

This brochure is *outdated*!

It describes the various undergraduate programs in the CSE Dept.
as they were under the quarter calendar (until Summer '12).

The current programs are described on the CSE Undergraduate Program
website at cse.ohio-state.edu

Or contact the CSE Advising Office in DL 374, tel: 292-1900
for information.

CSE Contacts

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CSE Department Office
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University Offices

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Columbus, Ohio 43210
Domestic Undergraduate: (614)292-3980
Graduate, International, Professional: (614) 292-9444

Arts and Sciences College Office
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164 W. 17th Avenue
Columbus, Ohio 43210
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Engineering College Office
244 Hitchcock Hall
2070 Neil Avenue
Columbus, Ohio 43210
(614) 292-2651

Fisher College of Business Office
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Electrical & Computer Engineering
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For more information about the department, please write, call, or e-mail us.

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2015 Neil Avenue Mall
Columbus, OH 43210-1277
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This document and other department information are also available from the World Wide Web at
<http://www.cse.ohio-state.edu>

Table of Contents

Degrees with a computing focus at The Ohio State University are featured in this brochure.

Semester Conversion	2
Introduction	3
Enrollment Notice	4
BS CSE Program Objectives and Outcomes	5
BS CSE College of Engineering	7
BS CSE Option Plans	8
I. Software Systems	8
II. Hardware - Software Systems	8
III. Information Systems	9
IV. Information and Computation Assurance	9
V. Individualized	10
BS CIS Colleges of the Arts and Sciences	11
BS Option Plans	12
I. Software Systems	12
II. Information Systems	12
III. Information and Computation Assurance	13
IV. Individualized	14
BA CIS Colleges of the Arts and Sciences	15
Minor in Computer and Information Science	16
Related Programs in Other Departments	
BS ECE (CpE Specialization) Electrical & Computer Engineering Department	17
BSBA (Information Systems) Fisher College of Business	18
Comparative Summary of Computing-Related Undergraduate Degrees	19
Computer Science and Engineering Undergraduate Courses	20
Departmental Resources and Supplemental Activities	21
Faculty	21
Computing Facilities	21
Student Organizations	21
Additional Activities	21
Scholarship Opportunities	21
Diversity Program	22
Honors & Scholars Programs	22
Career Services	23
Cooperative Education & Internships	23

SEMESTER CONVERSION

Semesters will be the OSU academic calendar beginning in summer 2012. The CSE Department is working to ensure that the transition from quarters to semesters will not negatively affect students' progress in the curriculum, provided they meet regularly with their academic advisor, follow through with the plan developed with their advisor, perform satisfactorily in their courses so that they are not required to repeat any classes, and do not change majors. Please look for regular e-mail communication from the department concerning the process and progress on the transition.

Additional information can be found at the following links:

<http://engineering.osu.edu/q2s/index.php>

<http://oaa.osu.edu/semesterconversion.html>

http://oaa.osu.edu/conversion_faq.html

<http://www.cse.ohio-state.edu/ugrad/semConversion.shtml>

Introduction

The purpose of this brochure is to describe the various baccalaureate-level computing degree programs offered through the CSE Department, as well as additional degrees offered through other departments and colleges that have a strong computing component. These options allow students to explore established career options or newly emerging fields they discover to be of interest to them as they progress through the program.

The dynamic and rapidly evolving field of computing is an area of study that encompasses a broad spectrum of theoretical and practical topics. Typical subjects of study include: design and analysis of algorithms and data structures; principles of programming language design; system software design; organization of computer hardware; computer networks; operating system principles; software engineering; databases and file design; artificial intelligence; numerical computation; computer graphics; network security and the theoretical foundations of computing.

The field of computing involves a broad spectrum of other fields of knowledge, and there are a variety of approaches to studying computing. In recognition of this situation, the CSE Department offers undergraduate major and minor programs through two different colleges: the College of Engineering, and the College of Mathematical and Physical Sciences in the Colleges of the Arts and Sciences.

The different undergraduate programs cater to the different interests of students. The BS programs from the College of Engineering (BS CSE) and the Colleges of the Arts and Sciences (BS CIS) prepare computing students for employment in the computing profession and for graduate study in computer science. The BA in Arts and Sciences (BA CIS) prepares CS students to use computers effectively in other fields to which computers can be applied, allowing the opportunity to combine the study of computer science with study in a related field.

Two other programs that have a strong computing component are the BS ECE (Computer option) offered in the Electrical & Computer Engineering Department (College of Engineering), and the BSBA (Information Systems option) in the Fisher College of Business. The BS ECE program offers students a solid grounding in electrical engineering and computer hardware. The BSBA program prepares students to use computers effectively in business emphasizing techniques of particular interest to commercial computing, while providing a strong background in business. Students in both programs are required to take a range of core CSE classes, ensuring that they have a solid background in computing fundamentals.

Students who are pursuing other degree programs and who have strong interest in computing may want to consider a minor in CIS. The requirements for a CIS Minor are also described in this brochure.

Enrollment Notice for Admission to Major

In order to ensure that majors will be able to complete their programs expeditiously, the Department gives scheduling priority in upper-division courses to CSE & CIS majors. All students in Engineering and Arts and Sciences who wish to become majors must apply for formal acceptance into the Department and will be admitted to the respective majors upon completion of the prerequisites outlined below.

The prerequisites for the CSE major (BS CSE) in Engineering are:

- 1. Completion of CSE 221 and 222 with at least a C-.
- 2. Completion of Math 151 and 152 with at least a C-.
- 3. Completion of either Chemistry 121 and Physics 131 or Physics 131 and 132.
- 4. Completion of English 110.xx.
- 5. A CPHR of at least **2.0** with at least 25 credit hours earned at the undergraduate level at Ohio State.
- 6. Completion of all admissions conditions.

The prerequisites for the CIS major (BS CIS, BA CIS) in Arts and Sciences are:

- 1. Completion of CSE 221 and 222 with at least a C-.
- 2. Completion of Math 151 and 152 with at least a C-.
- 3. Completion of English 110.xx.
- 4. A CPHR of at least **2.0** with at least 25 credit hours earned at the undergraduate level at Ohio State.
- 5. Completion of all admissions conditions.

