California State University Channel Islands
Program Modification

Date (Change if modified and update the file name with the new date): 5.15.09, catalog copy; 1.26.10
Program Area: COMPUTER SCIENCE
Semester /Year First affected: FALL 2010

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, and highlight. Insert new language or other changes to the program on the RIGHT and highlight in YELLOW 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 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. 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.	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. 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

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Contact Information

Bachelor of Science in Computer Science - (122 units)

Lower Division Required Major Courses 42
Upper Division Required Major Courses 28
Upper Division Elective Major Courses........................ 12
Elective Courses...   6
General Education...28
American Institutions Requirement 6
TOTAL   ....**122 units**

Note: General Education Included in Major Requirements 14

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

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.

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 - 40 units
Major Requirements - 28 units

COMP	350	Introduction to Software Engineering	3
COMP	362	Operating Systems	3
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 3*
           GE-A2
MATH 150 Calculus I...4
           GE-B3
MATH 151 Calculus II..4
MATH 230 Logic and Mathematical Reasoning 3
           GE-A3, B3
           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 - 18 units + GE

COMP	350	Introduction to Software Engineering 3
COMP	362	Operating Systems.................................3
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
(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 - 23 units
Lower Division Requirements - 14 units

COMP	105	Computer Programming Introductio 3
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.

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Master of Science in
Computer Science
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(Offered through CSU Channel Islands Extended Education 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. 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 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 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) 3
    COMP 597   Master Thesis.................................... 1-6
    COMP 599   Graduate Seminar 1
    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.

Bachelor of Science in Information Technology

Programs Offered

• Bachelor of Science in Information Technology

This BSIT program is specifically designed to provide an avenue of advancement for students with associate's degrees in a technology discipline such as networking (e.g.: Moorpark College's Associate in Science Degree in Computer Network Systems Engineering). This new program gives the student the opportunity to complete a Bachelor of Science degree in Information Technology. The course work will provide a foundation in mathematics, programming, networking, databases, web, computer architecture and information systems. The BSIT sits between a BS in Computer Science and a BS in Management Information Systems, emphasizing the fastest growing segments of the both: Web Systems, Databases, and Networks. For a foundation, the BSIT program draws from both camps: 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.

Careers

Potential career option for BSIT graduates include: 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, Web Technology Support.

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

Bachelor of Science in Information
Technology - (120 units)

Lower Division Requirements

Students entering this program are expected to have completed an associate's degree (or equivalent) in a technology area, including:
1. Statistics
2. One semester of a Laboratory science (Physics, Chemistry, or Biology).
3. First course in a computer programming language such as C, Java or C++.
4. First course in Computer Architecture and Assembly Language.
5. CSU GE Certification or courses fulfilling the CSUCI lower division general education requirements.
6. A minimum of 10 units of lower division coursework in a technology area (computer technology, electronics technology, manufacturing technology, engineering, computer science, etc.).

Students who have not completed these *60* units prior to their admission to the program will be required to complete them at CSUCI or a community college. Course substitutions for these requirements may be made with the approval of the program chair.

Upper Division Requirements - 60 units

Mathematics and Science Requirements
7 units
  MATH 301   Discrete Mathematics for IT 3

Careers

Potential career options for BSIT graduates include: 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, Web Technology Support.

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

Bachelor of Science in Information
Technology - (121 units)

Lower Division Requirements

Students entering this program are expected to have completed an associate's degree (or equivalent) in a technology area, including:
1. Statistics
2. One semester of a Laboratory science (Physics, Chemistry, or Biology).
3. First course in a computer programming language such as C, Java or C++.
4. First course in Computer Architecture and Assembly Language.
5. CSU GE Certification or courses fulfilling the CSUCI lower division general education requirements.
6. A minimum of 10 units of lower division coursework in a technology area (computer technology, electronics technology, manufacturing technology, engineering, computer science, etc.).

Students who have not completed these *60* units prior to their admission to the program will be required to complete them at CSUCI or a community college. Course substitutions for these requirements may be made with the approval of the program chair.

Upper Division Requirements - 61 units

Mathematics and Science Requirements
7 units
  MATH 301   Discrete Mathematics for IT 3

Lab Science II-Physics, Chemistry or Biology 4

Core Courses - 25 units

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

Upper Division Interdisciplinary
GE - (9 units)

As a graduation requirement, all CSUCI students must complete _48_ units of General Education. Nine of the _48_ units must be resident upper division, interdisciplinary courses numbered in the 330-349 or 430-449 ranges.

