

Blue Marble University

Bachelor of Science (B.S.) Computer Science

Curriculum and Course Descriptions

(3 year 100% Online Program)

A rock solid foundation in Computer Science will be achieved by students who complete this program. Our program was designed by Dr. Floyd Brown, who received an M.S. In software engineering from California State University, and holds a doctorate in Business Administration from Capella University. Along the way , he was a space engineer at Goodrich Aerospace, worked for a contractor for Northrop Grumman Corporation, until finally joining Northrop Grumman as software engineer and trainer. He knows what you need out there in the real world in the way of **marketable computer science skills**.

In constructing our program, we started out by selecting courses that provide a good computer science foundation for students that may be new to this field. Then we added courses applicable to growing industries such as health care, and skills in demand such as security and data base management. Finally, we topped off the program with hot courses in Mobile Computing, Virtual Worlds, and Video Gaming Design and Development. If you find a better program than this, that you can complete online in 3 years, take it instead!!!

We operate on a trimester schedule, which means that our academic year is divided into 3 segments of 4 months each. In each 4 month period, students take three courses. For some terms, or as determined by the University, students may be assigned courses in sequence, lasting about 1 month each. In that event, for any approximate one month period, a student will be studying one course.

Year	Term	Course Title and Description
1	1	Online Portfolio (1): Introduction to Blogging and the Creation of the Students Digital Portfolio of Accomplishments, Education, and Interests. The creation of a personal professional digital identity is required of all students at Blue Marble University.
		Fundamentals of Computer Science: Examines the computer science discipline, covering basic computer concepts such as binary logic, computer hardware, design and writing of programs, and advanced applications such as artificial intelligence. General overview of the computer science major and the terminology and concepts students learn throughout the program.

Year	Term	Course Title and Description
		Programming Concepts: This course provides the student with an introduction to the fundamentals of computer problems solving and programming. Students are introduced to structured and object oriented programming concepts in a language independent manner. Basic programming concepts, specific control structures, and object oriented design are explored.
1	2	Data Structure and Algorithms: This course will introduce the student to the methods of data storage in computer memory and on media. It will also introduce students to many of the foundation algorithms that are a key to well-written code.
		Operating Systems: This course focuses on the software operating systems that run today's personal computers. Emphasis will be placed on commands, functions, and terminology through practical instruction in the installation, configuration, and upgrade of operating systems.
		Computer Networks: Students are provided an introduction to networking technologies including local area networks (LANs), wide area networks (WANs), protocols, topologies, transmission media, and security. In addition to introducing a variety of fundamental concepts, the course encompasses in-depth aspects of networking including the Internet protocol suite (TCP-IP).
1	3	Introduction to Information System Security: This course explores principles, policies and technologies for securing computer and information systems. Topics include a survey of computer system vulnerabilities, cryptographic techniques, access control policies and mechanisms and security technology. Examines designing and implementing computer security policies, formulating contingency plans, analyzing system security architectures, and compliance and ethics.
		Health Care Informatics: Introduces current technology in the ambulatory, acute, long-term care and public health systems settings. Focuses on the requirements of information systems in the processing and storing of patient information and the medical management systems that facilitate appropriate and safe care.
		Database Management: Concepts and structures necessary to design and implement a database system, including logical and physical file organization and data organization techniques, data models, networks, data integrity, and file security. Topics covered include logical and user's viewpoint, theoretical foundations, and physical system implementation.

Year	Term	Course Title and Description
2	1	Multimedia Programming Using Python: This introductory computer science course will provide you with a solid level of computer literacy, which is increasingly expected in professional settings across all disciplines. In this course we will explore computer science in the context of multi-media programming. You will learn how digital music, images, and movies are created, transmitted, and manipulated. We will also learn the basics of how computers process codes written by programmer and you write computer programs that work with various kinds of media using the Python programming language. No prior programming experience is necessary.
		Programming in Visual Basic: This course provides an introduction to the Visual Basic programming language. Students develop executable programs that utilize an interactive graphical-user interface in the Windows environment.
		Programming in C: This course is an introduction to programming using C. Topics include flow of control, functions and structured programming, pointers, arrays, file manipulation, and an introduction to C++
2	2	Object Oriented Programming: Programming using class derivation, inheritance, and dynamic polymorphism. Application of a simple object-oriented design methodology to several software development problems.
		Fundamentals of SQL: This course is designed to give students an understanding of SQL Language. The course covers SQL commands for DML DDL, Query, and Transaction Control operations. Using a simulated server, student will write basic and advance SQL queries to retrieve desired data; write scripts to perform queries and display reports; and control access to database objects.
		Software Development Methods and Tools: Focuses on methods and tools for application development, including design and system organization; using and creating reusable libraries; building, testing, and debugging; performance evaluation; software development environments and frameworks.
2	3	Web Application Development: This course will introduce concepts in programming web application servers. Students explore the fundamental architectural elements of programming web sites that produce content dynamically.
		System Analysis and Design: Introduces the tools and techniques used in systems analysis and design, including requirements definition, data-flow diagramming, entity-relationship diagramming, database design, application architecture design, program design, test design and implementation.