Application to Major forms are available in the CSE undergraduate advising office in room 374 Dreese Laboratories and should be submitted during the quarter in which the above requirements will be met.

Additional Majors

BSBA (Information Systems)

The Fisher College of Business has similar competitive admissions standards for the Information Systems specialization. Please contact the College advisors in 120 Schoenbaum Hall for additional information about admission to major.

BS ECE (Electrical & Computer Engineering, Computer Specialization)

The BS ECE is a comprehensive Electrical & Computer Engineering degree. The program is a balanced study of hardware and software as applied to practical computer systems. Please consult with the Electrical & Computer Engineering Department in 205 Dreese Labs for additional information about curriculum and admission to major.

Scheduling Priorities

BS ECE (Computer Engineering Specialization) majors and BSBA (Information Systems) majors will be given the same priority as CSE and CIS majors for scheduling upper-division CSE courses that are **required** for their program; note, however, that they will be treated as non-majors for elective CSE courses.

CIS Minors are treated as non-majors for scheduling CSE courses and do not receive special priority for this purpose.

BS-CSE Program Objectives and Outcomes

Preamble

In this document, the term *Objective* denotes, as specified in the EC Criteria (see [ABET web site](#)), the expected accomplishments of graduates of the program during the several years following graduation. *Outcomes*, again as specified by EC, are statements that describe what students are expected to know or be able to do by the time of graduation from the program; i.e., achievement of the outcomes should "foster attainment of the objectives".)

There are three objectives, numbered (I) through (III). There are fourteen outcomes, numbered (a) through (n). The outcomes (a) through (k) correspond (but are not identical) to the EC outcomes (3.a) through (3.k); (l), (m), and (n) correspond to the CAC specified outcomes.

BS-CSE Program Objectives

The objectives of the BS-CSE program are:

- I. Graduates of the program will be employed in the computing profession, and will be engaged in learning, understanding, and applying new ideas and technologies as the field evolves.
- II. Graduates with an interest in, and aptitude for, advanced studies in computing will have completed, or be actively pursuing, graduate studies in computing.
- III. Graduates will be informed and involved members of their communities, and responsible engineering and computing professionals.

BS-CSE Program Outcomes

Students in the BS-CSE program will attain:

- a. an ability to apply knowledge of computing, mathematics including discrete mathematics as well as probability and statistics, science, and engineering;
 - b. an ability to design and conduct experiments, as well as to analyze and interpret data;
 - c. an ability to design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints such as memory, runtime efficiency, as well as appropriate constraints related to economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability considerations;
 - d. an ability to function on multi-disciplinary teams;
 - e. an ability to identify, formulate, and solve engineering problems;
 - f. an understanding of professional, ethical, legal, security and social issues and responsibilities;
-

- g. an ability to communicate effectively with a range of audiences;
- h. an ability to analyze the local and global impact of computing on individuals, organizations, and society;
- i. a recognition of the need for, and an ability to engage in life-long learning and continuing professional development;
- j. a knowledge of contemporary issues;
- k. an ability to use the techniques, skills, and modern engineering tools necessary for practice as a CSE professional;
- l. an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
- m. an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;
- n. an ability to apply design and development principles in the construction of software systems of varying complexity.

BSCSE

College of Engineering

A Bachelor of Science in Computer Science and Engineering (BSCSE) is offered through the College of Engineering. This program offers students a general education in engineering, physical sciences, and mathematics, along with intensive study in computer science and engineering. The core curriculum in computer science includes courses in programming and software development, computer architecture, algorithm analysis, numerical methods, operating systems, databases, programming languages, and theory of computation. In addition to the core curriculum, the program affords students the opportunity to choose an area of specialization by selecting technical electives from several options. Currently, the following options are available: software systems, hardware-software systems, information systems, and individualized option.

Requirements for the Major (Minimum 151 credit hours)

Core Courses (45 hours)

221	Software Development Using Components	(4)
222	Development of Software Components	(4)
321	Design and Analysis of Component-Based Software.....	(4)
360	Introduction to Computer Systems	(4)
459	Programming Languages for Programmers	(1)
541	Elementary Numerical Methods	(3)
560	Systems Software Design, Development, and Documentation.....	(5)
601	Social & Ethical Issues in Computing	(1)
625	Introduction to Automata and Formal Languages.....	(3)
655	Introduction to the Principles of Programming Languages	(4)
660	Introduction to Operating Systems	(3)
670	Introduction to Database Systems I.....	(3)
675.01	Introduction to Computer Architecture	(3)
680	Introduction to Algorithms & Data Structures.....	(3)

++ Students who entered OSU before Au 2006 may take any GEC course from the Social Sciences or Arts & Humanities in place of a course on ethics.

ACCREDITATION STATEMENT

The BS-CSE program is accredited by the Engineering Accreditation Commission (EAC) and the Computing Accreditation Commission (CAC) both of ABET, <http://www.abet.org>

CSE Options - Technical Electives (30 hours)

(Detailed on subsequent pages)

- I. Software Systems
- II. Hardware-Software Systems
- III. Information Systems
- IV. Information & Computation Assurance
- V. Individualized

Additional Major Requirements(min 76hours)

Mathematics 151, 152, 153, 254, 366, 566.....	(26)
Statistics 427, 428.....	(6)
Physics 131, 132	(10)
Chemistry 121	(5)
Physics 133 or Chem 125 or Biology 113or Geol 121(4-5)	
Electrical & Computer Engineering 261, 206, 300, 309, 320, 567	(13)
Mechanical Engineering 410 or ME 500 or MSE 205 (3-4)	
Industrial & Systems Engineering 504	(3)
Engineering 181, 183**	(6)

General Education Curriculum (40 hours)

Requirements:

- English
English 110.xx
Second writing course

(10)

Communication 321⁺

(5)

Minimum one course from each: Social sciences, analysis of texts/works of art and History for a total of 25 cr hrs with no more than one from any one group or subgroup.

