California State University Channel Islands
Program Modification
Program modifications must be submitted by October 15, 2010 for priority catalog review

Date (Change if modified and update the file name with the new date): 2011 2012 Catalog Copy; rev 11.24.10 rev 1 27 11; rev 3.3.11
Program Area: Computer Science
Semester /Year First affected: Fall 2011

Instructions: Please use this Program Modification form for changes to existing program requirements, units, outcomes, emphases or options, or for other programmatic concerns. For minor changes (faculty or address changes, additions of approved electives, minor editing for clarity, and other minor updates) use the Program Update form, available at the Curriculum website.

Paste the latest approved version of your entire program in the left AND right boxes below. Make your deletions in the LEFT column by using the strikeout feature in Word or underlining, <mark>and highlight</mark>. Insert new language or other changes to the program on the RIGHT and highlight in <mark>YELLOW</mark> for easy identification. If possible, please align the two columns so that changes appear side-by-side with the original text.

CURRENTLY APPROVED PROGRAM	PROPOSED PROGRAM
## COMPUTER SCIENCE	## COMPUTER SCIENCE
Programs Offered • Bachelor of Science in Computer Science • Minor in Computer Science • Minor in Computer Game Design and Development • Master of Science in Computer Science • Bachelor of Science in Information Technology The Computer Science degree offers the latest cutting edge education for various industrial and applied fields. Students are given a strong background in computer hardware and software, as well as a substantial amount of "hands-on" experience. The program stresses interdisciplinary applications in other sciences and business and prepares students for graduate studies.	**Programs Offered** • Bachelor of Science in Computer Science • Minor in Computer Science • Minor in Computer Game Design and Development • Master of Science in Computer Science • Bachelor of Science in Information Technology The Computer Science degree offers the latest cutting edge education for various industrial and applied fields. Students are given a strong background in computer hardware and software, as well as a substantial amount of "hands-on" experience. The program stresses interdisciplinary applications in other sciences and business and prepares students for graduate studies.

3.4.08 km2

1

Careers

The program prepares students for careers in high-tech, computer and Internet-driven industries, where interdisciplinary, dynamic and innovative professionals trained in the latest technologies are increasingly sought.

Program Learning Outcomes

Students graduating from the Computer Science program will be able to:
- Demonstrate critical thinking and problem solving skills by identifying, evaluating, analyzing and presenting
  fundamental software solutions and their applications;
- Demonstrate the knowledge of current computing practices and broad
  technology use in industry and society, including a working knowledge of
  software development techniques;
- Be cognizant of emerging new technologies and
  industrial practices connected to the computer industry;
- Demonstrate communication, research and cooperation
  skills by working effectively with others in interdisciplinary group settings - both
   inside and outside the classroom; and
- Demonstrate a sense of exploration that enables them to
  pursue rewarding careers in high- tech and bio-tech
  industries with life-learning.

Faculty

William J. Wolfe, Ph.D.
   Professor of Computer Science
   Chair, Computer Science Program
   Bell Tower West, Room 2225
   (805) 437-8985
   william.wolfe@csuci.edu

Peter Smith, Ph.D.
   Professor of Computer Science
   Academic Advisor
   Bell Tower West, Room 2265
   (805) 437-8882
   peter.smith@csuci.edu

Andrzej A. J. Bieszczad, Ph.D.
   Associate Professor of Computer Science

Director of the Masters Program
Bell Tower West, Room 2285
(805) 437-2773
aj.bieszczad@csuci.edu

Contact Information
http://compsci.csuci.edu

Bachelor of Science in Computer Science - (123 units)

Special Grade Requirement
A grade of C- or better is required in all pre-requisite courses in the major

Lower Division Required Major Courses 42
Upper Division Required Major Courses 29
Upper Division Elective Major Courses......................... 12
Elective Courses.. 6
General Education...28
American Institutions Requirement 6
TOTAL ....**123 units**

