MASTER OF SCIENCE (M.S.),
MAJOR IN SOFTWARE
ENGINEERING

Admission Policy
For information regarding admission application requirements
and deadlines, please visit The Graduate College website at http://
www.gradcollege.txstate.edu/soen.html.

Degree Requirements
The master of science (M.S.) degree with a major in software engineering requires:

1. Thesis option (30-hour degree): Completion of 21 hours of graduate
core courses, an additional 3 hours of graduate computer science
electives, and completion of a thesis. The thesis must be accepted by
a departmental supervisory committee of graduate faculty members,
the department chair, and the dean of The Graduate College. The
thesis program requires a minimum enrollment of 6 hours in CS
5399A and CS 5399B. Thesis credit requirement information is
provided in the Thesis tab.

2. Non-thesis option (36-hour degree): Completion of 24 hours of
graduate core courses and an additional 12 hours of graduate
computer science electives.

Non-thesis Option

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5389</td>
<td>Graphical User Interfaces</td>
<td>3</td>
</tr>
<tr>
<td>CS 5391</td>
<td>Survey of Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CS 5392</td>
<td>Formal Methods in Software Engineering</td>
<td>3</td>
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<td>CS 5393</td>
<td>Software Quality</td>
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<td>CS 5394</td>
<td>Advanced Software Engineering Project</td>
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<tr>
<td>CS 5396</td>
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<td>CS 5306</td>
<td>Advanced Operating Systems</td>
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<tr>
<td>CS 5310</td>
<td>Network and Communication Systems</td>
</tr>
<tr>
<td>CS 5329</td>
<td>Algorithm Design and Analysis</td>
</tr>
<tr>
<td>CS 5332</td>
<td>Data Base Theory and Design</td>
</tr>
<tr>
<td>CS 5346</td>
<td>Advanced Artificial Intelligence</td>
</tr>
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</table>

Advisor Approved Electives (Choose 12 hours) 12

Total Hours 36

Thesis Option

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Thesis Course Work

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</table>

Advisor Approved Electives (Choose 3 hours) 3

Thesis Course Work (Choose a minimum 6 hours) 6

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<thead>
<tr>
<th>Course</th>
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<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 5199B</td>
<td>Thesis</td>
<td></td>
</tr>
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<td>CS 5299B</td>
<td>Thesis</td>
<td></td>
</tr>
<tr>
<td>CS 5399A</td>
<td>Thesis</td>
<td></td>
</tr>
<tr>
<td>CS 5399B</td>
<td>Thesis</td>
<td></td>
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<tr>
<td>CS 5599B</td>
<td>Thesis</td>
<td></td>
</tr>
<tr>
<td>CS 5999B</td>
<td>Thesis</td>
<td></td>
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</tbody>
</table>

Total Hours 30

Background Requirements
Students are required to fulfill background course work if they do not
have adequate undergraduate computer science background. The
background requirements may be reduced if evidence is presented which
shows that the applicant has taken equivalent courses elsewhere prior to
enrollment at Texas State. Background work must be completed before
enrolling in graduate courses.

The minimum undergraduate background requirements for computer
science and software engineering majors are:

**Computer Science Course Work**

<table>
<thead>
<tr>
<th>Course</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CS 1428</td>
<td>Foundations of Computer Science I</td>
<td>4</td>
</tr>
<tr>
<td>CS 2308</td>
<td>Foundations of Computer Science II</td>
<td>3</td>
</tr>
<tr>
<td>CS 2318</td>
<td>Assembly Language</td>
<td>3</td>
</tr>
<tr>
<td>CS 2420</td>
<td>Digital Logic</td>
<td>4</td>
</tr>
<tr>
<td>CS 3339</td>
<td>Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>CS 3358</td>
<td>Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>CS 4318</td>
<td>Program Translators</td>
<td>3</td>
</tr>
<tr>
<td>or CS 4328</td>
<td>Operating Systems</td>
<td></td>
</tr>
</tbody>
</table>

Advanced computer science electives (CS 3000-4000 level) 6

**Mathematics Course Work**

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<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 5358</td>
<td>Applied Discrete Mathematics (or equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

Calculus 8

Total Hours 40

1. These courses must be completed with no grade less than "C" and no
more than two "Cs."

2. These courses must be completed with no grade less than "C."

If a student elects to follow the thesis option for the degree, a
committee to direct the written thesis will be established. The
thesis must demonstrate the student’s capability for research and
independent thought. Preparation of the thesis must be in conformity
with the *Graduate College Guide to Preparing and Submitting a Thesis
or Dissertation*. The thesis handbook may be accessed at http://

