GRADUATE CURRICULUM

2025 – 2026

Computer Science

SIU CARBONDALE
SOUTHERN ILLINOIS UNIVERSITY
SCHOOL OF COMPUTING

The Higher Learning Commission
A Commission of the North Central Association of Colleges and Schools
NCA

SCHOOL OF COMPUTING

Computer Science and Cybersecurity & Cyber Systems

Graduate Curriculum Guide and Handbook - 2025-2026

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Program Requirements and Timeline

Per the Graduate School Catalog 2025-2026 (entry in Summer 2025, Fall 2025, and Spring 2026), The School of Computing offers a graduate program leading to the Master of Science and Doctor of Philosophy degree in computer science. For admission procedures to these degree programs refer to the Graduate School (gradschool.siu.edu) or School of Computing (cs.siu.edu) websites.

A nonrefundable $65 application fee must be submitted with the Graduate School's online application for Admissions to Graduate Study in Computer Science. Applicants must pay this fee by credit card. No waivers are available.

Decisions concerning the admission of students and retention of students in the graduate program will be made by the School of Computing faculty subject to the requirements of the Graduate School.

Master of Science Degree in Computer Science

Admission. The evaluation of applicants for admission is based primarily on the student's academic record with particular attention being given to past performance in relevant undergraduate course work. Applicants are expected to have a substantial background in undergraduate computer science courses covering high level and assembly language programming, data structures, computer organization, logic design as well as discrete mathematics, calculus, and linear algebra. The applicant is expected to have completed course work in the above subject areas prior to admission. Normally, a GPA of at least 3.0/4.0 is required by the School of Computing.

Requirements. A student who has been admitted to the graduate program in Computer Science can meet the requirements for the Master of Science degree by completing 30 hours of graduate credit subject to the following constraints:

1. Students must take six credit hours of Computer Science coursework from the approved courses for
   each of the following three categories:
   • Computer Science Theory: CS 508, CS 526, CS 528, CS 545, CS 547, CS 549, CS 551, CS 552, CS 580, CS 510, CS 533, CS 534, CS 553, CS 555, CS 586
   • Software Development/Engineering: CS 507, CS 517, CS 518, CS 542, CS 583, CS 587, CS 520, CS 585
   • Computing Systems Technologies: CS 500, CS 504, CS 506, CS 509, CS 505, CS 513, CS 519, CS 521, CS 523, CS 524, CS 527, CS 529, CS 502, CS 541, CS 514, CS 525, CS 530, CS 534, CS 536, CS 540 (This requirement accounts for at least 18 hours of the required 30 hours of total graduate credit.)
   • Additional courses may be allowed as appropriate, subject to Graduate Program Director approval.
2. If a student believes they need to take a course from another academic unit at the University to gain specific knowledge for their thesis or project work, they must request approval from the Graduate Program Director prior to registering for such a course. The request must include an explanation of why the course is necessary for their program. Approval will be granted only if the justification is deemed adequate. No more than three hours of credit toward the 30-hour requirement will be given, and such courses must be at the 500-level only.

3. Students are required to choose either a thesis or non-thesis option:

Thesis Option

A student must complete six credit hours of CS 599, Thesis, in 3 credit hour segments taken for two semesters and 24 credit hours of lecture courses. The student is eligible to take the course CS 598 (must be in industry only). This CS 598 course will be considered equivalent to three credit hours of thesis (subject to the approval of the supervising faculty).

Non-Thesis Option
A student must take 27 credit hours of lecture courses. In addition, the student will take CS 598, Graduate Project, under the supervision of a faculty member.

Helpful, User-Friendly Links for CS Master's Students

The MS Degree page is:
https://academics.siu.edu/computing-and-technology/computer-science/masters/

Please make yourself very familiar with the information available to you on this page.

Admission Requirements –
https://academics.siu.edu/computing-and-technology/computer-science/masters/

MS Program Requirements –
https://academics.siu.edu/computing-and-technology/computer-science/masters/

Financial Assistance-
https://soc.siu.edu/student-resources/opportunities/index.php

Steps to be Followed in Fulfilling the MS Thesis Requirement –
https://soc.siu.edu/student-resources/steps-to-graduate/ms-thesis.php

Steps to be Followed in Fulfilling the Non-Thesis Requirement –
https://soc.siu.edu/student-resources/steps-to-graduate/ms-non-thesis.php

MS in CS Areas of Interest –
https://siu.edu/admissions/graduate/academics/

- *Artificial Intelligence, Soft computing and Multi-Agent Systems – MS, PhD*
- *Bioinformatics – MS, PhD*
- *Computer Graphics and Human Computer Interaction – MS, PhD*
- *Data Management – MS, PhD*
- *Distributed and Parallel Computing – MS, PhD*
- *Networks and Security – MS, PhD*
- *Pattern Recognition, Visualization and Multimedia Processing – MS, PhD*
- *Software Engineering – MS, PhD*

Accelerated Master's Degree

The Accelerated MS degree program allows motivated and high-achieving undergraduate students to complete a program leading to a Bachelor of Science and a Master of Science degree

in Computer Science in five years. During the junior year, a student working with a faculty advisor will develop a plan of study consistent with the student's interests and goals. To complete this five-year plan, 141 credit hours of study are required. Nine credit hours are awarded to both the undergraduate and graduate degree. Twenty-one additional hours of graduate level courses (500-level) are required to fulfill the graduate degree.

Master of Science Degree in Cybersecurity and Cyber Systems (CSCS)
(New MS Program Beginning in the Fall 2020 Term)

Admission. Applicants with a bachelor's degree in computer science, Engineering, Physics, Mathematics, Information Systems or equivalent degree will be admitted directly if their GPA satisfies Graduate School requirements. The MS degree requires 30 credit hours. Students can select among the concentrations in cybersecurity or in cyber systems. For applicants lacking the required specific background, we offer conditional admission status until completing prerequisite courses.

Admission to the MS program in Cybersecurity and Cyber Systems (CSCS) is based on the following factors: grade point average (GPA) of 2.75 or higher on a scale of 4.0 on approximately the last 60 semester hours of undergraduate coursework, class ranking, and faculty recommendation letters. Although GRE scores are not required for admission, they are important to qualify for the High Achievers Tuition Rate (and for possible financial assistance such as fellowships, scholarships, graduate assistantships, etc.). See also http://tuition.siuc.edu/highachievers2.html. The minimum TOEFL score requirement for international applicant is 550 (paper-based) or 80 (computer-based). The minimum IELTS score requirement for international applicants is a 6.5.

The program requires a nonrefundable $65 USD application fee that must be submitted with the application for admission to the MS program in Cybersecurity and Cyber Systems. Students must apply online and pay this fee by credit card. No waivers are available. Please address any correspondence to "Master of Science Program in Cyber security and Cyber Systems," to 1230 Lincoln Drive, Southern Illinois University Carbondale, Carbondale, Illinois 62901, MAILCODE 6603 or 4511. Inquiries can be addressed to cyberms@siu.edu. For telephone inquiries, please call 618-453-4321, 618-536-2364 or 618-536-2327, and refer to the Master of Cybersecurity and Cyber Systems Program. The facsimile numbers are 618-453-4235, 618-453-7972 and 618-453-6044.

Retention. Any student whose cumulative grade point average falls below 3.0 on courses that count towards the degree will be placed on departmental academic probation. Any graduate student on academic probation whose grade point average remains below 3.0 on courses that count towards the degree for two consecutive semesters in which she or he is enrolled will be permanently suspended from the program, unless the department grants an exception.

Curriculum. The degree requires three (3) courses from 3 key areas that will ascertain understanding of fundamentals and help build a solid foundation for the remainder of the program. These courses are listed below.

1. Fundamentals in Computer Security. This requirement will be completed by either CS505 or ECE504. Only one of these courses will count towards the degree.

2. Fundamentals in Systems Programming. This requirement will be completed by either CS517 or ECE 536. Only one of these courses will count towards the degree.

3. Fundamentals in Network Systems. This requirement will be completed by either CS502 or ECE553. Only one of these courses will count towards the degree.

A student should then seek a concentration either in cybersecurity or in cyber systems by selecting a least five (5) elective courses in cybersecurity or cyber systems. The lists of these courses are given below. A maximum of six (6) credit hours from academic units outside of the Department of Electrical and Computer Engineering or the School of Computing (formerly the Department of Computer Science) could be applied toward the degree

In Cybersecurity Concentration, students must complete four (4) courses in Cybersecurity and one (1) course in Cyber Systems. In Cyber Systems Concentration, students must complete four (4) courses in Cyber Systems and one (1) course in Cybersecurity. A fundamental area may be satisfied by a course that was taken prior to admission or a documental record of accomplishment in the subject matter content. In this case, the student must select an additional elective course either in cybersecurity or in cyber systems for each satisfied fundamental are. Students must take at least two CS/ECE five hundred-level courses not cross listed to a four hundred-level course. Students must take at least three (3) ECE and at least three (3) CS courses. Only three (3) credit hours of ECE592 or CS598 can count towards the degree.

MS Thesis Option: 6 credit hours of thesis in ECE or CS (ECE599 or CS599) may substitute for 6 credit hours in a concentration area.

List of Cybersecurity courses for the MS Degree: CS 508, CS 509, CS 513, CS 519, ECE 502, ECE 517, ECE 518, ECE 519, CS 525, CS 531
List of Cyber System courses for the MS degree: ECE 509, CS 523, CS 541, ECE 575A, ECE 512, ECE 528, ECE 536, CS 540, ECE 541.

