Computer Programming and Information Systems

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School of Business

Bachelor of Science Degree

Demand continues to be strong for students skilled in Information Technology. Of the top 10 degrees in demand for bachelor’s degree levels, four are computer related. They include the following degrees:

Computer Science
Information Science and Systems
Computer Engineering
Management Information Systems/Business Data Processing

As reported in the United States Department of Labor Occupational Outlook Handbook, employment of programmers, web developers, systems analysts and network architects is projected to grow in the range of 22 – 30 percent from 2010 to 2020, faster than the average projected growth for overall occupations.

The Computer Programming and Information Systems baccalaureate degree program requires a set of core courses that all graduates must take. The Core courses provide the diverse but fundamental foundation in technology necessary to create a technology savvy individual. In addition, the student selects one of five tracks with concentrations in Programming, Systems Development, Networking, Web Development or Database. Each track offers the student a skill set in one discipline of Information Technology and enables him/her to study a particular area in depth.

This program touches on all aspects of computer programming and information systems. It provides a practical hands-on approach to programming with an emphasis on solving business problems.

Typical Employment Opportunities

Computer Support Specialists
Information Technology Specialists
Data Communications Analysts
Quality Assurance Technicians
Systems Analysts
Programmer/Analysts
Data Base Analysts
Web Developers
Network Administrators
Software Applications
Computer Network Technologist
CISCO Computer Network Technologist
Infor Applications Specialist for Visual and Cloud Suite Interfaces ERP Software Analyst Oracle Software Applications
Programmers convert project specifications, addressing problem statements and procedures, into detailed coding in a computer language. They will also develop and write computer programs to store and retrieve documents, data and information.

The Systems Analyst analyzes business, scientific and technical problems for application to computer-based systems.

For those interested in networking, our program offers courses in conjunction with the Cisco Networking Academy. Students taking and passing these courses receive training certifications for each course directly from Cisco. These courses prepare each student for taking the Cisco Certified Network Associate (CCNA) exam.

Web Development professionals are in demand due to the growth of the Internet and the expansion of the World Wide Web (the graphical portion of the Internet). This rapid growth has generated a variety of occupations related to the design, development, and maintenance of Web sites and their servers.

Database professionals will be prepared to design and administer the advanced databases that industry relies on.

**Computer Programming & Information Systems (BS) Program Outcomes:**

- Graduates will be trained as technical problem solvers and will receive the knowledge and skills necessary to function and grow in this high-demand workforce.
- Graduates will have had experiential learning opportunities such as internships and/or capstone projects.
- Graduates will have an understanding of social and ethical issues as it relates to information technology.
- Graduates will be effective communicators and work successfully in teams.

Fall 2019 - Subject to Revision

**Liberal Arts and Sciences** (61-63 credits)

- EGL 101 Composition I: College Writing (GE) 3
- EGL 102 Composition II: Writing About Literature 3
- EGL 310 Technical Writing OR
- PCM 324 Report Writing and Technical Communications
- OR
- Upper Division Liberal Arts Elective as advised 3
- Communications (SPE330 or SPE331) (GE) 3
- The Arts (GE) 3
- Foreign Language (GE) 3
- Humanities (GE) 3
- Social Sciences 3
- American/Other World/Western Civilization History (GE) 3
- Natural Science (GE) 6-8
### MTH 130 Calculus I w Applications (GE)
4

### MTH 390 Prob Methods in Operations Research
3

### 300 level Arts & Science Electives
3

### Arts and Science Electives*
18

Required: Business & Computer Systems (60 credits)

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<th>Course Title</th>
<th>Credits</th>
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<td>BCS 109</td>
<td>Introduction to Programming</td>
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<td>BCS 120</td>
<td>Foundations of Computer Programming I</td>
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<td>BCS 160</td>
<td>Computers, Society, and Technology</td>
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<td>BCS 230</td>
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<td>BCS 215</td>
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<td>BCS 260</td>
<td>Introduction to Database Systems</td>
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<td>BCS 262</td>
<td>Data Communications OR</td>
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<td>BCS 208</td>
<td>Introduction to Networks</td>
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<td>BCS 300</td>
<td>Management Information Systems</td>
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<td>BCS 301</td>
<td>Systems Analysis and Design</td>
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<td>BCS 345</td>
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<td>BCS 430W</td>
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<td>*BCS Elective</td>
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<tr>
<td>BCS 3XX</td>
<td>300-level elective or above</td>
<td>21</td>
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<tr>
<td>BUS 101</td>
<td>Accounting I</td>
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*Note: BCS102 cannot be used to meet this elective

Degree Type: BS
Total Required Credits: 121-123

Please refer to the General Education, Applied Learning, and Writing Intensive requirement sections of the College Catalog and consult with your advisor to ensure that graduation requirements are satisfied.