**Thesis Proposal**

The student must submit an official Master’s Thesis Proposal
form to their thesis committee. The required thesis proposal
form may be obtained from The Graduate College at http://
www.gradcollege.txstate.edu/gcforms.html. After signing the form and
obtaining committee members’ signatures, graduate advisor’s signature
(if required by the program), and the department chair’s signature, the student must submit the thesis proposal form with one copy of the proposal attached to the dean of The Graduate College for approval before proceeding with research on the thesis. If the thesis research involves human subjects, the student must obtain exemption or approval from the Texas State Institutional Review Board prior to submitting the proposal form to The Graduate College. If the thesis research involves vertebrate animals, the proposal form must include the Texas State IACUC approval code. It is recommended the thesis proposal form be submitted to the dean of The Graduate College by the end of the student’s enrollment in 5399A.

**Thesis Committee**

The thesis committee must be composed of a minimum of three approved graduate faculty members.

**Thesis Enrollment and Credit**

The completion of a minimum of six hours of thesis enrollment is required. Enrollment for the thesis will be in course number 5399A for a student’s initial thesis enrollment and a thesis B course for each subsequent thesis enrollment in the field in which the subject matter of the thesis falls, e.g., ENG 5399A, ENG 5199B, ENG 5299B, ENG 5399B, ENG 5599B, and ENG 5999B. Preliminary discussions regarding the selection of a topic and assignment to a research supervisor will not require enrollment for the thesis course.

A student will be required to enroll in and pay the fee for at least one hour of the thesis course during any term in which the student will receive thesis supervision or guidance and/or in which the student is using university resources. Failure to register for the thesis course during a term in which supervision is received may result in postponement of graduation. After initial enrollment in 5399A, the student will continue to enroll in a thesis B course as long as it takes to complete the thesis. In the rare case when a student has not previously enrolled in thesis and plans to work on and complete the thesis in one term, the student will enroll in both 5399A and 5399B. The only grades assigned for thesis courses are PR (progress), CR (credit), W (withdrawn), and F (failing). If acceptable progress is not being made in a thesis course, the instructor may issue a grade of F. If the student is making acceptable progress, a grade of PR is assigned until the thesis is completed. The minimum number of hours of thesis credit (“CR”) will be awarded only after the thesis is filed in the Alkek Library and the librarian has electronically returned the thesis card to the office of The Graduate College.

A student who has selected the thesis option must be registered for the thesis course during the term or Summer I (during summer the thesis course runs ten weeks for both sessions) in which the degree will be conferred.

**Fee Reduction**

A master’s degree candidate for graduation may be eligible for a one-time fee reduction under V.T.C.A. Education Code, Section 54.054. Please refer to the section titled Fee Reduction in the Additional Fees and Expenses chapter of this catalog for more information.

**Thesis Deadlines and Approval Process**

Thesis deadlines are posted at the following web page: http://www.gradcollege.txstate.edu/Thes-Diss_Info/T-D_Deadlines.html. The completed thesis must be submitted to the chair of the thesis committee no later than 41 days before the date of the commencement at which the degree is to be conferred.

The following must be submitted to the office of The Graduate College no later than 24 days, not counting weekends or holidays, before the date of commencement at which the degree is to be conferred (see The Graduate College webpage for specific deadlines):

1. The Thesis/Dissertation Committee Approval form bearing original signatures of the student and all committee members.
2. One (1) copy of the thesis in final form, approved by all committee members, on standard paper (Hard-copy Submission Option) or PDF of the thesis in final form, approved by all committee members, uploaded in the on-line Vireo submission system (Vireo On-line Submission Option).

After the dean of The Graduate College approves the thesis, the process is as follows:

1. For the Vireo On-line Submission Option:
   a. No copies are required to be submitted to the Alkek Library. However, Alkek will bind copies submitted that the student wants bound for personal use. Personal copies are not required to be printed on archival quality paper. The student will take the personal copies to the Alkek Library and pay the binding fee for personal copies.

**Courses Offered**

**Computer Science (CS)**

**CS 5100. Advanced Computer Science Internship.**

This course provides advanced training supervised by computer scientists in internship programs approved by the department. Course cannot be counted toward any graduate degree, is open only to majors in the Department of Computer Science. May be repeated once but not for credit and requires approval of the department chair. About Advanced Computer Science Internship

1 Credit Hour. 0 Lecture Contact Hours. 1 Lab Contact Hours.

**Course Attribute(s):** Exclude from 3-peat Processing|Graduate Assistantship|Exclude from Graduate GPA

**Grade Mode:** Credit/No Credit about Thesis

**CS 5199B. Thesis.**

This course represents a student’s continuing thesis enrollments. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis. About Thesis

1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.

