Undergraduate Curriculum

2018-2019

Department of Computer Science

SIU CARBONDALE Southern Illinois University

ABET Computing Accreditation Commission

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I. Introduction

This booklet is designed to accomplish two main purposes. First, if you are a prospective student, the information it contains should help you make an informed decision about whether or not to study Computer Science at Southern Illinois University. Second, if you choose to attend SIU, it assembles in a comprehensive manner all the information about the Computer Science curriculum. This information should assist in properly advising you throughout your course of study.

Section II contains the official catalog description as it appears in the current Undergraduate Catalog. As you examine the catalog description, keep in mind that to obtain either degree at SIU you must meet University requirements, University Core Curriculum requirements, College of Science requirements, and departmental requirements.

The next four sections explain the requirements. Section III outlines the University requirements. Including the 41-hour University Core Curriculum requirement. The Undergraduate Catalog is the final authoritative source and should be consulted along with an advisor, if you have any questions regarding University Core Curriculum requirements. Section IV lists the College of Science requirements. Section V details the requirements in the major.

Section VI discusses what is expected of new students in Computer Science at SIU, including entering freshmen and transfer students. More details about the advisement process are also explained.

Section VII contains information designed to assist you in the advisement process and help you graduate in the minimal amount of time. It begins with a listing of the courses offered by the Department of Computer Science. Tree diagrams showing the prerequisite structure of the Computer Science courses follow. These diagrams can be used to insure that you meet the prerequisites of courses you plan to take. A table listing a subjective estimate of the amount of programming (programming load) required in each course is included. You can use this table to avoid concurrently taking several courses with heavy programming loads. This table also indicates the mathematical level of sophistication (mathematical level) of each Computer Science course. A sample curriculum for both degrees in Computer Science is also presented. The sample curriculums are not necessarily recommended, they are not optimal, they are not models, nor are they suggested—they are only samples. However, they do take advantage of allowable substitutions in order to reduce the University Core Curriculum requirement. As this curriculum is examined, keep in mind the order in which Computer Science electives are taken is subject to the course offerings in a given semester. Finally, tentative course offerings in the Department of Computer Science are also listed. You can use this tentative schedule to assist in planning a course of study.

Section VIII contains useful information about Computer Learning Centers, CS LINUX accounts, and scholarships. Several important and useful phone numbers are listed in the last two sections.

II. Program Description

Computer science encompasses the theory, tools, and techniques by which information is derived, stored, manipulated, and communicated using computers. It deals particularly with the study of algorithms that are used to direct the computer and with the expression of these algorithms as programs. Of central concern is the study and further development of the computer systems, including both hardware and software that support the execution of these programs.

The Department of Computer Science offers two degree programs to undergraduate students - the Bachelor of Science and the Bachelor of Arts. The Bachelor of Science degree in Computer Science is accredited by the Computing Accreditation Commission (CAC) of the Accreditation

Board for Engineering and Technology (ABET). The curriculum specified for the Bachelor of Science degree is more traditional and somewhat more flexible in that it prepares the student for a wide range of careers as well as for graduate degree programs in computer science. The Bachelor of Arts degree program is more specifically oriented toward the interdisciplinary aspect of computer science in which students select a secondary concentration such as: business, engineering, science, education, liberal arts, or mass communication. Pre-med, pre-law, or a minor in any of the above areas may fully or partially satisfy this requirement depending on credit hours. One possible secondary concentration in the area of business applications is designed to enable students to pursue a fifth year of studies leading to an MBA degree.

In support of these degree programs, the department offers courses covering all the major areas of computer science including programming languages, operating systems, databases, computer networks, computer architecture, computer graphics, artificial intelligence, WEB application development, systems administration, software engineering, algorithms, and parallel programming. In addition, the department offers an undergraduate minor and service courses for students from other fields who will use computer science as a tool in their own areas. Students interested in computer science will be advised with respect to Computer Science courses by the department so they may profitably pursue their academic and professional interests.

The department enforces the following retention policy: a Computer Science major will not be permitted to enter any of the courses—220, 306, 311, 320, 330, and 335—unless that student has achieved a grade point average of at least 2.00 for all required precedent Computer Science courses. Any exceptions to this policy will require the written approval of the department.

Permission to enroll in departmental courses is subject to the restriction that a student who receives a grade of F or WF three times in the same course cannot take the course again. An exception to this policy may be granted by written approval of the department, but such exceptions will be rare.

The department also enforces the following restriction on students repeating its courses: a student cannot repeat a course or its equivalent, in which a grade of B or better was earned, without the consent of the department.

Bachelor of Science Degree in Computer Science, College of Science

University Core Curriculum Requirements[1] **39**

College of Science Academic Requirements **9**

- Biological Sciences (3 hours included in the UCC Life Science hours) 3
- Mathematics (completed with computer science major)
- Physical Sciences (completed with computer science major)
- Supportive Skills 6
  - CS 290 and CS 280 or CS 480

Requirements for Major in Computer Science[2] **70**

- Computer Science Core[3] 31
  - Computer Science 202, 215, 220, 221, 306, 311, 320, 330, 335 each with a grade of C or better
- Computer Science Electives[4] 21
  - To build on the Core and to provide breadth and depth, seven 400-level computer science courses must be chosen
- Senior Seminar 498 and 499/499B 5
- Mathematics 150, 221, 250[5] 8
- Laboratory Science Sequence 5
  - Physics 205A,B and 255A,B

General Electives **2**

Total **120**

[1] The supportive skills are also required for a major.
[2] The supportive skills are also required for a major. At least half of the computer science credit hours must be taken at SIU.
[3] At least half of the computer science credit hours must be taken at SIU.
[4] At least half of the computer science credit hours must be taken at SIU. CS 300 and 393 cannot be used to fulfill the elective requirement. Use of 391 requires departmental approval. Use of CS 490, 491, 492, or 493 requires departmental approval. At most one of CS 447, 449, 471, 472, 475, and 476 can be used as an elective. Up to two of the seven 400-level courses could be replaced by 300-level computer science courses.
[5] The supportive skills are also required for a major. Prerequisite is MATH 111 or MATH 108 and 109. The elective hours are reduced by 3-6 hours for students who place into a course lower than calculus.

For your individualized curricular guide, see your Student Education Planner in DegreeWorks.

Bachelor of Arts Degree in Computer Science, College of Science

University Core Curriculum Requirements **39**
College of Science Academic Requirements **12**
Biological Sciences (3 hours included in UCC Life Sciences hours) 3
Mathematics – completed with computer science major
Physical Sciences (3 hours included in UCC Physical Science hours) 3
Supportive Skills 6
CS 280 or CS 480; and CS 290
Requirements for Major in Computer Science[1] **68**
Computer Science Core[2] 31
Computer Science 201, 202, 215, 220, 221, 304/305[6], 306, 330, 335 each with a grade of C or better
Computer Science Electives[3] 18
To build on the Core and to provide breadth and depth, two additional 300-level and four 400-level computer science courses must be chosen.
Mathematics 111 (3 hours included in UCC Math hours) [4] 1
Secondary Concentration[5] 18
Eighteen credit hours approved by the Department of Computer Science in one of the following areas: business, engineering, science, education, liberal arts, or mass communication. Pre-med, pre-law, or a minor in any of the above areas may fully or partially satisfy this requirement depending on credit hours.
General Electives 1
Total **120**

[1] The supportive skills are also required for a major.
[2] At least half of the computer science credit hours must be taken at SIU. Students must take either CS 304 or CS 305.
[3] At least half of the computer science credit hours must be taken at SIU. CS 300 and 393 cannot be used to fulfill the elective requirement. Use of 391 requires department approval. Use of CS 490, 491, 492, or 493 requires departmental approval. At most one of CS 447, 449, 471, 472, 475, and 476 can be used as an elective.
[4] MATH 111 could be replaced by MATH 108 and 109, or by MATH 150.
[5] **MBA Foundation**: MATH 150 (instead of MATH 111), ACCT 220, FIN 270 and 330, MGMT 304 or 318, MKTG 304, and ECON 240 and 241. MGMT 304 allows a student to earn a minor in Business Administration. MGMT 318 is required for entry into the Master in Business Administration degree program. Six credit hours must be at 300 – level or above.