Year	Term	Course Title and Description
		Programming for Mobile Computing: This course explores programming for mobile devices. Students explore the history, terminology, theory, and the wide range of uses for mobile computing. Topics may include: programming a variety of mobile devices such as the iPhone, android mobile devices and windows mobile devices
3	1	Game Design and Development (1): Theory and Practice: Includes video game design and programming, computer graphics, artificial intelligence, computer architecture and databases, and the study and use of the Flash Platform. An extensive list of course materials are required, such as but not limited to: Unity 3D game development environment; Art of Illusion, Wings 3d and Blender 3D modeling packages; Audacity, and Texture Editor. Heavy reliance is placed on online tutorials. Many sources are free, but a modest amount of \$200 USD should be budgeted. It is anticipated that the student will be able to complete the creation of a new game, which may be 2D/3D, a web ready game, or a console prototype. We hope to include a consideration of the game development cycle from green-lighting a project to localization and street delivery. Topics taught in the course includes project life cycles, legal framework for game development, the business of game development, development of game assets, scheduling, and documentation methods.
		Game Design and Development (2): A continuation of (1)
		Game Design and Development (3): Continued from (2)
	2	Virtual Worlds (1): History, Current Models, and New Creations: Discover virtual worlds using current virtual environments tools, such as Second Life. Featured topics include navigation, camera controls, object design and texturing, gestures, animations, sounds, basic use of tools and scripts. Using an activity-based learning approach, students create 3D virtual world content. Web based and software based worlds will be explored. Students will work on various projects including formulations designed to simplify the rapid deployment of virtual worlds into business web sites. Students will participate in actual creativity.
		Virtual Worlds (2): Continuation
		Virtual Worlds (3): Continuation of Virtual Worlds (2), with the addition of 3D Immersion Technology, a hot topic in the entertainment industry.
3	3	Technical Writing and Professional Communication: This course reviews technical writing as a process for organized expression of ideas and knowledgeable opinion; oral presentation and writing of letters, reports, memos, and proposals for effective communication; utilization of word-processing software to assist in the writing process.

Year	Term	Course Title and Description
		Independent Study: Wrap up of loose ends and finalization of any work begun in the Game Design segment, or in the Virtual worlds segment. The time is allocated to allow the student to polish up their work, or if appropriate to complete a research project as assigned by the faculty. The goal of the course is to generate an excellent piece of work for inclusion in the student's Online Portfolio
		Online Portfolio (2): With the guidance of the faculty, the student finalizes his/her Online Portfolio, presenting online their education, independent work, interests, and other accomplishments. As Dr. Gideon Burton stated: "You must consciously and conscientiously build your online presence....and use your college years to generate a body of visible and durable online work, openly accessible to the world, shouting who you are louder than any "graduated with honors" certification on a transcript one must pay to see."

Credits: Although not really relevant in the real world, as your prospective employer will want to know mostly what you know and what courses you took, each of our courses in this program carries 3 trimester credits. 27 courses times 3 credits each yields 81 trimester credits, which is the equivalent of 68 semester credits.

As we have stated before, we drop "seat time" from each and every one of our programs. We do not include general studies courses, second language courses and the like. All of our students must demonstrate "Proficiency" with regard to the subject matter of their studies. Consequently, our programs are shorter and are only as long as our faculty believes necessary to acquire competency in a particular field.

"Seat time", which is the foundation of "accreditation" in the USA, is the old fashioned, outdated requirement that a student spend a required amount of time and/or take required general studies courses in order to receive a Bachelors Degree. Even the USA Department of Education in its "National Education Technology Plan 2010" has recognized that "seat time" has got to go. At Page 12 of the report: "One of the most basic assumptions in our education system [accreditation] is time-based or "seat-time" measures of educational attainment.... [colleges and universities should be organized] around competence rather than seat time and others that enable more flexible scheduling that fits students' individual needs rather than traditional academic periods and lockstep curriculum pacing."