Helpful, User-Friendly Links for the MS Degree in CSCS

Cybersecurity & Cyber Systems Courses -
https://gradcatalog.siu.edu/programs/cscs/courses.php

Cybersecurity & Cyber Systems Faculty-
https://gradcatalog.siu.edu/programs/cscs/faculty.php

MS in Cybersecurity & Cyber Systems Website-
https://academics.siu.edu/computing-and-technology/cybersecurity/masters/

MS in Cybersecurity & Cyber Systems Admission Requirements-
https://academics.siu.edu/computing-and-technology/cybersecurity/masters/

MS in Cybersecurity & Cyber Systems Program Requirements-

https://academics.siu.edu/computing-and-technology/cybersecurity/masters/

Doctor of Philosophy Degree (Ph.D.) in Computer Science

Admission. Subject to meeting the admission requirements of the Graduate School, admission requirements for the Ph.D. in computer science consist of:

1. A master's degree in computer science or a related field with a minimum GPA of 3.25/4.0.

2. Graduate Record Examination (GRE) general test scores. It is recommended that results from the GRE subject area in computer science or a related area be included.

3. In exceptional cases, high achieving students with only bachelor's degrees will be admitted to the program. Each student, in addition to the Ph.D. program course requirements, must complete at least 15 semester hours of computer science graduate courses approved by the Graduate Program Director, with a minimum accumulated GPA of 3.25/4.0 in those courses. If a specific course, or its equivalent, is already part of the student's academic background, an alternate course will be submitted.

Each applicant is reviewed and evaluated on an individual basis. The evaluation of applicants for admission is based primarily on the student's academic record and area of research interest. Application materials should include evidence of scholarly ability and/or achievement (e.g. awards, scholarships, work experience, recommendation letters, and published research papers). Only those who best meet the research goals and objectives of the doctoral program will be selected for admission.

Requirements. The student must fulfill the requirements for the Qualifying Examination within three years of enrollment in the doctoral program. The Qualifying Examination is organized and administered by the student's academic advisor. The faculty prepares a written test based on at least two areas of concentration related to the student's intended dissertation area. Questions will be drawn from regularly scheduled 500-level graduate courses at SIU. The grade for the exam will be on a Pass or Fail basis for each subject area. If a student fails to pass any subject area of the written examination, a second chance is given for the failed topic test. Students who fail the Qualifying Examination after two attempts will be dismissed from the Ph.D. program.

To fulfill the course requirements of the Ph.D. program, the student must complete at least 24 credit hours of 500-level lecture courses and 24 credit hours of CS 600, Dissertation research, all of which are subject to the following constraints:

1. The course work must include two one-credit hour seminar courses, six credit hours from an approved list of computer science 500-level lecture courses, and six elective credit hours of CS500-level lecture courses.

2. The student must file a request with the School of Computing to appoint a dissertation committee to supervise the remaining doctoral work. This committee will consist of five graduate faculty members, one or two of whom will be from a graduate program outside the School of Computing, one preferably from outside this University. The student's dissertation advisor will serve as the chair of this committee.

3. Each student should complete a course of study as determined by the student's dissertation committee.

4. The course of study must include a minimum of six credit hours of 500-level courses from academic departments other than computer science. These courses must be selected from a list approved by the School of Computing.

5. Having passed the qualifying exams and after completion of most of the course requirements, a student will begin working on a dissertation proposal. The next step will be a Preliminary Examination consisting of an oral test on the student's proposed research topic. The student will pass the Preliminary Examination only if the members of the committee, with at most one exception, judge the performance of the student's oral examination to be satisfactory. In the event the student's performance is unsatisfactory, the committee will reschedule the exam for a later time. A student who fails the reexamination will be dismissed from the Ph.D. program.

6. A student will be officially admitted to candidacy for the Ph.D. degree after passing the Preliminary Exam and upon completion of all course work. The student must then complete 24 credit hours of dissertation credit, restricted to nine hours per semester. When the research is complete and the dissertation is written, a final oral examination will take place to determine if the research conducted is worthy of the Ph.D. degree. The dissertation must conform to high literary and scholastic standards and comply with all the relevant requirements of the Graduate School. The dissertation must represent original research of good quality. From the dissertation, the candidate should publish (or have accepted for publication) a minimum of two articles in peer-reviewed journals. The candidate must be listed as the primary author of at least one of these journal articles.

7. Each candidate must pass a final oral exam over the candidate's dissertation, conducted by the candidate's dissertation committee. The dissertation will be accepted provided the dissertation advisor and at least three of the other four members of the committee agree.

8. Degree requirements, graduation, and time limits are subject to the general guidelines of the Graduate School.

Helpful, User-Friendly Links for Ph.D. Students

The requirements for admission and completing **the Computer Science Ph.D. degree** are online, as are detailed instructions for successfully completing the doctoral dissertation. The School of Computing homepage is https://www.soc.siu.edu.

The Ph.D. Degree page can be found at
https://academics.siu.edu/computing-and-technology/computer-science/doctoral/.

Admission Requirements –

https://academics.siu.edu/computing-and-technology/computer-science/doctoral/

Ph.D. Program Requirements –
https://soc.siu.edu/student-resources/steps-to-graduate/phd.php.

Financial Assistance –
https://soc.siu.edu/student-resources/opportunities/index.php

Steps to be Followed in Fulfilling the Ph.D. Requirement –
https://soc.siu.edu/student-resources/steps-to-graduate/phd.php

Ph.D. in CS Areas of Interest –
http://gradschool.siu.edu/academics/computer-science.php

- *Artificial Intelligence, Soft computing and Multi-Agent Systems – MS, PhD*
- *Bioinformatics – MS, PhD*
- *Computer Graphics and Human Computer Interaction – MS, PhD*
- *Data Management – MS, PhD*
- *Distributed and Parallel Computing – MS, PhD*
- *Networks and Security – MS, PhD*
- *Pattern Recognition, Visualization and Multimedia Processing – MS, PhD*
- *Software Engineering – MS, PhD*

Helpful Advice from Dr. Ahmed, Graduate Program Director:

The following pages provide additional detailed information and guidance from Dr. Ahmed, GPD, on the various aspects of the School of Computing graduate programs that may not be covered as completely in the Graduate School Catalog. ***All information is covered in the Graduate School Catalog, though this portion of the SoC Graduate Curriculum Guide is to give you more details, tips, and SoC academic expectations so that you may have the best possible educational experience.*** *Our hope is that you will leave the SoC at SIU, successful, proud,*

more responsible and prepared, well-rounded in all aspects of life, enlightened, inspired, and motivated to change the world.

MS students must complete at least 30 semester hours of appropriate CS coursework including either a *thesis* or *graduate project* (more on these below). Many students complete these credits in *one year plus one semester.* For example, they take 9 credit hours (three classes) in the fall and spring semesters, 3 credit hours (one class) in the summer term, and then 9 credit hours the next fall semester. Nine hours per semester is the normal full-time load for graduate students. Any additional credit hours beyond the nine requires special permission from the Graduate Program Director via the Request for Adjustment of Maximum Hours form. You may request a copy of this form from the Graduate Program Assistant by emailing gradinfo@cs.siu.edu.

We sometimes will have a 591 course that is cross-listed with the 400-level version. In this case, it is advisable for MS students to register for the 591 version, to give themselves more flexibility about courses that are offered at only the 400 level. 400-level courses are no longer allowable for graduate credit. **Note:** Naturally, the 591 version will generally have additional work requirements compared to the 400-level version.

In addition to the general requirements just mentioned, the CS MS degree has *area requirements*. These are to ensure that you graduate with a reasonably broad background in Computer Science. For students starting in Fall 2015 and later, the area requirements are as follows:

You must take and pass *at least two approved courses* from *each* of the following *three Computer Science areas*:

1. Computer Science Theory
2. Software Development/Engineering
3. Computing Systems Technologies

Please see page 1 under Program Requirements and Timeline for the Graduate Area Requirements and List of approved CS catalog courses.

Graduate Courses Typically Offered in the FALL Semester

The School of Computing Schedule of Classes is available as a PDF from the School of Computing homepage, as are descriptions of all “Special Topics” courses. Use the following link for the latest schedule information: http://www.cs.siu.edu/resources/course_schedule.php. Click on the arrow for the semester schedule that you wish to view.

CS: 507, 508, 505, 517, 518, 524, 528, 552, 570, 583, 530, 533, 539, 540, along with 491/591 Special Topics courses. Additional Special Topics courses (CS491/591) may also be approved, by the Graduate Program Director, as meeting an area requirement.

When a course is offered in both a 400 and 500-level version, graduate students are required to take the 500-level version to help satisfy their course requirements. However, the 500-level version will have additional requirements (e.g., a term project). Please see the course instructor for details.

Courses normally offered in the fall for Cybersecurity and Cyber Systems are: ECE 553 – Computer Network System Architecture and ECE 508 – Computer Systems Security.

Graduate Courses Typically Offered in the SPRING Semester

The School of Computing Schedule of Classes is available as a PDF from the School of Computing homepage, as are descriptions of all "Special Topics" courses. Use the following link for the latest schedule information: http://www.cs.siu.edu/resources/course_schedule.php Click on the arrow for the semester schedule that you wish to view.

CS: 504, 505, 523, 542, 502, 541, 587, 514, 539, 586, 593, along with 491/591 Special Topics courses.

There are generally plenty of options of courses in each area. If a course (in a particular area that you need to fill) is closed due to full capacity, *you will need to choose another course in that area*. Course Capacity Overrides will not be completed just because you request a certain course in a certain area. As mentioned earlier, it is important that MS students register for sufficient 500-level courses to be able to meet the Graduate School's requirements for graduation.

Courses normally offered in the spring for Cybersecurity and Cyber Systems are: ECE 502 – Network System Security, ECE 575A – Cyber Security for Digital Health, ECE 519 – Advanced Computer Security, and ECE 528 – Programmable ASIC Design.

Course Registration

Registration for courses is carried out online via **SalukiNet.** In some instances, you may need prior approval or permission from the Graduate Program Director and/or advisor to register for a CS course. Independent study courses will require special approval and an override by the advisor prior to registration. **Note**: Those interested in getting *program credit for a non-CS course must get prior approval from the GPD* (see below).

