EASTERN OREGON UNIVERSITY

Program Portfolio
Computer Science/Multimedia
2009-2010

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.

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.

In addition, course offerings by the CS/MM department serve other programs whose students need fundamental expertise in writing computer programs or technical skill with graphics or authoring tools.

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 be 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 ½ computer science and ½ multimedia was originally supposed to teach 1/3 computer science and 2/3 multimedia, allowing us to resume development of this ground-breaking curriculum.

The full-time position has recently been converted to tenure-track, and a national search is underway. We anticipate that providing the security of a long-term appointment will allow the incumbent to dedicate fully to serving students.

I. Program Objectives/Outcomes: CS/MM

All program graduates will demonstrate achievement in the following areas:

1. **Integrated Learning and Communication**: demonstrate the ability to incorporate learned skills design, develop, and evaluate software systems of varying complexity to meet desired user requirements;

2. **Problem Solving**: demonstrate proficiency in using one or more industry-standard programming languages and mark-up and scripting languages to solve problems;

3. **Inquiry, Critical Thinking, and Analysis**: demonstrate ability to apply conceptual knowledge for analysis and problem solving;

4. **Teamwork and Civic Engagement**: demonstrate teamwork ability to work collaboratively with end users and other developers;

5. **Content Knowledge**: demonstrate factual and conceptual grasp of the field of computing.

   Possible courses for assessing the outcomes:
   1. CS 401 and MM 401
   2. CS 260
   3. CS 318 and MM 319
   4. CS 370
   5. CS 160, CS

All CS/MM students take CS 161, MM 252, CS 370, and a 401 capstone. All CS students take CS 318, and all MM students take MM 319.

II. Four-Year Assessment Cycle: CS/MM

Year	Outcome to be Assessed
2008-2009 (Spring)	1. Integrated Learning and Communication: Capstone (CS 401)
2009-2010 (Fall)	5. Content Knowledge (CS 161)
2010-2011 (Winter)	4. Teamwork and Civic Engagement (CS 370)
2011-2012 (Fall, Winter)	3. Inquiry, Critical Thinking, and Analysis (CS 318, MM 319)
2012-2013 (Spring)	2. Problem Solving (CS 260)

In addition, outcome one will be assessed every year.

III. Curriculum Assessment Plan

Year	Outcome	Course	Assignment/ Task	Assessment Tool	Levels of Achievement
2008-2009	**Integrated Learning and Communication**	CS 401	Project	Rubric	**1-3**
2009-2010	**Content Knowledge**	CS 161	Final Exam	Scored Multiple Choice	**%**
2010-2011	**Teamwork & Civic Engagement**	CS 370	Term Project	Rubric	**1-3**
2011-2012	**Inquiry, Critical Thinking, and Analysis**	CS 318, MM 319	Various	Common Rubric TBD	**1-3**
2012-2013	**Problem Solving**	CS 260	Program 4	Rubric	**1-3**

Degree Program Outcomes Assessment

Spring 2009

Degree Program: CS/MM
Outcome Assessed (i.e. Critical Thinking): Integrated Learning and Communication
Course / Activity: CS 401, MM 401 Capstone

Summary of Assessment Results

Performance Criteria	Assessment Method	Measurement Scale	Minimum Accepted Performance	Results
List criteria on scoring rubric here	***Integrated Project***	***1-3 Rubric***	***50% at 2; 50% at 3***	*60% at 2; 40% at 3*
1. Demonstrate understanding of software development			***50% at 2; 50% at 3***	20% at 1; 80% at 3
2. Product Revision			***50% at 2; 50% at 3***	
3 Communication			***50% at 2; 50% at 3***	

Note: See "Supporting Documentation" tab or for detailed records of the summary. The assessment representative for each department must archive supporting student samples

Explanation of Assignment / Activity / Prompt

Students work on a software design project either for a real client (which rarely happens) or to design a product to satisfy some imagined niche. Over the course of several months students complete initial proposal documents, formal specifications, navigation diagrams, and screen layouts. Specifications may be very complex, including outlines of database files and catalogs of needed media. The process includes considerable opportunity for revision and it is the process students should focus on. If time permits, students may construct a prototype of the product to demonstrate its functionality.