**Grade Mode:** Credit/No Credit about Thesis

**CS 5299B. Thesis.**

This course represents a student’s continuing thesis enrollments. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis. About Thesis

2 Credit Hours. 2 Lecture Contact Hours. 0 Lab Contact Hours.

**Grade Mode:** Credit/No Credit about Thesis
CS 5300. Professional Development of Graduate Assistants.
This course is designed to develop and enhance the professional and technical skills of graduate teaching and instructional assistants. Topics covered may include, but are not limited to, teaching skills, technical skills, ethical and legal issues, and laboratory management. This course does not earn graduate degree credit. Graded on a credit (CR), no-credit (NC) basis.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Graduate Assistantship
Grade Mode: Leveling/Assistantships
about Professional Development of Graduate Assistants

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Leveling/Assistantships
Grade Mode: Leveling/Assistantships
about Professional Development of Graduate Assistants

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Programming Practicum

CS 5301. Programming Practicum.
Intensive review of programming through data structures. Includes syntax, semantics, problem solving, algorithm development, and in-class exercises. May be repeated once. Does not count for credit toward any graduate degree. Prerequisite: CS 3358 with a grade of C or higher, or consent of instructor.

about Programming Practicum

A study of modern operating systems including network, distributed, or real-time systems. Prerequisites: CS 3358 and CS 4328.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Advanced Operating Systems

A study of network and communication systems. Verification and/or implementation of protocols will be required. Prerequisite: CS 3358.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Network and Communication Systems

CS 5316. Data Mining.
This course covers fundamental concepts and techniques plus recent developments in data mining and information retrieval. It provides relevant research training and practice opportunities. May not be taken for credit if student received credit for CS 4315. Prerequisite: CS 3358 with a grade of C or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Data Mining

CS 5318. Design of Programming Languages.
Covers various aspect of the design of programming languages including principles, methodologies, and a panorama of techniques in formal syntax and formal semantics. Prerequisite: CS 3358.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Design of Programming Languages

Professional level presentation of techniques and research findings related to human-computer interactions. Prerequisite: CS 3358.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Advanced Studies in Human Factors of Computer Science

CS 5329. Algorithm Design and Analysis.
Introduction to algorithm design and analysis, computational complexity, NP-completeness theory. Prerequisites: CS 3358, MATH 2472, and MATH 3398 or MATH 5358 with a grade of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Algorithm Design and Analysis

CS 5331. Crafting Compilers.
Overview of the internal structure of modern compilers. Research on compilation techniques. Topics include lexical scanning, parsing techniques, static type checking, code generation, dataflow analysis, storage management, and execution environments. Prerequisite: CS 3358 with a grade of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Crafting Compilers

CS 5332. Data Base Theory and Design.
Computer system organization for the management of data; data models, data model theory, optimization and normalization; integrity constraints; query languages; intelligent database systems. Prerequisites: CS 3358 and CS 4328.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Data Base Theory and Design

Database related topics will be covered including object-oriented database, intelligent database, distributed database, CASE tools, and DBMS. The design of databases will be covered with an emphasis on the design of the conceptual, logical, and internal models. Prerequisite: CS 4332 or CS 5332, with a grade of C or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Advanced Database Systems

CS 5334. Advanced Internet Information Processing.
Integration of popular scripting languages (Perl, JavaScript, PHP, and other CGI capable languages) and database programming languages (embedded database programming languages, JavaServlets, and PHP) to provide advanced information processing for Internet applications that demand both database support and sophisticated, application specific information processing. Prerequisite: CS 4332 or CS 5332 with a grade of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Advanced Internet Information Processing
CS 5335. Research in Object-Oriented System Development.
The course covers the object-oriented methodologies for system analysis, design, implementation, testing, and other aspects of system development. Emphasis will be on using OO methodologies to manage the complexity of complicated software. Other topics like modeling, OODB, and OO languages will also be covered. Prerequisites: CS 3358, and either CS 4332 or CS 5332 with grades of C or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Research in Object-Oriented System Development

CS 5338. Formal Languages.
Advanced topics in automata theory, grammars, Turing machines, decidability, and algorithmic complexity. Prerequisites: CS 3358 and MATH 3398.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Formal Languages