- Econ 200 or 201⁺
- (5)
- Arts and Humanities
Analysis of Texts/Works of Art/Culture & Idea..(5- 10)
Historical Survey..... (5-10)
GEC.....(5)
Ethics ++ (may be covered in another GEC category)
Social Diversity (may be covered in another
GEC category)
- (0 - 5)

MINIMUM TOTAL HOURS FOR DEGREE 191

** Students are encouraged to take Engineering 181, 183 early in their program.

BSCSE in Engineering

T e c h n i c a l O p t i o n s (3 0 c r e d i t h o u r s)

Technical Options (30 credit hours): BS-CSE majors are required to choose one of the five technical options described below and on the next page. Each of the first three options includes a set of **required** courses and a number of credit-hours of **elective** courses.

Elective CSE Courses: The CSE courses that may be included as **elective courses** in each of the options are:

- Letter-graded CSE courses at the 500-level and above, unless otherwise noted in the *OSU Course Bulletin*;
- Up to 1 hour of 459 (in addition to that required as part of the core);
- Up to 2 hours of 693/793 combined (individual studies);
- Up to 3 hours of 699 or H783 combined (for honors students pursuing undergraduate research).

Only one of Math 568 or Math 571 may be counted; and only one of CSE 676 or ECE 765 may be counted.

If you wish to count as an elective course one that does not meet the requirements of your chosen option, you must get prior approval from your faculty advisor.

I. Software Systems Option (30 hours)

This option can provide a general broad-based overview of the field, or electives may be tailored to emphasize particular areas such as AI, graphics, databases, distributed computing, software engineering, etc. The option prepares students for positions as general applications programmers and systems analysts.

Required Courses (16 hours)

CSE 757 Software Engineering.....	(3)
CSE 551 Information Security.....	(3)
CSE 677 Computer Networking	(3)
Math 568, 571, 648 Math Elective.....	(3)
Capstone Design Course (recommended: CSE 758).....	(4)

Elective Courses (14 hours)

At least 10 credit hours of the elective courses must be CSE courses listed under **elective CSE courses** at the top of this page. The remainder may be either CSE courses listed at the top, or ECE 561, ECE 761, ECE 765, ECE 769, ISE 573, Math 572, Math 575, Math 647, Math 648, AMIS 310, BusFin 420, BusMHR 400, BusMgt 430/630, BusMktg 450.

II. Hardware-Software Option (30 hours)

This option emphasizes computer architecture, providing the student with a better understanding of the interface between a system's software and the hardware that it controls. It prepares students for positions as systems programmers and applications programmers for embedded systems (i.e., computers that control or provide intelligence in larger systems, such as aircraft navigation systems, robotics, etc.).

Required Courses (13-14 hours)

CSE 677 Computer Networking.....	(3)
ECE 561 Digital Circuit Design.....	(3)
Math 415 or 568 or 571 Math Elective	(3-4)
Capstone Design Course (recommended: CSE 778).....	(4)

Elective Courses (17-18 hours)

At least 10 credit hours of the elective courses must be CSE courses listed under **elective CSE courses** at the top of this page. The remainder may be either CSE courses listed at the top, or ECE 761, ECE 762, ECE 765, ECE 769, ISE 573, Math 568/571, Math 572, Math 575, Math 647, Math 648, AMIS 310, BusFin 420, BusMHR 400, BusMgt 430/630, BusMktg 450.

BSCSE in Engineering

T e c h n i c a l O p t i o n s (c o n t ' d .)

III. Information Systems Option (30 hours)

This option combines a rigorous CSE curriculum with an introduction to business topics. It places emphasis on the design and implementation of information processing systems. The option prepares students for positions as analysts and application programmers in a business environment.

Required Courses (19 hours)

CSE 616 Object-Oriented Systems Analysis	(4)
CSE 671 Introduction to Database Systems II.....	(3)
AMIS 211 or 310 Introduction to Accounting	(5)
Math 568 or 571 Math Elective	(3)
Capstone Design Course (recommended: CSE 772)	(4)

Electives Courses (11 hours)

At least 8 of the 11 credit hours of the elective courses must be CSE courses listed under **elective CSE courses** at the top of the previous page, or ISE 573.

IV. Information and Computation Assurance Option (30 hours)

Over the last few years, issues related to information and computation assurance (ICA) have become increasingly important. These issues are related to privacy concerns of individuals, national security considerations, as well as private businesses concerned with protecting trade and other secrets. The ICA option is well suited for students interested in this topic.

Required Courses (19 hours)

CSE 551 Introduction to Information Security	(3)
CSE 651 Network Security	(3)
CSE 677 Computer Networking	(3)
CSE 678 Internetworking	(3)
Math 568/571/648	(3)
Capstone Design Course (recommended: CSE 762)	(4)

Elective Courses (11 hours)

At least 3 credit hours of the elective courses must be CSE courses listed under elective CSE courses at the top of the previous page; other hours may be CSE or other appropriate non-CSE courses; some appropriate non-CSE courses for students in this option are: AMIS 531,627,653,658,659, and CRP/ GEOG 607.

BSCSE in Engineering

T e c h n i c a l O p t i o n s (c o n t ' d .)

V. Individualized Option (30 hours)

This option is intended to allow students to tailor their technical electives in such a manner as to enable them to study, in depth, a particular area of CSE such as networking or graphics or AI etc., or possibly explore the applications of computing to other areas such as linguistics or visualization of large amounts of scientific data, etc This option requires at least 30 credit hours of elective courses. Of these, **at least 12 credit hours must be CSE courses**. The remaining 18 credit hours may be CSE courses or appropriate courses from one or more other disciplines. All the CSE courses must be from among those listed under **elective CSE courses** at the top of the previous page. The student must develop a coherent program in consultation with his/her advisor, and must get approval of the program from the advisor at least four quarters before graduation. Students in this option are encouraged to consider with their advisor how the individualized major may work in conjunction with minors from other departments; appropriate courses included in a minor may be “double-counted” as part of the Individualized Option.

Students in the Individualized Option may follow one of the following tracks: or they may, as described above, tailor their option to their own interests, in consultation with their faculty advisor.