Analysis of Assessment Results

A greater number of students paid appropriate attention to the process and the business of documenting their progress. In most cases the evolution of the design was clear in the final versions of documents and the prototypes. However, there were shortcomings in the extent of code documentation in several instances. It appears that in regular meetings with supervising faculty students are getting the message about

documenting revisions, but there is not sufficient stress on attention to documentation.

Closing the Loop: Strengths, Weaknesses, Conclusions, Recommendations

The quality of this project as an integrative learning opportunity is improving. However, it appears that even in their final year of study students still fail to pay sufficient attention to documentation. As a program we must examine all courses in which students write code and make documentation an explicit element of how student work is assessed. Faculty who teach programming intensive courses such as CS 161, CS 162, CS 221, CS 260, CS 360, MM 319, MM 419, and MM 420 will develop a consistent set of documentation requirements and make them explicitly clear to students.

CS/MM Assessment Rubric and Data Collection Sheet

Outcome: Integrative Learning

Instructions
Complete this worksheet for each student after reviewing his or her capstone work. You will need to review the complete design documents and the finished product, and for some items you may need to reflect on meetings you have had with the student during the course of the work. Score each outcome area from 1 (developing) to 3 (proficient). Note the specific shortcomings you observe in each outcome area. The program will use the information thus collected to assess our performance in these areas and if necessary make curricular adjustments.

Criterion One—Demonstrate understanding of software development

Proficient: Design documents include detailed specifications that agree with the finished product. Interface appears to be designed for the intended user population, and the development environment is appropriate for the type of product and the intended users. Any code is well documented, and the product behaves consistently and quickly without errors.

Adequate: Design documents include specifications but there is not complete coherence between specs and the interface, OR code is weakly documented OR there are some non-fatal inconsistencies in product behavior.

Developing: Design documents are incomplete or fail to match the interface OR interface is not appropriate for audience OR documentation is missing OR product consistently fails under some circumstances.

Score (1, 2, or 3). _____

Specific Weaknesses: (Must list if the score is not 3).

Outcome Two—Product Revision

Proficient Design documents reflect a history of modification in response to user feedback or developer's discovery. Developer has throughout the project consulted with faculty advisor on revisions. If this project builds on previous work, product integrates seamlessly with original product.

Adequate One of the criteria listed for "Proficient" has not been met.

Developing Two or more of the criteria for "Proficient" have not been met.

N/A This project offered no opportunity for revision.

Score (N/A, 1, 2, or 3). _____

Specific Weaknesses: (Must list if the score is not 3 or N/A).

Outcome Three—Communication

Proficient	Design documents show evidence of communication and collaboration with user community to develop specifications and design interface, and resultant product reflects the collaboration. User has signed off on product.
Adequate	Design documents show little evidence of user input for design but user has signed of on finished product.
Developing	Design documents show no evidence of collaboration with user, OR user has failed to sign off on product.
N/A	The project did not involve working with other people.

Score (N/A 1, 2, or 3). _____

Specific Weaknesses: (Must list if the score is not 3 or N/A).

Degree Program Outcomes Assessment

Fall 2009

Degree Program: CS/MM
Outcome Assessed (i.e. Critical Thinking): Content Knowledge
Course / Activity: CS 161 Introduction to CS; Multiple Choice section of Final Exam

Summary of Assessment Results

Performance Criteria	Assessment Method	Measurement Scale	Minimum Accepted Performance	Results
Factual and Conceptual Knowledge of Computing	***Multiple Choice Section of Final Exam***	***22 questions***	***At least 75% correct overall***	***79%***

Note: See "Supporting Documentation" tab or for detailed records of the summary. The assessment representative for each department must archive supporting student samples

Explanation of Assignment / Activity / Prompt

The final exam for CS 161 (Foundations of Computer Science I) includes a section of 30 multiple choice questions, most of which test students' knowledge of facts or the ability to apply fundamental concepts—learning in the lower tiers of Bloom's Taxonomy. (nine questions address problem-solving situations involving learning beyond basic knowledge). The number of correct answers for the 22 basic knowledge/applied concept questions served as the basis for assessment.