For your individualized curricular guide, see your Student Education Planner in DegreeWorks.

Concentrations for BS and BA Programs

Computer science majors may use their electives to form an optional concentration in five different computer science areas: computer graphics and game development; computer networks and

security; database and systems; software engineering and application development; or artificial intelligence and robotics. Computer science majors must take three courses (out of their 400-level electives) from a particular topic to receive a concentration in that area. For database and systems, **CS 430** must be one of the electives. For software engineering and applications development, **CS 435** is required as one of the electives. Concentrations will not appear on the transcript but will be stated on a certificate issued by the Department. The list of the courses for each concentration is as follows:

Computer Graphics & Game Development: CS 484, CS 485, CS 487
Computer Networks & Security: CS 408, CS 410, CS 440, CS 441
Database & Systems: CS 401, CS 406, CS 407, CS 420, **CS 430**, CS 455
Software Engineering & Application Development: CS 406, CS 407, CS 412, **CS 435**, CS 484
Artificial Intelligence & Robotics: CS 404, CS 434, CS 436, CS 437, CS 480

Computer Science Minor

A minor consists of Computer Science 202, 215, 220, and at least nine hours of 300-level Computer science coursework. At least nine of these hours must be taken at SIU.

III. University Requirements

All students seeking a Baccalaureate degree at SIU must satisfy the following requirements for graduation:

1. Complete a minimum of 120 semester hours of credit, which can include credit for work experience, College Level Examination Program (CLEP), Advanced Placement Program (AP), military credit, and proficiency examination credit, with at least 42 semester hours (or equivalent number of quarter hours) in courses at the 300 level or above, earned at or awarded through proficiency examination from an accredited, senior-level institution.
2. The University Core Curriculum Requirements, which are explained in Chapter 3 of the Undergraduate Catalog, total 41 semester hours of credit although there are methods available to reduce the number for certain students.
3. Maintain a C average in all SIU coursework and a C average in the major (2.0 on a 4.0 scale).
4. Satisfy residence requirements by completing 90 semester hours at SIU or the last 30 semester hours at SIU.

Additional details pertaining to University Core Curriculum Requirements are available in the Undergraduate Catalog at *http://registrar.siu.edu/catalog/undergraduatecatalog.html*.

IV. College of Science Requirements

The College of Science degree requirements, as they pertain to Computer Science majors, fall into four categories: biological sciences, physical sciences, supportive skills and general requirements. The specifics are listed on the following page.

Biological Sciences (6 hours)

Six semester hours in courses offered by the biological sciences departments in the college are required. This requirement cannot be satisfied in whole or in part by University Core Curriculum courses.

PHSL 201 (Human Physiology) **AND** PLB 301I (Environmental Issues)
OR
ZOOL 118 (Principles of Animal Biology) **OR** PHSL 201 & PHSL 208
AND BIOL 202

Physical Sciences

Six semester hours in courses offered by the physical science departments of the college (Chemistry and Biochemistry, Geology and Physics) are required. This requirement cannot be satisfied in whole or in part by University Core Curriculum courses, but certain courses chosen to meet the requirement may also substitute for certain University Core Curriculum requirements.

Note that the Department of Computer Science requires a two-semester sequence of laboratory science courses for the B.S. degree (see Section VI) which also satisfies the College of Science physical sciences requirement.

Supportive Skills (6/7 hours)

Either CS 280-3 (Computational Statistics I) OR CS 480-3 (Computational Statistics II) is required for both B.S. and B.A. degree programs. Although students may take either course; B.S. students are encouraged to register for CS 480-3.

A third English composition course beyond ENGL 102 is required and CS 290-3 (Communication Skills and Ethics for Computer Science) should be taken for both programs.

General Requirements

Each candidate for a bachelor's degree must complete the requirements listed:
Hour Requirements - Each student must complete at least 120 semester hours of credit, which can include credit for work experience, College Level Examination Program (CLEP), Advanced Placement Program (AP), military credit, and proficiency examination credit, with at least 42 semester hours (or equivalent number of quarter hours) in courses at the 300 level or above, earned at or awarded through proficiency examination from an accredited, senior-level institution. All credit granted may be applied toward the 42 hour requirement unless the credit has specifically been designated as being from a two-year college or credit has been awarded based on attendance at a two-year school. Mathematics 107 and University 388 cannot be counted in the 120 hours required for graduation.

V. Major Requirements

The Department of Computer Science's major requirements subdivide into four categories for each degree program:

Computer Science Core (B.S. – 31 hours; B.A. - 31 hours)

The department requires each of the following core courses for either program and each must be completed with a grade of C or better:

- CS 202 – Introduction to Computer Science
  The department's introductory course for majors taught on Pentium-based machines; currently using the Java language as the vehicle to introduce computer programming.
- CS 215 – Discrete Mathematics
  A course in discrete mathematics which gives students the necessary mathematical foundation for subsequent CS courses.
- CS 220 – Programming with Data Structures
  A data structures course taught on Pentium-based machines using the language Java.
- CS 221 – Introduction to Internet and Mobile Computing
  Introduction to components, architecture and infrastructure of systems and services to support internet computing and mobile platforms.
- CS 306 – Linux/UNIX Programming

This course uses the UNIX operating system and provides an in-depth coverage of the C language, which is used for the system programming projects in the course.

- CS 330 – Introduction to the Design and Analysis of Algorithms
  This course introduces some advanced data structures as they relate to file organization.
- CS 335 –Operating Systems
  This course discusses different aspects of operating system design and implementation.

In addition, the B.S. degree requires the following courses to be completed with a grade of C or better:

- CS 311 –The Theory and Implementation of Programming Languages
  A course based on programming language design and implementation.
- CS 320 – Computer Organization and Architecture
  A course in assembly language and computer organization.

And B.A. degree requires the following course to be completed with a grade of C or better:

- CS 201 – Problem Solving with Computers
  An introduction to problem solving using computers
- CS 304 – Advanced Object-Oriented Programming
  Advanced features of object-oriented programming are covered in depth.
  OR
- CS 305 – Software Development Practices
  Practices, tools and methodologies for development of software within the context of a team.

A major in Computer Science must satisfy the department's retention requirement in order to remain a major in the department. Specifically, permission to enroll in departmental courses is subject to the restriction that a student who receives a grade of F or WF three times in the same course cannot take the course again. An exception to this policy may be granted by written approval of the department, but such exceptions will be rare.

Computer Science Electives (B.S. – 21 hours; B.A. – 18 hours)

Each Computer Science major pursuing a B.S. degree is required to take 21 hours of Computer Science courses in addition to those listed previously. Seven 400-level Computer Science courses (two of which may be replaced by a 300-level course) must be chosen from the following list:

CS	401	Computer Architecture
CS	404	Autonomous Mobile Robots
CS	406	Basic Linux System Administration
CS	407	Advanced Linux/UNIX Programming
CS	408	Applied Cryptography
CS	410	Computer Security
CS	412	Programming Distributed Applications
CS	416	Compiler Construction
CS	420	Distributed Systems
CS	425	Principles of Virtualization and Cloud Computing
CS	430	Database Systems
CS	434	Learning From Data
CS	435	Software Engineering
CS	436	Artificial Intelligence I
CS	437	Machine Learning and Soft Computing
CS	438	Bioinformatics Algorithms
CS	440	Computer Networks
CS	441	Mobile and Wireless Computing
CS	451	Theory of Computing
CS	455	Advanced Algorithm Design and Analysis

CS	480	Computational Statistics II
CS	484	User Interface Design and Development
CS	485	Computer Graphics
CS	487	Software Aspects of Game Development

At most, one can be selected from the following cross-listed Math courses:

CS	447	Introduction to Graph Theory
CS	449	Introduction to Combinatorics
CS	471	Optimization Techniques
CS	472	Linear Programming,
CS	475	Numerical Analysis I
CS	476	Numerical Analysis II

Students pursuing a B.A. degree are required to choose four Computer Science courses (12 hours) from the 400-level courses above and two Computer Science courses (6 hours) from the 300-level courses below:

CS	304	Advanced Object-Oriented Programming
CS	305	Software Development Practices
CS	311	The Theory and Implementation of Programming Languages
CS	315	Computer Logic and Digital Design
CS	320	Computer Organization and Architecture
CS	350	Web Application Development

Senior Seminar in Computer Science: Senior Project/Senior Thesis (5 hours) – Required for B.S. degree only

Students pursuing a B.S. degree are required to take Senior Seminar in Computer Science. To fulfill this requirement, students would have to take CS 498 (2 credit hours) and CS 499 or 499B (3 credit hours) in two consecutive semesters. To take Senior Project in CS or Senior Thesis in CS, senior status in Computer Science, including completion of, or concurrent enrollment in, at least two other 400-level Computer Science courses, is required.