Note: General Education Included in Major Requirements 14

Lower Division Requirements - 42 units

COMP	150	Object-Oriented Programming GE-B4	4
COMP	151	Data Structures and Program Design	4
COMP	162	Computer Architecture and Assembly Language...............................	3
COMP	232	Programming Languages	3
COMP	262	Computer Organization and Architecture	3
MATH	150	Calculus I.. GE-B3	4
MATH	151	Calculus II	4
MATH	230	Logic and Mathematical Reasoning........ GE-A3, B3	3
MATH	240	Linear Algebra	3

Science: Choose either

a. Physics 200 General Physics I (4), Physics 201 General Physics II (4) and a course from GE section B2 (3)

   or

b. Physics 200 General Physics I (4), Biology 200 Principles of Organismal and Population Biology (4), Biology 212 Neurobiology and Cognitive Science (3) GE B1 and B2

Upper Division Requirements - 41 units

Major Requirements - 29 units

COMP	350	Introduction to Software Engineering	3
COMP	362	Operating Systems	4
COMP	447	Societal Issues in Computing GE-B4, D, INTD	3
COMP	454	Automata, Languages and Computation	3
COMP	491	Capstone Preparation	1
COMP	499	Capstone Project	3
MATH	300	Discrete Mathematics	3
MATH	352	Probability and Statistics	3
MATH	354	Analysis of Algorithms	3

Choose three units from the following:

COMP	420	Database Theory and Design	3
COMP	464	Computer Graphic Systems and Design I	3

Electives - 12 units

Choose 12 Elective units from:

COMP	345	Digital Image Processing (MATH/PHYS) GE-B1, B4, INTD	3
COMP	351	Distributed Computing	3
COMP	420	Database Theory and Design	3
COMP	421	Unix for Programmers	3
COMP	424	Computer System Security	3
COMP	425	Computer Game Programming	3
COMP	429	Computer Networks	3
COMP	445	Image Analysis & Pattern Recognition (MATH/PHYS) GE-B1, B4, INTD	3

COMP	451	Advanced Object Oriented Programming	3
COMP	452	Computational Bioinformatics (MATH)	4
COMP	462	Embedded Systems	3
COMP	464	Computer Graphic Systems and Design I	3
COMP	469	Artificial Intelligence/Neural Nets	3
COMP	490	Topics in Computer Science	3
COMP	492	Internship	1-3
COMP	494	Independent Research	1-3
COMP	497	Directed Studies	3
ENGL	482	Technical Writing	3
MATH	429	Operations Research	3
MATH	448	Scientific Computing	3
		GE B3, B4, INTD	

Proposed Course of Study

Freshman Year - 31 units

COMP	150	Object-Oriented Programming GE-B4	4
COMP	151	Data Structures and Program Design	4
COMP	162	Computer Architecture and Assembly Language	3
ENGL	105	Composition and Rhetoric GE-A2	3*
MATH	150	Calculus I GE-B3	4
MATH	151	Calculus II	4
MATH	230	Logic and Mathematical Reasoning GE-A3, B3	3
		GE Section A or C	3

* **or** ENGL 102 and 103 6

Sophomore Year - 23 - 24 units

COMP	232	Programming Languages	3
COMP	262	Computer Organization & Architecture	3
MATH	240	Linear Algebra	3
MATH	300	Discrete Mathematics	3

Science: *Choose either*

a. Physics 200 General Physics I (4), Physics 201 General Physics II (4) and a course from GE section B2.

 or

b. Physics 200 General Physics I (4), Biology 200

Principles of Organismal and Population Biology (4),
Biology 212 Neurobiology and Cognitive Science (3)
GE B1 and B2

Junior Year - 19 units + GE

COMP	350	Introduction to Software Engineering 3
COMP	362	Operating Systems..................................4
COMP	421	Unix for Programmers..........................3
COMP	454	Automata, Languages, & Computation .3
MATH	352	Probability and Statistics.......................3
MATH	354	Analysis of Algorithms 3

