UNIVERSITY OF WISCONSIN-SUPERIOR

Academic Program Review

Mathematics and Computer Science (MCS)
2014

Department:

Program	Check all that apply :					Degree (e.g., BA, BS, BM, BFA, MA, MSE)
	Compre-hensive Major	Major	Minor	Certificate	Graduate	
Mathematics	X	X	X			BA&BS
Computer Science	X	X	X			BA&BS
ITS			X	X		

Date Submitted:

Signature of Department Chair: _____

Approval of the APRC Chair:_____

Approval of Provost/Dean of Faculties: _____

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Departmental Summary

I.   Executive Summary

Summarize the main findings for this Department, associated with successful completion of the APR process. Describe this in terms of current departmental strengths and opportunities (i.e., areas in need of attention) for future planning.

II.   Department Mission and Alignment

Mission and Alignment seeks to establish the degree to which this Department is compatible with the mission of UW-Superior and its strategic priorities.

A.   Department Mission

1. Provide the current version of your Department's mission

The University of Wisconsin-Superior Mathematics and Computer Science Department fosters intellectual growth and career preparation within a liberal arts tradition that emphasizes individual attention and embodies respect for diverse cultures and multiple voices.

2. When was this current mission statements adopted or revised?

22 September 2014

3. What process was used in the adoption and/or revision of the mission statement for the department?

There is no record in MCS minutes or handbook of any specific mission statement. Since any such mission statement would have to nominally comply with the University mission statement, it was adopted as a starting point.

B.   Alignment of Department Mission to the Institutional Mission

1. Address the means by which the Department ensures that its mission, expectations, and objectives align with the University's liberal arts mission and high impact practices, as well as its Liberal Education Learning Goals.

As noted above, the current MCS mission as stated is exactly in alignment with the University's. MCS ensures policy alignment by actively participating in governance, regularly meeting as a department and discussing detailed reports from its governance representatives (e.g. senator and UAAC rep). As to HIP specifically, the chair participates in the regularly scheduled (1st and 3rd Monday

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each month) meeting with other chairs, Dean of Faculty and Provost and during that meeting there is a standing agenda item for HIPs. The chair then disseminates that information via regular department meetings. As to LELG specifically, MCS has a department assessment liaison that continues to interact with the greater campus assessment initiative and ensures that MCS continues to develop assessment in line with campus expectations. There is a standing agenda item during each department meeting for the assessment liaison.

C.   Response to the Recommendations Made in the Previous Review

1. What recommendations were made to the Department at the time of the last review?

The following recommendations (summarized) were made:

   a. Make the senior lecturer position of Marilyn Toscano permanent and compensated at a higher rate.
   b. Continue discussion analyzing the integration of the CIS program.
   c. Work with institutional research to develop a formal assessment of the program and graduates.
   d. Grow the number of majors and balance the teaching load.
   e. Improve faculty office conditions.
   f. Provost and other entities should improve and stabilize faculty development funding.
   g. Develop a plan to attract and retain more tenure-track women and minority students to the department.

2. How did the Department address the recommendations?

Good progress was made on most of the recommendations 1.a. – 1.g. Each recommendation is address in turn below.

   a. Marilyn Toscano's position was made permanent as recommended. The historically significant fiscal issues that arose in the last 5 years were unanticipated and, as a result, essentially all faculty net compensation was significantly reduced (e.g. legislative Act 10). To the extent possible in such an environment (e.g. additional overload pay), the effort to improve Marilyn's compensation was addressed.
   b. The MCS chair (Dr. Scott) and the rest of the department worked extensively with Provost Markwood, DBE and the CIS faculty (Dr. Lynch and Dr. Tucker) to transition the CIS faculty to MCS and the chair worked with those faculty to develop a new minor appropriate to their expertise and the department (i.e. the ITS Minor). The ITS Minor has been up and running for 4-5 years now and in the last two years (2012 and 2013) shows

an average of 6.5 graduates a year.