- CS 498 & 499 or 499B – Senior Seminar in CS & Senior Project in CS (Design, implementation, documentation, and deployment of a group project) or Senior Thesis in CS (A written thesis and presentation to CS faculty).

Mathematics (B.S. - 11 hours; B.A. - 4 hours)

The B.A. degree requires only MATH 111 (Precalculus). The B.S. degree requires MATH 150 (Calculus I), MATH 221 (Introduction to Linear Algebra) and MATH 250 (Calculus II).

Science (8 hours) - Required for B.S. degree only

The department requires a two-semester sequence of laboratory science courses:

PHYS	205A,B	University Physics
PHYS	255A,B	University Physics Laboratory

Secondary Concentration (18 hours) - Required for B.A. degree only

Eighteen credit hours approved by the Department of Computer Science in one of the following areas: business, engineering, science, education, liberal arts, or mass communication. Pre-med, pre-law or a minor in any of the above areas may fully or partially satisfy this requirement depending on credit hours.

MBA Foundation (as the secondary concentration): MATH 150 (instead of MATH 111), ACCT 220, FIN 270 and 330, MGMT 304 or 318, MKTG 304, and ECON 240 and 241. MGMT 304 allows a student to earn a minor in Business Administration. MGMT 318 is required for entry into the Master in Business Administration degree program.

VI. New Students and Advisement

New Students

If you are a high school graduate entering SIU as a freshman, you can complete all degree requirements in the normal four years (or possibly less). Prior exposure to computers is not a prerequisite. However, the department does honor the Advanced Placement Test in Computer Science given by the College Board. Additionally, the department can grant proficiency credit, particularly for the first course (CS 202), through examinations given by the department's Undergraduate Program Director.

If you are transferring from a community college, you can complete the departmental requirements in five or six semesters. Less time may be required depending on time of entrance and prior preparation. More precise estimates may be given in individual cases. It should be noted, however, that an associate degree in data processing may not significantly reduce the number of semesters required.

A transfer student need not have taken calculus prior to entrance into the program, but it is desirable that the student have had suitable precalculus courses. Indeed, Math 111 (Precalculus) or its equivalent (Math 108 and Math 109) is a prerequisite to CS 215. Math 150 (Calculus I) is required of majors in the B.S. degree only.

Advisement

The Computer Science Undergraduate Program Director will meet with new admitted and transfer students to review your career objectives and help you outline a course of study to meet your goals. The Director is available for assistance to CS undergraduate majors at any time throughout their program of study. To make an appointment, call the CS Main Office at 618-536-2327.

Additionally, an Undergraduate Orientation seminar is conducted each fall semester. The seminar offers an opportunity to gain familiarity with changes in the curriculum and to ask questions regarding the curriculum, course offerings, advisement, registration, and departmental issues.

There are some Computer Science students who <u>must</u> meet with the Undergraduate Program Director. They are:

1. **Students who are on academic probation.**
2. **Students who have less than a 2.0 average in the major.**
3. **Students deemed to be academically "at risk".**
4. **Graduating seniors (with Major Check forms).**

<u>New Freshmen or Transfer Students</u>:
Once admitted to the University and after the initial meeting with the Undergraduate Program Director, new freshmen and/or transfer students must make an appointment with an advisor in the Undergraduate Science Advisement Office. To see an advisor, call 536-5537 or stop by Neckers A185 at least two days in advance to make an appointment. This will allow the advisor time to review your transfer credit and set up the MATH placement testing, if needed.

<u>Current Students</u>:
The first two weeks of fall and spring semesters, the Undergraduate Science Advisement Office is open for walk-ins from 8-12, 1-4:30. If you have problems or questions, drop in at your convenience. No appointment is necessary. After the second week, there are two or three walk-in hours every day for problems and questions. If you need to see an advisor, call 536-5537 or stop by Neckers A185 to see when these times are available.

Make advisement/registration appointments early. The Undergraduate Science Advisement Office typically begins making advisement appointments for the spring semester during the month of October and for fall semester during the month of April. Registering early can make a difference in obtaining the classes you want.

SalukiNet:
SalukiNet is a web-based information system available to all SIU students. You can use it to register, obtain class schedules and grades, inquire about financial aid, and much more. All you need is your 9-digit SIU student ID number and your 4-digit PIN (new students are initially assigned a random PIN and are normally informed of it in writing at the time of admission or registration). You are strongly urged to change your PIN as soon as possible in order to maintain the privacy of your records. SalukiNet is available at http://salukinet.siu.edu/. More information on SalukiNet and Web Registration is available at http://registrar.siu.edu/.

Important Facts

Adding and Dropping Classes:
Classes may be added during the first week of each semester. If you foresee any problems with a class, see your advisor for assistance. If you find yourself overloaded, classes can be dropped until the end of the second week without affecting your record. Between the second week and the eighth week, classes can be dropped with a "W" (withdrawal) grade. This does not affect your grade point average. If you are having problems, talk to an advisor as early as possible.

Career Development Center:
At the beginning of your junior year, you should register with the Career Development Center to begin the job search process at https://careerdevelopment.siu.edu/.

Graduation:
An application for graduation must be completed and submitted during the first two weeks of your last semester. Please go to http://registrar.siu.edu/pdf/ApplyToGraduate.pdf.

VII. Advisement Materials

Computer Science Course Listings

105-3 Introduction to Application Software

This course is designed to provide a detailed exposure to various computer applications software including word processing, database management, spreadsheet, presentation, Web design software, and programming concepts. The course is designed to help students to better use the computer as a tool in their own fields and to help prepare students for Microsoft Office Specialist Certification examinations.

200B-3 Computer Concepts [IAI Course: BUS 902]

The course is designed to provide participants with a broad overview of computer concepts including key terminology and components of computer hardware, software, and operating systems. Topics will include, but are not limited to computer architecture, peripheral devices, networking components, system software, information system analysis, application software including word processing, database management, spreadsheet, and presentation software. Discussion will also include the Internet and Web page development.

201-3 Problem Solving with Computers

This course provides an introduction to problem solving using computers. It goes beyond basic computer literacy and application software experiences, but is less intensive than a first course devoted solely to programming. The course focuses on problem solving in the context of an introduction to computer programming and includes coverage of topics from computer literacy, word processing, spreadsheet and database packages. A preliminary treatment of the Internet and World Wide Web is also included.

201B-3 The Beauty and Joy of Computing

This course serves as an introductory course to the beauty and joy of computing for non-CS majors as well as first year CS majors. The history, social implications, principles, and applications of computing in addition to programming basics will be discussed. The joy of programming a computer will be delivered to the students using a friendly, visual programming language that does not require a keyboard, instead a simple drag and drop window interface. There will be many fun programming assignments and one team project related to the student's interests.

202-4 Introduction to Computer Science [IAI Course: CS911]

An introduction to computers and programming using a high-level structured language including a discussion of programming constructs and data representation. Primary emphasis will be given to problem solving, algorithm design, and program development. There are three one-hour lectures and one two-hour lab per week.