Study of advanced concepts and programming skills in computer networks such as advanced TCP/IP, API, multicasting and broadcasting, reliable communications, advanced I/O functions and options. Prerequisite: CS 5310 with a grade of C or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Advanced Network Programming

CS 5343. Wireless Communications and Networks.
Study of the fundamental aspects of wireless communications and elsewhere/mobile networks, introduction of wireless/mobile networking APIs. Prerequisites: CS 3358 with a grade of B or higher and CS 5310 with a grade of C or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Wireless Communications and Networks

CS 5346. Advanced Artificial Intelligence.
Knowledge representation; knowledge engineering; parallel and distributed AI; heuristic searches; machine learning and intelligent databases; implementation of systems in high-level AI languages. Prerequisite: CS 3358.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Advanced Artificial Intelligence

CS 5348. Computer Organization and Design.
This course covers the dynamic interaction of the computer system building blocks and their management. Course topics include the design of the instruction set, high speed arithmetic, memory hierarchy, and control units. Computer system performance evaluation methodology and techniques are also covered. Prerequisites: CS 3339 and CS 3358.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Computer Organization and Design

CS 5351. Parallel Processing.
Introduction to the design and analysis of parallel algorithms, parallel architectures, and computers. Prerequisites: CS 3358, CS 3409, and CS 4328.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Parallel Processing

CS 5352. Distributed Computing.
Study of advanced topics in distributed systems: concurrency control and failure recovery, management of replicated data, distributed consensus and fault tolerance, remote procedure calls, naming and security. Prerequisites: CS 3358 and CS 4328.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Distributed Computing

CS 5369D. Advanced Digital Forensics.
This course provides a comprehensive understanding of the techniques and tools used in criminal and civil investigations that involve computing systems, digital devices and media, and communication networks. The course covers recent research material published in the field. Hands-on experience will be acquired through case studies and projects.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Topics
Grade Mode: Standard Letter
about Advanced Digital Forensics

CS 5369E. Advanced Embedded Computer Systems.
Research in the architecture of embedded systems, micro-controllers, their peripherals, languages, and operating systems and the special techniques required to use them. Course will provide in-depth knowledge of implementation of individual projects. Course cannot be taken for credit if student received credit for CS 3468. Prerequisite: CS 3339 or the equivalent.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Topics
Grade Mode: Standard Letter
about Advanced Embedded Computer Systems

CS 5369G. Web Service Engineering.
Advanced concepts and techniques for enabling Web application integration and interaction using Semantic Web and Web services. Concepts and techniques include service discovery ontology (RDF, DAML-S), XML-based interactions standards (eBXML, RosettaNet) and Web Services (WSDL, SOAP, UDDI, BPEL). Prerequisite: CS 3358 with a grade of C or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Topics
Grade Mode: Standard Letter
about Web Service Engineering
CS 5369H. Designing, Implementing and Evaluating E-Commerce Applications.
Design, implement, evaluate working e-commerce website using Microsoft ASP.NET Framework and C#.
Organization, purpose, operation allowing themes, membership and content management systems, mailing list, and E-commerce store with support for real-time credit card processing, home page personalization, and localization. Prerequisite: CS 5326 with C or higher or instructor’s permission.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Topics
Grade Mode: Standard Letter
about Designing, Implementing and Evaluating E-Commerce Applications

CS 5369J. Advanced Human Computer Interaction.
This course will cover state of the art human computer interaction topics such as perceptual compression, eye-gaze, and brain computer interfaces with emphasis on the human visual system, eye-tracking, and electroencephalography. Prerequisite: CS 3358.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Topics
Grade Mode: Standard Letter
about Advanced Human Computer Interaction

CS 5369L. Machine Learning and Applications.
Provides broad introduction to machine learning, including learning theory, and recent topics like support vector machines and feature selection. Covers basic ideas, intuition, and understanding behind modern machine learning methods. Discusses applications like face recognition, text recognition, biometrics, bioinformatics, and multimedia retrieval. Prerequisite: CS 3358 grade of C or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Topics
Grade Mode: Standard Letter
about Machine Learning and Applications

CS 5369P. Principles of Programming Languages.
Overview of principles of programming languages including type checking algorithms. Emphasis is on type systems’ theoretical aspects and pragmatics of their use in imperative and functional languages including peculiarities of object-oriented systems. Prerequisites: CS 3358 and MATH 3398 with grades of C or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Topics
Grade Mode: Standard Letter
about Principles of Programming Languages

