

**Computer Science Department
College of Engineering
University of Missouri – Columbia**

Graduate Degrees in Computer Science

**MS – Computer Science
Ph.D. – Computer Science**

(Revision August 23, 2004)

The following is a general description of the graduate degree programs offered by the Computer Science (CS) Department at the University of Missouri–Columbia (MU). Admission and graduation requirements are described.

GENERAL ORIENTATION

The CS Department graduate programs lead to the degrees of Master of Science in Computer Science and Doctor of Philosophy in Computer Science. The CS graduate degree programs prepare prior recipients of four-year BS degrees in Computer Science or closely related areas for further study at the doctoral level or for successful careers as specialized computer professionals. The Ph.D. program is a research degree designed to prepare students for various advanced professional careers, including college teaching and research, as well as research and development in leading industrial and government R&D facilities.

Specialized training is available in the faculty's active research fields which includes: artificial and computational intelligence, cognitive science, computational complexity and automata, computer graphics and scientific visualization, computer vision, computer networking, database theory and design, digital libraries, fuzzy logic, high speed networking systems and applications, multimedia systems, operating systems, parallel and distributed computing, software engineering, software system design, wireless computing, and world-wide-web programming.

In addition to the graduate programs in CS, the CS Department offers undergraduate programs leading to the degrees: BS in Computer Science and BA in Computer Science.

The CS Department has a variety of computing equipment and laboratories available for instruction and research. These facilities, enhanced in conjunction with computing laboratories maintained by the campus, offer students in CS a wealth of opportunity to access and utilize a wide range of equipment best suited for their instructional and research needs. All of the equipment is connected to departmental, campus and global networks, which provides ready access to the exploding world of information and computational resources. Departmental information can be obtained by accessing the Departmental Web pages at <http://www.cs.missouri.edu> or by sending an e-mail to grad_sec@cs.missouri.edu.

A wealth of library resources are available through the extensive collections of books and journals housed in the Engineering and Mathematical Sciences libraries as well as collections in the Main Library and Health Sciences Libraries at MU. The entire library catalog at MU (all library branches) as well as the other campuses of the University of Missouri are available online and can be searched from any computer access point at the University.

APPLICATION PROCEDURES

Application for admission to a graduate degree program in CS involves submitting a formal application through the Graduate School's online application for admission (http://gradschool.missouri.edu/prospective/prospective_apply.htm). An application must be accompanied by an application fee. In addition, the applicant must have the following original paperwork sent directly from the originating institutions to the Graduate School.

1. Official transcripts from ALL institutions attended
2. Official GRE score report from Educational Testing Service in New Jersey (and TOEFL scores for international applicants)

The following supplemental materials must be uploaded in the online application or mailed to the CS Department:

1. A personal goal statement indicating why you feel prepared to pursue the degree program and why you want to pursue this degree (**uploaded** in your online application)
2. Minimum course requirement form if you do not have a BS in computer science (**uploaded** in your online application)
3. Three letters of recommendation from professors who know your abilities that must address your ability and readiness to pursue a graduate program in computer science (**mailed** to Director of Graduate Studies, Computer Science Department, 201 Engineering Building West, University of Missouri-Columbia, Columbia, MO 65211-2060, USA)

In order to be considered for admission in a particular semester, the Director of Graduate Studies, according to the following deadlines must receive ***all*** required paperwork:

Fall admission: Applications and all paperwork must be received by March 1st.

Winter Admission: Applications and all paperwork must be received by October 1st.

Note: Copies of the required papers (transcripts, GRE scores, etc.) cannot be accepted in lieu of the official reports from the originating institutions. Copies of these records can be submitted for evaluation, but any decision on admission is non-binding until the official records have been received. International students are urged to submit all paperwork well in advance of the published deadlines.

All MU students (current or prior) must meet the same requirements as external students. The only difference is that MU students file one of the following forms (in lieu of an MU Application Form):

- a) Current undergraduates or Non-Degree Graduates: **Transfer of Division** form,
- b) Previous student: **Request to Re-enroll** form,
- c) Current graduate students in another department: **Change of Advisor, Degree Program or Division** form.

These forms can be obtained from the Department Office or the Graduate School, 210 Jesse Hall.