Prerequisite: Mathematics 111 or equivalent with a grade of C or better.

215-4 Discrete Mathematics [IAI Course: M1 905]

Introduction to topics relevant to the study of computer science including: number systems, sets, sequences, summations, logic and truth tables, proofs, functions, relations, matrix operations, combinations, permutations, counting techniques, discrete probability, algorithmic complexity, recurrence relations, Boolean algebra, simple combinational circuits, simplification techniques.

Prerequisite: Mathematics 111 or equivalent with a grade of C or better.

220-4 Programming with Data Structures [IAI Course: CS 912]

Advanced programming, data structures and algorithm design. Topics included advanced language features, data abstraction and object-oriented programming, recursion, stacks, queues, linked lists, trees and graphs, sorting and searching. The course meets for three lecture hours and two laboratory hours per week.

Prerequisites: CS 202 and CS 215 each with a grade of C or better.

221-4 Introduction to Internet and Mobile Computing

Introduction to components, architecture and infrastructure of systems and services to support internet computing and mobile platforms. Linux/Unix systems and server-side infrastructure: tools, commands and scripting. Client-side interfaces and application development (Android and web), IDEs, debugging, utilizing resources and services. This course will have a strong hands-on component.

Prerequisite: CS 202 with a grade of C or better.

280-3 Computational Statistics I

This course provides a basic introduction to probability and statistics as well as related computational approaches. Topics include basic probability models, combinatorics, random variables, discrete and continuous probability distributions, statistical estimation and hypotheses testing, confidence intervals and linear regression. Some selected computational approach for statistic problem such as simulation of random variables from probability distributions, the visualization of multivariate data, Monte Carlo integration and methods in inference will also be discussed. The R language will be used for programming assignments.

Prerequisite: MATH 108 with a C or better.

290-3 Communication Skills and Ethics for Computer Science

Effective writing, reading, presentation and oral communication skills for computer science professionals. Evaluation and analysis of technical material. Communicating with stakeholders and team members. Professional ethics and responsibilities in society and industry. Legal and sustainability impact. Discussions and assignments utilizing technical materials and case studies pertaining to history, research, practice and ethics in the discipline.

Prerequisites: CS 201 or CS 202 with a grade of C or better or consent of the instructor.

300-3 Introduction to Linux

A gentle introduction to the Linux operating system. Computer programming experience is not required. Students will gain the knowledge and hands-on experience needed to install, configure, and use Linux. Emphasis will be placed on administration skills and security. Software for Linux will be surveyed, particularly to identify replacements for standard Windows applications. Prior experience with Windows or Macintosh operating systems is assumed.

304-3 Advanced Object-Oriented Programming

Advanced features of object-oriented programming are covered in depth. The topics covered include, but are not limited to, the following: polymorphism, inheritance, overloading, generic programming, exception handling, file I/O, GUI development. A group project is an integral part of the course.

Prerequisite: CS 220 with a grade of C or better.

305-3 Software Development Practices

Practices, tools and methodologies for development of software within the context of a team. Agile software practices and modern development tools are used to build an enhanced understanding of object-oriented design principles, implementation, and testing to meet customer requirements. A team project is an integral part of this course.

Prerequisite: CS 220 with C or better.

306-3 Linux/UNIX Programming

This course will prepare students to develop software in and for Linux/UNIX environments. Topics to be covered include basic operating system concepts, effective command line usage, shell programming, the C language, programming development tools, system programming, network programming (client-server model and sockets), and GUI programming.

Prerequisites: CS 220 and CS 221 with a grade of C or better.

311-3 Theory and Implementation of Programming Languages

Introduction to the theory and implementation of programming languages including finite automata, regular grammars, lexical analysis, parsing, syntax-directed translation, semantic analysis, binding variables, data types, static and dynamic scope, subprograms, abstraction, and concurrency. Study of object-oriented, functional, and logic programming languages.

Lab work is essential.

Prerequisite: CS 220 with a grade of C or better.

315-3 Computer Logic and Digital Design

Introduction to switching algebra and its applications. Combinational logic and combinational circuit components. Sequential logic and sequential circuit components. Asynchronous sequential circuits.

Prerequisite: CS 215 with a grade of C or better.

320-3 Computer Organization and Architecture

Overview of the basic logic circuits needed in constructing a computer. Fundamental computer operations: machine and assembly language instructions, stacks, procedures and macros. The translation process: assembly, linking and loading. Hardware elements for processing, transferring, and storing information. Data path and control unit for a simple processor. *Prerequisite:* CS 220 with a grade of C or better.

330-3 Introduction to the Design and Analysis of Algorithms

A detailed treatment of the design, analysis, and complexity of algorithms, including greedy algorithms, divide and conquer, dynamic programming, and limitations of algorithms as problems get larger or more complex.

Prerequisite: CS 220 with a grade of C or better.

335-3 Operating Systems

An extended treatment of the components of operating systems including process management, concurrency, memory management, device management, file management, and security.

Prerequisite: CS 220 and CS 221 with a grade of C or better.

350-3 Web Application Development

A comprehensive introduction to languages and tools used to create client side and server side Web applications. Topics include, but are not limited to, markup languages, server-side and client-side scripting languages, web programming languages, web development architectures, frameworks and technologies, and database access.

Prerequisites: CS 202 and CS 221 with a grade of C or better or consent of instructor.

391-1 to 3 Current Topics in Computer Science

Selected current topics from various fields of computer science. Special approval needed from the instructor.

393-1 to 6 Internship in Computer Science

Credit for participation in a formalized internship program involving computer science related work. Hours do not count toward requirements for computer science major. Mandatory Pass/Fail.

Prerequisite: Computer Science major and prior approval of the sponsoring agency and the Department of Computer Science.

401-3 Computer Architecture

Review of logical circuit design. Hardware description languages. Algorithms for high-speed addition, multiplication and division. Pipelined arithmetic. Implementation and control issues using PLA's and microprogramming control. Cache and main memory design. Input/Output. Introduction to interconnection networks and multiprocessor organization.

Prerequisite: CS 320 with a grade of C or better.

404-3 Autonomous Mobile Robots

This course is a comprehensive introduction to modern robotics with an emphasis on autonomous mobile robotics. Fundamental of sensors and actuators as well as algorithms for top level control are discussed. Multi-robotics and human-robot interaction issues are explored. A group project is an integral part of this course.

Prerequisite: CS 330 with a grade of C or better.

406-3 Basic Linux System Administration

This course will be an introduction to the administration of Linux systems, with emphasis on security for networked systems. Topics to be covered include: installation and configuration of Linux distributions, typical maintenance activities, and security measures for networked systems. Students will have access to lab machines for hands on practice.

Prerequisite: CS 306 with a grade of C or better or graduate standing.

407-3 Advanced Linux/UNIX Programming

This course builds on the knowledge gained in CS 306, to prepare students to do advanced development on Linux/UNIX platforms. The topics studied are critical for achieving high performance in large-scale, high-load network software systems. These topics include development techniques such as profiling, concurrent programming and synchronization, network programming for high-load servers, advance I/O alternatives and IPC such as shared memory. The course will involve the study of code from Open Source projects like Apache and Nginx. The focus will be on the C language, but other languages will be considered. Students must complete a significant network software project.

Prerequisites: CS 306 and CS 335 with grades of C or better or graduate standing with C language & Linux systems programming experience.

408-3 Applied Cryptography

This course is a comprehensive introduction to modern cryptography, with an emphasis on the application and implementation of various techniques for achieving message confidentiality, integrity, authentication and non-repudiation. Applications to Internet security and electronic commerce will be discussed. All background mathematics will be covered in the course. *Prerequisites:* CS 330 with a grade of C or better and MATH 221 or graduate standing.