Graphics/Animation Track

CSE 581 Interactive Computer Graphics..... (4)
Capstone Design Course (suggested: CSE 682 or 694G)..... (4)
Other recommended courses: CSE 681, 694A, 781, 782, 784, 694G/682..... (4)
Technical electives OR suitable minor..... (18)
Recommended minors: Studio Art; Industrial, Interior & Visual Communication Design

Artificial Intelligence Track

CSE 630 Survey of Artificial Intelligence..... (4)
Capstone Design Course (suggested: CSE 694G or 731)..... (4)
Other recommended courses: CSE 612, 634, 730, 733, 735, 779, 731/694G..... (3-4)
Technical electives OR suitable minor..... (18)
Recommended minors: Linguistics, Psychology

Advanced Studies Track

CSE 725/755/780 (choose one).....(3)
CSE 760/775 (choose one).....(3)
Math 568/571/647/648 (choose one).....(3)
Capstone Design Course(4)
Technical electives OR suitable minor (17)
Other recommended courses: Choose from the approved guidelines and with faculty advisor.
Recommended minor: Math

Business Information Systems Track

CSE 616 Object Oriented Systems Analysis.....(4)
CSE 671 Introduction to Data Bases.....(3)
Capstone Design course (suggested: CSE 772).....(4)
Business Minor.....(20)

BSCIS

Colleges of the Arts and Sciences

Both a Bachelor of Science (BS) and a Bachelor of Arts (BA) with a major in Computer and Information science are offered through the College of Mathematical and Physical Sciences, which is one of the coalitions of colleges which constitute the Colleges of the Arts and Sciences. These programs combine a broad liberal arts background with specialized study in computer science. The BS CIS program has a strong scientific and technical orientation, and encourages students to specialize by choosing one of the following options to accompany the core computer science courses: software systems, advanced studies, information systems, information and computation assurance, and an individualized option. The BA CIS program permits students to combine the study of computer science with the study of some related field of potential computer application.

BSCIS

Requirements for the Major⁺ (91 hours)

Core Courses (46 hours)

221	Software Development Using Components	(4)
222	Development of Software Components	(4)
321	Design and Analysis of Component-Based Software	(4)
360	Introduction to Computer Systems	(4)
459*	Programming Languages for Programmers	(1)
541	Elementary Numerical Methods	(3)
560	Systems Software Design, Development, and Documentation.....	(5)
601	Social and Ethical Issues in Computing.....	(1)
625	Introduction to Automata and Formal Languages. (3)	
655	Introduction to the Principles of Programming Languages.....	(4)
660	Introduction to Operating Systems	(3)
670	Introduction to Database Systems I.....	(3)
675.02	Introduction to Computer Architecture.....	(4)
680	Introduction to Algorithms & Data Structures.....	(3)

CIS Options (28 hours)

- I. Software Systems
- II. Information Systems
- III. Information & Computation Assurance
- IV. Individualized Option

Additional Math Requirements (17 hours)

Mathematics 153, 366, 566	(11)
Statistics 427, 428	(6)

General Education

Curriculum (90hours)

<http://artsandsciences.osu.edu/students/gec.cfm>

Requirements:

Writing and Related Skills		
English 110 .xx.....	(5)	
Second writing course	(5)	
Quantitative and Logical Skills		
Math 151, 152.....	(10)	
Diversity Experiences (may be covered in other GEC categories).....		(0 - 15)
Foreign Language (through 104)		(10 - 20)
Natural Science		
Physics 111/112 or 131/132	(10)	
Elective Science (Structured Selection).....	(10)	
Social Science#		(10)
Arts and Humanities		
Historical Survey	(10)	
Structured Selection.....	(10)	

MINIMUM TOTAL HOURS FOR DEGREE 181

+ The Colleges of the Arts and Sciences requires that students earn at least a “C-” or better for all courses listed for the major.

The Information Systems option requires ECON 200.

Accreditation Statement

The BSCIS program has not sought and is not accredited by a commission of ABET, Inc.

BSCIS in Arts and Sciences

T e c h n i c a l O p t i o n s (2 8 c r h r s)

Technical Options (28 credit hours): BSCIS majors are required to choose one of the four technical options described below and on the next page. Each of the options includes a set of **required** courses and a number of credit hours of **elective** courses.

Elective CSE Courses: The CSE courses that may be included as **elective courses** in each of the options are:

- Letter-graded CSE courses at the 500-level and above, unless otherwise noted in the *OSU Course Bulletin*;
- Up to 1 hour of 459 (in addition to that required as part of the core);
- Up to 2 hours of 693/793 combined (individual studies);
- Up to 3 hours of 699 or H783 combined (for honors students pursuing undergraduate research).

Only one of Math 568 or Math 571 may be counted.

If you wish to count as an elective course one that does not meet the requirements of your chosen option, you must get prior approval from your faculty advisor.

I. Software Systems Option (28 hours)

This option can provide a general broad-based overview of the field, or electives may be tailored to emphasize particular areas such as AI, graphics, databases, distributed computing, software engineering, etc. The option prepares students for positions as general applications programmers and systems analysts.

Required Courses (13 hours)

CSE 551 Intro to Information Security	(3)
CSE 677 Introduction to Computer Networking.....	(3)
CSE 757 Software Engineering.....	(3)
Capstone (suggested: CSE 758).....	(4)

Elective Courses (15 hours)

At least 10 credit hours of the elective courses must be CSE courses listed under **elective CSE courses** at the top of this page. The remainder may be either CSE courses listed at the top, or ISE 573, Math 568/571, Math 572, Math 575, Math 647, Math 648, AMIS 310, BusFin 420, BusMHR 400, BusMgt 430/630, BusMktg 450.

II. Information Systems Option (28 hrs)

This option combines a rigorous CSE curriculum with an introduction to business topics. It places emphasis on the design and implementation of information processing systems. The option prepares students for positions as analysts and application programmers in a business environment.

Note that students in this option must take Econ 200 as a Social Science GEC course since it is a prerequisite for AMIS 211/310.

Required Courses (16 hours)

CSE 616 Object-Oriented Systems Analysis.....	(4)
CSE 671 Introduction to Database Systems II	(3)
AMIS 211 or 310 Introduction to Accounting	(5)
Capstone (suggested: CSE 772).	(4)

Elective Courses (12 hours)

At least 8 credit hours of the elective courses must be CSE courses listed under **elective CSE courses** at the top of the previous page, or ISE 573.