Course Prerequisite Overrides:

Many 500-level courses, will require that you have taken one or more prerequisite courses (or their equivalents) to be permitted to take the course. Decisions about allowing students into a course are made by the instructor, and in some cases, the Graduate Program Director, so contact the instructor first. The Graduate Program Assistant will not perform any course override without written email permission from the course instructor. Once the override has been completed, the

Graduate Program Assistant will email you that the override has been completed and you may then register.

Closed (Full) Classes:

You may find that you cannot register for some classes because they are closed (full). We constantly monitor enrollment in our classes during registration periods and will sometimes be able to increase capacity for in-demand classes. When this is not possible, we will make more seats available in other classes, or add new classes to the schedule, or provide a **waitlist option through SalukiNet**.

If you cannot register for a class because it is full, you will need to choose another course that has available seats. Please do not ask the course instructor or office staff to complete capacity overrides for you. If there is a waitlist, we cannot do capacity overrides. If /when more seats are added to a closed class, graduate students will be informed about this by email. You should also keep checking on a closed class, as seats may open up when other students change their schedules.

If the course is full and the waitlist option is available, it is important to get on the waitlist as soon as possible. Follow the direction to get on the waitlist. As students make changes to their schedules, seats often become available. **SalukiNet** will contact the first person on that waitlist of the newly open seat. The email will explain that this opening is time sensitive, and that the student must reply to accept the seat within 24 hours of receiving the email. Failure to respond within the allotted time, will result in the student losing the opportunity to accept that vacant seat. The next person on the waitlist for that class will be contacted to accept the seat. Once the waitlists have been purged, there will be no record of the waitlist. **Your best course of action is to register as soon as you are permitted, per the Advance Registration Calendar Schedule.**

Nine-Hour Registration Limit:

A *nine-hour* (three course) limit has been placed on CS graduate student registration, per semester. To be permitted to register for more than nine hours, you must contact the Graduate Program Director, make a case for why this is a good idea (see more on this below) and complete a **Request for Adjustment of Maximum Hours form**. **Note** however, that CS MS students will not be approved to register for more than three lecture courses until *after the start of classes.*

Course Load:

Computer Science MS students have traditionally taken three graduate CS classes per semester (generally nine hours). Recently, some students have been trying to finish sooner by taking four (or more) classes per semester. While this may be allowed, students should think very carefully about whether this is a good idea. If you take four courses but end up getting poor grades, you may come to regret your decision. Graduate students must maintain a 3.0 (“B”) GPA to remain in good standing and must have at least a 3.0 GPA to graduate. This means that if you get a “C” in one course, you will have to get an “A” to offset it. If you should get a “D” in one course, you will need to get “A” grades in two courses to offset it (and “D” courses do not count toward the required 30 hours).

Note also that the *CS Department will not allow any students holding a Graduate Assistantship from the School of Computing to be enrolled in more than three lecture courses.* Other units on campus may have similar restrictions, should you get an assistantship. **Note:** Please inform the Graduate Program Assistant if you receive an assistantship from another department.

Course Selection

A question that most new MS students have is, "*what courses should I register for?"* The basic answer to this question is that you should register for course topics for which you are interested and wish to learn more about, that you think are relevant to future jobs, and/or topics on which you plan to do a project/thesis. Our program is quite flexible, so most of your course selections will be completely up to you. The only exception to choosing courses based on what interests you, is that you must eventually meet the MS degree requirements (summarized earlier) in order to graduate.

The reason to pursue a graduate degree in CS is to enhance your prospects for getting a job that interests you and that pays well. Potential employers will generally consider the topics you have studied during your MS program in judging whether you have the skills for which they are looking. Thus, you should pay attention to the skills that are sought in the job market when choosing what courses to take. Taking courses just because your friends are taking them or because you have heard they are not as difficult as other courses might make it "easier" to complete the degree, but it may also make the degree less useful in helping you get a desirable job. Likewise, avoiding any course that involves programming because you believe such courses are more time consuming might reduce your workload during the degree period, but could end up restricting your choice of jobs in the future.

To complete your degree, you will eventually have to complete a *thesis* or a *Graduate Project.* Both require committees of multiple faculty (three for the thesis/ at least two for the Graduate Project), one faculty member will be the Chair of your committee, and that person will have the primary responsibility for directing your work. It is generally advisable to try to take as many classes as possible with the faculty member you will eventually want to serve as your committee Chair. While it may be possible to convince a faculty member to supervise your work even if you have never taken a course with them, you are more likely to be successful if the faculty is familiar with you from a course (and you have done well in their course, obviously).

Only a subset of 500-level courses that we offer will be taught in any given semester, and a particular course might not be offered even during a given year. Furthermore, Special Topics (CS 491/591) courses cover rotating and very infrequently offered topics. ***This means if a course that you are interested in is being offered on a given semester, it is advisable for you to take it then rather than thinking you will take it "next year.***" Even some required/standard courses might not be taught during a year due to faculty sabbaticals and the like.

Conditional Admits

Some students who were deemed deficient in the standard Computer Science undergraduate background may have been offered *Conditional Admission* (Admission with Conditions) to the CS MS program. These students were given admission despite their lack of CS background under the conditions that:

- They must take additional semester hours of coursework for the CS MS degree
- The credit hours must be particular chosen courses (as stated in the Admission with Conditions letter).
- The additional coursework must be taken during the first semester at SIUC.
- Only these three courses may be taken during the first semester. (If given all 3)
- A grade of "B" or higher is required in each of these courses.

- Failure to achieve a "B" in any course will require that course be repeated. (Repeats will not be counted toward the required 30 hours of regular coursework for the CS MS degree.)

Students who accept this Admission with Conditions offer are required to register for some or all of the following three courses for the semester in which admitted:

1. CS491: Linux/UNIX Programming in C (3 cred. hrs.)
2. CS491: Java Programming with Data Structures (3 cred. hrs.)
3. CS491: Intro. to the Design & Analysis of Algorithms (3 cred. hrs.)

As noted in the offer of Admission with Conditions, we will not negotiate with students about the need for these courses! The conditions of the admission will remain a condition of your degree requirements for graduation. If you have changed your mind about being willing to take additional background courses, you should not start the CS MS program! These conditions will be enforced by the School of Computing and the Graduate School.

Thesis Option vs. Non-Thesis Option

The CS MS degree has *two options*: Thesis and Non-Thesis (Graduate Project). The Thesis Option is the more research-oriented option. It is strongly recommended for students that are considering eventually continuing their education in a doctoral program. Students that elect the Thesis Option will take 6 credit hours of CS 599 over two semesters (3 + 3). Thesis students will have to find a *Committee Chair/Advisor and a Committee of at least two additional faculty members, prior to* the start of the semester in which they first register for 3 hours of CS 599 (generally the next-to-the-last semester). The process to be followed is detailed here: http://www.cs.siu.edu/ms_degree_thesis_requirement.shtml

Note: Any MS student *planning to apply for a Teaching Assistantship* (TA) in our department of Computer Science *will be expected to choose the Thesis Option.* As you consider applying for this role, please be aware that priority will be given to those students who have opted for the thesis track or are currently enrolled in a thesis course. This policy is in place to ensure that our TAs have a strong commitment to academic research and a deep understanding of the subject matter they will be teaching.

The Non-Thesis Option has the student complete a Graduate Project instead of a thesis. This option is more appropriate for students who intend to pursue non-research jobs. Students who elect the Non-Thesis Option will take 3 credit hours of CS 598, typically during their final semester. Graduate Project students will need to find a *Project Chair/Advisor and a Committee of at least one additional faculty member, prior to* the start of the semester in which they register for CS 598. The process to be followed is detailed here: https://www.cs.siu.edu/graduate/current_students/steps_to_grad/ms_nonthesis_req.php

NOTE: MS students need to make themselves *very familiar* with this information. *It is a step-by-step, semester-by-semester guide to be followed in fulfilling the requirements of the Thesis and Non-Thesis Options for the MS degree.*

It is the responsibility of the graduate student to know the MS degree requirements, dates and deadlines of the department and the Graduate School. This information is posted (several semesters in advance) on each of the departments' respective websites and in the SoC Main Office Suite (EGRA 0319). *It is easily accessible*. Take the time now to plan ahead, mark

your calendars for important meetings, workshops, events, dates and deadlines. ***Procrastination and lack of planning on a student's part does not make for an emergency on the part of the School of Computing.***

Taking a Non-CS Course

If you wish to take a non-CS course and obtain credit toward the required 30 credit hours for the CS MS degree, *you must request and receive written approval from the Graduate Program Director prior to registering for the course.* Non-CS courses will be approved for credit only if a student can justify that the course is critical to the student gaining specific knowledge that is required for their thesis or Graduate Project. Even then, no more than 3 semester hours of outside coursework will be accepted toward the 30 hours. *Failure to get prior approval for a course will result in that course not being counted toward the required 30 semester hours of coursework!*

Since you are going to be awarded an MS degree in *Computer Science,* there must be a compelling reason why a non-CS course is *critical* for your thesis or project. There are very few courses at SIUC that meet these requirements for most students, so you should not be surprised if your request is denied. Our CS degree is a software degree, so largely hardware-oriented courses in the School of Electrical, Computer, and Biomedical Engineering will rarely be accepted for MS credit (except for the MS degree in Cybersecurity and Cyber Systems). Online courses will almost never be accepted.

You are welcome to take any non-CS course you wish to take during your time in the MS program, if you do not expect it to count toward the 30-credit hour MS degree requirement. Many students have an interest in some non-CS topic, and taking courses in such an area is perfectly fine (if you can afford the tuition and time). However, there is no reason this course should count toward your completion of an MS degree in CS.

Teaching Assistantships and Other Employment

The School of Computing generally awards several to MS students each semester. The number of available TA positions is fewer than the number of interested MS students, therefore, the positions are highly competitive. Because of the limited funds available, the *School of Computing cannot guarantee that every MS student will receive a TA for even one semester during their time in the program.* Students must not rely on receiving a TA to be able to finance their degree. All international students have had to attest to the US Government that they have sufficient financial resources (without a TA) to be able to complete their degree.

