYS 541 Ethics, Legal, and Compliance Issues in Cybersecurity 3 credits

Prerequisite: **CYS 500 Foundations of Cybersecurity**

Coursework examines the ethical, legal, and regulatory compliance issues related to the practice of cybersecurity. The course focuses on the requirements, challenges, and dilemmas of data protection, due diligence, privacy laws, fraud and risk management, intellectual property, IT auditing, and ethical corporate codes of conduct. The course covers key mandates and laws in Cybersecurity and also the IT audit process and techniques. To minimize liabilities and reduce risks from electronic, physical threats and reduce the losses from legal action, the information security practitioner must understand the current legal environment and stay informed of emerging laws and regulations as well as auditing frameworks.

CYS 545 Security Policy and Compliance 3 credits

Prerequisite: **CYS 500 Foundations of Cybersecurity**

This course will focus on security policy and compliance in the world of cybersecurity that encompass laws, ethics, privacy and governance issues. Students will be exposed to national and international policies while understanding the importance of security policy as the beginning of any security program in organizations. The theory and principles behind the topics mentioned are explored in depth where policy documents are critiqued and compliance issues and frameworks are examined. Students will learn the approach to writing security policies while taking into consideration the significant role of compliance.

CYS 550 Leadership and Communication in Cybersecurity 3 credits

Prerequisite: **CYS 500 Foundations of Cybersecurity**

This course will develop the knowledge and skills necessary to design a cybersecurity strategy, including people, process, and technology, in a complex organization. The role of leaders in cybersecurity become critical to business success. The course will cover global issues, emphasis will be placed on individual's roles within organizations and how they communicate their ideals to the teams of individuals performing cybersecurity tasks and other stakeholders providing oversight.

CYS 555 Cybersecurity in Healthcare

Prerequisite: **CYS 500 Foundations of Cybersecurity**

This course provides an in-depth analysis of the diversity of the healthcare industry, types of technologies, flow of information, and levels of protection. It presents a plan-protect-respond framework of relevant legal and regulatory requirements, ensuring an organizations' policies and procedures are in compliance with industry standards. The course examines how an organization manages information risk through security and privacy governance, risk management lifecycles, and principle risk activities.

CYS 556 Healthcare Information Systems 3 credits

Prerequisite: **CYS 555 Cybersecurity in Health Care**

This course focuses on data and information technology to improve organizational performance in healthcare settings. System like The Nationwide Health Information Network (NwHIN) and other health information systems will be surveyed. Information systems and data management fundamentals will be reviewed. The use of research tools and databases will be used to analyze organizational problems. The course includes exploration of electronic medical records (EMRs) that are used in the medical fields. Legal and ethical issues will be explored as will the other use of technologies in healthcare settings.

CYS 557 Healthcare Standards and Policies 3 credits

Prerequisite: **CYS 555 Cybersecurity in Health Care**

This course will examine the standards and the effect of diversifying standards in healthcare. This course will cover coding terminology and standards including voluntary standards from SDOs. This course will examine the healthcare standards for HClSSP certification. It

will use these standards to prepare the student to handle situations in the area of Regulatory Environments, Privacy and Security in Healthcare, Information Governance and Risk Management, and Information Risk Assessment.

CYS 560 Information Assurance 3 credits

Prerequisite: CYS 500 Foundations of Cybersecurity

This course will focus on providing students with insights, guidance, and best practices on the principles of information security. Students will examine the foundations of information security as defined by experts and ISC², which is considered a definitive source for information security best practices. Students will examine information security using the 10 domains of knowledge as our guidebook. The materials will include course textbooks, other sources, and case studies to support class discussions. Students will learn to apply some of the information security knowledge and skills through individual activities. The course will include an opportunity to apply the course topics to a mock digital crime scene.

CYS 565 Security Management Awareness 3 credits

Prerequisite: CYS 500 Foundations of Cybersecurity

This course introduces Security Management awareness and provides important and cost-effective methods to protect sensitive information. Through a structured environment of physical, computer, and network security measures, implementation of effective user training, establishment of policies and procedures, and sharing of knowledge and expertise within an organization to protect sensitive information, each student is provided essential information to create and maintain a secure environment.