BSCIS in Arts and Sciences

T e c h n i c a l O p t i o n s (c o n ' t)

III. Information and Computation

Assurance Option (28 hours)

Over the last few years, issues related to information and computation assurance (ICA) have become increasingly important. These issues are related to privacy concerns of individuals, national security considerations, as well as private businesses concerned with protecting trade and other secrets. The ICA option is well suited for students interested in this topic.

Required Courses (16 hours)

- CSE 551 Introduction to Information Security..... (3)
- CSE 651 Network Security..... (3)
- CSE 677 Introduction to Comp Networking..... (3)
- CSE 678 Internetworking (3)
- Capstone (suggested: CSE 762) (4)

Elective Courses (12 hours)

At least 3 credit hours of the elective courses must be CSE courses listed under elective CSE courses at the top of the previous page, or other appropriate courses such as: AMIS 531,627,653,658,659, and CRP/GEOG 607

BSCIS in Arts and Sciences

T e c h n i c a l O p t i o n s (c o n ' t)

IV. Individualized Option (28 hours OR 18 CSE hours + approved minor)

This option is intended to allow students to tailor their technical electives so as to study, in depth, a particular area of computer science such as networking, graphics, AI etc., or possibly explore the applications of computing to other areas such as linguistics or visualization of large amounts of scientific data, etc.

Students pursuing this option are required to complete 10 hours of CSE courses and **one** of the following:

- 10 hours of CSE and non-CSE courses approved by the advisor; OR
- a minor program approved by the advisor.

The CSE courses included in the program must be from among those listed under **elective CSE courses** at the top of the previous page.

Students interested in this option are urged to consult with their advisors early in their program, so that they can get approval of the courses they propose to take including the non-CSE courses or the minor, whichever applies.

The following tracks have been pre-approved for students in the following options in the Individualized Option.

Graphics/Animation

CSE 581 Interactive Comp Graphics	(4)
Capstone (suggested: CSE 682 or 786).....	(4)
Technical Electives (CSE courses)	(10)
Technical Electives OR suitable mino	(10)

The following courses are strongly recommended for the technical elective hours required above: CSE 681, 694A, 781, 782, 784, 786/682.

Recommended minors: Studio Art; Industrial, Interior & Visual Communications Design

Artificial Intelligence

CSE 630 Survey Art Intelligence.....	(3)
Capstone (suggested: CSE 786 or 731).....	(4)
Technical Electives	(11)
Technical Electives OR suitable minor.....	(10)

The following courses are strongly recommended for the technical elective hours required above: CSE 612,634,730,732,733,735,779,786/731.

Recommended minors: Linguistics, Psychology

Advanced Studies

CSE 725 or 755 or 780	(3)
CSE 760 or 775.....	(3)
Math 568 or 571 or 647 or 648	(3)
Capstone	(4)
Technical Electives (CSE courses).....	(5)
Technical Electives OR suitable minor.....	(10)

Choose suitable CSE courses at 500 level or above as specified at the list of Technical Options.

Recommended minors: Mathematics

Business Information Systems (31hrs)

CSE 616 Object-Oriented Sys. Analysis	(4)
CSE 671 Intro Database Sys II	(3)
Capstone (suggested: CSE 772).....	(4)
<u>Business minor (required).....</u>	<u>(20)</u>

BACIS

Colleges of the Arts and Sciences

Requirements for the Major* (87 hours)

Core Courses (25 hours)

221	Software Development Using Components	(4)
222	Development of Software Components	(4)
321	Design and Analysis of Component-Based Software	(4)
360	Introduction to Computer Systems	(4)
560	Systems Software Design, Development, and Documentation.....	(5)
601	Social and Ethical Issues in Computing.....	(1)
670	Introduction to Database Systems I	(3)

Electives (20 hours)

To be chosen from the list of courses which follows and other CSE courses at the 600 level and above:

541, 551, 581, 616, 625, 630, 655, 660, 671, 675.02, 680, 757

Additional Major Requirements (42 hours)

Math 152, 153 Calculus and Analytic Geometry ...	(10)
Math 366 Discrete Mathematical Structures I.....	(3)
Statistics 245 Introduction to Statistical Analysis	(5)
CSE 459.xx Programming Language Elective	(1)
Approved Related Field ⁺ Introductory level	(5)
Above the introductory level	(10)
General Electives in Major	(8)
(additional courses in CSE at the 500 level (not CSE 502), Math, or the related field)	

General Education Curriculum (80 hours)

Requirements:

Writing and Related Skills	(10)
English 110 .xx Second writing course	
Quantitative and Logical Skills	
Math 151	(5)
Data Analysis (included in the major)	(0)
Foreign Language (through 104)	(0 - 20)
Diversity Experiences (may be covered in other GEC categories)	(0-15)

Natural Science.....	(15)*
Social Science.....	(10)*

Arts and Humanities

Historical Survey	(10)
Selected Breadth.....	(10)*
Issues of the Contemporary World	(5)

MINIMUM TOTAL HOURS FOR DEGREE 181

- * The Colleges of the Arts and Sciences requires that students earn at least a “C-” or better for all courses listed for the major.
- + The related field may be any in which Computer Science has potential application. At least one of these courses must be technical in nature. All courses used to satisfy the requirement of the Approved Related Field must be at the 200 level or above. Approval forms are available from the CSE undergraduate advising office.

Accreditation Statement

The BACIS program has not sought and is not accredited by a commission of ABET, Inc.

*Details : <http://artsandsciences.osu.edu/students/gec.cfm>

Minor in Computer and Information Science

A student may choose one of the following two tracks for a minor in Computer and Information Science. Courses applied to the minor may not be applied to the major.

Programming and Algorithms Track

Required Courses

CSE 201/202 Elementary Computer Programming(4)
CSE 221 Software Development Using Components ... (4)
CSE 222 Development of Software Components (4)
CSE 321 Design and Analysis of
Component-Based Software (4)
Math 366 or Math 345 Discrete Mathematical Structures I
/Foundations of Higher Math.....(3-4)

Elective Courses (choose two) +

CSE 360 Introduction to Computer Systems.....(4)
CSE 541 Elementary Numerical Methods(3)
CSE 551 Introduction to Information Security.....(3)
CSE 581 Interactive Computer Graphics.....(4)
CSE 621 Introduction to High-Perf Computing.....(3)
CSE 625 Introduction to Automata and Formal
Languages(3)
CSE 630 Survey of Artificial Intelligence I.....(3)
CSE 651 Network Security.....(3)
CSE 670 Introduction to Database Systems I.....(3)
CSE 671 Introduction to Database Systems II..... (3)
CSE 675.01 or 675.02 Introduction to Computer
Architecture.....(3-4)
CSE 677 Introduction to Computer Networking.....(3)
CSE 680 Intro to Algorithms & Data Structures.....(3)

+ Other courses as approved by CSE Advising Office.

