

INFORMATION TECHNOLOGY

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Students pursuing information technology major expand their fundamental technology knowledge and take their IT careers to the next level at College of Professional Studies, where classes are designed and delivered for busy adults.

A technology degree, offered as hybrid and/or online, allows students to explore and develop practical skills in systems analysis and design, networking, cybersecurity, databases, software, and web design and programming. Whether currently working in the information technology field or aspiring to, the hands-on instruction and interdisciplinary approach provide students with the skills necessary to thrive in the IT industry.

Students who major in information technology will be well-prepared to apply for the Information Technology master's program offered by College of Professional Studies, as the undergraduate major provides the fundamental building blocks for a technology career or further study of IT at the graduate level. Bachelor's completion students complete an information technology-based experience learning project that expands their fundamental knowledge, allowing them to further explore the field through research and hands on experience.

This degree prepares students to:

- Demonstrate effective and persuasive oral, written, and non-verbal communication techniques using tone and principles appropriate to the audience.
- Apply information technology theory and principles to formulate well-organized arguments in writing and speaking that contain a clear purpose, relevant content, and a conclusion that directly reflects the purpose and strength of the content.
- Plan, create, assess, and evaluate effective web design using current web development tools, written evaluations, and design projects.
- Distinguish, reproduce, and employ informational technology programming skills using web and non-web-based practical projects, program analysis, and project management techniques.
- Quantify data, analyze trends and exceptions, and establish the reliability of conclusions within an information technology framework.

Undergraduate Certificate in Information Technology Foundations

Students in the Information Technology Foundations certificate will develop the foundational knowledge of the IT field needed to work within the information technology field through hands-on applied instruction on topics such as systems analysis and design, network fundamentals, programming, and data structures, and one specific area of interest within the field.

This certificate prepares students to:

- Employ structured programming concepts focused on logic and data.
- Explain the purpose, objectives, and fundamental principles of IT for systems design.
- Evaluate existing network and technology options for identifying which will best meet organizational needs.
- Articulate an in-depth understanding of one key sub-sector within the technology field.

Information Technology Bachelor of Arts Major Requirements

(180 credits required for the degree (<http://bulletin.du.edu/undergraduate/undergraduateprograms/professionalstudiesofartscompletionprogram/degreeanddegree requirements/bachelorofartsba/>))

Code	Title	Credits
Major Courses (44 credits)		
BACP 2075	Data Concepts and Structures	4
ICT 3100	Systems Analysis and Design	4
ICT 3200	Cybersecurity	4
ICT 3300	Foundations of Algorithms and Data Structures with Python	4
ICT 3400	Database Fundamentals	4
ICT 3500	Web Fundamentals	4
ICT 3800	Network and Internet Fundamentals	4

ICT 3350	Software Development	4
ICT 3450	Emerging Professional Concepts	4
ICT 3950 or ICT 3980	Field Experience in Information Technology Information Technology Internship	4
ST 3050	Quantitative Reasoning	4
Total Credits		44

Specialized Undergraduate Certificate in Information Technology Foundations

Code	Title	Credits
ICT 3100	Systems Analysis and Design	4
ICT 3200	Cybersecurity	4
ICT 3300	Programming and Data Structures	4
ICT 3400	Database Fundamentals	4
Total Credits		16

Minimum number of credits required for certificate: **16 credits**

ICT 3100 Systems Analysis and Design (4 Credits)

This course examines the systems analysis and design process from understanding what a system should do through how a system should be implemented. Topics include the System Development Life Cycle (SDLC); the roles of the Systems Analyst and Designer; an introduction to requirements gathering, including identifying user stories, use cases, use of modeling tools; and system design, user interface design, and database design. The course encourages interpersonal skill development with clients, users, and personnel involved in development, operation, and maintenance of a system. Quality issues such as software testing, configuration management, quality management, and process improvement are addressed throughout the course.