All eligible applicants/students are automatically considered for available TA positions in the semester they enter the program. As mentioned above, the availability of GA positions is less than the number of interested and eligible candidates. Consequently, Graduate Assistantships are very rarely offered to incoming graduate students, as these positions are highly competitive and reserved for our continuing students. In subsequent semesters, all graduate students will be emailed about completing a Graduate Assistantship application for the next semester and will have to submit that application to be considered for a position. TA positions are usually awarded for just one semester at a time, since the teaching demands and current needs vary from semester to semester. Being awarded a position for, say, a fall semester, does not in any way guarantee a position for the following spring semester.

Teaching Assistantships are not a form of financial aid, but rather a tool to support the undergraduate teaching mission of the School of Computing. Financial need plays no role in the awarding of TAs and will not be considered (it is a rare graduate student that does not claim they are in dire financial need!). **Selection will be based on a student's ability to support one or more courses for which the School of Computing needs assistance.** As previously mentioned, this changes from semester to semester. Among the selection criteria will be the student's GPA, familiarity with the course topics (strong knowledge/skills), whether the candidate has taken the course(s) here, fluency in English and public speaking skills (critical for low level courses), and last, but not least, the candidate's maturity/reliability.

To qualify for the TA role, international students must also achieve an adequate score on the English proficiency exam. We accept TOEFL and IELTS scores as proof of language proficiency. However, Duolingo test scores are not considered valid proof of English proficiency and may not be used for TA consideration. International student must ALSO have an official GRE score report on file. **Note:** The School of Computing takes this process very seriously. **Much responsibility is given to and expected from our TAs.**

Frequently throughout the semester, the school will host special guest speakers on various topics in Computer Science. All TAs are expected to attend professional workshops/seminars, hosted by the school, with special guest speakers. It is an honor to be able to hear from some very distinguished professionals on their area of expertise. The presence of all TAs at such events is expected. TA attendance at seminars is for the purpose of personal professional growth, to encourage other graduate and undergraduate student attendance, and to support our school and guest speakers. *Attendance will be taken at the seminars/workshops*. Should you have a time conflict with your TA office hours and a scheduled seminar, please speak with your advisor. For this reason alone, a TA would most likely be given permission to reschedule the office hours to attend the seminar. In the event that a TA must cancel office hours due to illness or a time conflict with a mandatory seminar, the TA must first contact the course instructor for permission, then notify the Graduate Program Assistant at **gradinfo@cs.siu.edu**., and notify the students in the class for which you assist. **It is unacceptable to miss office hours without permission and without notifying your students in advance. This will be monitored.**

All international TAs will be evaluated by an oral ITA exam given by a small committee comprised of a Graduate School representative, a CESL instructor, and a representative from the School of Computing. All TAs must pass the oral ITA exam before being approved for teaching duties. These exams are conducted prior to the beginning of each semester by appointments only. *A TA candidate will be notified of their scheduled appointment date/time in advance.* Please note: Graduate students can improve their chances of being hired by maintaining a high GPA, taking 400-level courses that the undergraduates also take (since we will need TAs), and improving their spoken and written English skills. More info: https://cte.siu.edu/ta-teaching-support/ita-exam.php

Teaching Assistantships from the School of Computing are not the only source of employment available to CS graduate students. CS faculty may have research grants and employ Graduate Assistants to pursue research. Many CS MS students find jobs elsewhere on campus, as there are many student positions available that require significant computer skills. For example, SIUC IT (Information Technology) employs many CS students. Some of these jobs may be Graduate

Assistant positions and involve tuition waivers, while others may be "student worker" jobs that pay only a wage. The School of Computing emails all graduate students of any requests or job opportunities for students with computer-related skills. The SIUC Graduate School website (http://gradschool.siu.edu/) has listings for open Graduate Assistant positions. The SIUC Student Jobs website posts student job listings at http://studentjobs.siu.edu. Those students interested in finding student employment should also watch for "Student Work" Fairs occasionally held on campus. This is a great opportunity to see prospective employers, interview on the spot and gain student employment. For more information go to http://careerservices.siu.edu.

Helpful Links from Career Services

https://careerdevelopment.siu.edu/about-us1.php

https://siu.joinhandshake.com/login

https://careerdevelopment.siu.edu/employers/fairs.php

https://careerdevelopment.siu.edu/faculty/

https://careerdevelopment.siu.edu/student/

https://careerdevelopment.siu.edu/policies-procedures/

https://careerdevelopment.siu.edu/student/

Academic Dishonesty (Cheating)

The School of Computing takes the problem of *academic dishonesty* (more commonly known as ***cheating***) very seriously! If you are found to be violating Course/Department/University rules on this, you may receive an "F" in a course or even be expelled from SIUC (once a graduate student receives an "F" in a course, it is extremely difficult to attain the 3.0 GPA required to graduate!). **Graduate students found guilty of cheating in courses will be dismissed from TA positions and barred from holding future TA positions.**

For clarification, the basic rule that we adhere to in the School of Computing/University (and the US in general) is that ***you are to submit only work that you have done yourself unless you have been explicitly told otherwise.*** You may come from a country where you are implicitly allowed to work in groups or get assistance from others, but the degree you are pursuing will be granted by THIS university, so you MUST follow OUR rules. If you have not been advised that you may collaborate with other students, do NOT do so without verifying that it is permitted by the instructor. If the answer is *no,* then you are *not to collaborate with other students in the class or with anyone else (whether they are current CS students or not!).* The burden is *on you* to be sure that collaborative work is acceptable in a class!

You are also NOT to take code/text from the Internet, make minor modifications, and then turn it in as your own work. This IS c*heating and will NOT be tolerated!* While the Internet is a great source of help, the proper way to use it is to find information that allows you to figure out how to complete your program or paper. Searching for the major functionality you are to implement (e.g.,

"java bubble sort code") and then *copying/pasting* multiple lines of code into your program is *cheating!* This is NOT actually YOUR work! If you do not understand why submitting somebody else's modified code/text is cheating, consider that this would be the equivalent to taking a book somebody else has written, changing the names of the characters, and then claiming the "new" book as your own original work. Not only is this clearly NOT true, but it is in fact a ***violation of the law***! All computer software is inherently *copywritten* in the US and most of the rest of the world. Copying somebody else's code without their permission is thus a ***violation of copyright law***. This is even the case for most *"free and open-source software,"* since virtually all such software requires that anyone using the code must retain existing authorship and copyright notices in any derived code (which would obviously alert the instructor that you have cheated). The proper way to use the Internet is to find information that allows you to complete your assignment – not by copying/pasting someone else's work.

Studies of cheating in CS classes have found that students drastically underestimate the ease with which instructors can identify copied code. No two independently developed programs of any length should look terribly similar since there will be a vast number of alternative ways to meet the program specifications. *Students also seem to forget that the instructor/TAs can perform the very same Internet searches that they can, and so can find the same publicly available code/test.* **If you are having trouble with an assignment, you need to seek help from the instructor and/or the TA. This is the *correct and ethical* way to learn/understand the concepts needed to complete your OWN work**. Thinking that turning in work done by somebody else will get you out of an immediate jam is a serious mistake. ***It can end up destroying your academic career!*** Nor will it secure you a great job in the future when your prospective employer learns that you really do not have the skills necessary to do the work. Simply put, **CHEATING IS NOT WORTH THE RISK!** All students will sign a form acknowledging that the definition of Academic Dishonesty (also commonly referred to as "Cheating"), as is stated by the School of Computing/University, was explicitly explained during the New Graduate Student Orientation. By signing the form, students acknowledge their understanding of the definition, risks, and consequences of Academic Dishonesty.

CS Graduate Course Descriptions

CS491 - Special Topics Selected advanced topics from the various fields of computer science. Credit Hours: 1-6

CS492 - Special Problems Individual projects involving independent work. Special approval needed from the instructor. Credit Hours: 1-6

CS493 - Seminar Supervised study. Preparation and presentation of reports. Special approval needed from the instructor. Credit Hours: 1-6

CS500 - 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. Students who have completed CS 401 are ineligible to enroll. Prerequisite: CS 320 with a grade of C or better or graduate standing. Credit Hours: 3

CS501 - Advanced Computer Architecture Hardware and software elements of multiprocessors, multicomputers, pipeline and array machines, data flow architecture and other state-of-the-art architectures. Design principles related to machine structures, interconnection networks, control software and hardware, data storage and access. Prerequisite: CS 401. Credit Hours: 3

CS502 - 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. Prerequisite: CS 330 with a grade of C or better or graduate standing; CS 306 recommended. Students who have completed CS 440 are ineligible to enroll. Credit Hours: 3

CS503 - Fault-Tolerant Computing Systems An introduction to different aspects of fault-tolerance in computing systems. Redundancy techniques with an emphasis on information redundancy, software fault-tolerance, coding techniques, algorithm-based fault-tolerance, fault-tolerant interconnection network architecture, DFT techniques, and quantitative evaluation methods. Prerequisite: CS 401. Credit Hours: 3

CS504 - 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. Students who have completed CS 404 are ineligible to enroll. Prerequisite: CS 330 with a grade of C or better or graduate standing. Credit Hours: 3

CS505 - 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. Students who have completed CS 410 are ineligible to enroll. Credit Hours: 3

CS506 - 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. Students who have completed CS 406 are ineligible to enroll. Prerequisite: CS 306 with a grade of C or better or graduate standing. Credit Hours: 3

CS507 - 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 networked software systems. These topics include development techniques such as profiling, concurrent programming and synchronization, network programming for high-load servers, advanced 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 also be considered. Students must complete a significant network software project. Prerequisites: CS 306 & CS 335 with grades of C or better, or graduate standing with C language & Linux system programming experience. Students who have completed CS 407 are ineligible to enroll. Credit Hours: 3