Information Systems Track

Required Courses

CSE 200 Computer Asst. Prob Solv Business.....(5)
CSE 201 Elementary Computer Programming (4)
CSE 214 Data Structures for Information Systems (4)
CSE 670 Introduction to Database Systems I..... (3)
Math 366 or Math 345 Discrete Mathematical Structures I
/Foundations of Higher Math.....(3-4)

Elective Courses (choose two)+

CSE 314 Business Program File Processing.....(4)
CSE 551 Intro to Information Security.....(4)
CSE 616 Object-Oriented Systems Analysis.....(4)
CSE 671 Introduction to Database Systems II.....(3)

BS ECE (CpE Specialization)

C o l l e g e o f E n g i n e e r i n g

A Bachelor of Science in Electrical and Computer Engineering (BS ECE) with a specialization in Computer Engineering is offered by the Department of Electrical and Computer Engineering. This program offers students a solid grounding in electrical engineering and in computer hardware, along with a basic introduction to computing software. The core curriculum includes courses in analog and digital circuits, signals and systems, programming and software development, and operating systems. In addition to the core curriculum, the program affords students the opportunity to choose an area of specialization by selecting technical electives from several areas. Currently, ten areas are available, and they are listed below.

Requirements for the Major

(158 hours)

CSE Core (20 hours)

221	Software Development Using Components	(4)
222	Development of Software Components	(4)
321	Design and Analysis of Component-Based Software	(4)
560	Systems Software Design, Development, and Documentation.....	(5)
660	Introduction to Operating Systems	(3)

ECE Core Subjects (39 hours)

Analog Circuits 205, 209, 301, 323.....	(11)
Digital Circuits 206, 261, 265, 561,567, 662	(15)
Signals & Systems 351, 352.....	(6)
Additional Topics 331, 481, 682 (or 683)	(7)

CpE Electives (33 hours)

Includes additional math and science, electrical engineering and non-electrical engineering technical electives and courses from the following ten topics:

CpE Topics

1. VLSI & Computer-Aided Design
2. Microprocessor Based Systems
3. Digital Design & Computer Architecture
4. Computer Interfacing & Protocols, Networks
5. Robotics and Control for Automation
6. Neural Networks, Artificial Intelligence
7. Digital Signal Processing, Image Processing
8. Semiconductors
9. Communication Theory
10. Numerical Analysis

Additional Major Requirements (66 hours)

Mathematics 151, 152, 153, 254, 366, 415, 568 or 571.....	(30)
Statistics 427 (or Math 530)	(3)
Physics 131, 132, 133	(15)
Chemistry 121	(5)
Industrial & Systems Engineering 504	(3)
Engineering Graphics 167 or CSE 202.....	(4)
Engineering 181,183.....	(6)

General Education Curriculum (38 hours)

Requirements:

English

English 110 .xx

Second writing course

ECE582 (Design 1)..... (13)

Ethics

Social Sciences

Social Diversity (may be covered in another

GEC category)

Arts and Humanities

..... (5-10)

Historical Study

MINIMUM TOTAL HOURS FOR DEGREE 196

For complete and current information about the BS ECE program please contact the Department of Electrical and Computer Engineering located in 205 Dreese Labs, 292-2572 or visit <http://www.ece.osu.edu>

BSBA (Information Systems)

Max M. Fisher College of Business

A Bachelor of Science in Business Administration (BSBA) with a concentration in Information Systems is offered through the Fisher College of Business. This program is designed to educate students in the technical aspects of computer science so that they can use the information processing and problem-solving capabilities of computers effectively in business. These students follow a special sequence of introductory courses that emphasizes computing languages and techniques commonly employed in commercial computing. The program also provides a strong background in accounting, economics, finance, management, and general business.

Requirements for the Major (118 hours)

CS Core (19 hours)

201	Elementary Computer Programming.....	(4)
214	Data Structures for Information Systems	(4)
314	Business Programming with File Processing	(4)
670	Introduction to Database Systems I.....	(3)
616	Object-Oriented Systems Analysis.....	(4)

Major Options (12 hours)

Select 3 courses from the list below: (12-13 hours)

Acct. & MIS 532, 658, 659

Additional Major Requirements (89 hours)

Mathematics 131, 132, 366	(12)
CSE 200	(5)
Statistics 133	(5)
Bus-Mgt 330, 331	(9)
Accounting and MIS 211, 212	(10)
Economics: Required Courses 200, 201	(10)
Options (One course from list below)	
501, 502, 520, 530, 570, 580	(5)

Business Core Requirements:

Business Skills/Environment: Bus-Adm 499	(4)
International Business: Bus-Adm 555	(4)
Legal Environment of Business: Bus-Fin 510	(4)
Business Finance: Bus-Fin 620.....	(4)
Intro. to Oper.: Bus-Mgt 630	(4)
Marketing & Logistics Bus-M&L 650	(4)
Org. Behavior & Human Resources Bus-MHR 701	(5)
Senior Seminar: Bus-Adm 799	(4)

General Education Curriculum (60 hours)

Requirements:

English

English 110 .xx.....(5)

Second writing course..... (5)

Natural Science*..... (20)

Social Science**..... (10)

Social Diversity (may be covered in another GEC category) (0-5)

Arts and Humanities***

Historical Survey..... (5)

Visual/Perf Arts..... (5)

Literature..... (5)

Culture & Ideas / Lit/ VPA / Hist or FL102.....(5)

BA 100/H100..... (1)

Electives: (0-5)

MINIMUM TOTAL HOURS FOR DEGREE 186

* Natural Sciences component must include one sequence, one lab, one biological science course and one physical science course.