1: No student will be permitted to remain in the Computer Programming and Information Systems Program if he/she has received three “F’s” in any BCS course or courses. Candidates for graduation will be required to have a minimum average GPA of 2.0 in BCS courses.

2: For all BCS courses that require a BCS prerequisite, the BCS prerequisite must be completed with a grade of C or better.

3: Students must complete at least 18 credits with BCS designation at Farmingdale.
4: Students with life experience may challenge up to 3 courses (9 credits via credit-by-evaluation).

Course Descriptions

EGL 101 Composition I: College Writing (GE)
This is the first part of a required sequence in college essay writing. Students learn to view writing as a process that involves generating ideas, formulating and developing a thesis, structuring paragraphs and essays, as well as revising and editing drafts. The focus is on the development of critical and analytical thinking. Students also learn the correct and ethical use of print and electronic sources. At least one research paper is required. A grade of C or higher is a graduation requirement.
Note: Students passing a departmental diagnostic exam given on the first day of class will remain in EGL 101; all others will be placed in EGL 097. Prerequisite is any of the following: successful completion of EGL 097; an SAT essay score (taken prior to March 1, 2016) of 7 or higher; an SAT essay score (taken after March 1, 2016) of 5 or higher; on-campus placement testing.

EGL 102 Composition II: Writing About Literature
This is the second part of the required introductory English composition sequence. This course builds on writing skills developed in EGL 101, specifically the ability to write analytical and persuasive essays and to use research materials correctly and effectively. Students read selections from different literary genres (poetry, drama, and narrative fiction). Selections from the literature provide the basis for analytical and critical essays that explore the ways writers use works of the imagination to explore human experience. Grade of C or higher is a graduation requirement. Prerequisite(s): EGL 101

EGL 310 Technical Writing OR
A detailed study of the fundamentals of writing technical reports and other technical communications. Topics emphasized include the elements of a technical report, the interpretation of statistics and data, and the composition of letters, memos, and informal reports containing technical information. Assignments and student exercises are drawn from the student's technical area. Prerequisite(s): EGL 102 with a grade of C or higher

PCM 324 Report Writing and Technical Communications OR
A practicum in which students produce a variety of business oriented and technical documents. This course provides students with a survey of current practices and techniques appropriate to writing for forums, especially for technical journals, newspapers, and magazines. It is also designed to make students proficient at writing professional articles and reports such as new product information sheets, technical correspondence, periodic reports, summaries, process and technical descriptions, instructions and analysis, and to allow students to incorporate graphs, tables and other illustrative matter with textual content. Prerequisite(s): Upper division standing or permission of department chair.

MTH 130 Calculus I w Applications (GE)
This is a calculus course for those not majoring in Mathematics, Engineering Science or Computer Science. Topics include the derivative, differentiation of algebraic, trigonometric, exponential and logarithmic functions, applications of the derivative and the definite integral. Applications are taken from technology, science, and business. Problem solving is stressed. A graphing calculator is required. Note: Students completing this course will not receive credit for MTH 150. Prerequisite(s): MP4 or MTH 117 or 129

MTH 390 Prob Methods in Operations Research
This course is intended to focus on understanding, formulating and solving deterministic models in operations research. Maximum and Minimum Linear Programming problems will be studied graphically and theoretically. The Simplex Method, Sensitivity Analysis and Duality will be covered and an in-depth analysis of the reasoning on which these topics are based will be given. Instruction in computer software techniques will be presented to solve Linear Programming problems, using the simplex method and sensitivity analysis. Transportation Problems, Integer Programming, or Markov Chains will be covered.
In order to enhance quantitative reasoning, the course emphasizes the formulation of mathematical models commonly used by operation research analysts, as well as the theoretical and computer software solutions to these models. Prerequisite(s): MTH 130 or MTH 150

**BCS 109 Introduction to Programming**
Using Python, this course covers the basic concepts of computer programming. Python is an easy-to-learn, high-level computer programming language that is widely used in many applications. This course introduces the fundamental elements of programming such as expressions, conditionals, loops, functions, files, and then use these elements to create simple interactive applications. This course covers also simple GUI and animation-based applications.

**BCS 120 Foundations of Computer Programming I**
This course introduces the C++ Programming Language as a means of developing structured programs. Students will be taught to develop algorithms using top-down stepwise refinement. Students will be introduced to the concept of Object Oriented programming. In addition, students will get a thorough exposure to C++ syntax and debugging techniques.