Electives 15 units

Choose _15_ units from the following:
Note: 9 units of the15 units must be taken in IT 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

Lab Science II-Physics, Chemistry or Biology 4

Core Courses - 2<mark>6</mark> units

COMP	151	Data Structures and Program Design ...4
COMP	262	Computer Organization and Architecture .3
COMP	362	Operating Systems ....<mark>4</mark>
IT	280	Web Programming.................................3
IT	420	Database Theory and Design for IT 3
IT	429	Computer Networks for IT 3
MIS	310	Management Information Systems 3
MGT	307	Management of Organizations 3

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GE - (9 units)

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Electives 15 units

Choose _15_ units from the following:
Note: 9 units of the15 units must be taken in IT 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   424 ..... Computer System Security for IT   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).

Capstone - 4 units
   MGT   471   Project Management................................3
   IT   499   BSIT Capstone Project 1

BSIT Summary - 120 units
   Lower Division Requirements 60
   Mathematics and Science Requirements 7
   Core Courses 25
   Upper Division Interdisciplinary GE..................................9
   Upper Division Electives 15
   Capstone.......... 4

Proposed Course of Study
Junior Year
Fall - 17 units
Lab Science II (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 - 15 units
   COMP   447   Societal Issues in Computing 3
   COMP   362   Operating Systems.................................3
   IT   280   Web Programming...................................3
   IT   420   Database Theory and Design for IT 3
   MGT   307   Management of Organizations 3

IT   424 ..... Computer System Security for IT   3
IT   402 ....Advanced IT Programming   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).

Capstone - 4 units
   MGT   471   Project Management..............................3
   IT   499   BSIT Capstone Project 1

BSIT Summary - 121 units
   Lower Division Requirements 60
   Mathematics and Science Requirements 7
   Core Courses 26
   Upper Division Interdisciplinary GE 9
   Upper Division Electives 15
   Capstone 4

Proposed Course of Study
Junior Year
Fall - 17 units
Lab Science II (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
   IT   280   Web Programming..................................3
   IT   420   Database Theory and Design for IT 3
   MGT   307   Management of Organizations 3

Senior Year

Senior Year			*Fall - 15 units*			
Fall - 15 units			IT	400	e-Commerce 3	
IT	400	e-Commerce 3	IT	402	Advanced IT Programming...................3	
IT	402	Advanced IT Programming....................3	IT	429	Computer Networks for IT 3	
IT	429	Computer Networks for IT......................3	MGT	471	Project Management..............................3	
MGT	471	Project Management..............................3	MIS	310	Management Information Systems 3	
MIS	310	Management Information Systems........3				
			Spring - 13 units			
Spring - 11 units			COMP	449	Human Computer Interaction (PSY) 3	
COMP	449	Human Computer Interaction (PSY)......3	IT	424	Computer System Security for IT 3	
IT	424	Computer System Security for IT 3	IT	401	Web Intelligence 3	
IT	401	Web Intelligence....................................3	IT	490	Special Topics for IT……………….……3	
IT	499	BSIT Capstone......................................1	IT	499	BSIT Capstone......................................1	

SUMMARY OF CHANGES

A. These changes are the primarily the result of COMP 362 going from 3 units to 4 units. The ripple of units through the credit unit totals needed to be adjusted. Here is the list of changes:

1. "Core Courses" should have 26 units, not 25 units.

2. Under "Proposed Course of Study":

a) Junior Year Spring should be 16 units, not 15 units.

b) Senior Year Spring should be 13 units, not 11 units. (see note B.2 below concerning IT 490).

B. While checking all the total unit amounts it was noticed that:

1. The course IT 424 was accidentally listed twice in the list of electives, so one instance has been deleted.
2. The unit totals, and elective requirements, would not be met without an additional 3 unit elective in the "proposed course of study", so the course IT 490 Special Topics for IT was added to the spring of the senior year: add: "IT 490 Special Topics for IT 3" to the list of courses in Senior Year Spring.

JUSTIFICATION

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_William J. Wolfe_____1/26/2010_____
Proposer of Program Modification   Date

Program:

Program Chair		
	Signature	Date

Curriculum Chair		
	Signature	Date

Dean of Faculty		
	Signature	Date