** At least one non-economics social science must be taken.

*** The Arts and Humanities component must include at least one US/Europe course and one non-US/Europe course.

**** Electives taken to meet minimum hours for graduation requirement of 186 credit hours.

For complete and current information about the BSBA please contact the Fisher College of Business in 120 Schoenbaum Hall, 292-2715 or <http://fisher.osu.edu/>

COMPARISON OF OSU UNDERGRADUATE COMPUTING DEGREES

SUBJECT	Credit Hours Required by Degree Option within College				
	ARTS & SCIENCES		ENGINEERING		BUSINESS
	<i>BS CIS CSE Dept.</i>	<i>BA CIS CSE Dept.</i>	<i>BS CSE CSE Dept.</i>	<i>BS ECE CpE ECE Dept.</i>	<i>BSBA IS Fisher COB</i>
CSE CORE	45	25	45	20	19
CSE ELECTIVES	23-27	20-28	30	0-18	12
MATH & STATISTICS	29 [#]	23 [#]	32	33-51	22-26
ECE			13	57-75	
OTHER ENGINEERING			12-13	13-31	
BUSINESS	0	0	0	0-18	60-61
RELATED FIELD	0	15-23	0	0-18	
SCIENCE	25	20	19-20	20-38	20
ETHICS			5	5	
ENGLISH	5	10	10	10	10
SOCIAL SCIENCE	5-10	15	5-10	5-10	20
ARTS & HUMANITIES (includes history)	15-20	25	15-20	15-20	20
FOREIGN LANGUAGE	10-20 [*]	10-20 [*]			
CONTEMPORARY WORLD		5			
COMMUNICATION/ ADDITIONAL GEC			5	3	
FREE ELECTIVES	15	15			
MINIMUM HOURS REQUIRED FOR DEGREE	191	191	191	196	186

The elective option in the major may include additional course(s) in this area. *To include 103 -104.

Computer Science & Engineering Undergraduate Courses

The following courses are available to students in **undergraduate degree programs**. For a complete list of courses offered by the Department of Computer Science & Engineering, see the Course Descriptions booklet published by the Department. Courses at the 300 level or below may not be used as CSE electives in the BS CSE, BS CIS, or the BA CIS programs.

Number	Title	Credit			
			682	Computer Animation.....	4
200	Computer Assisted Problem Solving For Business.....	5	693	Individual Study	1-5
201,202	Elementary Computer Programming	4	699	Undergraduate Research.....	1-5
203	Interactive Animation & Games	4	721	Introduction to Parallel Computing	4
204	Digital Images & Sound	4	723	Introduction to Cryptography.....	3
214	Data Structures for Information Systems	4	725	Computability and Unsolvability.....	3
221	Software Development Using Components	4	727	Computational Complexity	3
222	Development of Software Components	4	730	Survey of Artificial Intelligence II: Advanced Topics..	3
314	Business Programming with File Processing.....	4	731	Knowledge-Based Systems	4
321	Design and Analysis of Component-Based Software ...	4	732	Computational Linguistics.....	3
360	Introduction to Computer Systems	4	735	Machine Learning & Statistical Pattern Recognition	3
421	Software Development using Java.....	3	737	Proseminar in Cognitive Science.....	2
459	Programming Languages for Programmers	1	739	Knowledge-Based Systems in Engineering.....	3
541	Elementary Numerical Methods	3	741	Comparative Operating Systems	3
551	Information Security	3	752	Techniques for Simulation of Information Systems	3
560	Systems Software Design, Development, and Documentation.....	5	755	Programming Languages.....	3
581	Survey of Computer Graphics	4	756	Compiler Design and Implementation.....	4
601	Social and Ethical Issues in Computing.....	1	757	Software Engineering	3
612	Introduction to Cognitive Science.....	3	758	Software Engineering Project.....	4
616	Object Oriented Systems Analysis.....	3	760	Operating Systems.....	3
621	High Performance Computing	3	762	Web-Services-Based Dist.Systems Project.....	4
625	Introduction to Automata and Formal Languages.....	3	763	Introduction to Distributed Computing	3
630	Survey of Artificial Intelligence I: Basic Techniques ...	3	769	Applied Component-Based Prog. for Engin. & Sci.....	3
634	Computer Vision for Human Comp Int	3	770	Database Systems Implementation	3
651	Network Security	3	772	Information Systems Project	4
655	Introduction to Principles of Programming Languages.	4	775	Computer Architecture	3
660	Introduction to Operating Systems	3	776	Hardware/Software Interface Design Project	3
662	Operating Systems Laboratory	3	777	Telecommunication Networks.....	3
670	Introduction to Database Systems I	3	778	Computer Aided Design and Testing of VLSI Circuits	4
671	Introduction to Database Systems II	3	779	Introduction to Artificial Neural Network Methods	3
674	Introduction to Data Mining	3	780	Analysis of Algorithms	3
675.01 or 675.02	Introduction to Computer Architecture.....	3 or 4	781	Introduction to 3D Image Generation.....	4
676	Minicomputer & Microcomputer Systems.....	3	782	Advanced 3D Image Generation	3
677	Introduction to Computer Networking.....	3	H783	Honors Research	3
678	Internetworking.....	3	784	Geometric Modeling.....	3
679	Introduction to Multimedia Networking	3	786	Game Design and Development Project.....	4
680	Intro to Algorithms & Data Structures.....	3	790	Advanced Algorithms.....	3
681	Introduction to Graphics	4			

Departmental Resources and Supplemental Activities

In addition to the regular curriculum, students may seek intellectual and professional enrichment through departmental events and various university-sponsored programs.

Faculty

The CSE teaching faculty includes 34 professors with Ph.D.'s covering a wide variety of computing areas; several lecturers and instructors with M.S. or PhD degrees in computing; and about 45 graduate teaching associates who handle recitation sections of introductory courses, assist in computing labs, and help to grade upper-level courses. With few exceptions, course section sizes are restricted to 40 to encourage teacher-student interaction. All CSE majors are assigned an academic advisor, and a faculty advisor who can offer technical course and career suggestions.

