



Program Portfolio
Computer Science/Multimedia
May 5 2008

Description of Program

Students in the Computer Science/ Multimedia Studies program prepare for a future in software development and the use of computer technology to solve complex problems. An initial core of classes introduces students to general principles of programming and multimedia development. Upon completion of the core students choose either a concentration in computer science, scientific and statistical computing, or multimedia studies.

Students in the computer science concentration will learn to design and develop software systems for industrial, scientific, and commercial applications. They will acquire an understanding of computer operating systems, programming, data structures and algorithms, and systems analysis. Graduates will be prepared to work in the private or public sectors as programmers, analysts, or software engineers, or to proceed to advanced study.

The statistical and scientific computing concentration focuses on applications development for chemistry, physics, biology and biochemistry along with newer disciplines such as geographic information systems, bioinformatics, genomics and business intelligence systems. Students in the SSC concentration are encouraged to minor in Mathematics.

Students completing a degree in the multimedia studies concentration will be prepared to design and develop interactive multimedia products for use in education, industry, or the non-profit sector. These graduates will be able to design and assemble CD, DVD, or Web delivered titles, and will be prepared to work in publishing, training support, or many other areas.

Recent Programmatic Changes

In 2007 the program replaced two adjunct faculty who together amounted to just over 0.5 FTE with a full-time Assistant Professor, recovering in the process a position lost in 2002. The addition of this position accomplishes several things. First, it gives us a broader range of expertise, making possible courses in a wider variety of elective offerings in computer science. It also provides students in courses previously taught by the part-timers greater access to the professor teaching their class, which we hope will translate into a higher-quality learning experience. Finally, the restoration of a full-time position in computer science frees some time for a faculty member who has been teaching $\frac{1}{2}$ computer science and $\frac{1}{2}$ multimedia was originally supposed to teach $\frac{1}{3}$ computer science and $\frac{2}{3}$ multimedia, allowing us to resume development of this ground-breaking curriculum.

How Program Serves the Mission of the University and Needs of the Region

The CS/MM program prepares students in the creative science of software development. Computer software plays an increasingly important role in every sector of modern US society, including business, industry, entertainment, education, and agriculture. The supply of individuals with skills in software design and development remains sufficiently low that US employers are frequently driven to seek workers abroad. This program strives to satisfy the need for capable software developers *from* the region who can *serve* the region.

Program Objectives/Outcomes

The primary outcome of the CS/MM program is proficiency in software design and development.

Additional outcome that apply to students in the Computer Science and Scientific and Statistical Computing concentrations are:

- demonstrated proficiency in several programming languages
- demonstrating the ability to analyze problems and determine appropriate optimal solutions.

The Multimedia Studies concentration also has an additional specific outcome:

- demonstrated ability to integrate various digital media in a meaningful interactive software product using one or more authoring tools.

Courses addressing each outcome

These are required courses which include course outcomes directly related to specific program outcomes.

Demonstrate proficiency in software design and development.

- MM 315 (Multimedia Design)
- CS 370 (Interface Design)
- CS/MM 401 (Capstone)

Demonstrated proficiency in several programming languages.

- CS 161 (Foundations of CS I)
- CS 162 (Foundations of CS II)
- CS 221 (C/C++ Programming)
- CS 248 (UNIX Programming)

In order for students to complete these four required courses, they must gain proficiency in four programming languages (each course addresses a separate language).

Demonstrating the ability to analyze problems and determine appropriate optimal solutions.

- MM 315 (Multimedia Design)
- CS 370 (Interface Design)
- CS 401 (Capstone)
- CS 430 (Database)

Demonstrated ability to integrate various digital media in a meaningful interactive software product using one or more authoring tools.

- MM 225 (Introduction to Multimedia Development)
- MM 315 (Multimedia Design)
- MM 319 (Multimedia Programming)
- CS 370 (Interface Design)
- MM 401 (Capstone)

Key Programmatic Assessments

The outcomes for each class will be clearly stated on the syllabus. Assessments for courses will address both the conceptual and applied aspects of the class. Means of assessment include projects, quizzes and exams. The objectives for projects and other assigned work tie directly into course outcomes.