CS508 - 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. Prerequisite: CS 330 with a grade of C or better and MATH 221 or graduate standing. Students who have completed CS 408 are ineligible to enroll. Credit Hours: 3

CS509 - Ethical Hacking This course will explore the various means that an intruder has available to gain access to computer resources. We will investigate weaknesses by discussing the theoretical background, and whenever possible, actually performing the attack. We will then discuss methods to prevent/reduce the vulnerabilities. This course is targeted specifically for Certified Ethical Hacking (CEH) exam candidates, matching the CEH exam objectives with the effective and popular Cert Guide method of study. Prerequisite: CS 202 or equivalent with a grade of C or better. Students who have completed CS 409 are ineligible to enroll. Credit Hours: 3

CS510 - Wireless and Network Security Advanced security concepts of distributed systems and wireless networks are presented. Topics include IEEE 802.11 security, Wireless Encryption and Authentication, Key Management in Networks, Distributed Denial of Service Attacks, Routing Security, Intrusion Detection and Mobile Code Security. Prerequisite: CS 410 with a grade of C or better or consent of the instructor. Credit Hours: 3

CS511 - Formal Specification of Programming Languages A survey of modeling techniques and Meta languages for the formal specification of the syntax and semantics of high-level programming languages. Prerequisite: CS 311. Credit Hours: 3

CS512 - Declarative Programming An advanced level course on nonprocedural programming with emphasis on logic programming, pure functional programming, and the characteristics of the declarative style common to these two paradigms. Topics include logic programming, functional programming, implementation consideration for each along with current research topics in the areas. Prerequisite: CS 311. Credit Hours: 3

CS513 - Digital Forensics Cybersecurity has become a ubiquitous concern well beyond finding solutions to post-mortem threat analysis. The course provides a broad overview of security objectives and will cover fundamentals in confidentiality, integrity, and availability. Lectures will offer a broad range of topics on digital forensics. Students will be trained for an investigation mindset. Contemporary tools and techniques for digital forensics and investigations are reviewed. Security for stationary and mobile platforms are foci of current course in both forensic and active modes. There will be multiple hands-on homework and laboratories as well as a practical project as integral part of this course. Students who have completed CS 413 are ineligible to enroll. Prerequisite: CS 330 with a grade of C or better or graduate standing. Credit Hours: 3

CS514 - Advanced Operating Systems Rigorous treatment of advanced topics in operating systems. Multiprocessors and distributed operating systems. Highly concurrent machines. Performance analysis of memory management and scheduling algorithms. Recovery techniques in distributed computation. Security in operating systems. Prerequisite: CS 335 with a grade of C or better. Credit Hours: 3

CS515 - Computational Blockchain This course introduces fundamentals of modern blockchain-based systems as well as cryptocurrency applications. Topics for discussion include consensus and distributed computing, smart contracts, privacy and secrecy, and other relevant computational platforms. Non-currency applications of blockchains, and legal and social implications will be outlined. Students will be required to develop a term project. Prerequisites: CS 330 with grade of C or better or CS 410 or graduate standing. Credit Hours: 3

CS516 - Advanced Compilers A continuation of 416 including advanced topics in lexical and syntax analysis, error recovery, sematic analysis, code optimization and compiler compilers. Prerequisite: CS 416. Credit Hours: 3

CS517 - 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. Students who have completed CS 412 are ineligible to enroll. Credit Hours: 3

CS518 - 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. Students who have completed CS 420 are ineligible to enroll. Prerequisite: CS 335 with a grade of C or better or graduate standing. Credit Hours: 3

CS519 - Network Forensics With the proliferation of wireless networks, security is at odds with privacy and integrity. The course provides a broad overview of security strategies for wireless networks. Topics will range from intrusion detection and network security protocols to collaborative computing. Contemporary tools and techniques for wireless network security are reviewed. A hands-on project will be an integral part of this course. Students who have completed CS 415 are ineligible to enroll. Prerequisite: CS 330 with a grade of C or better or graduate standing. Credit Hours: 3

CS520 - Advanced Topics in Parallel & Distributed Computing An advanced treatment of parallel and distributed computing; review of hardware and software considerations for parallel computation; development and analysis of parallel algorithms (with particular attention to the communication and synchronization costs associated with parallel algorithms); effect of granularity on performance; a comparison of the parallel and distributed programming paradigms including a detailed study of the central features of each approach; software systems for distributed computing including exposure to one or more distributed programming environments; the direction of parallel computing as suggested by recent, high level parallel languages; parallelizing serial programs; parallelizing compilers; future directions of parallel and distributed computing systems. The course will include a student project. Prerequisite: CS 420. Credit Hours: 3

CS521 - Compiler Construction Introduction to compiler construction. Design of a simple complete compiler, including lexical analysis, syntactical analysis, type checking, and code generation. Students who have completed CS 416 are ineligible to enroll. Prerequisites: CS 306 and 311 each with a grade of C or better or graduate standing. Credit Hours: 3

CS522 - Artificial Intelligence I Search and heuristics, problem reduction. Predicate calculus, automated theorem proving. Knowledge representation. Applications of artificial intelligence. Parallel processing in artificial intelligence. Students who have completed CS 436 are ineligible to enroll. Prerequisites: CS 311 and CS 330 each with a grade of C or better or graduate standing. Credit Hours: 3

CS523 - 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. Students who have completed CS 425 are ineligible to enroll. Prerequisite: CS 330 with a grade of C or better or graduate standing. Credit Hours: 3

CS524 - 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. Students who have completed CS 430 are ineligible to enroll. Credit Hours: 3

CS525 - Security Issues in Cloud Computing This course offers a survey of security and privacy issues in Cloud Computing systems along with an overview of current best practices and available technologies. Threat model as well as practical applications of secure Cloud Computing are explored. Prerequisite: CS 410 or graduate standing. Credit Hours: 3

CS526 - 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. Students who have completed CS 434 are ineligible to enroll. Credit Hours: 3

CS527 - Cyber-Physical Systems The goal of this course is to introduce and develop an understanding of the computing and communication for Internet of Things as a subset of Cyber-Physical systems. Connectivity among devices in our daily lives such as WiFi-enabled thermostats, smarts grids, and driverless cars is ushering in an era of sociality that transcends human social networks to machine to machine networks. Prerequisite: CS 306 with a grade of C or better or graduate standing. Students who have completed CS 431 are ineligible to enroll. Credit Hours: 3

CS528 - 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. Students who have completed CS 437 are ineligible to enroll. Credit Hours: 3

CS529 - Natural Language Processing This course combines essential ideas from linguistics and artificial intelligence to for machine understanding and generation of language. We will cover language syntax, semantics, and pragmatics and discuss the applications such as information extraction, question answering and dialog systems. Machine learning is the main computational tool to solve NLP problems and will devote a part of the course to discussing ML approaches that model NLP tasks. Deep Neural Networks and their ability in learning representations are also part of our approach to NLP problems. We will discuss learning representations and learn about transformer-based architectures that help in learning rich representations. This course is suitable for students who are willing and able to learn abstract concepts, complete programming assignments, develop a project, and produce a term paper. Prerequisite: CS 330 with a grade of C or better. Credit Hours: 3

CS530 - Advanced Database Systems A detailed treatment of advanced topics in data base systems including, but not limited or restricted to, relational database theory, query optimization, recovery techniques, concurrency control, distributed database systems, security and integrity and database machines. Prerequisite: CS 430. Credit Hours: 3

CS531 - Security in Cyber-Physical Systems The course covers introductory topics in cyber-physical systems security. The goal is to expose students to fundamental security primitives specific to cyberphysical systems and to apply them to a broad range of current and future security challenges. Various tools and techniques used by hackers to compromise computer systems or otherwise interfere with normal operations are explored using tools that are unique to interacting with cyber-physical systems. Restricted to graduate standing or consent of the instructor. Credit Hours: 3

CS532 - Topics in Information Systems A detailed study of two or three topics relevant to information systems. Topics may include but are not limited to sorting, searching, information retrieval and automatic text processing, database security and encryption, distributed databases

and data communication. Prerequisite: CS 430. Special approval needed from the instructor. Credit Hours: 3-6

CS533 - Data Mining and Big Data Analysis This course provides a series of comprehensive and in-depth lectures on the core techniques in data mining and knowledge discovery; addresses the unique issues of big data; and discusses potential applications of data mining particularly on big data analysis. Major topics include: data preparation, association mining, classification (and prediction), clustering, characteristics and challenges of big data, and strategies of big data mining and analysis. Prerequisites: CS 330 and CS 430 with grades of C or better or consent of instructor. Credit Hours: 3

CS534 - Big Data Management and Analytics This course provides comprehensive and in-depth discussions of big data management and analytics. Main subjects include computation and programming models, management and analytics algorithms, and platforms/frameworks especially designed for big data. The objective of this course is to equip students with the ability to understand, use, and build big data management and analytics systems or tools. Prerequisites: CS 430 with a grade of C or better or graduate standing. Credit Hours: 3

CS535 - Advanced Machine Learning The purpose of this course is for students to acquire in-depth knowledge of advanced aspects of machine learning. This course will cover topics including classification, clustering, the foundation of deep learning, convolutional Neural Networks, recurrent Neural Networks, and some other advanced topics-deep reinforcement learning and deep generative models. Students will learn the foundations of machine learning, deep learning, and develop skills for performing research to advance the state of knowledge in machine learning. Prerequisites: CS 434 or CS 437 with a grade of C or better. Concurrent enrollment in CS 434 or CS 437 is allowed. Credit Hours: 3

CS536 - Artificial Intelligence II Theorem proving, the Resolution Principle, strategies, and achievements. Program verification. Natural language processing. Other selected topics. Prerequisite: CS 436. Credit Hours: 3

CS537 - Advanced Topics in Expert Systems This course is designed to provide students with advanced topics in expert systems theory. Topics covered include: knowledge representation, methods of inference, reasoning under uncertainty, and inexact reasoning (fuzzy logic). A practical introduction to expert systems programming serves to reinforce and clarify the theoretical concepts. Prerequisite: CS 330 or consent of instructor. Credit Hours: 3