Teaching and Research Assistantships: Applications for teaching assistantships must be received according to the same deadline schedule as applications for admission. In order to apply for a TA, send your resume with your application for graduate study. International students who have not completed their first semester or residency at MU are not eligible for teaching assistantships. International students must be tested by the Program for Excellence in Teaching and receive a satisfactory score before they will be considered as a TA their second semester. To apply for a research assistantship, you should contact the CS professors directly. Their emails and research interests are located at our website: <http://www.cs.missouri.edu>. The professor will make you an offer if he/she is interested in hiring you.

Financial Aid Pointers

For:	Apply To:
Teaching and Research Assistantships Fellowships & Scholarships	CS Department, 201 EBW <u>Graduate School</u> 210 Jesse Hall University of Missouri – Columbia Columbia, MO 65211
Fellowships & Scholarships	<u>International Center</u> N52 Memorial Union University of Missouri – Columbia Columbia, MO 65211
<u>Information and Technology Service Positions</u>	<u>IATS</u> 615 Locust Street University of Missouri – Columbia Columbia, MO 65211
Student Loans	<u>Financial Aid Office</u> 11 Jesse Hall University of Missouri – Columbia Columbia, MO 65211

ADMISSION

Students applying to the CS Graduate Program must have a sufficient background in mathematics and computer science to be able to enroll in and perform satisfactorily in the CS courses numbered 7000 and above. Students applying for admission must fulfill

the following minimum requirements that include material contained in specific CS courses or their equivalent taken at another institution. It is preferred that students have earned a BS degree in Computer Science. However, students from other disciplines meeting the minimum requirements will be considered for admission.

1. Proficiency in a procedural programming language equivalent to that gained by taking CS 1050 and 2050 (Algorithm Design & Programming I and II). The preferred programming language is Java. This material includes fundamental algorithm design and data structures.
2. Three semesters of formal course work in Calculus (Math 1500, 1700 and 2300 at MU) and an additional 4000 level course in mathematics for which Math 2300 (Calculus III) is a prerequisite.
3. Knowledge of statistics equivalent to that contained in Stat 4710 (Introduction to Mathematical Statistics).
4. Knowledge of discrete mathematical structures equivalent to that covered in Math 2320 (Discrete Mathematical Structures).
5. Knowledge of computer system architecture equivalent to that contained in CS 3270 (Introduction to Digital Logic) and CS 3280 (Assembly Languages and Computer Organization).
6. Four courses with grades B or better equivalent to those defined as follows:
 - a. CS 4050 (Design and Analysis of Algorithms I)
 - b. CS 4320 (Software Engineering) or 4330 (Object-Oriented Design)
 - c. CS 4410 (Theory of Computation I), 4430 (Compilers I) or 4450 (Principles of Programming Languages)
 - d. CS 4520 (Operating Systems I)
7. A GPA of at least 3.0 (A=4.0) for the last half of the undergraduate curriculum.
8. Acceptable scores on the GRE General Test's three parts taken within the last five years. The minimum acceptable scores are the 25th percentile on the verbal (GRE-v) part, the 80th percentile on the quantitative part (GRE-q), and 4 on the analytical writing part.
9. For those not schooled in English as their native language, a score of TOEFL (taken within last two years) above 577 if paper-based, 233 if computer-based, or 90 if Internet-based.
10. For admission into the Ph.D. program, the student must have either:
 - a. A Bachelor's degree in Computer Science with a GPA of 3.4 (out of 4.), or
 - b. An equivalent of a Master's degree in Computer Science, or a closely related field, with a GPA of least 3.4 (out of 4.0).

GRADUATION REQUIREMENTS

Students must complete the following requirements in order to earn the respective graduate degrees from the CS Department. The Master's degree programs have both a thesis and a non-thesis option, which can be chosen by the student after consultation with their selected advisor.