In addition to course-level assessment, the program provides for assessment of the students' abilities to integrate concepts from the entire spectrum of coursework. Each student is required to develop a capstone project prior to graduation. The precise nature of the capstones varies according to specific student interests, but generally include the complete design documents for a software product and the finished product itself. We have developed a rubric to use as a first cut for gathering data but we are certain that after applying this tool a few times we will discover necessary refinements to make.

Some benchmark courses in the concentrations include project assignments that may lend themselves to use for assessment of the primary outcome and concentration-specific outcomes. We will identify these projects and develop assessment tools to allow us to gather critical data.

We are also in the process of surveying all of our graduates (at least all for whom we have contact information) to determine if there are programmatic weaknesses that reveal themselves to students once they seek employment or enter graduate school).

Current Programmatic Assessment Data/Reflections/Recommendations of Curriculum and Instruction

During the first several years of the CS/MM program's existence, there was a period of four years of high faculty turnover followed by another period of serious curriculum design and development. Only as the composition of the faculty and curriculum began to stabilize did the program attempt any serious efforts at program assessment.

Since Fall term 2004, the program has maintained a database of student registrations to manage user IDs for the CS/MM labs and to track program enrollments. Program faculty review these lists together to try to identify the reasons a given student might have decided not to return. This qualitative review is informed by exit interviews with students by their advisors whenever possible.

In the past two years, the CS/MM program has adopted two assessments in an effort to gauge progress and success of the program. In academic year 2005-06, the program adopted an assessment rubric for the senior project (“Capstone”) course to determine how well graduating seniors have mastered three general major outcomes applicable to software development: A solid understanding of the design and development process, the ability to revise specifications and product, and the ability to communicate clearly with the user community to develop specifications. Evaluation of the completed instruments has not really shed much light on the success of the program due partly to inconsistent application of the assessment. In addition, the data may simply reveal that students need a better understanding of the capstone, rather than reflect on the program as a whole.

A second assessment effort was undertaken at the end of Winter Term 2007, employing a survey to determine the reason for a decrease in enrolled CS majors between their sophomore and junior years. This instrument failed to provide much insight concerning decreased enrollment because reasons were related more to requirements and tuition money rather than program quality. Anecdotal evidence of the decline in student enrollments suggests that the stringent math requirements for computer science discourages some students and that adjunct faculty who have carried much of the load of late sophomore year and early junior year courses have not been as student-centered as their full-time counterparts.

To address the first concern faculty intend to increase the presentation of examples of uses of various types of mathematics in interesting problem solutions, and the hiring of Suranga Hetiarachchi as a full-time fixed-term faculty member seems likely to remedy the second concern.

CS/MM faculty plan to continue following up on assessment of the satisfaction of program outcomes and the satisfaction of students with the curriculum, as well as maintaining contact with alumni to gain post graduation feedback of program strengths and weaknesses.

Program and Course Scheduling Requirements

Owing to a relative shortage of FTE, the CS/MM program has since its inception kept most of the upper-division elective courses on a two-year rotation. In 2003, we reduced the number of sections of CS 161 from three to two each year. (CS 161 is required for CS, Math, Chemistry, Physics, and some Multidisciplinary Studies students, creating a higher demand for this course than most others.) At the same time, we reduced the number of offerings of CS 260 (Data Structures) from twice a year to once. We are evaluating the possibility of reducing the number of times we offer CS 162 (Foundations of CS II) from twice to once. Our main misgiving here is that the first two years of the CS curriculum is linear, and students encountering difficulty with this class could see their graduation date pushed back a year if they did not have the option of repeating the class the next term

General Education and Service Course Schedule

FALL YEAR 1

Course	Load Hours	Mean Enroll
CS 140	3	*
MM125	3	8

TOTAL 6

FALL YEAR 2

Course	Load Hours	Mean Enroll
CS 140	3	*
MM125	3	8

TOTAL 6

* CS 140 was formerly offered several times a year but was suspended in 2002 due to the loss of one faculty position, which has now been restored.

Minor/Major Course Requirements Schedule

Courses shown in **bold** are alternate-year electives.