CS538 - Game Theory in Networks Game theoretic concepts apply whenever actions of several players are interdependent. This course will provide an introduction to classic game theory and strategic thinking including dominance, Nash equilibrium, and stability. Social choice, social learning, and online mechanism design are then discussed. We will examine how game theoretic concepts can be used in developing reasoning strategies, i.e., algorithms. Application of game theoretic framework to telecommunication and human networks is an integral part of this course. Restricted to graduate standing or consent of instructor. Credit Hours: 3

CS539 - Agents and Multiagent Systems This is an advanced treatment of fundamental concepts in the design of intelligent autonomous agents and agent systems. Classic agent theories, architectures, algorithms, and languages are discussed. An agent-based project is an integral part of this course. Restricted to graduate standing or consent of instructor. Credit Hours: 3

CS540 - Advanced Computer Networks Topics include routing protocols used in internet; data compression techniques; telecommunication systems - its services, architecture and protocols; high speed networks; routing protocols in mobile ad-hoc networks; and a detailed performance analysis of different window flow control and congestion control mechanisms using queuing

theory. Prerequisite: CS 440 with a grade of C or better, or consent of the instructor. Credit Hours: 3

CS541 - 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 graduate standing, or consent of the instructor. Students who have completed CS 441 are ineligible to enroll. Credit Hours: 3

CS542 - 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. Prerequisite: CS 330 with a grade of C or better or graduate standing. Students who have completed CS 435 are ineligible to enroll. Credit Hours: 3

CS545 - 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. Students who have completed CS 438 are ineligible to enroll. Credit Hours: 3

CS547 - Introduction to Graph Theory 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, colorability, digraphs, depth-first and breadth-first searches. Prerequisite: MATH 349 with a grade of C or better. Students who have completed CS 447 are ineligible to enroll. Credit Hours: 3

CS549 - Introduction to Combinatorics 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 a grade of C or better. Students who have completed CS 449 are ineligible to enroll. Credit Hours: 3

CS551 - 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. Students who have completed CS 451 are ineligible to enroll. Credit Hours: 3

CS552 - 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. Students who have completed CS 455 are ineligible to enroll. Credit Hours: 3

CS553 - Formal Languages and Automata The Chomsky hierarchy of formal grammars and the corresponding classes of automata. Turing machines and basic concepts of computability. Recursive and recursively enumerable languages. Closure properties. Undecidable problems about Turing machines and context-free languages. Deterministic context-free languages and the construction of LR parsers. Prerequisite: CS 451. Credit Hours: 3

CS555 - Computability and Complexity Turing machines and other models of computation. Computable functions. Church's thesis. Solvable and unsolvable problems. Introduction to complexity theory including the classes P and NP. Polynomial time approximation algorithms for NP-complete problems. Prerequisite: CS 451. Credit Hours: 3

CS570 - Linear Programming 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 duality theorem; complementary slackness; sensitivity analysis; and selected applications of linear programming. Prerequisite: MATH 221 with a grade of C or better. Students who have completed CS 472 are ineligible to enroll. Credit Hours: 3

CS571 - Optimization Techniques 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 a grade of C or better. Students who have completed CS 471 are ineligible to enroll. Credit Hours: 3

CS572 - Advanced Topics in Numerical Analysis (Same as MATH 572) Selected advanced topics in Numerical Analysis chosen from such areas as: approximation theory; spline theory; special functions; wavelets; numerical solution of initial value problems; numerical solution of boundary value problems; numerical linear algebra; numerical methods of optimization; and functional analytic methods. Special approval needed from the instructor. Credit Hours: 1-12

CS575 - Numerical Analysis I 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 grades of C or better. Students who have completed in CS 475 are ineligible to enroll. Credit Hours: 3

CS580 - Computational Statistics II This 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. Prerequisites: MATH 250 and CS 306 or CS 330 with a grade of C or better or graduate standing. Students who have completed CS 480 are ineligible to enroll. Credit Hours: 3

CS583 - Computer Graphics Principles and techniques of computer graphics. Interactive graphics software development using a modern graphics standard such as OpenGL. Topics include: primitives, transforms, clipping, modeling, viewing, texture, lighting and shading. Advanced rendering and modern graphics hardware. Prerequisite: CS 306 with a grade of C or better or graduate standing; MATH 150 and MATH 221 are recommended. Students who have completed CS 485 are ineligible to enroll. Credit Hours: 3

CS584 - 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. Students who have completed CS 484 are ineligible to enroll. Credit Hours: 3

CS585 - Advanced Topics in Computer Graphics Study of computer graphics for realistic image synthesis. Object modeling and associated date structures. Advanced rendering techniques such as raytracing and radiosity. Efficiency considerations. Image composition and compression. Current advances and research problems in realistic computer graphics. Prerequisite: CS 485. Credit Hours: 3

CS586 - Pattern Recognition An introduction to the area of pattern recognition and data science. This course will cover basic and advanced theories, algorithms, and practical solutions of statistical pattern recognition. It covers bayesian learning, parametric and non-parametric learning, data clustering, component analysis, boosting techniques, sequential data, reinforcement learning, and deep learning with neural networks. Credit Hours: 3

CS587 - 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. Students who have completed CS 487 are ineligible to enroll. Credit Hours: 3

CS590 - Readings Supervised readings in selected subjects. Graded S/U only. Special approval needed from the instructor. Credit Hours: 1-6

CS591 - Special Topics Selected advanced topics from the various fields of computer science. Repeatable on different topics toward degree credit. Credit Hours: 1-3

CS593 - Seminar Preparation and presentation of reports. Graded S/U only. Special approval needed from the instructor. Credit Hours: 1-4

CS598 - Graduate Project A practical exercise in the design, implementation, documentation and deployment of a project. A project may be completed through internship, work/study, or a supervised project. For Ph.D. students only, an internship could include face-to-face or online teaching. Credit Hours: 3-9

CS599 - Thesis Special approval needed from the instructor. Credit Hours: 3-9

CS600 - Doctoral Dissertation Dissertation research. Hours and credit to be arranged by the student's academic advisor. Graded S/U only. Restricted to admission to Ph.D. in computer science program. Credit Hours: 1-9

CS601 - Continuing Enrollment For those graduate students who have not finished their degree programs and who are in the process of working on their dissertation, thesis, or graduate project. The student must have completed a minimum of 24 hours of dissertation research, or the minimum thesis or graduate project hours before being eligible to register for this course. Concurrent enrollment in any other course is not permitted. Graded S/U or DEF only. Credit Hours: 1

School of Computing - Graduate Faculty

Ahmed, Khaled, Associate Professor, Ph.D., Tokyo Institute of Technology, 2004; 2019. High performance computing distributed and parallel computing, peer-to-peer computing, big data, machine learning, and image processing.
Office: ENGA 0307C
Ph: (618) 453-6048
Email: kahmed@cs.siu.edu

Bhattacharya, Ansuman, Assistant Professor, Ph.D., University of Calcutta, 2012; 2016. Broad areas of networks and network security research, especially, Next Generation Networks, Internet-of-Things, Cognitive Radio Networks, Software Defined Networks, Green Communication, Wireless Network Security, etc.
Office: ENGA 0409G
Ph: (618) 453-6057
Email: ansuman.bhattacharya@cs.siu.edu

Chen, Zhong, Assistant Professor, Ph.D., Wuhan University of Technology, 2015. Machine Learning, Data Mining and their potential applications to Big Data Mining and Healthcare.
Office: EGRA 405D
Ph: (618) 453-6053
Email: zhong.chen@cs.siu.edu

Gupta, Bidyut, Professor, Ph.D., University of Calcutta, 1986; 1988. Distributed systems, fault-tolerant computing, mobile communication, routing algorithms, peer-to-peer networks.
Office: EGRA 0405B
Ph: (618) 453-7194
Email: bidyut@cs.siu.edu

Hexmoor, Henry, Professor, Ph.D., University of Buffalo, 1996; 2006. Artificial intelligence, multi-agent systems, cognitive science, mobile robotics, knowledge representation and reasoning.
Office: EGRA 0409C
Ph: (618) 453-6047
Email: hexmoor@cs.siu.edu

Hossain, Md-Belayat, Assistant Professor, Ph.D., Electronics & Computer Science, University of Hyogo, 2018. Machine Learning, Artificial Intelligence, Generative AI, Computer Vision, Medical Image Processing, and Healthcare Analytics.
Office: EGRA 407D
Ph: (618) 453-6081
Email: belayat@cs.siu.edu

Huang, Chun-Hsi (Vincent), Professor and Director, Ph.D., State University of New York at Buffalo, 2001; 2019. Extreme-Scale Computing and Data Analytics, Computational Biology, and Security and Applied Algorithmics.
Office: EGRA 0319D
Ph: (618) 536-2327 (CS Main Office Contact)
Email: chunhsi.huang@siu.edu

Huang, Xiaolan (Sharon), Assistant Professor, Ph.D., Southern Illinois University, 2017; 2019 Bioinformatics, data mining, machine learning, network architecture, data communication and security.
Office: EGRA 307A
Ph: (618) 453-6036

Email: xhuang@cs.siu.edu

Jiang, Xiaopeng, Assistant Professor, Ph.D., New Jersey Institute of Technology, 2019-2024. Broad areas of Machine Learning and Computing Systems. Specifically, Federated Learning, Mobile Computing, Cloud Computing, Internet of Things.
Office: EGRA 407
Ph: (618) 453-9421
Email: xiaopeng.jiang@siu.edu

Liu, Xiaoqing (Frank), Dean of the College of Engineering, Ph.D., Computer Science, Texas A&M University, 2020. Cyber argumentation based social media and networking, data analytics-based recommendation systems, service computing, cyber physical systems, software engineering, applied artificial intelligence, and advanced computing and data applications.