CS 5369Q. Recommender Systems.
This course covers various concepts of recommender systems, including personalization algorithms, evaluation tools, and user experiences. Discussion of how recommender systems are deployed in business applications, design of new recommender experiences, and how to conduct and evaluate research in recommender systems. Cannot take for credit if already took CS 4379Q. Prerequisite: CS 3358 with a grade of C or higher or consent of instructor.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Recommender Systems

CS 5369R. Research in Digital Forensics.
Students will design and implement computer-based forensic tools applicable to an instructor chosen domain.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Topics
Grade Mode: Standard Letter
about Research in Digital Forensics

CS 5369Y. Green Computing.
Reducing mobile device, cloud computing platform, and supercomputer energy consumption is a paramount, daunting problem. This course covers state-of-the-art green computing research, including energy-efficient hardware and software design, power-aware resource management and storage solutions, green data centers and mobile computing. Cannot be taken for credit if received CS 4379Y credit. Prerequisite: CS 3358 with a grade of C or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter
about Green Computing

CS 5374. Neural Networks.
A study of neural computing, including basic concepts, algorithms, and applications; back propagation and counter propagation networks; Hopfield networks; associative memories; massively parallel neural architectures; adaptive resonance theory; optical neural networks; connectionist approaches. Prerequisite: CS 3358.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Neural Networks

A study of the digital representation and processing of major multimedia data types: image, audio, and video. Compression techniques for the three data types, standards, and storage media. Prerequisite: CS 3358.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Multimedia Computing
CS 5376. Enterprise Application Integration.
Introduction to the integration of all services available on the Web. It emphasizes component-based integration frameworks based on J2EE specification (EJB, Servlets, JMS), inter-organization workflow integration frameworks, and XML framework. Students must have knowledge of object-oriented design, object-oriented programming language, databases, and networking. Prerequisite: CS 3358.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Enterprise Application Integration

This course covers various aspects of producing secure computer information systems that provide guaranteed controlled sharing. Emphasis is on software models and design, including discovery and prevention of computing systems security vulnerabilities. Current systems and methods are examined and critiqued. Prerequisite: CS 3358 with a grade of C or higher.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Advanced Computer Security

A study of the algorithms and data structures used in representing and processing visual data. Prerequisite: CS 3358.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Advanced Computer Graphics

CS 5389. Graphical User Interfaces.
Covers both abstract and practical treatments of using graphics to implement interactive computer/human interfaces. Includes a survey of the major GUI standards and tools. Prerequisite: CS 3358.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Graphical User Interfaces

CS 5391. Survey of Software Engineering.
A study of the software life cycle with emphasis on system analysis and design. Methodologies based on data flows and on objects will be surveyed. A component on professional ethics is included. Prerequisite: CS 3358.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Survey of Software Engineering

The use of design and specification languages in producing software systems. Emphasis is placed on proving correctness of designs and implementations. Prerequisites: CS 3358 and CS 5391.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Formal Methods in Software Engineering

CS 5393. Software Quality.
The latter half of the software life cycle is discussed. Topics include testing, performance evaluation, and software metrics. Appropriate software tools are studied and used. Prerequisite: CS 5391.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Software Quality

CS 5394. Advanced Software Engineering Project.
Students produce a software project of significant size in a team environment. All aspects of the software engineering course sequence are integrated and put into practice. Prerequisite: CS 5391.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Advanced Software Engineering Project

Open to graduate students on an independent basis by arrangement with the faculty member concerned. Course is not repeatable for credit. Prerequisite: CS 3358.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit
about Independent Study in Advanced Computer Science

The essentials of software engineering processes, methods, and tools for the evolutionary design of complex interactive software are discussed. Overviews of other topics like quality concepts, SEI CMM, information technology, and network technology are covered. Student completes a literature survey of the latest software engineering analysis and design processes, methods, and tools. Prerequisite: CS 5391.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
about Advanced Software Engineering Processes and Methods

CS 5399A. Thesis.
This course represents a student’s initial thesis enrollment. No thesis credit is awarded until the student has completed the thesis in CS 5399B. Graded on a credit (CR), progress (PR), no-credit (F) basis.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit
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CS 5399B. Thesis.
This course represents a student’s continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit
about Thesis
CS 5599B. Thesis.
This course represents a student's continuing thesis enrollments. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.

Grade Mode: Credit/No Credit

About Thesis

CS 5999B. Thesis.
This course represents a student's continuing thesis enrollments. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.

Grade Mode: Credit/No Credit

About Thesis