* Indicates no enrollment data available (as with new course offerings)

FALL YEAR 1

Course	Load Hours	Mean Enroll	
CS 121	1	17.5	C
CS 161	4	28.4	C
CS 221	4	9	H
CS 318	4	6.2	H
CS 335	4	7.8	W
CS 344	3	7.6	P
CS 401	1	5.25	P
CS 430	3	5.8	P

MM 225	3	24.4	C
MM 252	3	20.67	R
MM 262	3	11.2	R
MM 315	3	21.2	C
MM 368	3	13.67	R
MM401	1	5.1	C

CS 301	4	7.67	H
CS 381	4	*	P

FALL YEAR 2

Course	Load Hours	Mean Enroll
CS 121	1	17.5
CS 161	4	28.4
CS 221	4	9
CS 318	4	6.2
CS 335	4	7.8
CS 344	3	7.6
CS 401	1	5.25
CS 430	3	5.8

MM 225	3	24.4
MM 252	3	20.67
MM 262	3	11.2
MM 315	3	21.2
MM 368	3	13.67
MM 401	1	5.1

CS 321	3	6.5
CS 210	3	*

WINTER YEAR 1

Course	Load Hours	Mean Enroll
CS 161	4	28.4
CS 162	4	15.2
CS 248	4	11.4
CS 360	4	8
CS 380	4	5.3
CS 390	2	9
CS 401	1	5.25
CS 427	3	3
CS 428	3	7.5

MM 319	3	11.6
MM 350	3	11.2
MM 352	3	15
MM 362	3	11.33
MM 364	3	9.4
MM401	1	5.1

CSMM407	2	9.4
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CS 314	4	5
CS 410	4	*

WINTER YEAR 2

Course	Load Hours	Mean Enroll
CS 161	4	28.4
CS 162	4	15.2
CS 248	4	11.4
CS 360	4	8
CS 380	4	5.3
CS 390	2	9
CS 401	1	5.25
CS 427	3	3
CS 428	3	7.5

MM 319	3	11.6
MM 350	3	11.2
MM 352	3	15
MM 362	3	11.33
MM 364	3	9.4
MM 401	1	5.1

CSMM407	2	9.4
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CS 327	3	*
CS 440	4	6.5

SPRING YEAR 1

Course	Load Hours	Mean Enroll
CS 110	3	*
CS 162	4	15.2
CS 260	4	10.875
CS 311	3	8
CS 370	3	15
CS 401	1	5.25

MM 225	3	24.4
MM 360	3	17.5
MM 366	4	7.67
MM 410	3	*
MM 419	3	5
MM 401	1	5.1
MM 410	3	*

TOTAL 153

SPRING YEAR 2

Course	Load Hours	Mean Enroll
CS 110	3	*
CS 162	4	15.2
CS 260	4	10.875
CS 311	3	8
CS 370	3	15
CS 401	1	5.25

MM 225	3	24.4
MM 360	3	17.5
MM 366	4	7.67
MM 410	3	*
MM 419	3	5
MM 401	1	5.1
MM 420	3	*

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Staffing

The faculty list should include those individual supporting the residential program. A separate list should be made for those who are teaching exclusively online or onsite. A group photo of the faculty is optional here.

Apologies if this is supposed to be ready. We're still pulling it together.

Cost RatiosLoad/Faculty On Campus

The Provosts Office will help make these calculations for each major/minor. We will provide the raw data and computations for these areas. Prepares should make notes or –provide clarifications if the data are inadequate to communicate the entire truth.

Based on the 2006/7 SCH, the ratio of SCH to faculty in ----- prefix courses is -
--- Student load hours/---- FTE = ----- load hours per faculty member.

Total SCH is -----

ON Campus SCH -----

ONLINE SCH -----

ON SITE SCH -----

SCH/Faculty ratios:

On campus (-----SCH/----- FTE) ----- SCH per faculty member

Summary Recommendations/Observations

This is an opportunity to discuss the short and long term aspirations of the program based on programmatic assessment, SCH and grad data, and any other information necessary.

Administrative Review of Program

Based on all of these data, the Dean and Provost will provide some direction for each program .