410-3 Computer Security

A broad overview of the principles, mechanisms, and implementations of computer security. Topics include cryptography, access control, software security and malicious code, trusted systems, network security and electronic commerce, audit and monitoring, risk management and disaster recovery, military security and information warfare, physical security, privacy and copyrights, and legal issues.

Prerequisite: CS 306 with a grade of C or better or graduate standing.

412-3 Programming Distributed Applications

This course uses advanced features of the Java programming language to develop networked, distributed, and web-based applications. Topics covered include, but are not limited to, sockets, datagrams, the Java security model, threads, multi-tier architectures, Java RMI, Java database connectivity, and Java-based mobile agents.

Prerequisite: CS 306 with a grade of C or better or graduate standing .

416-3 Compiler Construction

Introduction to compiler construction. Design of a simple complete compiler, including lexical analysis, syntactical analysis, type checking, and code generation.

Prerequisites: CS 306 and CS 311 each with a grade of C or better or graduate standing.

420-3 Distributed Systems

A top-down approach addressing the issues to be resolved in the design of distributed systems. Concepts and existing approaches are described using a variety of methods including case studies, abstract models, algorithms and implementation exercises.

Prerequisite: CS 335 or graduate standing.

425-3 Principles of Virtualization and Cloud Computing

Cloud Computing (CC) represents a recent major strategic shift in computing and Information Technology. This course explores fundamental principles, foundational technologies, architecture, design, and business values of CC. Understanding will be reinforced through multiple angles including: analysis of real world case studies, hands-on projects and in depth study of research developments.

Prerequisite: CS 330 with a grade of C or better or graduate standing.

430-3 Database Systems

The course concentrates on the relational model, database design, and database programming. Topics include relational model, relational algebra, SQL, constraints and integrity, transaction support, concurrency control, database design, normalization, backup, recovery, and security. A comprehensive product-like project is an integral part of the course.

Prerequisite: CS 330 with a grade of C or better or graduate standing.

434-3 Learning From Data

An introduction to classical machine learning theory and practical techniques. Topics to be covered include computational learning theory (VC theory), linear classification and regression models, SVMs and kernel methods, decision trees, the bias-variance tradeoff, overfitting, and regularization.

Prerequisite: CS 330 with a grade of C or better or graduate standing.

435-3 Software Engineering

Principles, practices and methodology for development of large software systems. Object-oriented principles, design notations, design patterns and coping with changing requirements in the software process. Experiences with modern development tools and methodologies. A team project is an integral part of this course.

Prerequisites: CS 330 with a grade of C or better or graduate standing; CS 306 with a grade of C or better recommended.

436-3 Artificial Intelligence I

Search and heuristics, problem reduction. Predicate calculus, automated theorem proving. Knowledge representation. Applications of artificial intelligence. Parallel processing in artificial intelligence.

Prerequisites: CS 311 and CS 330 each with a grade of C or better or graduate standing.

437-3 Machine Learning and Soft Computing

An introduction to the field of machine learning and soft computing. It covers rule-based expert systems, fuzzy expert systems, artificial neural networks, evolutionary computation, and hybrid systems. Students will develop rule-based expert systems, design a fuzzy system, explore artificial neural networks, and implement genetic algorithms.

Prerequisite: CS 330 with a grade of C or better or graduate standing.

438-3 Bioinformatics Algorithms

This course is an introductory course on bioinformatics algorithms and the computational ideas that have driven them. The course includes discussions of different techniques that can be used to solve a large number of practical problems in biology.

Prerequisite: CS 330 with a grade of C or better or graduate standing.

440-3 Computer Networks

Design and analysis of computer communication networks. Topics to be covered include queuing systems, data transmission, data link protocols, topological design, routing, flow control, security and privacy, and network performance evaluation.

Prerequisites: CS 330 with a grade of C or better; CS 306 recommended, or graduate standing.

441-3 Mobile and Wireless Computing

Concepts of mobile and wireless systems are presented. These concepts include, but are not limited to, Routing and Medium Access for Mobile Ad hoc and Wireless Sensor Networks, Mobile IP, Wireless LAN and IEEE 802.11. Hands-on group lab experience is an integral component in the course.

Prerequisite: CS 330 with a grade of C or better, or consent of the instructor.

447-3 Introduction to Graph Theory

(Same as MATH 447.) Graph theory is an area of mathematics which is fundamental to future problems such as computer security, parallel processing, the structure of the World Wide Web, traffic flow and scheduling problems. It also plays an increasingly important role within computer science. Topics include: trees, coverings, planarity, color ability, digraphs, depth-first and breadth-first searches.

Prerequisite: MATH 349 with C or better.

449-3 Introduction to Combinatorics

(Same as MATH 449.) This course will introduce the student to various basic topics in combinatorics that are widely used throughout applicable mathematics. Possible topics include: elementary counting techniques, pigeonhole principle, multinomial principle, inclusion and exclusion, recurrence relations, generating functions, partitions, designs, graphs, finite geometry, codes and cryptography.

Prerequisite: MATH 349 with C or better.

451-3 Theory of Computing

The fundamental concepts of the theory of computation including finite state acceptors, formal grammars, Turing machines, and recursive functions. The relationship between grammars and machines with emphasis on regular expressions and context-free languages.

Prerequisites: CS 311 and CS 330 each with a grade of C or better or graduate standing.

455-3 Advanced Algorithm Design and Analysis

An in-depth treatment of the design, analysis and complexity of algorithms with an emphasis on problem analysis and design techniques.

Prerequisite: CS 330 with a grade of C or better or graduate standing.

471-3 Optimization Techniques

(Same as MATH 471.) Introduction to algorithms for finding extreme values of nonlinear multivariable functions with or without constraints. Topics include: convex sets and functions; the arithmetic-geometric mean inequality; Taylor's theorem for multivariable functions; positive definite, negative definite, and indefinite matrices; iterative methods for unconstrained optimization.

Prerequisites: MATH 221 and MATH 250 with C or better.

472-3 Linear Programming

(Same as MATH 472.) Introduction to finding extreme values of linear functionals subject to linear constraints. Topics include: recognition, formulation, and solution of real problems via the simplex algorithm; development of the simplex algorithm; artificial variables; the dual problem and the duality theorem; complementary slackness; sensitivity analysis; and selected applications of linear programming.

Prerequisite: MATH 221 with C or better.

475-3 Numerical Analysis I

(Same as MATH 475.) Introduction to theory & techniques for computation with digital computers. Topics include: solution of nonlinear equations; interpolation & approximation; solution of systems of linear equations; numerical integration. Students will use MATLAB to study the numerical performance of the algorithms introduced in the course.

Prerequisites: MATH 221 and MATH 250 with C or better.

476-3 Numerical Analysis II

(Same as MATH 476) Continuation of CS 475. Topics include: solution of ordinary differential equations; computation of eigenvalues and eigenvectors; and solution of partial differential equations. Students will use MATLAB to study the numerical performance of the algorithms introduced in the course.

Prerequisites: MATH 305 and MATH 475 with C or better.

480-3 Computational Statistics II

This computational statistic course utilizes computational and graphical approaches to solve statistical problems. A comprehensive coverage on modern and classical methods of statistical computing will be given. Case studies in various disciplines such as science, engineering and education will be discussed. Various topics such as numerical integration and simulation, optimization and maximum likelihood estimation, density estimation and smoothing as well as re-sampling will be presented. Students will be able to create graphical and numerical display based on their data analysis results using R programming language.

Prerequisite: MATH 250 and CS306 or CS330 with C or better or graduate standing.

484-3 User Interface Design and Development

Problems and processes in the design of highly usable systems. Understanding stakeholders, requirements, tasks, prototyping, evaluation, guidelines and design process and heuristics. Interactive software concepts and implementation considerations. A group project is an integral part of this course.

Prerequisite: CS 306 with a grade of C or better or graduate standing.

485-3 Computer Graphics

Principles and techniques of computer graphics. Interactive graphics software development using a modern graphics standard. Topics include: primitives, transforms, clipping, modeling,

viewing, rendering, texture, animation and ray tracing. A group project is an integral part of this course.