Analysis of Assessment Results

Of the 22 questions examined, ten were basic knowledge, eight required simple application of basic knowledge, and four required more advanced application of conceptual knowledge.
79 % of the students correctly answered the ten basic knowledge questions, 80 % answered the eight basic concept questions correctly, and the remaining four questions were correctly answered 76 % of the time.

Closing the Loop: Strengths, Weaknesses, Conclusions, Recommendations

One basic knowledge question was only answered correctly by 8 students, barely more than a third of the class. This question may be badly worded. However, examination of the remaining questions that were regularly missed suggests a need for more practice to make basic knowledge more memorable. I will develop further drill activities for students to use to rehearse the meanings of fundamental terminology and more in-class practice for problems that require application of basic concepts.

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 off 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 200506, 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

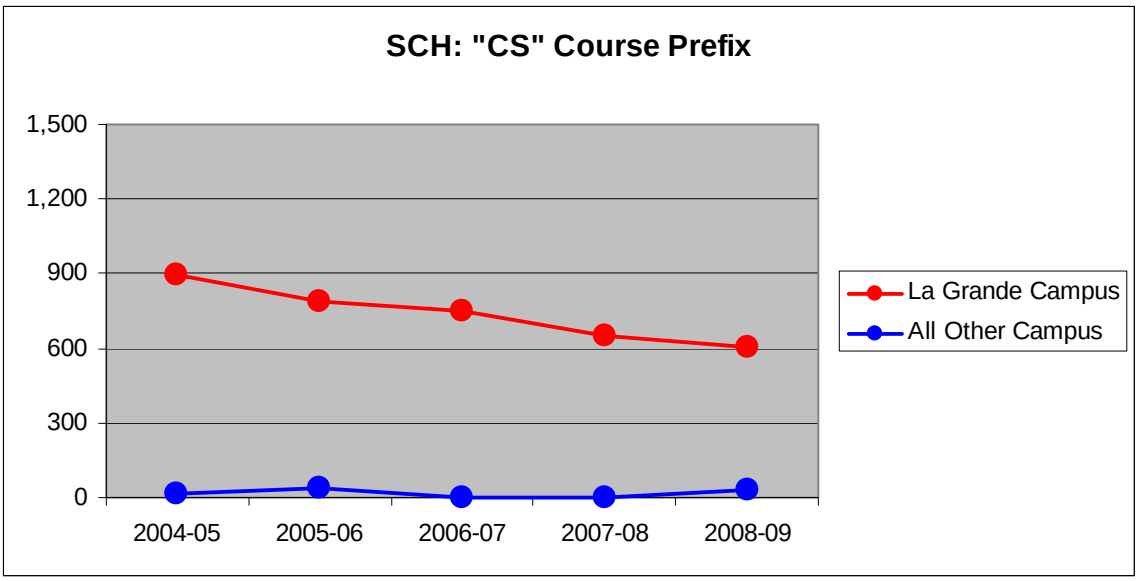
carried much of the load of late sophomore year and early junior year courses have not been as student-centered as their full-time counterparts.

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 acquisition of another full-time faculty member to teach computer science 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.

Enrollment Program Performance

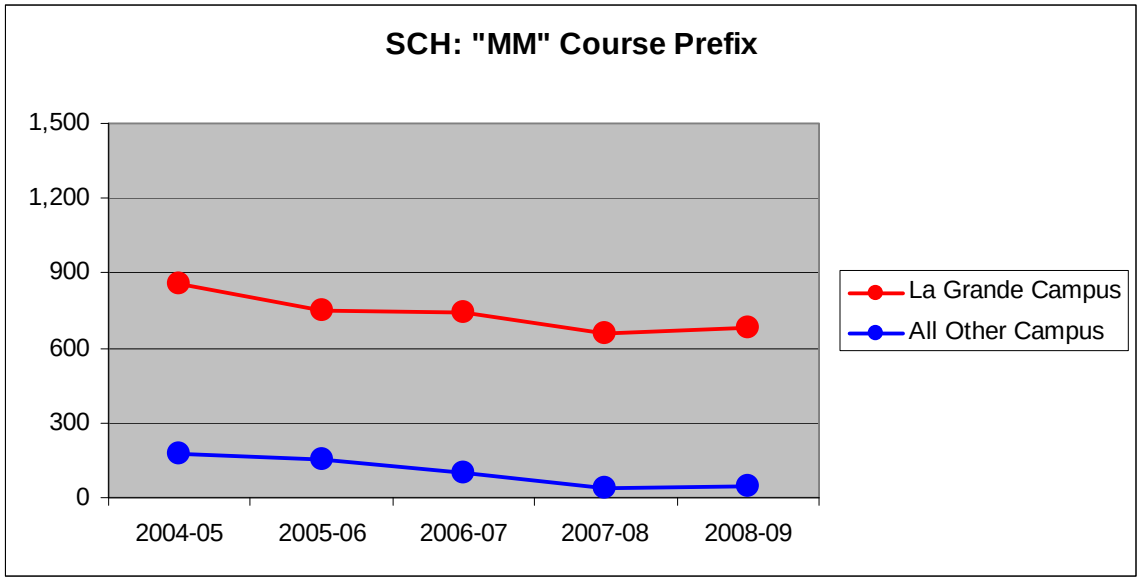
5-Year Student Credit Hours Generated by 'CS' Course Prefix