ICT 3200 Cybersecurity (4 Credits)

Given the constant increase of global technology usage, coupled with an escalation of threats to those systems, cybersecurity is a crucial practice for every learner to understand. This course will provide students with a fundamental overview of cybersecurity, including a set of basic skills needed to evaluate, remediate, and defend against risks within a technological environment. Additionally, students will gain the knowledge required to develop security plans for technological frameworks that are used personally and in organizations. This course is designed for students with varying cybersecurity experience and will empower them to acquire and maintain a strong security posture in their personal and professional lives. From those tasked with building new IT infrastructures to those managing marketing teams, this class will teach students how to best leverage cybersecurity for a safer digital community.

ICT 3300 Programming and Data Structures (4 Credits)

This course provides a first exposure to algorithms and fundamental data structures. Working "hands-on" with an integrated development environment, students learn to write and modify code in a widely used contemporary programming language, and discover how their acquired programming skills contribute to the plans, designs, implementations, tests, and maintenance of software solutions. Emphasis is placed on language syntax and structure, data types, arrays, Boolean logic, and functions. The course progresses to topics such as indirection, list and tree structures, object-oriented programming, application programming interfaces, and simple user interfaces.

ICT 3350 Software Development (4 Credits)

This course offers a streamlined journey through the essential stages of software development. Students will delve into the art of translating product requirements into actionable designs, followed by bringing those designs to life through fundamental programming practices. Throughout the course, students will use of version control systems to maintain a well-organized codebase and explore communication tools vital for team collaboration. The course also covers the deployment of code to live servers, and equips students with strategies for monitoring software performance. This enables them to proactively optimize functionality, troubleshoot issues, and refine their products based on user feedback.

ICT 3400 Database Fundamentals (4 Credits)

This course introduces databases and database system concepts. The material covers information systems design and implementation within a database management system environment. Incorporating lecture content and lab exercises, this course gives students a solid comprehension of the benefits and limitations of databases, while allowing them to get hands-on experience building a user interface to an existing database. All application development will be done in a graphical environment, using a popular desktop database workbench. File processing issues will also be introduced. Prerequisites: ICT 3100, ICT 3300, or equivalent experience.

ICT 3450 Emerging Professional Concepts (4 Credits)

New ideas arise in the technology sector almost daily. This course is designed to focus on emerging professional concepts that are timely, relevant, and forward-thinking. The course topics will change as trends emerge. Students will research, write, and present about the special topic in context.

ICT 3500 Web Fundamentals (4 Credits)

This course explores the fundamental development techniques of web page design using Hypertext Markup Language (HTML). Students learn how to create fully functional web pages by utilizing web fundamentals and best practices, including: how to effectively create layouts, use graphics, create hyperlinks, and use text formatting features of HTML. In addition, students are introduced to the use of cascading style sheets (CSS) to enhance the look of web pages. To better prepare students for evolving web standards, the course introduces students to the new HTML5 specifications and CSS3 features.

ICT 3800 Network and Internet Fundamentals (4 Credits)

This course covers networking and Internet technologies, hardware, software, and network communications protocols. Students gain knowledge of networking and telecommunications fundamentals including Local and Wide Area Networks, wireless communications, and the Internet. The core of the TCP/IP protocol suite is explored. Voice and data communication concepts, models, standards, and protocols are studied. Students learn about the ramifications of network characteristics such as throughput, latency and jitter on applications and the user experience. Students are introduced to the process of evaluation, selection, and implementation of different communication options within an organization.

ICT 3950 Field Experience in Information Technology (4 Credits)

This course is an experiential learning collaboration between a student, a faculty advisor, and a professional supervisor, offering students an opportunity to apply their content knowledge to a professional setting. Students will integrate academic theory with practical experience in a professional field of interest. Additional site-specific learning outcomes are established in conjunction with the site supervisor.

ICT 3980 Information Technology Internship (0-4 Credits)

Students will use their internships to integrate knowledge and theory learned in the classroom with practical application and skills development in a professional setting. Independent work products will be created.