Prerequisite: CS 306 with a grade of C or better; MATH 150 and 221 are recommended, or graduate standing.

487-3 Software Aspects of Game Development

This course focuses on software implementation and development aspects of game production including: software process, system architecture, frameworks, entity management and interaction design, game design, production and business issues as well as technical foundations in graphics modeling and rendering, collision detection, physics, artificial intelligence, and multiplayer techniques.

Prerequisite: CS 330 with a grade of C or better or graduate standing.

490-1 to 6 (1 to 3 per semester) Readings

Supervised readings in selected subjects. Not for graduate credit. Mandatory Pass/Fail. Special approval needed from the instructor and department.

491-1 to 6 (1 to 3 per topic) Special Topics

Selected advanced topics from the various fields of computer science. Special approval needed from the instructor.

492-1 to 6 (1 to 3 per semester) Special Problems

Individual projects involving independent work. Special approval needed from the department.

493-1 to 4 Seminar.

Supervised study. Preparation and presentation of reports. Special approval needed from the instructor.

498-2 Senior Seminar in Computer Science

This course consists of diverse presentations by faculty, students, and invited speakers from industry, and prepares students for CS 499 (Senior Project in Computer Science) or CS 499B (Senior Thesis in Computer Science). Students in CS project track will select and plan a real world team project, while students in CS thesis track will select a research topic, under advisement of a Computer Science faculty, and will present a research proposal.

Prerequisite: completion of or concurrent enrollment in at least two other 400-level Computer Science courses. Restricted to senior status in Computer Science.

499-3 Senior Project in Computer Science

A continuation of CS 498, performing exercise in the design, implementation, documentation, and deployment of a group project culminating in a presentation to the Computer Science faculty.

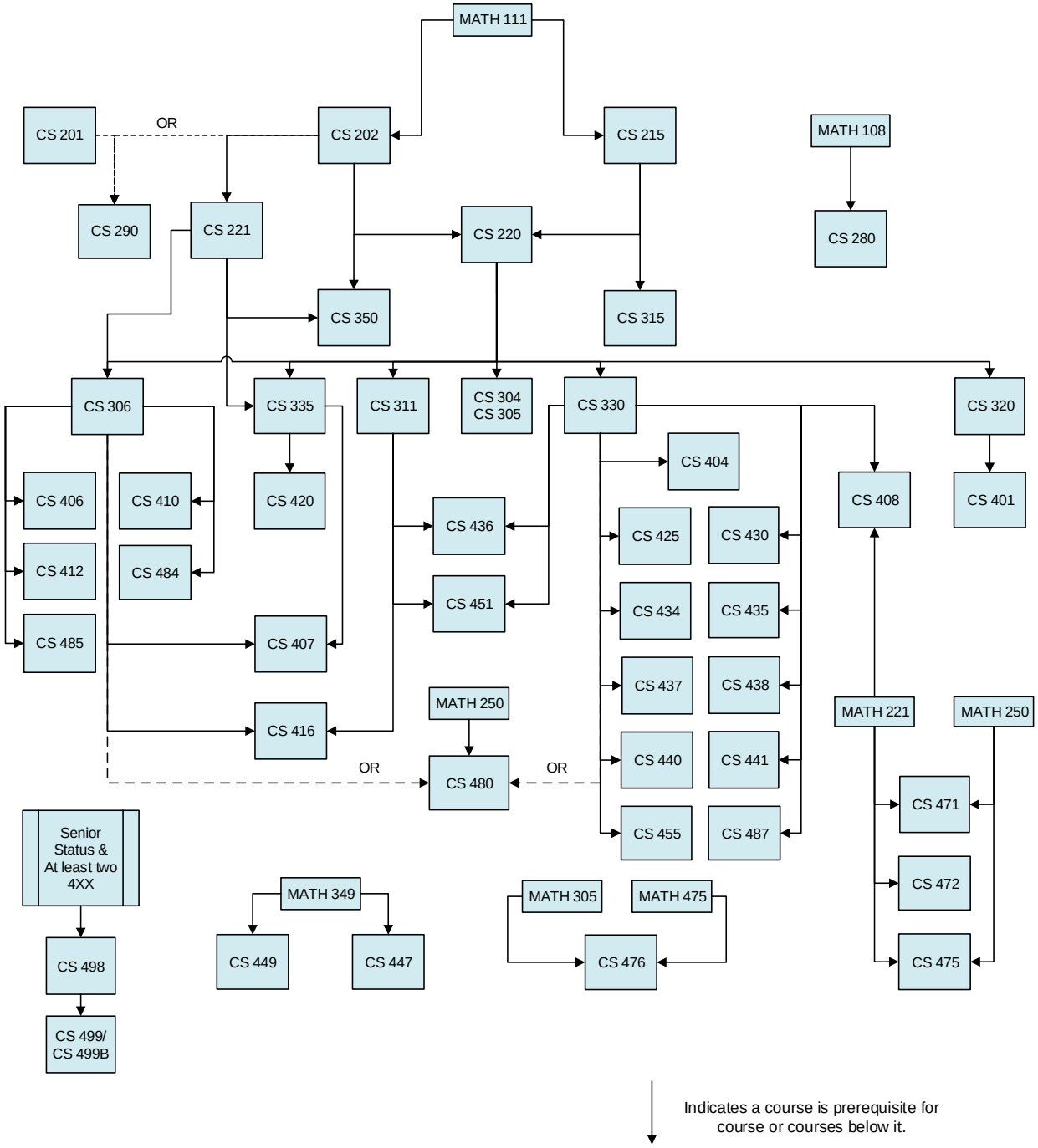
Prerequisite: CS 498.

499B-3 Senior Thesis in Computer Science

A continuation of CS 498, carrying out the approved research under the supervision of a Computer Science faculty culminating in a written thesis and presentation to the Computer Science faculty, evaluated by a committee consisting of the Undergraduate Curriculum Committee, the advisor, and the instructor of the course. *Prerequisite:* CS 498.

Prerequisite Structure

Department of Computer Science Prerequisite Structure



Programming Load and Mathematical Level of Sophistication

Course	Programming Load	Mathematical Level	Prerequisites
105	0	0	none
200B	0	0	none
201/201B	1	0	none
202	2	1	MATH 111
215	0	2	MATH 111
220	3	2	CS 202 and CS 215
221	3	1	CS 202
280	2	2	MATH 108
290	1	0	CS 201 or CS 202
300	0	0	None
304	3	1	CS 220
305	3	1	CS 220
306	3	1	CS 220 and CS 221
311	2	2	CS 220
315	0	2	CS 215
320	1	1	CS 220
330	3	2	CS 220
335	2	1	CS 220
350	2	1	CS 202 and CS 221
401	0	1	CS 320
404	2	1	CS 330
406	1	1	CS 306
407	3	1	CS 306 and CS 335
408	2	3	CS 330 and MATH 221 or equivalents
410	1	2	CS 306
412	3	1	CS 306
416	3	0	CS 306 and CS 311
420	2	2	CS 335
425	2	2	CS 330
430	1	1	CS 330
434	2	2	CS 330
435	3	0	CS 306 and CS 330
436	2	1	CS 311 and CS 330
437	2	1	CS 330
438	2	2	CS 330
440	1	2	CS 330
441	2	2	CS 330
447	0	3	MATH 349
449	0	3	MATH 349
451	0	2	CS 311 and CS 330
455	1	2	CS 330
471	1	2	MATH 221 and 250
472	1	2	MATH 221
475	1	3	MATH 221 and 250
476	1	3	MATH 305 and MATH 475
480	3	2	MATH 250 and CS306 or CS330
484	2	1	CS 306
485	2	2	CS 306; MATH 150 and 221 recommended
487	2	2	CS 330
498			Restricted to senior status in Computer Science
499/499B			CS498

Legend:
0 = none to slight
1 = slight to moderate
2 = moderate
3 = heavy

The levels in a particular course may vary from one instructor to another and may even vary from term to term with a particular instructor.