	2004-05	2005-06	2006-07	2007-08	2008-09
La Grande Campus	897	792	753	652	604
All Other Campus	18	36	0	0	34
Total	915	828	753	652	638

*SCH includes all terms effective end of term

5-Year Student Credit Hours Generated by 'MM' Course Prefix

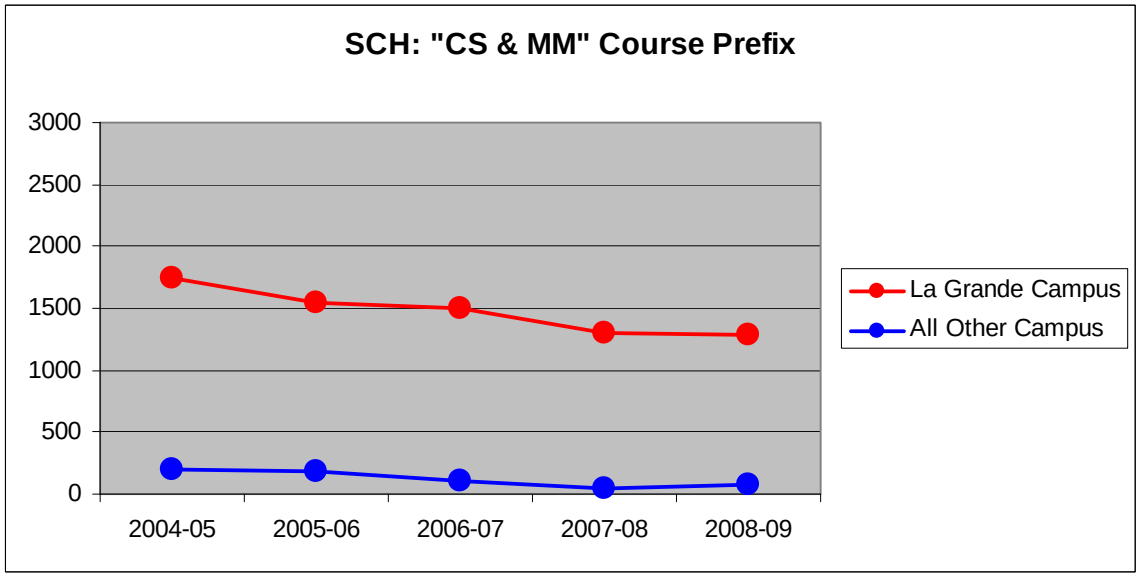


	2004-05	2005-06	2006-07	2007-08	2008-09
La Grande Campus	854	749	741	655	684
All Other Campus	177	154	102	39	45

