



NATIONAL
UNIVERSITY

ERRATA TO ADDENDUM G TO THE NATIONAL UNIVERSITY GENERAL CATALOG 82

Effective Date November 25, 2019

National University Academic Headquarters

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Technology Fees

The following courses utilize a third-party technology. Accessing the third-party technology is a required component of your course. The technology fee will be applied to the student's account at the time tuition is applied.

RN to BSN Fees

NSG 335 Technology Fee.....	\$170.00
NSG 412 Technology Fee	\$155.00
NSG 460 Technology Fee.....	\$155.00

- Engaged and active as responsible professionals pursuing diverse career paths or successfully continuing their education in graduate school
- Participating in continuing education opportunities enabling them to understand and apply new ideas and technologies in the field of computing
- Effective communicators and team members
- Active contributors to their community and their profession

ACADEMIC PROGRAM INFORMATION

COLLEGE OF PROFESSIONAL STUDIES

UNDERGRADUATE DEGREE

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

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The Bachelor of Science in Computer Science degree program provides a strong technical background for students planning to begin careers upon graduation and for those interested in graduate study in computer science. Degree requirements include courses in object-oriented programming, data structures and algorithms, operating systems, computer communication networks, software engineering, and computer architecture, as well as mathematics, statistics, and the natural sciences. The program features a rigorous academic foundation that is complemented by realistic programming assignments. Emphasis is placed on developing both the technical and design skills necessary to begin and enhance an individual's career. Graduates of this program are well prepared for immediate employment in either the computer industry or many other businesses that increasingly rely on computer science.

The Bachelor of Science in Computer Science Program Educational Objectives are as follows.

Within a few years of graduation, graduates are expected to be:

Bachelor of Science in Computer Science/Master of Science in Computer Science (BSCS/MSCS) Transition Program

Students must complete graduate-level coursework taken as part of the BSCS degree with a grade of B or better. This coursework, which counts as electives, will not transfer as graduate-level credit to National University or any other institution as it is part of an undergraduate degree program. Grades earned in graduate level courses will be calculated as part of the student's undergraduate grade point average. Students must be within completing their last six courses in their undergraduate program and have a cumulative GPA of at least a 3.00 to be eligible. Lastly, students must apply for and begin the MSCS program within six months after completing their final BSCS course. Students must complete their MSCS program within four years with no break exceeding 12 months. Students in the BSCS transition program may take up to two MSCS classes as electives during the BSCS. Students may choose from the following courses: CSC 603, CSC 605, CSC 675, CSC606, and CSC607. The number of courses required to earn an MSCS degree for transition program students is reduced from 12 to as few as 10 courses.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

- Communicate effectively in a variety of professional contexts.
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- Apply computer science theory and software development fundamentals to produce computing-based solutions.

Degree Requirements

To receive a Bachelor of Science in Computer Science, students must complete at least 180 quarter units to include a minimum of 70.5 units of the University General Education requirements; 76.5 quarter units must be completed at the upper-division level, and 45, including the senior project courses (CSC 480A, CSC 480B & CSC 480C), must be taken in residence at National University. In the absence of transfer credit, students may need to take additional general electives to satisfy the total units for the degree. Students should refer to the section on undergraduate admission procedures for specific information on admission and evaluation. All students receiving an undergraduate degree in Nevada are required by State Law to complete a course in Nevada Constitution.

Prerequisites for the Major (10 courses; 42 quarter units)

Students must select **one (1)** science related lecture and **one (1)** lab course from Area F of the General Education for a total of 6 quarter units. The course/lab combination must be intended for science and engineering majors and develop an understanding of the scientific method (PHY104 and PHY104A or PHY130A are recommended).

MTH 215*	College Algebra & Trigonometry <i>Prerequisite: Accuplacer test placement evaluation or MTH 12A and MTH 12B</i>
CSC 208*	Calculus for Comp. Science I <i>Prerequisite: MTH 215</i>
CSC 209	Calculus for Comp. Science II <i>Prerequisite: CSC 208</i>
CSC 220	Applied Probability & Stats. <i>Prerequisite: MTH 215</i>
CSC 242*	Intro to Programming Concepts <i>Prerequisite: MTH 215</i>
CSC 252*	Programming in C++

CSC 262*	Programming in JAVA <i>Prerequisite: CSC 242</i>
CSC 272	Advanced Programming in Java <i>Prerequisite: MTH 215</i> <i>Prerequisite: CSC 262</i>

* May be used to meet a General Education requirement.

Requirements for the Major (18 courses; 78 quarter units)

CSC 300	Object Oriented Design <i>Prerequisite: CSC 252 or CSC 272</i>
CSC 350	Computer Ethics
EGR 320	Scientific Problem Solving <i>Prerequisite: EGR 220 or CSC 208</i>
CSC 310	Linear Algebra and Matrix Comp <i>Prerequisite: CSC 252 or CSC 272</i>
CSC 331	Discrete Structures and Logic <i>Prerequisite: CSC 252 or CSC 272</i>
CSC 335	Data Structures and Algorithms <i>Prerequisite: CSC 300 and CSC 331</i>
CSC 338	Algorithm Design <i>Prerequisite: CSC 335</i>
CSC 340	Digital Logic Design <i>Prerequisite: CSC 331, Corequisite: CSC 340L</i>
CSC 340L	Digital Logic Design Lab (1.5 quarter units) <i>Prerequisite: CSC 331, Corequisite: CSC 340</i>
CSC 342	Computer Architecture <i>Prerequisite: CSC 340 and CSC 340L</i>
CSC 400	OS Theory and Design <i>Prerequisite: CSC 335</i>
CSC 422	Database Design <i>Prerequisite: CSC 300</i>
CSC 436	Comp. Communication Networks <i>Prerequisite: CSC 331</i>
CSC 430	Programming Languages <i>Prerequisite: CSC 300</i>
CSC 480A	Computer Science Project I <i>Prerequisite: Completion of core courses.</i>
CSC 480B	Computer Science Project II <i>Prerequisite: CSC 480A</i>
CSC 480C	Computer Science Project III <i>Prerequisite: CSC 480B</i>
ITM 470	Information Security Management

Approved Electives (2 courses; 9 quarter units)

Students must complete **two (2)** 400 level technical electives, these electives can be taken from the computer science, computer information systems, or information technology management programs without duplicating any of the core courses.