CYS 575 IT Risk Analysis and Management 3 credits

Prerequisite: CYS 500 Foundations of Cybersecurity

This course examines information security risk analysis and management from a business perspective. The course will provide an overview of the key aspects of risk analysis and management, including asset identification and associated risk identification, qualitative and quantitative risk assessment and prioritization, determination of risk mitigation strategies, budgeting for risk, and ongoing risk management. This course will provide knowledge, skills, and techniques to identify, prioritize, and manage the many IT security risks facing businesses today. Students will also examine how

IT risk management supports IT governance and decision making by businesses. The role of risk analysts, auditors, security personnel, and management will be discussed.

CYS 577 Global Cybersecurity 3 credits

Prerequisite: CYS 500 Foundations of Cybersecurity

This course focuses on four general areas of cyber capabilities and trends in the global community. The theory and practice of cybersecurity and cyberwar will be analyzed through cyber capabilities of nation-states as well as non-state actors. Existing trends and new trends will be evaluated in cyber-related strategies and policies related to challenges facing governments. Global cybersecurity policies will be evaluated and best practices will be discussed.

CYS 586 Digital Crime Prevention and Investigation 3 credits

Prerequisite: CYS 500 Foundations of Cybersecurity

This course provides an in-depth analysis of the digital defense planning, technologies, and methods to safeguard organizational networks, databases, and applications. It presents a plan-protect-respond framework of digital security; the interaction of policies, implementation, and oversight; and ways to perform a computer forensic investigation.

CYS 591 Special Topics in Cybersecurity 3 credits

Prerequisite: CYS 500 Foundations of Cybersecurity

This is a capstone course for the Graduate Certificate in Cybersecurity Management. It is designed to explore the most up-to-date technologies used to combat and mitigate the evolving threats within the domain of cybersecurity. Through the analysis of vulnerabilities, failure analysis, and continuous improvement of first-line defenses, and knowledge of relevant standards, the cybersecurity expert must be prepared for threats of an unknown origin at all times.

CYS 596 Capstone Project in Cybersecurity 3 credits

This is a required course in the MS in Cybersecurity program; it is only open to MS in Cybersecurity students who have completed all other degree requirements. This course must be taken in the final term.

This capstone course for the Master of Science in Cybersecurity examines computer security technology and principles, including cryptography, authentication, access control, and database security; software security;

management issues, including physical and infrastructure security; human factors; and security auditing. This course also covers IT security management, risk assessment, and legal and ethical considerations.

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Higher Education General Information Survey Code for Classifying Academic Subject Areas

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Administrative/Management Studies	5004	AAS
Business	0501	BS
Accounting (NYS CPA Track)	0502	BS
Bachelor of Professional Studies in Business and Management	0599	BPS
Business	0506	MBA
Management	0506	MS

PROGRAM TITLE	HEGIS	AWARD
SCHOOL OF BUSINESS & TECHNOLOGY: TECHNOLOGY PROGRAMS		
Cybersecurity	5199	Certificate
Cybersecurity Management	0799	Certificate
Cybersecurity	0702	BS
Technical Studies	5315	AAS
Technology	5315	AS
Technology	0925	BS
Electrical Engineering Technology	0925	BS
Information Technology	0702	BS
Nuclear Engineering Technology	0925	BS
Bachelor of Professional Studies in Technology Management	0599	BPS
Cybersecurity	0702	MS
Cybersecurity	0702	MS

PROGRAM TITLE	HEGIS	AWARD
SCHOOL OF HEALTH SCIENCES PROGRAMS		
Public Health	1214	BS
Health Sciences	5201	AS
Health Sciences	1201	BS, MS
Health Care Management	1202	BS-MBA, MS in HCA

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SCHOOL OF LIBERAL ARTS PROGRAMS		
Liberal Arts	5649	AA, AS
Liberal Arts	4901	BA, BS
Liberal Studies	4901	MA
History	2205	BA, BS
Humanities	1599	BA
Natural Sciences	1901	BS
Psychology	2001	BA, BS
Social Sciences	2201	BS
Sociology	2208	BA, BS

PROGRAM TITLE	HEGIS	AWARD
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Nursing	5208	AAS, AS
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Nursing Education	1203.12	Certificate
Nursing Leadership and Administration of Health Care Systems	1203.12	Certificate

PROGRAM TITLE	HEGIS	AWARD
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Criminal Justice	5505	AS
Criminal Justice	2105	BS, MS
Military Leadership	2299	BS
National Security	2210	BS
Public Administration	2102	MPA

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