These levels should be viewed as rough estimates.

Sample Curriculum

The curriculums below are presented only as samples. In no way are these model curriculums or even recommended curriculums. These curriculums can and should be tailored to a student's background and preparation. For example, one may have the ability to take CS 202 and CS 215 the first semester of the freshman year if he/she has the background equivalent to MATH 111. These sample curriculums do take advantage of allowable substitutes for University Core Curriculum courses in order to reduce requirements. Keep in mind that the order in which Computer Science electives are taken is subject to the course offerings in a given semester.

Bachelor of Science in Computer Science

First Year

Fall Semester (14 credit hours)

ENGL 101	English Composition I	3
MATH 150	Calculus I	4
PHIL 105	Elementary Logic	3
Select	College of Science Biology	3
UNIV 101	Saluki Success	1

Spring Semester (16 credit hours)

CS 202	Introduction to Computer Science	4
CS 215	Discrete Mathematics	4
ENGL 102	English Composition II	3
Select	UCC Human Health	2
CMST 101	Introduction to Oral Communications: Speech, Self and Society	3

Second Year

Fall Semester (15 credit hours)

CS 220	Programming with Data Structures	4
CS 221	Introduction to Internet and Mobile Computing	4
CS 290	Communication Skills and Ethics for Computer Science	3
MATH 250	Calculus II	4

Spring Semester (16 credit hours)

CS 306	Linux/ Unix Programming	3
CS 311	The Theory and Implementation of Programming Languages	3
MATH 221	Introduction to Linear Algebra	3
PHYS 205A	University Physics	3
PHYS 255A	University Physics Laboratory	1
Select	UCC Fine Arts	3

Third Year

Fall Semester (16 credit hours)

CS 320	Computer Organization and Architecture	3
CS 330	Introduction to the Design and Analysis of Algorithms	3
PHYS 205B	University Physics	3
PHYS 255B	University Physics Laboratory	1
Select	UCC Humanities	3
Select	UCC Social Science	3

Spring Semester (15 credit hours)

CS 335	Operating Systems	3
CS 480	Computational Statistics II	3
CS 4XX	CS Elective	3
Select	College of Science Biology	3
Select	UCC Multicultural	3

Fourth Year

Fall Semester (14 credit hours)

CS 498	Senior Seminar in Computer Science	2
CS 4XX	CS Elective	3
CS 4XX	CS Elective	3
CS 4XX	CS Elective	3
Select	UCC Social Science	3

Spring Semester (14 credit hours)

CS 499/ CS499B	Senior Project in Computer Science **OR** Senior Thesis is Computer Science	3
CS 4XX	CS Elective	3
CS 4XX	CS Elective	3
CS 4XX	CS Elective	3
Select	General Elective	2

Bachelor of Arts in Computer Science

First Year

Fall Semester (14 credit hours)

CS 201	Problem Solving with Computers	3
ENGL 101	English Composition I	3
MATH 111	Precalculus	4
PHIL 105	Elementary Logic	3
UNIV 101	Saluki Success	1

Spring Semester (15 credit hours)

CS 202	Introduction to Computer Science	4
CS 215	Discrete Mathematics	4
CMST 101	Introduction to Oral Communications: Speech, Self and Society	3
ENGL 102	English Composition II	3
Select	General Elective	1

Second Year

Fall Semester (16 credit hours)

CS 220	Programming with Data Structures	4
CS 221	Introduction to Internet and Mobile Computing	4
Select	Secondary Concentration	3
Select	UCC Human Health	2
Select	UCC Social Science	3

Spring Semester (15 credit hours)

CS 290	Communication Skills and Ethics for Computer Science	3
CS 306	Linux/UNIX Programming	3
CS 3XX	CS Elective	3
Select	Secondary Concentration	3
Select	UCC Social Science	3

Third Year

Fall Semester (15 credit hours)

CS 280	Computational Statistics I	3
CS 304/ CS 305	Advanced Object-Oriented Programming **OR** Software Development Practices	3
CS 330	Introduction to the Design and Analysis of Algorithms	3
Select	Secondary Concentration	3
Select	UCC Humanities	3

Spring Semester (15 credit hours)

CS 335	Operating Systems	3
CS 3XX	CS Elective	3
Select	Secondary Concentration	3
Select	College of Science Biology	3
Select	College of Science Physical Science	3

Fourth Year

Fall Semester (15 credit hours)

CS 4XX	CS Elective	3
CS 4XX	CS Elective	3
Select	Secondary Concentration	3
Select	College of Science Biology	3
Select	UCC Fine Arts	3

Spring Semester (15 credit hours)

CS 4XX	CS Elective	3
CS 4XX	CS Elective	3
Select	Secondary Concentration	3
Select	College of Science Physical Science	3
Select	UCC Multicultural	3

Four-Year Plan

	Fall Semester	Spring Semester	Summer Semester
Year 1			
Year 2			
Year 3			
Year 4			

Record of Courses and Grades–BS Degree[3]

UNIVERSITY CORE	Hrs.	Grade
Foundation Skills (12 hrs.)		
ENGL 101, 120 or LING 101	3	
ENGL 102 or LING 102	3	
MATH*		
CMST 101	3	
UCOL 101	1	
Fine Arts (3 hrs.)		
Choose 1 of AD 100A,B, 101, CP 101, ENGL 119, 206A,B, FL 100A,B,C, HIST 201, MUS 103, THEA 101, MUS 257A,B, THEA 220	3	
Human Health (2 hrs.)		
Choose 1 of FN 101, BIOL 202, HED 101, PE 101, PHSL 201, HCP 241, PE 201, PHSL 310	2	
Humanities (6 hrs.)		
Choose 2 from the provided list **OR**	6	
Choose 1 of these sequences 1. ENGL 121 and 204 2. FR 101A and 101B 3. GER 101A and 101B 4. HIST 101A and 101B 5. PHIL 103A and 103B 6. AD 207 A,B,C (choose 2)	6	
Science (6 hrs.)[1]		
COS physical and biological science requirements will substitute		
Social Science (6 hrs.)		
Choose 2 from the provided list	6	
Multicultural (3 hrs.)		
Choose 1 from the provided list	3	
Interdisciplinary (3 hrs.)		
Choose 1 from the provided list	3	
COS REQUIREMENTS		
Biological Science (6 hrs.)		
PHSL 201 & PLB 301I **OR** ZOOL 118 or PHSL 201 & 208 and BIOL 202	3 3 3	
Supportive Skills (6 hrs.)		
CS 480	3	
CS 290	3	

CS MAJOR REQUIREMENTS	Hrs.	Grade
CS Core (31 hrs.)		
CS 202	4	
CS 215	4	
CS 220	4	
CS 221	4	
CS 306	3	
CS 311	3	
CS 320	3	
CS 330	3	
CS 335	3	

All of the above require a "C" or better and a cumulative "C" average.

CS Electives (21 hrs.)		
CS 4 __ __	3	
CS 4 __ __	3	
CS 4 __ __	3	
CS 4 __ __	3	
CS 4 __ __	3	
CS 4 __ __	3	
CS 4 __ __	3	

The above must be from the approved list on pages 6-7.

Senior Project (5 hrs.)		
CS 498	2	
CS 499/499B	3	
Mathematics* (11 hrs.)		
MATH 150	4	
MATH 221	3	
MATH 250	4	
Physical Science (8 hrs.)[1, 2]		
PHYS 205 A,B and PHYS 255 A,B	8	

[1]Can be reduced by courses taken to satisfy University Core Curriculum requirements.
[2]Courses taken to fulfill the CS Major Science Requirement will also fulfill the COS Physical Science Requirement.
[3]Some courses fulfill multiple requirements. Degree requirements are 120 hours.