CIS 430 Web/EB Design & Development
CIS 460 Human Factor /Ergonomic Design
ITM 475 Information Security Technology
Prerequisite: ITM 470

COURSE DESCRIPTION INFORMATION

COURSE TERMINATION

CSC 200 Orientation to Comp. Science
CSC 440 Advanced Programming in Java
CSC 451 AI Programming
CSC 456 Advanced Game Programming

COM- Communication

COM 220 Media Literacy

Teaches ability to access, analyze, and evaluate information received from the media. Investigates message design strategies, the effects of media consumption and information fatigue, and the influences of bias and economic forces on media content. Covers meaning formation, verbal and visual rhetorical structures and the effects of media convergence.

CSC – Computer Science

CSC 272 Advanced Programming in Java

Prerequisite: CSC 262

A treatment of advanced programming techniques in Java using abstraction, encapsulation and inheritance. Development of applets and applications using client server technology, multithreading, even-driven programming techniques and multimedia.

CSC – Computer Science

CSC 300 Object Oriented Design

Prerequisite: CSC 252 or CSC 272

Covers the key concepts and methodologies required for object-oriented design, evaluation and development with focus on practical techniques such as use-case, CRC analysis and patterns. The Unified Modeling Language (UML) is presented in detail. Special emphasis is given to the use of object patterns in developing software systems.

CSC 310 Linear Algebra and Matrix Comp

Prerequisite: CSC 252 or CSC 272

The course includes the study of vectors in the plane and space, systems of linear equations, matrices, determinants, vectors, vector spaces, linear transformations, inner products, eigenvalues and eigenvectors. The course will approach the study of linear algebra through computer-based exercises. Technology will be an integral part of this course. Students will also develop experience applying abstract concepts to concrete problems drawn from engineering and computer science.

CSC 331 Discrete Structures and Logic

Prerequisite: CSC 252 or CSC 272

A theoretical foundation for computer science. Introduction to topics such as sets, propositional logic. Boolean algebra, counting techniques, recursive equations and solution techniques, graph algorithms with application to trees. Introduction to mathematical proofs. Students may not receive credit for both CSC 331 and MTH 325.

CSC 340 Digital Logic Design

Prerequisite: CSC 331, Corequisite: CSC 340L

Foundation in design and analysis of the operation of digital gates. Design and implementation of combinational and sequential logic circuits. Concepts of Boolean algebra, Karnaugh maps, flip-flops, registers and counters along with various logic families and comparison of their behavior and characteristics.

CSC 340L Digital Logic Design Lab (1.5 quarter units)

Prerequisite: CSC 331, Corequisite: CSC 340

A study of basic digital logic circuit design and implementation. Circuit schematic development and computer modeling and simulation of digital systems. Experiments explore designs with combinational and sequential logic. Students work through design activities, which include testing, troubleshooting and documentation.

CSC 436 Comp. Communication Networks

Prerequisite: CSC 331

An in-depth study of fundamental concepts in the design and implementation of computer communication networks. Coverage of core problems such as framing, error recovery, multiple-access, flow control, congestion control, routing and end-to-end reliability. Topics include basics of switched communication networks, packet switch architecture, TCP/IP networking, routing algorithms, Quality-of-Service networks and wireless communications. Mathematical tools are applied in quantitative modeling and analysis of networks.

CSC 445 Web and Mobile App Development

Prerequisite: CSC 300 Permission of the program director

Current web and wireless technologies and communication protocols. Coverage includes the current and emerging web and mobile applications. Examines the impact of web and wireless applications on individuals and organizations. Students will study the current tools, languages and techniques employed in development of web and mobile software solutions. A discussion of user interface design.

CSC 480A Computer Science Project I

Prerequisite: Completion of core courses.

Part I of three-part capstone project course focusing on Software Engineering concepts. Coverage of software development processes with a focus on agile development model. An exposure to software project management concepts including project scheduling. Students work

collaboratively to gather requirements and generate UML use case diagrams for a realistic software project to be designed and constructed in parts II and III of the series. Emphasis is on agile Scrum software development process model. Grading is by H, S or U only.

CSC 480B Computer Science Project II

Prerequisite: CSC 480A

Part II of three-part series on Software Engineering concepts and practices. Students follow a formal software development process model to build a system with specified requirements. A study of software testing methodologies. The focus is on object-oriented design, implementation and testing of tasks and subsystems in sprints. Students engage in Scrum software development process model and sprint planning. Grading is by H, S or U only.

CSC 480C Computer Science Project III

Prerequisite: CSC 480B

Part III of three-part capstone project course with focus on Software Engineering concepts and practices. Exposure to Software security engineering and software configuration management. Students engage in Scrum agile software development process model and sprint planning. Conduct object-oriented design, implementation and testing to deliver and demonstrate the finished software product. Grading is by H, S or U only.