Total	1031	903	843	694	729

*SCH includes all terms effective end of term

5 Year Student Credit Hours Generated by 'CS' & 'MM' Course Prefix

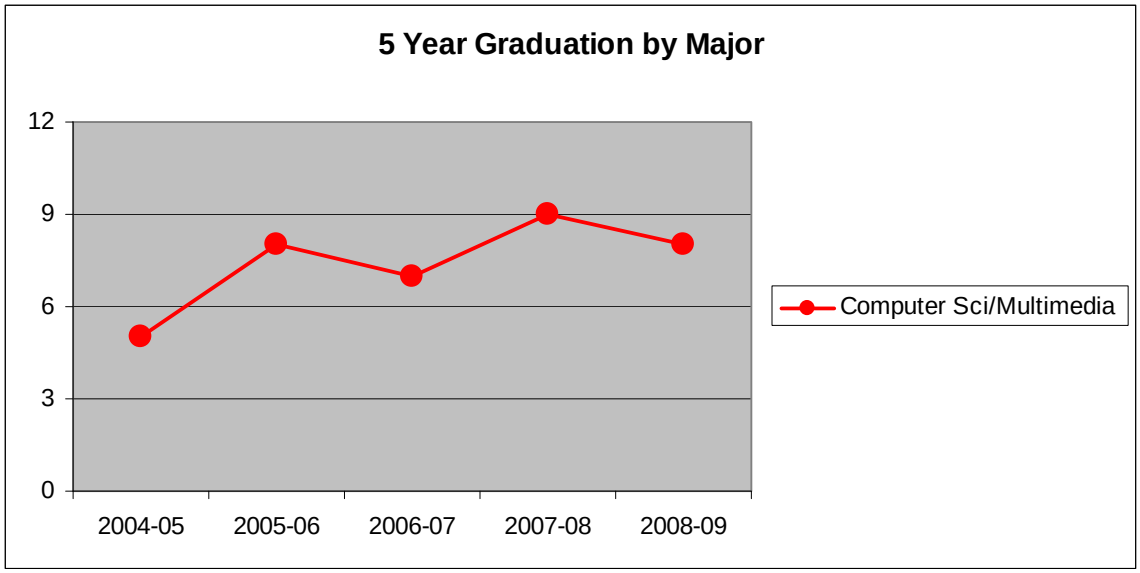


	2004-05	2005-06	2006-07	2007-08	2008-09
La Grande Campus	1751	1541	1494	1307	1288
All Other Campus	195	190	102	39	79

Total	1946	1731	1596	1346	1367

*SCH includes all terms effective end of term

5-Year Graduation by Major



	2004-05	2005-06	2006-07	2007-08	2008-09
Computer Sci/Multimedia	5	8	7	9	8

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			FALL YEAR 2		
Course	Load Hours	Mean Enroll	Course	Load Hours	Mean Enroll
CS 140	3	*	CS 140	3	*
MM125	3	8	MM125	3	8
TOTAL	6		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				FALL YEAR 2		
Course	Load Hours	Mean Enroll		Course	Load Hours	Mean Enroll
CS 121	1	17.5	C	CS 121	1	17.5
CS 161	4	28.4	C	CS 161	4	28.4
CS 221	4	9	H	CS 221	4	9
CS 318	4	6.2	H	CS 318	4	6.2
CS 335	4	7.8	W	CS 335	4	7.8
CS 344	3	7.6	P	CS 344	3	7.6
CS 401	1	5.25	P	CS 401	1	5.25
CS 430	3	5.8	P	CS 430	3	5.8
MM 225	3	24.4	C	MM 225	3	24.4
MM 252	3	20.67	R	MM 252	3	20.67
MM 262	3	11.2	R	MM 262	3	11.2
MM 315	3	21.2	C	MM 315	3	21.2
MM 368	3	13.67	R	MM 368	3	13.67
MM401	1	5.1	C	MM 401	1	5.1
CS 301	**4**	**7.67**	**H**	**CS 321**	**3**	**6.5**
CS 381	**4**	*****	**P**	**CS 290**	**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 360	3	17.5
MM 362	3	11.33
MM 364	3	9.4
MM401	1	5.1
CSMM407	2	9.4
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 360	3	17.5
MM 362	3	11.33
MM 364	3	9.4
MM 401	1	5.1
CSMM407	2	9.4
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 366	4	7.67
MM 410	3	*
MM 419	3	5
MM 401	1	5.1
MM 410	**3**	*****
MM 460	3	7
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 366	4	7.67
MM 410	3	*
MM 419	3	5
MM 401	1	5.1
MM 420	**3**	*****
MM 460	3	7
TOTAL	150	

Staffing

Dr. Richard Croft is the senior member of the program and teaches a combination of multimedia development and computer science courses. His background includes working as a programmer/analyst in the defense industry, teaching in education, math, and computer science, and the design and development of educational products used in forestry and veterinary medicine.