Record of Courses and Grades – BA Degree[2]
(MBA CONCENTRATION)

UNIVERSITY CORE	Hrs.	Grade
Foundation Skills (14 hrs.)		
ENGL 101, 120 or LING 101	3	
ENGL 102 or LING 105	3	
MATH 111[1]	4	
CMST 101	3	
UCOL 101	1	
Fine Arts (3 hrs.)		
Choose 1 of AD 100A,B, 101, CP 101, ENGL 119, 206A,B FL 100A,B,C, HIST 201, MUS 103, THEA 101, MUS 257A,B, THEA 220	3	
Human Health (2 hrs.)		
Choose 1 of FN 101, BIOL 202, HED 101, PE 101, PHSL 201, HCP 241, PE 201, PHSL 310	2	
Humanities (6 hrs.)		
Choose 2 from provided list **OR**	6	
Choose 1 of these sequences 1. ENGL 121 and 204 2. FR 101A and 101B 3. GER 101A and 101B 4. HIST 101A and 101B 5. PHIL 103A and 103B 6. AD 207 A, B, C (choose 2)	6	
Science (6 hrs.)		
COS physical and biological science requirements will substitute		
Social Science (6 hrs.)		
Choose 2 from provided list	6	
Multicultural (3 hrs.)		
Choose 1 from provided list	3	
Interdisciplinary (3 hrs.)		
Choose 1 from provided list	3	
COS REQUIREMENTS		
Biological Science (6 hrs.)		
PHSL 201 & PLB 301I **OR** ZOOL 118 or PHSL 201 & 208 And BIOL 2021	6	

Supportive Skills (6 hrs.)		
CS 280	3	
CS 290	3	
CS MAJOR REQUIREMENTS	**Hrs.**	**Grade**
CS Core (31 hrs.)		
CS 201	3	
CS 202	4	
CS 215	4	
CS 220	4	
CS 221	4	
CS 304 or 305	3	
CS 306	3	
CS 330	3	
CS 335	3	

All of the above require a "C" or better and a cumulative "C" average.

CS Electives (18 hrs.)		
CS 3 __ __	3	
CS 3 __ __	3	
CS 4 __ __	3	
CS 4 __ __	3	
CS 4 __ __	3	
CS 4 __ __	3	
Mathematics (4 hrs.)		
MATH 150	4	
Physical Science (8 hrs.)[1, 2]		
PHYS 203 A,B and PHYS 253 A,B	8	
Secondary Concentration (18 hrs.)		
ECON 240	3	
ECON 241	3	
FIN 270	3	
FIN 330	3	
MGMT 304 or 318	3	
MKTG 304	3	

[1]Can be reduced by courses taken to satisfy University Core curriculum requirements.
[2] Some courses fulfill multiple requirements. Degree requirements are 120 hours.

VIII. Other Important Information

Computer Learning Centers / Computer Science Accounts

Computer Learning Centers are available across campus to all Computer Science majors. CLC II located in the ASA building, Room 112 provides general access lab computers with a Windows development environment. All Computer Science majors enrolled in CS 220 or higher are entitled to an account on the department's LINUX system. This account may be used to access the computers in the labs of the Department of Computer Science and is kept as long as the student is actively pursuing a major in Computer Science. The account will be dispatched in class by the instructor.

Computer Science Scholarship for Current and Transfer Students

The Department of Computer Science offers one or more $800 scholarships for current and transfer students. Each scholarship is disbursed in two equal parts of $400 each for the Fall and Spring semesters. The funds will be applied to recipient's Bursar account. Applications may be obtained from the department or there is a link to the application form on the CS website. (Deadline: February 1st)

Scholarships are awarded to undergraduate students who are currently enrolled at SIU and who have made significant progress toward a major in Computer Science. These awards are based on the following criteria:

- Completion of at least CS 202, CS 215, and CS 220 or their equivalents.
- Current GPA of 3.25 overall.
- Current GPA of 3.50 in the major.
- Maintain enrollment status as a CS major and full-time student at SIU during the award period and maintain the above listed GPA standards.

Computer Science Scholarship for High School Seniors

The Department of Computer Science offers one or more $2,000 scholarships for selected high school seniors who enroll at SIU with a major in Computer Science. The scholarship is disbursed in four equal parts of $500 per semester for four semesters (Fall and Spring). The funds will be applied to recipients Bursar account. Applications may be obtained from the department or there is a link to the application form on the CS website as well as a listing of additional requirements. (Deadline: February 1st)

Selection will be based on a candidate's entire academic and extracurricular record. Minimum requirements are a composite ACT score of at least 27 (SAT 1220), a math ACT score of at least 27 (SAT 610), and a class ranking in the top 25%.

To retain the CS Scholarship for High School Seniors, a student must do the following:

- Maintain an overall GPA of at least 3.0 (out of 4.0)
- Maintain a GPA in Computer Science (CS) courses of at least 3.25
- Pass an average of at least 27 semester hours per academic year (Fall through Summer)
- Successfully complete at least two CS courses per year
- Have successfully completed at least six CS courses by the end of the second year
- Maintain enrollment status as a CS major and full-time student at SIU

Other scholarships are available at https://siu.academicworks.com.

IX. Departmental Contact Information

Undergraduate Program Director
Department of Computer Science
Engineering A319 – Mail Code 4511
Southern Illinois University Carbondale
1230 Lincoln Drive
Carbondale, IL 62901-4511 USA

Phone: (618) 536-2327
Email: csinfo@cs.siu.edu
FAX: (618) 453-6044
SIU Homepage: cs.siu.edu

X. University Contact Information

Achieve Program:
Northwest Annex Bldg. C, Room 121
(618) 453-6155 / achieve@siu.edu

Bursar:
Student Services Bldg., 2nd floor
(618) 453-2221
bursar.siu.edu / bursar@siu.edu

Undergraduate Science Advisement:
Neckers A185 / (618) 536-5537
www.science.siu.edu/advisement/
advise@cos.siu.edu

College of Science Dean's Office:
Neckers A157 / (618) 536-6666
www.science.siu.edu/about/dean.html
dean@cos.siu.edu

Disability Support Services:
Woody B104 / (618) 453-5738
TDD (618) 453-2293
disabilityservices.siu.edu

Financial Aid:
Student Services Bldg., 2nd floor
(618) 453-4334
fao.siu.edu / fao@siu.edu

Identification Cards:
Student Center / (618) 536-3351
studentcenter.siu.edu / services/id-card-office/

Information Technology:
(618) 453-5155 (Customer Service Center)
www.oit.siu.edu / salukitech@siu.edu

Center for International Education:
Woody Hall –Wing D
(618) 453-5774
www.cie.siu.edu / issinfo@siu.edu

Morris Library:
(618) 453-2818 (Info. Desk)
www.lib.siu.edu / askalibrarian@lib.siu.edu

New Student Programs:
Student Center, Rooms 303A-303F
(618) 453-1000
www.nsp.siu.edu / orientation@siu.edu

Non-Traditional Student Services:
Student Services Bldg., Room 484
(618) 453-7521
nontrad.siu.edu / nontrad@siu.edu

Office of the Registrar:
Student Services Bldg., Room 0251
(618) 453-2963
registrar.siu.edu / registrar@siu.edu

Saluki Express Bus Service:
(618) 453-5749
studentcenter.siu.edu/services/saluki-express

SalukiNet (Student Information System):
oit.siu.edu/sis/

Student Health Center:
374 Grand Avenue
(618) 453-3311 / shc.siu.edu

Undergraduate Admissions:
(618) 536-4405
admissions.siu.edu / admissions@siu.edu

Career Development Center:
1263 Lincoln Drive, Suite 0179
(618) 453-2391
careerdevelopment.siu.edu / careerdevelopment@siu.edu

University Core Curriculum:
Student Services Bldg., Room 375
(618) 453-3468
corecurriculum.siu.edu / corecurr@siu.edu

University Honors:
Morris Library, Room 110
(618) 453-2824
honors.siu.edu / honors@siu.edu

University Housing:
618-453-2301
www.housing.siu.edu / housing@siu.edu

Veterans Services:
Woody Hall, B258
(618) 453-1335
veterans.siu.edu / vets@siu.edu

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