**BCS 160 Computers, Society, and Technology**
This is an introductory course that provides students with the knowledge to stay current and informed in a technology-oriented, global society. Students will receive instruction in basic computer concepts and terminology, the fundamentals of the Windows operating system and have hands-on experience at the beginning to intermediate level using Microsoft Excel and Access. The Internet will be used to supplement textbook and lecture materials. Note: Students taking this course may not receive credit for BCS 102 or 202.

**BCS 230 Foundations of Computer Programming II**
This course expands the knowledge and skills of Foundations of Computer Programming I. Among the topics covered are: arrays, pointers, strings, classes, data abstraction, inheritance, composition and overloading. Prerequisite(s): BCS 120 with a grade of C or higher

**BCS 215 UNIX Operating System**
This course develops the fundamental knowledge of computer operating systems using UNIX. Topics include basic understanding of the UNIX system, utilizing the file system, programming language and security system. BCS 120 may be taken as a Prerequisite or Corequisite. Prerequisite(s): BCS 120 Corequisite(s): BCS 120

**BCS 260 Introduction to Database Systems**
This course provides the fundamental knowledge of database concepts. Topics studied will include the history and advantages of database systems, and the process of database design including entity-relationship diagrams and database normalization. Students will have hands-on experience using SQL (Structured Query Language). Prerequisite(s): BCS 120 and BCS 160 all with a grade of C or higher

**BCS 262 Data Communications OR**
This course is an introduction to the concepts and applications of computer networking and its role in the business world today. Topics include: history of networking and applications, voice and data communications, hardware, transmission, network topologies, network analysis, the OSI model, design, implementation and management issues.

**BCS 208 Introduction to Networks**
This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. The principles and structure of IPv4 and IPv6 addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. By the end of the course, students will be able to build simple LAN's, perform basic configurations for routers and switches, and implement IP addressing schemes. The
laboratory component of this course will give the students hands-on experience configuring equipment needed to build a LAN. Prerequisite(s): Sophomore status

**BCS 300 Management Information Systems**
Managers have increasing responsibility for determining their information system needs and for designing and implementing information systems that support these needs. Management information systems integrate, for purposes of information requirements, the accounting, finance, and operations management functions of an organization. This course will examine the various levels and types of software and information systems required by an organization to integrate these functions. Prerequisite(s): BUS 109 or BUS 111 or BCS 160 or BCS 109

**BCS 301 Systems Analysis and Design**
This course explores the major issues in the analysis and design of a system, including methods of data collection, information requirements analysis, and the analysis process are discussed. Emphasis is placed on the importance of the user in the design process and focuses on approaches that improve the successful implementation of a computer system. Topics include general systems theory, Systems Development Life Cycle, data flow diagrams, data dictionary, hardware and software evaluation, feasibility analysis, CASE tools and prototyping. Students are required to demonstrate their skill in using project management and diagramming application software. Note: Credit cannot be given for both BCS 265 and BCS 301. Prerequisite(s): BCS 120 with a grade of C or higher and Junior Level Status.

**BCS 345 Java Programming**
This course is designed for students with some experience with programming. The syntax of the Java programming language, object-oriented programming, creating graphical user interfaces (GUI), exceptions, file input/output (I/O), and how to create Java applications and applets will be covered. Prerequisite(s): BCS 230 with grade of a C or higher.

**BCS 430W Senior Project**
The primary objective of this course is to give Computer Programming and Information Systems students an opportunity to integrate techniques and concepts acquired in their other courses. Elements will be drawn primarily from BCS301 (Systems Analysis and Design) and BCS260 (Database), in addition to other courses in the student's selected track of study. The course is experiential in nature i.e. the student will be required to produce results for use by real individuals and will be evaluated both on process and product. In addition to prerequisites, a second level programming course with a grade of C or better, and Senior level status is required. This is a writing-intensive course. Note: Students cannot get credit for BSC 430 and 430W; BCS 430W can be used to fulfill the writing intensive requirement. Note: Offered at the discretion of the Computer Programming and Info Systems Department. Prerequisite(s): EGL 101, BCS 260, BCS 230 and BCS 301 all with a grade of C or higher

**BUS 101 Accounting I**
Fundamental accounting concepts and principles are covered through an understanding of the following topics: accounting as an information system; analyzing a transaction; the accounting cycle; accounting for both service enterprises and merchandising businesses; deferrals and accruals; reversing entries; systems design; accounting for cash, receivables, temporary investments and inventory; payroll accounting. Students apply concepts to the preparation of special journals, subsidiary ledgers, worksheets and financial statements.

Admission to Farmingdale State College - State University of New York is based on the qualifications of the applicant without regard to age, sex, marital or military status, race, color, creed, religion, national origin, disability or sexual orientation.