Computing Facilities

In the OSU Department of Computer Science and Engineering the students, faculty and staff enjoy some of the best computing facilities available at OSU. These facilities consist of general-purpose instructional computers and specialized research laboratories. The Department uses a variety of operating systems with the primary ones being Windows and Solaris. The Windows environment consists of Dell workstations and servers; these are used by all courses. The UNIX environment consists of Sun servers running Solaris as well as some Linux servers; these are used by the intermediate and advanced courses. The Department also has access to other University computing resources such as large IBM mainframes and Cray supercomputers.

Student Organizations

Students are encouraged to become active in various professional societies in computer science: the **Association for Computing Machinery (ACM)**, the **Association for Computing Machinery for Women (ACM-W)**, and the **Computer Society of the Institute for Electrical and Electronic Engineers (IEEE)**. Other societies include **Upsilon Pi Epsilon** (an honorary society for computer science students), the **Society of Women Engineers**, the

Engineer's Council, the **Black Undergraduate Engineers Council**, the **Engineering Speaking Society**, and the **Ohio Society of Professional Engineers**, **OSU Open Source**, **OSUNTSIG**.

Additional Activities

Europa is a forum for students engaged in research in component-based software engineering. Europa research focuses on component-based software as studied in the Software Component Engineering Course Sequence and on related topics pursued by the OSU CSE Reusable Software Research Group. See the following link for more details:

<http://www.cse.ohio-state.edu/europa/>

NEWPATH is a program intended for CSE and CIS students, at all levels, who are interested in IT entrepreneurship. The program brings together students, faculty, and outside IT entrepreneurs to explore issues related to IT entrepreneurship and help students develop their entrepreneurial skills. See the following link for more details:

<http://www.cse.ohio-state.edu/ugrad/newpathhome.shtml>

Scholarship Opportunities

Each spring, the Computer Science and Engineering Department offers several one year scholarships with the intent of recognizing and encouraging excellence in the study of computing. The awards range from \$500-\$1500. See the following link for more details:

<http://www.cse.ohio-state.edu/ugrad/schols.shtml>

Diversity Program

The Diversity Program in CSE seeks to develop and educate a diverse and highly-regarded community of computer scientists through a supportive infrastructure for women and underrepresented minorities. Students are encouraged to become active in the many professional and special interest societies offered. Tutoring, mentoring, CSE newsgroup server, job postings, co-ops/internships are just a few of the many benefits of being active in the community. See the following link for more details:

<http://www.cse.ohio-state.edu/diversity>

Honors & Scholars Programs

University Honors & Scholars is a university-wide array of opportunities available to high-ability undergraduates. While there is some variation from College to College, these opportunities are designed to encourage and facilitate the pursuit of undergraduate academic excellence. At both the university and the college levels, exceptional students are encouraged to undertake honors programs, special classroom and research opportunities, and co-curricular activities which may result in an enhanced and distinctive undergraduate program.

Prospective students entering The Ohio State University must formally apply for honors affiliation through the University Honors & Scholars Center (220 West 12th Avenue, Columbus, OH 43210). Upon application approval, students are eligible to access the many opportunities available to honor-affiliated undergraduates, including priority scheduling privileges, honors residence halls, and honors classes. These classes are limited to 25 students and are taught by faculty. A currently enrolled undergraduate in a degree-granting college at the university must obtain formal honors affiliation through that college. For additional information, please contact the University Honors Center:

<http://www.honors-scholars.ohio-state.edu/>

In Engineering, the designation “engineering honors student” is awarded on a quarterly basis to college-designated undergraduates who have earned a cumulative GPA of at least 3.4. In addition, incoming direct-admit freshmen with an ACT composite score of at least 30 or a 1340 SAT combined score and in the top 10% of their high school graduating class may enroll in honors courses.

Career Services

Your college Career Services office is a valuable resource to help you reach your career goals. Whether you are an undergraduate just beginning to explore your options through co-op or internship experience, or an undergraduate or graduate student planning to graduate within a year, you will want to take full advantage of these services. For CSE students, opportunities abound to meet with employers here on campus, both through career fairs and through on-campus interviewing coordinated by each college. In addition, each career services office provides: career information (including salary statistics); information about potential employers; a variety of workshops and individual appointments to help with job search issues (interviewing skills, resume writing, job decisions); full-time career, co-op, internship, summer, and part-time job postings; resume referral services; and career fairs. Each career services office provides convenient web-based services to help registered students link with potential employers. Ohio State's reputation for academic excellence means that many nationally known employers travel to campus to recruit our students.

To take full advantage of all of the services and opportunities provided, you should plan to register with your college career services office at least three quarters prior to graduation—ideally, so that you are registered to interview during fall quarter when most interviewing takes place. (Please note that if you have previously registered as a co-op or intern candidate, you will need to update your registration to participate in full-time employment services).

Students should register with the Career Services office serving their college of enrollment. To find out about the full range of services offered by each office and to learn about specific registration procedures, simply call, stop by, or visit the web site of the office that applies to you.

Cooperative Education & Internships

Students are strongly encouraged to participate in their college co-op or internship program, since employers of college graduates generally favor those with career-related experience. In fact, employers typically give first priority to hiring their own co-ops and interns, since both students and employers have had the opportunity for a “test drive.”

Undergraduate students ready to seek practical, well-paid career-related work experience should start by visiting their College Career Services office. Program details and requirements for participation vary from college to college; however, students are encouraged to start pursuing practical experience as early as their sophomore year.

Cooperative Education (co-op) students alternate quarters of full-time work and full-time classes, usually maintaining a continuing commitment to the same employer throughout their undergraduate degrees. Internship students may work full-time for a single quarter or two back-to-back quarters before returning to full-time studies. Part-time employment in computer-related positions is also available with many central Ohio employers, including Ohio State. The career services offices co-sponsor an Internship/Co-op Job Fair each April, and employer recruiting activities take place throughout the year, with peak activity in fall and winter quarters.

Locating Your Career Services Office

Arts & Sciences Career Services

48 Townshend Hall
1885 Neil Avenue
292-7055
<http://asccareerservices.osu.edu>

Fisher College of Business Career Services

150 Gerlach Hall
2108 Neil Avenue
292-5415
<http://fisher.osu.edu/career/>

Engineering Career Services

199 Hitchcock Hall
2050 Neil Ave.
292-6651
<http://engineering.osu.edu/futurestudents/internship.php>