Shahid, Abdur Rahman Bin, Assistant Professor, Ph.D., Florida International University, 2019. Privacy-aware, secure, and trustworthy Internet of Intelligent Things-Driven Cyberspace. Adversarial machine learning; federated learning; inter-dependent networks; blockchain; privacy enhancing technologies; and analytics with privacy.
Office: EGRA 409F
Ph: (618) 453-6032
Email: shahid@cs.siu.edu

Sinha, Koushik, Assoc. Professor, Ph.D., Jadavpur University, 2007; 2015. Mobile and wireless sensor networks, cloud computing and social computing, resource allocation and task scheduling.
Office: EGRA 0407A
Ph: (618) 453-3922
Email: koushik.sinha@cs.siu.edu

Tsatsoulis, Constantinos, Professor and Vice Chancellor for Research and Graduate School Dean, Electrical Engineering, Ph.D., Purdue University, 1987; 2022. Multiagent systems, case-based reasoning, machine learning, and intelligent image analysis.

School of Computing - Term Faculty

Paper, David, Clinical Assistant Professor, Ph.D., Education, Southern Illinois University, Carbondale, 1995. Machine Learning, Data Analytics and Data Science. Leveraging business process improvement techniques and AI technologies to reduce wasteful practices, redundancy, error, and costs. AI in everyday lives of human beings and e-Learning.
Office: EGRA 405H
Ph: (618) 453-6055
Email: david.paper@siu.edu

Salameh, Rana, Clinical Associate Professor, Ph.D., Education, Southern Illinois University, Carbondale, 2019. Game-based assessment, End-user interaction and behavior, Serious games developing, and Cybersecurity awareness.
Office: EGRA 0407E
Ph: (618) 453-6179
Email: ranasalameh@siu.edu

Sunny, S M Nahian Al, Assistant Professor of Practice, Ph.D., Computer Engineering, University of Arkansas, 2020.
Email: smnahianal.sunny@siu.edu

Woods, John, Assistant Lecturer, MS, Computer Science, Southern Illinois University, 2019. Computer Graphics and Linux/UNIX system programming.
Email: johnheathwoods@siu.edu

For a complete list of the School of Computing continuing, adjunct and emeritus faculty, please go to http://www.cs.siu.edu/faculty-staff/index.php.

Helpful Links

It is highly encouraged that all graduate students take some time at the beginning of their program to read and become familiar with the following information on the sites below. *The following links provide all the information that a graduate student will need to know to successfully navigate their program to its completion.* **Taking the time now will save you much time and hassle in the future!**

While the Graduate Program Director is available to advise students, and the Graduate Program Assistant is available to assist students, *we are not a substitute for the student taking the initiative to be informed of their program requirements*. Ultimately, it is up to the graduate student to know their program requirements, deadlines, and ensure that personal progress is made in a timely manner toward the completion of the degree program. **Procrastination and/or lack of planning on a student's part does NOT constitute an emergency on the part of the School of Computing.** Please use the following resources throughout your course of study. Read, reread and schedule periodic appointments with your committee advisor to make certain that you are on track to your goal of graduation. **We hope you find this information helpful. Please let us know if you are unable to find the information for which you are searching. We will do our best to keep our information updated and assist you in finding the appropriate contact for your specific need.**

SOUTHERN ILLINOIS UNIVERSITY-CARBONDALE

SIU homepage - http://siu.edu/

Academic Dishonesty - http://www.cs.siu.edu/resources/cs_academic_dishonesty.php

SIU Calendars and Events - http://siu.edu/events/

OFFICE OF THE BURSAR

Bursar's Office - http://bursar.siu.edu/
(For information regarding your bursar payments)

DEPARTMENT OF COMPUTER SCIENCE

Grad CS webpage - http://www.cs.siu.edu/graduate/index.php

CS Degrees Offered - http://www.cs.siu.edu/graduate/degrees_offered/index.php

CS Graduate Course Listings - http://www.cs.siu.edu/graduate/grad-course-links/index.php

CS Course Schedule - http://www.cs.siu.edu/resources/course_schedule.php

CS Resources - http://www.cs.siu.edu/resources/index.php

Current Grad Students - http://www.cs.siu.edu/graduate/current_students/index.php
(Includes information on Work Reporting Responsibilities for GAs, Registration Approval and Signatures, Forms, and Steps to Graduate)

Graduate Advisement - http://www.cs.siu.edu/graduate/graduate_advisement/index.php

MS Program Description -
http://www.cs.siu.edu/graduate/degrees_offered/ms_comp_science/index.php

Ph.D. Program Description -
http://www.cs.siu.edu/graduate/degrees_offered/phd_comp_science/index.php

Prospective Graduate Students -
http://www.cs.siu.edu/graduate/prospective_students/index.php

CENTER FOR ENGLISH AS A SECOND LANGUAGE

Center for English as a Second Language (CESL) -
http://cesl.siu.edu/

CENTER FOR INTERNATIONAL EDUCATION

Center for International Education (CIE) - http://cie.siu.edu/

CIE Forms for Graduate Students - http://www.cs.siu.edu/graduate/current_students/forms.php
(Includes OPT, Signature for Travel form, Visa Status Verification form)

International Students - http://cie.siu.edu/internationalstudents/

GRADUATE SCHOOL

Graduate School homepage - http://gradschool.siu.edu/
Areas of Interest – http://gradschool.siu.edu/academics/computer-science.php

Graduate School Catalog - http://gradschool.siu.edu/about-us/grad-catalog/
(Click on the appropriate catalog year that you entered the graduate school.)

Cost and Financial Assistance - http://gradschool.siu.edu/cost-aid/
(Information on the cost of tuition (per credit hour) and fees, Fellowships/Scholarships, Graduate Assistantships and Student Job Postings)

Frequently Asked Questions (FAQs) & Terms - http://gradschool.siu.edu/about-us/faq.php

Graduate School Forms - http://gradschool.siu.edu/about-us/forms.php

GS Guidelines/Processes for Completing and Submitting a Research Paper, Thesis and Dissertation - http://gradschool.siu.edu/current-students/thesis-dissertation-researchpaper/
(View Deadline Dates, Copyright Info, Information on Graduation, Graduation Application and Commencement.)

Graduate School Staff - http://gradschool.siu.edu/about-us/grad_staff.php

OFFICE OF THE REGISTRAR

Office of the Registrar - http://registrar.siu.edu/
(Request a transcript, calendars, schedule of classes, catalogs, registration, grade information, and graduation)

Course Title Listing and Graduate Area Requirements
(updated 6/6/2025)

COURSE	COURSE TITLE	CH	GRAD AREA REQU.
500 LEVEL			
CS 500	Computer Architecture	3	3
CS 504	Autonomous Mobile Robots	3	3
CS 506	Basic Linux System Administration	3	3
CS 507/591	Advanced Linux/UNIX Programming	3	2
CS 508	Applied Cryptography	3	1
CS 509	Ethical Hacking	3	2
CS 505/591	Computer Security	3	3
CS 517	Programming Distributed Applications	3	2
CS 513	Digital Forensics	3	3
CS 519	Network Forensics	3	3
CS 521	Compiler Construction	3	3
CS 518/591	Distributed Systems	3	2
CS 523	Principles of Virtualization and Cloud Computing	3	3
CS 524	Database Systems	3	3
CS 527	Cyber-Physical Systems	3	3
CS 526/591	Learning from Data	3	1
CS 542	Software Engineering	3	2
CS 522	Artificial Intelligence I	3	3
CS 528/591	Machine Learning and Soft Computing	3	1
CS 545	Bioinformatics Algorithms	3	1
CS 502	Computer Networks	3	3
CS 541/491	Mobile and Wireless Computing	3	3
CS 547	Introduction to Graph Theory	3	1
CS 549	Introduction to Combinatorics	3	1
CS 551	Theory of Computing	3	1
CS 552	Advanced Algorithm Design and Analysis	3	1

CS 571	Optimization Techniques	3	
CS 570	Linear Programming	3	
CS 575	Numerical Analysis	3	
CS 580	Computational Statistics II	3	1
CS 584	User Interface Design and Development	3	
CS 583	Computer Graphics	3	2
CS 587	Software Aspects of Game Development	3	2
CS 491/CS 591	Generative Artificial Intelligence	1 to 3	3
CS 491/CS 591	Advanced Python	1 to 3	2
CS 491/CS 591	Deep Learning for Energy Aspects	1 to 3	2
CS 491/CS 591	Natural Language Processing	1 to 3	2 or 3
CS 491/CS 591	Introduction to Data Engineering	1 to 3	1 or 2
CS 492	Special Problems (1-3 per semester)	up to 6	
CS 493	Seminar	up to 4	
CS 498	Senior Seminar in Computer Science	2	
CS 499	Senior Project in Computer Science	3	
CS 499B	Senior Thesis in Computer Science	3	
CS 501	Advanced Computer Architecture	3	
CS 503	Fault-Tolerant Computing Systems	3	
CS 510	Wireless and Network Security	3	1
CS 511	Formal Specification of Programming Languages	3	
CS 512	Declarative Programming	3	
CS 514	Advanced Operating Systems	3	3
CS 515	Computational Blockchain	3	
CS 516	Advanced Compilers	3	
CS 520	Advanced Topics in Parallel & Distributed Computing	3	2
CS 525	Security Issues in Cloud Computing	3	3
CS 530	Advanced Data Base Systems	3	3
CS 531	Security in Cyber-Physical Systems	3	3
CS 532	Topics in Information Systems	3	
CS 533	Data Mining and Big Data Analysis	3	1 or 2
CS 534	Big Data Management and Analytics	3	1 or 2
CS 535	Advanced Machine Learning: Deep Learning	3	1
CS 536	Artificial Intelligence II	3	3
CS 537	Advanced Topics in Expert Systems	3	3
CS 538	Game Theory in Networks	3	
CS 539	Agents and Multiagent Systems	3	
CS 540	Advanced Computer Networks	3	3
CS 553	Formal Languages and Automata	3	1
CS 555	Computability and Complexity	3	
CS 572	Advanced Topics in Numerical Analysis	up to 12	