Dr. Frederick Pratter, whose professional background includes many years of consulting in the insurance industry as an analyst and software developer, joined the faculty in 2002 and teaches a wide variety of computer science courses as well as the advance web authoring course offered as a multimedia elective.

Professor Kevin Roy teaches the graphics applications course and the introductory and intermediate web development courses for the multimedia concentration. The program shares his time with EOU's Media Arts program, for which he teaches digital audio and digital film production courses.

Deborah Thomas (ABD, Notre Dame University) joined the program faculty in January 2010. She teaches computer science course, with an emphasis on upper-division courses. Her specialty is in the area of biometrics and automatic facial recognition, and she will be guiding interested students in independent research in these areas.

Cost Ratios

Load/Faculty On Campus

Minimum Staffing Requirements
1) Current assessment of Faculty
Based on the current faculty, the following FTE are available:

Total: 3.0 FTE ; 2 tenure, 1 fixed term

Based on the 2008-09 SCH, the ratio of SCH to faculty in CS course Prefix is --
-- Student load hours/---- FTE = ------ load hours per faculty member.

Total SCH: 638

ON Campus SCH: 604

ONLINE SCH: 0

ON SITE SCH: 34

SCH/Faculty ratios:

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

Based on the 2008-09 SCH, the ratio of SCH to faculty in MM course prefix is -
--- Student load hours/---- FTE = ------ load hours per faculty member.

Total SCH: 729

ON Campus SCH: 684

ONLINE SCH: 0

ON SITE SCH: 45

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 he program based on programmatic assessment, SCH and grad data, and any other information necessary.

Administrative Review of Program (Dean Marilyn Levine)
Administrative Assessment of program portfolios will consist of three areas of commentary: assessments conducted relating to student learning outcomes; comments on enrollment indicators; program goals and observations. If appropriate other observations will be offered.

1. Assessment of Program Outcomes:
The first assessment activity needs more discussion of the results for this integrated learning assignment. Students had adequate to proficient performances in all 3 areas of performance criteria. One of the key issues is documentation and the faculty rightfully sees this as an ongoing issue throughout the earlier part of the program. They have some ideas about how to increase attention to this area, and I would suggest an individualized portfolio that has a communication component to it for this area – so the concept is ongoing.
The second assessment has a good rate again, but the faculty wants to better the student learning and plan to give more in-class problems and practice.

2. Enrollment Indicators:
CS/MM is relatively new major and it is unique in its foci on problem solving, multimedia competency, as well as the statistical concentration. While the graduation rate is relatively constant, the sch have declined. This is in large part due to the growth of media arts and digital media courses. Another anomalous situation is the introduction of CS and MM certificates in 2010 (Winter). The program needs to be marketed more

widely and recruitment and pathways need to receive more focus and effort. The CS/MM program now has an Industry Advisory Board to help them in these efforts.

3. Program Goals and Observations:

Given the role of high tech industries in Oregon, the CS/MM program should be more ambitious in recruitment and retention of students. Now that faculty numbers are more stable, the program has some scope to work in this area. Moreover, the program in April of 2009 developed a regional Industry Advisory Board (IAB), led by David Stich of Cayuse Technologies. Agreements, joint projects, certificates, workforce training, and community collaborations are a vector the program will take to increase program capacity but also to increase regional economic vitality. Both the IAB and the state-funded initiative known as ETIC are increasingly supportive of the program. The CS/MM faculty must optimize these areas.

In general the CS/MM faculty should be commended for their patience and diligence in operating in uncertain times and without much regional infrastructure to support them. They did not list several of their accomplishments, in particular – holding one of the largest LEGO Robotics tournaments in the state. They also have had successful student internships.

Finally, as the program examines its next phase, my one suggestion would be to coordinate realistic directions, benchmarks and assign areas of responsibility to individual faculty members so there is clarity and parity.

Other Observations:

The portfolio demonstrates many fine points about the program. I would suggest adding a section on student accomplishments, some more project descriptions outreach activities, and photos.