Computer Science - B.S.

Curriculum

The Computer Science bachelor's degree program is designed to provide a broad overview to the fundamentals of computer science, including software and systems analysis, programming languages, machine architecture, algorithmic thinking, and theoretical foundations of computing.

Upon completion of the program, graduates are expected to:

- Apply knowledge of math, science, engineering and contemporary developments in the fields of software programming, networking, system design, computer science and/or project management.
- Analyze problems through the use of computer science concepts and processes to formulate, implement and test software-based algorithms.
- Incorporate historical context and emerging developments in computer science to create adaptable and efficient algorithmic solutions that reflect ethical considerations and global awareness.
- Use the techniques, skills and emerging tools necessary for analysis and evolution of algorithms in computer science.

Upon completion of the Software Engineering specialization (offered at the Providence campus), graduates are expected to:

- Integrate knowledge, tools and problem-solving skills to carry out the design, creation, maintenance and testing of state-of-the-art software solutions.

Upon completion of the Network Engineering specialization (offered at the Providence Campus), graduates are expected to:

- Apply computer science knowledge, skills and tools focused on real-time, finite state machine development methods aimed at creating network products, network designs, troubleshooting plans and advanced protocol tracking.

Modern computer science touches many academic pursuits (i.e., business, economics, the sciences, mathematics, etc.). Computer Science students have the flexibility to truly pursue integrated learning across the university and beyond, made possible by additional elective options with this degree. The benefits of problem-solving and algorithmic thinking can be applied to many intellectual pursuits changing the way students approach problem solving. Coupled with the pragmatic skills of programming and computer internals training, students can be action-oriented in mobilizing and automating problem-solving methods.

In the Software Engineering specialization, the core concepts found in computer science are expanded upon in the pursuit of perfecting the methods and tactics necessary for large-scale software development. Software engineering applies problem-solving methods, data-handling techniques and programming skills to large-scale implementations. Large projects pose unique challenges in terms of specification of problems to be solved, practical application development concerns, testing, project management and documentation. The Software Engineering specialization focuses on learning in these key areas. Programming is comprised of unique skills that separate software engineers from pure computer scientists. Students that complete this specialization are ready to join software development teams and make significant contributions to software product development.

In the Network Engineering specialization, students learn how computer science drives the next level of networking enhancements: application-aware networks, software-driven networks, advanced network security screening/firewalling/packet examination, and data-handling improvements based on advanced-routing algorithms. Finite state-based programming has always been at the core of networking and is the focus of this program. Students who complete this specialization are intimately familiar with the evolution of network products, the software internals of switches and routers, and the latest trends in software development specific to this industry. Students are positioned to lead network design teams, benchmark network products, create network products, and analyze network problems from both a software and hardware point of view.

Computer Science

A four-year program leading to the bachelor of science degree

Major Courses		
CSIS1101	Computer Science I	3
CSIS1112	Computer Science II	3
CSIS2018	Advanced Data Structures	3
CSIS2023	Survey of Programming Languages	3
CSIS2030	Database Concepts	3
CSIS2045	Introduction to Operating Systems	3
CSIS3200	Introduction to Artificial Intelligence & Machine Learning	3
CSIS3250	Cloud Computing at Scale	3
CYB2010	Computer Architecture with Assembly Language Programming	3
ITEC2081	Network Protocols I	3
ITEC3050	Information Security with Cryptography	3
MATH1030	Precalculus	3
PRMG2010	Introduction to Project Management & Project Membership	3
Major Courses/Specialization		
Choose additional major courses or a specialization listed below†		18-21
CSIS3126	Design Project I	
CYB3038	HCI/Usable Security	
ITEC3070	Systems Modeling and Simulation	
9 credits at the 2000+ level in the following subjects: BIO, CHM, CSIS, CYB, ECON, ENGN, GDES, IDES, ITEC, LEAD, MATH, MGMT, PHY, PSYC, SCI, SOC		
Applied/Experiential Learning		
Choose 6 credits from the following:		6
ASCI4799	College of Arts & Sciences Internship [Ic]	
DEE3999	Directed Experiential Education [D]	
TECX4190	Technical Solutions Design Project	
Related Professional Studies		
ENG2010	Introduction to Technical Communication	3
LAW2001	The Legal Environment of Business I	3
MATH2020	Discrete Mathematics	3
MGMT2020	Organizational Behavior	3
University Core Curriculum		
Communicating		9
ENG1020	Rhetoric & Composition I	
ENG1021	Rhetoric & Composition II	
ENG1030	Communication Skills	
Connecting		6
Two courses with the Connecting attribute (ECNG), one at the 2000 level, one at the 4000 level		
Experiencing		6
PHIL3240	Ethics: A Global Perspective	
Additional course with the Experiencing attribute (EEXP) in a different discipline		
Measuring		6
MATH1020	Fundamentals of Algebra (or higher, based on student's placement)	
MATH2001	Statistics I	
Exploring		4
PHY1011 & PHY1016	General Physics I and General Physics I Laboratory	
Interacting		6
LEAD1010	Foundations of Leadership Studies	
Additional course with the Interacting attribute (EINT) in a different discipline		
A&S Electives		6
Two courses with the Arts & Sciences elective attribute (EASC)		
Free Electives [#]		
3 credits selected from 1000-4999 numbered offerings within the university (Students selecting the Software Engineering Specialization do not take any free electives)		0-3
Total Credits		**121.0**