MS Degree (MS/CS)

All students completing a Master's degree must fulfill the following minimum requirements:

1. The student must earn a minimum of 30 credit hours of course work approved by the CS Department. This course work must include at least 15 credit hours of course work numbered 8000 or above (CS 8990 Thesis Research credit is counted in the required 15 credit hours, but CS 8980 is not).
2. The overall GPA of course work taken as an enrolled graduate student must be at least 3.0 (out of 4.0).
3. Courses taken in other departments (up to 6 credit hours) will be considered for approval as part of a student's MS program and the approval is sought prior to the student undertaking the course work.
4. **Non-Thesis Option:**
In order to complete the non-thesis option, the student must complete an independent project under a faculty advisor approved by the department. This project is carried out by enrolling in CS 8980 (Non-Thesis Research) for at least one hour of credit. This project is documented and presented to a faculty committee of at least three graduate faculty members and defended in a public defense as part of a final oral examination. The CS 8980 course grade is assigned by the student's faculty advisor upon the conclusion of the oral examination. This course is graded on an S/U basis and cannot be used to increase the student's overall GPA in graduate work.
5. **Thesis Option:**
In order to complete the thesis option, the student must complete an independent project under a faculty advisor approved by the department. This project is carried out by enrolling in CS 8990 (Thesis Research) for at least three hours of credit. A maximum of six credit hours of CS 8990 can be counted toward the required 30 credit hours for the MS degree program. The thesis project is documented in a formal thesis, presented to a faculty committee of at least three graduate faculty members (one of whom is a faculty member from another department) and defended in a public defense as part of a final oral examination. The CS 8990 course grade(s) is/are assigned by the student's faculty advisor upon the conclusion of the oral examination. CS 8990 is graded on an S/U basis and cannot be used to increase the student's overall GPA in graduate work.

Ph.D. Degree

All students completing a Ph.D. degree must fulfill the following minimum requirements:

1. Complete all of the course work requirements of the Master's degree in CS or have an MS degree in CS from another institution. The student must have maintained an overall GPA of at least 3.4/4.0 in their prior graduate level course work (excluding research and problems courses).
2. Pass a qualifying examination to be admitted to candidacy in the CS Ph.D. program.

3. Earn a minimum of 72 credit hours of course work and research past the student's BS degree.
4. Pass a comprehensive examination covering their areas of expertise.
5. Complete a doctoral dissertation on a topic approved by the candidate's advisory committee.
6. Defend the dissertation in a final oral examination.
7. Have at least one journal paper submitted, accepted or published, as approved by the advisor.

ADDITIONAL NOTES

MS Thesis and Non-Thesis Requirements: The MS thesis or non-thesis project is the distinctive element of the MS degree program. Documentation of the project work is an extended report on a technically substantive research project that involves basic computer science, and, possible, one of its many application areas. Interdisciplinary topics for both thesis and non-thesis project reports are encouraged. Both thesis and non-thesis projects are defended.

To satisfy the Graduate School, the MS thesis must be "the student's own work and must demonstrate a capacity for research and independent thought." It is not required that the MS thesis involve the discovery or creation of new knowledge, as is the case for the Ph.D. thesis. An MS thesis must show the student's ability to carry through to completion a project of a credible level of difficulty that draws on the knowledge and experience gained through advanced graduate course work.

Annual Review

All graduate students will be reviewed annually using electronic or face-to-face means, whichever best meets the needs of each degree program. Annual reviews of graduate students will be done by the advisor of record and include the indicators listed below, not all of which are applicable to all graduate students every year.

1. Review of progress toward degree completion using program of study as a guide.
2. Areas in which student is meeting or exceeding expectations.
3. Areas in which student needs improvement
4. * Number of presentations (single or co-authored) at:
 - a. Local conferences
 - b. Regional conference
 - c. National conferences
5. *Number of publications (single or co-authored)
6. *Notification of any grant/fellowship applications submitted
7. *Notification of any grant/fellowship applications funded
8. *Involvement in any partnerships programs of research, outreach, or appropriate professional activity with non-university organizations;

9. *Notification of any teaching awards
10. *Notification of any research awards
11. *Notification of any other awards, specify
12. *Notification of any conference travel
13. *Notification of any department/college awarded fellowship/scholarship
14. *Participation and evaluation of any internship experience
15. *Update on job search; notification of job placement

*Indicates items of information required on annual data forms submitted by departments to the Graduate School in July of each year.

Credit Toward a Second Master's Degree: A student who has completed one Master's degree at MU or elsewhere may present, upon the recommendation of the student's advisor and approval by the Director of Graduate Studies and the Graduate School, a maximum of six hours of credit earned in the previous program toward a second Master's degree. (**Note:** the Graduate School permits eight credits, but the CS Department only accepts six).