Senior Year - 19 units + GE

COMP	420	Database Theory and Design................3
COMP	424	Computer System Security....................3
COMP	429	Computer Networks 3
COMP	447	Societal Issues in Computing 3
		GE-B4, D, INTD
COMP	469	Artificial Intelligence/Neural Nets 3
COMP	491	Capstone Preparation 1
COMP	499	Capstone Project...................................3

General Education Courses Included in Major
Requirements - 14 units

COMP	150	Object-Oriented Programming...............4
		GE-B4
COMP	447	Societal Issues in Computing Sciences 3
		GE-B4, D
MATH	150	Calculus I...4
		GE-B3
MATH	230	Logic and Mathematical Reasoning 3
		GE-A3, B3

Minor in Computer Science
(20-23 units)

The Computer Science minor teaches the fundamentals of computer systems and

programming. This minor includes the fundamentals of computer programming, including design, implementation, and testing of object-oriented programs. It also teaches the basic architecture of the computer hardware, including the fundamental components of a computer system and the logical reasoning that it is based upon. Since these computer skills are extremely useful in most other disciplines, enhancing the students knowledge of technology no matter which major they have chosen.

Careers
Computer Programmer; Computer Systems Analyst; Any career that requires a basic knowledge of computer systems and programming

Requirements - 20-23 units
Lower Division Requirements - 11-14 units
COMP   105   Computer Programming Introduction ... 3*
* This course is waived for students with equivalent programming experience
COMP 150   Object Oriented Programming 4
COMP 151   Data Structures and Program Design ... 4
COMP 162   Computer Architecture and Assembly ... 3

Upper Division Requirements - 9 units
Three upper-division courses from the CS program approved by the advisor.

Master of Science in
Computer Science

(Offered through CI Extended University Program)

The MS in Computer Science prepares students for advanced careers in high-tech, computer-driven industries, including applications to business, aerospace, education, military, and government where interdisciplinary, dynamic and innovative professionals trained in latest technologies are increasingly sought. Students develop a strong background in computer theory, software and hardware, as well as skills to conduct applied research. The program stresses interdisciplinary applications while preparing students for a wide range of industry, academic, and research positions.
http://www.cs.csuci.edu/MSCS/

Admission

~~Students seeking admission are expected to have an undergraduate degree in computer science, mathematics, engineering, or science. Other majors will be considered on a case by case basis. The applicant is expected to have a 2.7 or higher cumulative undergraduate grade point average (GPA). A GRE report is also required for applicant whose GPA is less than 3.0.~~

Graduation

To obtain the degree, the student must complete each course with a minimum grade of B, and successfully defend a thesis before an examination committee.

Required Courses - 32 units
- COMP 599   Graduate Seminar..................................2
- COMP 597   Thesis 6
- Electives (minimum of *18* units must be COMP)...........24

Electives - 24 units
A minimum of 18 units must be COMP
- COMP 510   Algorithms...3
- COMP 520   Advanced Database Systems 3
- COMP 524   Security...3
- COMP 529   Network Computing 3
- COMP 549   Human-Computer Interaction 3
- COMP 550   Advanced Software Engineering 3
- COMP 566   Geometry and Computer Graphics 3
- COMP 569   Artificial Intelligence.............................3
- COMP 571   Biologically Inspired Computing.............3
- COMP 572   Neural Networks....................................3
- COMP 575   Multi-agent Systems 3
- COMP 578   Data Mining 3
- COMP 590   Special Topics in Computer Science.....3

COMP	581	Mathematical Methods in Artificial Intelligence	
MATH	510	Probabilistic Methods & Measure Theory	3
MATH	511	Functional Analysis	3
MATH	555	Actuarial Sciences	3
MATH	565	Research In Mathematics Education	3
MATH	582	Number Theory And Cryptography	3
MATH	584	Algebraic Geometry & Coding Theory	3
MATH	587	Markov Chains & Markov Processes	3
MATH	588	Stochastic Analysis	3
PHYS	510	Advanced Image Analysis Techniques	3
PHYS	546	Pattern Recognition	3

Graduate Writing Assessment Requirement

Writing proficiency prior to the awarding of the degree is demonstrated by successful completion of COMP 597 Masters Thesis with a grade of B or higher.