CS 585	Advanced Topics in Computer Graphics	3	2
CS 586	Pattern Recognition and Image Processing	3	1 or 2
CS 590	Readings (15 max per degree	up to 6	
CS 591	Special Topics (1-3 per topic)	up to 9	
CS 591	Ethical Hacking	1 to 3	2
CS 591	Digital Forensics	1 to 3	3
CS 591	Distribution Systems	1 to 3	2
CS 591	Machine Learning & Soft Computing	1 to 3	1
CS 591	Natural Language Processing	1 to 3	2 or 3
CS 591	Deep Learning	1 to 3	1
CS 591	Principles of Virtualization and Cloud Computing	1 to 3	3
CS 591	Linux/UNIX Programming	1 to 3	2
CS 591	Learning from Data	1 to 3	1
CS 593	Seminar (PhD)	up to 4	
CS 598	Graduate Project	3 up to 9	
CS 599	Thesis (max 6 toward degree)	3 up to 9	
CS 600	Doctoral Dissertation (max 9 per term/max 90 towards degree)	up to 9	
CS 601	Continuing Enrollment (PhD-24 diss hrs first)	1	

Master of Science in Computer Science
Graduate Advisement Worksheet

Student Name:_____ Date:_____

Advisor Name:_____ DAWGTAG:_____

SIU Email:_____ Sem. Entered MS Prog.:_____

Regular/Adm w/Cond.:_____ Req. Crs. Hrs. to Grad._____

Proj./Thesis:_____ Anticipated Grad. Date:_____ Concentration:_____

CS AREA REQUIREMENTS	SEMESTER TAKEN	CRS	GRADE	CRED. EARNED	NOTES
CS Theory (Choose 2) 508, 526, 528, 545, 547, 549, 551, 552, 580, 510, 533, 534, 535, 553, 555, 586 ***591 Courses that correspond to them**					
Software Development/Engineering (Choose 2) 507, 517, 518, 542, 583, 587, 520, 585 ***591 Courses that correspond to them**					
Computing Systems Technology (Choose 2) 500, 504, 506, 509, 505, 513, 519, 521, 523, 524, 527, 529, 502, 541, 514, 525, 530, 534, 536, 540 This requirement accounts for at least 18 hours of the required 30 hours of total graduate credit. ***591 Courses that correspond to them**					
MS PROJECT (3 cred. hrs.)					**Project Advisor:**
(OR)					
MS THESIS - (1st 3 cred. hrs.)			**Thesis Adv:**		**Committee Members:**
MS THESIS - (2nd 3 cred. hrs.)					
Additional Courses					
MEETS GRADE Require. ("C" or better):	**YES NO**				
TOTAL CRED. HRS: **MEETS 30 TOTAL CRED. HRS. REQUIRE: YES NO**		Readings - CS590 (Do NOT Count Toward Cred. Hrs)			
IF NO, TOTAL CRED. HRS Left:					
Starting Fall 2025, all CS graduate level courses are 500-level and above. Prior credits still count.					
Comments:					

COMPUTER SCIENCE

Ph.D. Program – Major Check

NAME		DawgTag		Catalog Year:

RESIDENCY REQUIREMENTS	24 credit hours of Graduate level coursework within 4 calendar years. No more than 6 dissertation hours prior to candidacy.

REQUIRED COURSES (20 credits):	Semester	Course Number	Hrs	Grade
Seminar Courses (2 – 1-credit courses):		CS 593	1	
		CS 593	1	
CS 500 level courses (6 credits):				
CS 500 level courses (6 elective credits):				
400/500-level courses from Academic Units other than CS (from approved list) (6 credits):				

ADDITIONAL COURSES (4 credits):	Semester	Course Number	Hrs	Grade

QUALIFYING/PRELIMINARY EXAMS	Taken within 3 years of enrollment in Ph.D. Program – written test over 2 areas of concentration related to dissertation area and questions from regularly scheduled 400/500 graduate level coursework. Pass/Fail – a failure after second attempt, student is dismissed from Ph.D. program.

Research Advisor		1st Attempt		2nd Attempt	
Faculty Member		Pass	Fail	Pass	Fail
Faculty Member		Pass	Fail	Pass	Fail
Faculty Member		Pass	Fail	Pass	Fail

DISSERTATION PROPOSAL APPROVAL – Preliminary Examination			1st Attempt		2nd Attempt	
Student's Proposed Research Topic	Date		Pass	Fail	Pass	Fail

CANDIDACY REQUIREMENTS	Pass Qualifying Exam and complete all coursework. Then, complete 24 credit hours of dissertation credit (restricted to 9 hours per semester). Must be completed within 5 years.

Admitted to Candidacy		DISSERTATION HOURS			
DISSERTATION COMMITTEE		Semester	Course Number	Hrs	Total
Committee Chair			CS 600		0
Committee Member			CS 600		0
Committee Member			CS 600		0
Committee Member			CS 600		0
Committee Member			CS 600		0

PUBLICATION REQUIREMENTS	Candidate should publish (or have accepted for publication) a minimum of two articles in peer-reviewed journals. The candidate must be listed as the primary author of at least one of these journal articles.
Title of Article	
Journal	
Title of Article	
Journal	

ORAL DEFENSE		Pass	Fail	GS Dissertation Approval		Exit Survey		Digital Copy Received	
Date				Date		Date		Date	

DISSERTATION TITLE	

Qualifying exam within 3 years of enrollment in Ph.D. Program – written test over 2 areas of concentration related to dissertation area and questions from regularly scheduled 500 graduate level coursework.
Pass/Fail – a failure after second attempt, student is dismissed from Ph.D. program.

Course Requirements:

1) Students joining the PhD program with **only bachelor's degree, in addition to the Ph.D. program course requirements, must complete at least 15 semester hours of approved computer science courses including CS 500, CS 518, CS 552, and two other 500-level lecture courses, with a minimum accumulated GPA of 3.25/4.0 in those courses. If a specific course, or its equivalent, is already part of the student's academic background, an alternate course will be submitted.**
2) Residency: 24 credit hours of 500 level courses – which must include:
   *2 – 1 credit hour seminar courses
   *6 credit hours from CS 500 level
   *6 elective credit hours from CS 500 level
   *6 credit hours of 400/500 level from academic dept. other than CS—and approved by faculty advisor or Graduate Program Director
3) Must pass two qualifying exams – see information above for more details.
4) File department request to appoint dissertation committee.
5) Course of study is determined by faculty advisor and/or dissertation committee.
6) Dissertation Proposal – Preliminary Examination – oral test on student's proposed research topic – Pass/fail with one reexamination prior to dismissal from the Ph.D. program
7) Admitted to Candidacy after meeting all residency and coursework requirements and passing qualifying/preliminary examinations. Must finish dissertation within a 5-year period to be awarded the PhD degree once candidacy has been granted.
8) 24 credit hours of CS 600 Dissertation research – nine hours per semester after candidacy (may take 6 credit hours of dissertation ONLY before being granted candidacy status – additional dissertation hours taken BEFORE candidacy status is awarded will NOT count toward the 24 credit hours of dissertation needed to complete the PhD requirements.
9) When research is complete and dissertation written, a final oral examination will determine if research conducted is worthy of Ph.D. degree.
   *Publish two articles – peer-reviewed journals.
10) Follow general guidelines of the Graduate School.

Candidate should publish (or have accepted for publication) a minimum of two articles in peer-reviewed publications, at least one of which should be a journal.

Cybersecurity MS Program - Graduate Advisement Worksheet

Student Name: _____ Date: _____

Advisor Name: _____ DAWGTAG: _____

SIU Email: _____ Sem. Entered MS Prog.: _____

Regular/Adm w/Cond.: _____ Req Crs. Hrs. to Grad. _____

Project /Thesis: _____ Anticipated Grad. Date: _____ Concentration: _____

CSCS REQUIREMENTS	SEMESTER TAKEN	Course	Meets 500-Level Req.	GRADE	CRED. EARNED	NOTES
Fundamentals in Computer Security (Choose 1): ***CS 505 or ECE 508***						
Fundamentals in Systems Programming (Choose 1): ***CS 507 or ECE 536***						
Fundamentals in Network Systems (Choose 1): ***CS 502 or ECE 553***						
Cybersecurity Concentration ***- 4 courses in Cybersecurity*** ***- 1 course in Cyber Systems*** ***Cybersecurity courses:*** *CS 508, CS 509, CS 513, CS 519, ECE 502, ECE 517, ECE 518, ECE 519, CS 525, CS 531* ***Cyber System courses:*** *ECE 509, CS 523, CS 541, ECE 575A, ECE 512, ECE 528, ECE 536, CS 540, ECE 541*						
Cyber Systems Concentration ***- 4 courses in Cyber Systems*** ***- 1 course in Cybersecurity*** ***Cybersecurity courses:*** *CS 508, CS 509, CS 513, CS 519, ECE 502, ECE 517, ECE 518, ECE 519, CS 525, CS 531* ***Cyber System courses:*** *ECE 509, CS 523, CS 541, ECE 575A, ECE 512, ECE 528, ECE 536, CS 540, ECE 541*						
Take at least two CS/ECE 500-level courses not crosslisted to a 400-level course	**YES NO**					
Take at least 3 ECE and at least 3 CS courses	**YES NO**		**Addt'l courses:**			
MS PROJECT (3 cred. hrs.) (ECE592 or CS598)			**Project Advisor:**			
MS THESIS 6 credit hours of thesis in ECE or CS (May substitute for 6 credit hours in a concentration area)			**Thesis Adv:**			**Committee Members:**
TOTAL CRED. HRS: **MEETS 30 TOTAL CRED. HRS. REQUIRE: YES NO**		Readings - CS590 (Do NOT Count Toward Cred. Hrs)				
IF NO, TOTAL CRED. HRS Left:		**Suggested courses:**				