†Network Engineering Specialization		**18**
ITEC2082	Network Protocols II	
ITEC2085	Distributed Systems with TCP/IP	
ITEC3031	Router Internals and Integration	
ITEC3075	Network Security	
ITEC3083	Wireless Networking	
MATH1040	Calculus I	

†Software Engineering Specialization		**21**
CSIS3106	Software Verification, Validation, Testing and Security	
CSIS3126	Design Project I	

CSIS4010	Software Engineering
ENGN2085	Introduction to Embedded Systems
ITEC2085	Distributed Systems with TCP/IP
ITEC3040	Systems Analysis
MATH1040	Calculus I

[D] Directed Experiential Education (DEE) opportunities are based on project availability with community partners and student eligibility. For more information, visit Experiential Education & Career Services (EE&CS).

[IC]Typically, internships require a minimum of six credits. Students interested in a 9 or 12-credit internship can apply additional experiential learning and free elective credits, if available. Students are strongly encouraged to contact a faculty advisor before scheduling internship and free elective credits.

In addition to classes, free elective credits may be applied to a number of options such as internship, study abroad, Directed Experiential Education courses and courses in a specialization or minor as relevant. For students who qualify for the J2 program, up to four graduate courses may apply. Students are strongly encouraged to contact a faculty advisor before scheduling free elective credits.

Note: Students must pass MATH0010 Pre-Algebra or have equivalent placement scores to enroll in required math courses.

Note: Students must pass ENG0001 Writing Workshop or have equivalent placement scores to enroll in ILS 2000-level courses.

In collaboration with academic colleges Study Abroad offer several options, direct enroll with international universities, domestic and digital options meet with a Study Abroad Advisor to learn more about how your major, minor, free electives, experiential learning and transferable courses would benefit by a Study Abroad program. There are many options for students during a semester, spring and/or summer breaks. Faculty-led, exchange, and direct-enroll programs range in duration from one week to a full semester or full year. Financial aid may be applied, and some partners offer external scholarships. Visit the study abroad website for information, program descriptions and online applications. Where will you go? Wherever you decide, make the best of your educational journey!

Admissions Requirements

Undergraduate

Johnson & Wales University holistically reviews all elements of a student's application to identify those students most likely to succeed at the university.

For first-year applicants, a completed application and high school transcript(s) are required. For transfer applicants, a completed application, high school and/or college transcript(s) are required. Completion of optional materials is encouraged.

Successful candidates for first year admission have taken a high school, college preparatory academic program including English, mathematics, science, social science and foreign language. The Computer Science program requires students to have successfully completed Algebra II or higher level math class. Students who apply for admission and do not meet the requirements will be reviewed for admission into the Undeclared – University Explorations program. Admissions decisions may also consider individual experiences and particular circumstances unique to each student. Other considerations are made based upon recommendations, writing ability and extracurricular activities.

Visiting campus, both in-person or virtually, and interacting with admissions staff are all valuable ways of assuring that JWU is the right university for you.

Accelerated Program Options

J2 Program

The JWU J2 program allows qualified students enrolled in a matriculating undergraduate program to take graduate level courses at JWU. Students interested in pursuing this option should meet with their academic advisor to discuss their interest, qualifications and plans. The undergraduate student may take up to four graduate courses (maximum 12 credits) and are limited to 6 credits a semester and 3 credits per session (Fall Session I and Fall Session II).

The completion of graduate credits to fulfill undergraduate program requirements does not guarantee acceptance into the graduate program after completion of the baccalaureate degree. Matriculating undergraduate students who wish to formally enroll in a graduate program must fulfill all requirements for entrance into the intended graduate program and complete a graduate program application.

Note: Not all graduate courses are included as part of this policy. Courses offered as part of the Master of Arts in Teaching, Master of Education, Master of Science in Physician Assistant Studies and doctoral courses are excluded from this policy and are restricted to program majors only. Additional courses and/or programs as determined by individual colleges may also have restricted access.

Eligibility Criteria

To be eligible to enroll in graduate level courses (excludes: Masters of Arts in Teaching, Masters of Education, Masters of Science in Physician Assistant Studies, doctoral courses and other programs as outlined by the colleges).

Undergraduate students must meet the following criteria:

- Undergraduate cumulative GPA of 3.00 or higher
- Completed and registered undergraduate credits at least 90 credits
- Meet the individual course prerequisites

Appeal to Eligibility Criteria: College dean or designee will receive a copy of the Petition Form, Student's GPS and email requesting appeal if the student requests to appeal the GPA or earned/registered credit criteria. College dean/designee will review and determine approval.

These courses carry graduate credit and will replace undergraduate degree requirements when applicable, traditionally free-electives (maximum of 12 credits). The course will be applied to the undergraduate degree in the order in which they are taken (if required) and will also be applied towards both the students undergraduate and graduate GPA.

Students should maintain enrollment in at least 12 credits of undergraduate coursework to maintain full-time status; graduate course enrollment is not calculated into undergraduate full-time status. For students already attending full-time as undergraduates (12 credits or more) and paying the full-time tuition, the graduate credits will be included in full-time tuition fee. Students attending part-time (11 credits or less) will pay the cost per-credit undergraduate tuition for the graduate course.

Course registration will be based on space availability and students enrolled in graduate level courses will be required to maintain good academic standing at the undergraduate and graduate level.