Continuous Registration Requirement

A student, who is not on an Academic Leave of Absence, must register every semester until graduating. If all other course requirements have been satisfied, a student should register in one unit of COMP597 to satisfy the requirement

Bachelor of Science in Information Technology

Programs Offered

- Bachelor of Science in Information Technology

This BSIT program prepares students for careers in Information Technology such as Computer Systems Integrator, Computer Systems Manager, Information

Technology Designer, Information Technology Support, Database Systems Manager, Database Systems Designer, Data Communications Analyst, Network Manager, Network Designer, Web Technology Manager and Web Technology Support.

In addition to serving CSUCI freshmen, the program provides an avenue of advancement for students with associate's degrees in a technology discipline such as networking gained at a two-year institution (e.g.: Moorpark College's Associate in Science Degree in Computer Network Systems Engineering).

The coursework will provide a foundation in mathematics, programming, networking, databases, web systems, computer architecture and information systems. The BSIT covers the interdisciplinary ground between a BS in Computer Science and a BS in Management Information Systems, emphasizing the fastest growing segments of both: web systems, databases, and networks. This interdisciplinary program draws from both Computer Science and Management Information Systems: mathematics, science, and computer programming from Computer Science, and business organization and project management from Management Information Systems. From there it adds depth in Web Programming and Technology, Database Theory and Design, and Data Communications and Networking, while allowing for further depth in these or related areas such as e-Commerce, Computer Security, and Multimedia

Program Learning Outcomes and Contact Information
http://www.cs.csuci.edu/

Bachelor of Science in Information Technology - (121 units)

Special Grade Requirement

A grade of C- or better is required in all prerequisites courses in the major

Lower Division Requirements.. 18

Core Courses   29
Upper Division Electives 15
Technology Electives...9 – 10
Capstone   4
General Education and Title V 42
University Electives .... 4 – 5
Total   **121 units**

Lower Division Requirements (18 units)

1. Statistics (3 units)
MATH 201 Elementary Statistics (3), OR
MATH 329 Statistics for Business and Economics (3), OR
MATH 202 Biostatistics (3)

2. Two semesters of a Laboratory science: Physics, Chemistry, or Biology (8 units)

BIOL 200 Principles of Organismal and Population Biology (4) AND
BIOL 201 Principles of Molecular and Cellular Biology, OR

CHEM 121 General Chemistry I (4) AND
CHEM 122 General Chemistry II (4), OR

PHYS 100 Introduction to Physics (4) AND
PHYS 101 Introduction to Physics II (4)

3. First course in Java programming language (4 units)
COMP 150 Object-Oriented Programming (4)

4. First course in Computer Architecture and Assembly Language (3 units)
COMP 162 Computer Architecture and Assembly Language (3)

Note: appropriate community college courses may meet these requirements.

Core Courses (29 units)

   MATH 300   Discrete Mathematics 3

Or MATH 301   Discrete Mathematics for IT 3
    COMP 151   Data Structures and Program Design 4
    COMP 262   Computer Organization and Architecture 3
    COMP 362   Operating Systems.................................... 4
    COMP 420   Database Theory and Design 3
    IT   280   Web Programming 3
    IT   429   Computer Networks for IT...................... 3
    MIS 310   Management Information Systems 3
    MGT 307   Management of Organizations................. 3

Upper Division Electives (15 units)

Choose 15 units from the following:

Note: 9 units of the 15 units must be taken in IT or COMP courses

    ART   324   Communication Design Technology:
                  Web Design 3
    ART   326   Digital Media Art:
                  3D Computer Animation........................... 3
    COMP 232   Programming Languages 3
    COMP 337   Survey of Computer Gaming 3
    COMP 345   Digital Image Processing
                  (MATH/PHYS) 3
    COMP 350   Introduction to Software Engineering...... 3
    COMP 425   Computer Game Programming................ 3
    COMP 447   Societal Issues in Computing 3
    COMP 449   Human Computer Interaction (PSY) 3
    COMP 452   Computational Bioinformatics (MATH) . 4
    IT 400   e-Commerce 3
    IT 401   Web Intelligence 3
    IT 402   Advanced IT Programming 3
    IT 424   Computer System Security for IT............. 3
    IT 464   Computer Graphics for IT 3
    IT 469   Artificial Intelligence/Neural Networks
                  for IT 3
    IT 490   Special Topics for IT 3
    MATH 137   Strategies and Game Design 3
    MATH 330   Mathematics and Fine Arts 3
    MATH 437   Mathematics for Game Programming 3
(Additional electives to be added based on faculty availability).

Technology Electives (9 – 10 units)
For a listing of suitable CI courses, see the BSIT program advisor

Capstone (4 units)

| MGT | 471 | Project Management | 3 |
| IT | 499 | BSIT Capstone | 1 |

General Education and Title V (42 units)
GE (36 units)
Title V (6 units)

University Electives (5 – 6 units)

Proposed Course of Study
Freshman Year
Fall - 15 units
ENGL 105 Composition and Rhetoric…………………… 3*
MATH 201 Elementary Statistics …………………….. 3
MATH 230 Logic and Mathematical Reasoning (GE A3) .. 3
General Education …………………………………………6
* or ENGL 102 and 103 …………………………………… 6

Spring - 13 units
COMP 150 Object-oriented programming …………….. 4
Title V ……………………………………………………… 3
General Education …………………………………… 6

Sophomore Year
Fall - 16 units
COMP 162 Computer Architecture and Assembly ……... 3
Title V …………………………………………………….. 3

General Education ………………………………….. 7
University elective ………………………………… 3

Spring - 16 units
Lab Science (Bio 200 or Chem 121 or Phys 100) ……………… 4
University elective …………………………………… 3
General Education ………………………………….. 9

Junior Year
Fall - 17 units
Lab Science II (Second semester Bio, Chem, or Phys).......4
   ENGL   330   Interdisciplinary Writing 3
   COMP 151   Data Structures 4
   COMP 262   Computer Organization and Architecture .3
   MATH 301   Discrete Mathematics for IT 3

Spring - 16 units
   COMP 447   Societal Issues in Computing 3
   COMP 362   Operating Systems................................4
   COMP 420   Database Theory and Design.................3
   IT   280   Web Programming...................................3
   MGT   307   Management of Organizations 3

Senior Year
Fall - 15 units
   IT   400   eCommerce..3
   IT   402   Advanced IT Programming....................3
   IT   429   Computer Networks for IT......................3
   MGT   471   Project Management..............................3
   MIS   310   Management Information Systems........3

Spring - 13 units
   COMP 449   Human Computer Interaction (PSY)......3
   IT   424   Computer System Security for IT 3
   IT   401   Web Intelligence....................................3
   IT   490   Special Topics for IT 3
   IT   499   BSIT Capstone......................................1

SUMMARY OF CHANGES
    MS Program: greater detail in the Admissions section.

JUSTIFICATION
    Clarifies requirements for prospective students

A. J. Bieszczad, Peter Smith   1/26/11
Proposers of Program Modifications   Date

Program: COMPUTER SCIENCE

Program Chair		
	Signature	Date

Curriculum Chair		
	Signature	Date

Dean of Faculty		
	Signature	Date

3.4.08 km2