c. During the last 5-10 years, assessment has become a campus wide (even state wide) mandate. In response to that mandate and this recommendation, MCS has a designated assessment liaison that continues to ensure improving assessment and compliance with the campus initiative.

d. In an era of declining enrollment for the entire campus, it has been difficult to grow our student numbers. MCS, however, has not seen significant declines in enrollment (relative to the rest of campus) and in some areas (e.g. Math) has seen an improvement in the average number of majors. Still, where this recommendation concerns increasing numbers of students, the recommendation has been largely unmet. The chair works extensively on balancing the teaching load and to the extent that it is possible to balance the load given varying expertise among the faculty, the chair believes it has been done.

e. This recommendation has been completely met. The PRPC noted that the new academic building was "far in the future", but it was realized as of the Fall of 2011. An MCS subcommittee including the chair (Dr. Scott), Dr. Lynch and Dr. Piotrowski worked extensively with the campus building committee to ensure appropriate office space, classrooms and labs with proper adjacencies in the new Swenson hall. It is 3 years later and MCS has comfortably settled into these new facilities and they are excellent and meeting expectations and needs.

f. This recommendation was odd in the sense that MCS has very little control over the actions of the Provost and broader campus faculty. As a matter of reporting, the campus FDG still exists but structurally has not been improved significantly. The maximum request for an individual support grant has increased from $600 to $1000.

g. The recommendation to develop a plan as not been significantly met. Generically speaking, the department has been sensitive to the issue of diversity and as a result has picked up 2 additional female staff (one of which is tenured) and 2 additional international tenure / tenure track faculty.

3. Did any kind of assessment and/or strategic planning take place to address the recommendations? If so, what did these entail and what actions were taken to address the recommendations? If not, explain why the recommendations were not addressed.

Yes. MCS is very collegial but not terribly large (10 FT). Consequently, all of the tactics and strategies necessary to achieve the recommendations as described in items 2 and 3 above were achieved through faculty initiative presented at department meetings, tweaked and endorsed there.

4. If additional response to recommendations is provided elsewhere in this document, please specify where.

III. Department Planning for Continuous Improvement

Planning continuous improvement examines planning and assessment processes and how strategies and action plans are helping achieve Departmental mission.

1. What is the Department's vision of what it will be like in the next 5-10 years?

   MCS has 2 long established programs (MATH and CSCI) and one relatively new (past 5 years) minor (ITS). MATH and CSCI offer a few different versions of their major to accommodate professional plans such as teaching.

   Where MATH is concerned, it will continue to serve as a substantial core service component to many other programs while having a lean and flexible array of upper division courses to serve its majors. Also, there is a push at the state level to see the remedial / developmental aspects of the program redesigned and improved. MCS is engaged currently in a project to pilot some such alternatives and anticipates continuing this effort.

   CSCI and ITS are somewhat more dynamic in terms of the content appropriate to such a program (innovation continues to alter them over time). As such, CSCI and ITS anticipate continuing to morph their course offerings to remain relevant and compliant with outlines from national bodies such as ACM.

   MCS recognizes that at a national level there is a significant push to get American young people more engaged in STEM (Science, Technology, Engineering and Mathematics) fields. This is critical to United States national security. So, the push will not go away until it is successful. This push represents financial opportunity for the campus and a national imperative. Obviously, the three programs offered by the department are core components of STEM. Consequently, MCS plans to keep its programs robust and ready to deal with the influx of students that are likely as the United States begins to succeed in moving young people toward STEM.

2. Discuss the Department's plan for funding projects to meet objectives.

   MCS does not perceive extraordinary need for funding projects. The existing campus budgetary process, while lean, has been adequate to meet our needs except for some isolated, smaller projects. For example, MCS has a yearly high school math meet. Historically a small participation fee and a piece of the S/E budget has been adequate to fund that meet. Unfortunately, the campus has begun to charge the department for things it previously had not (e.g. larger catering charges, use of space, etc.) This only amounts to a shortage of about $1000. MCS is discussing this with the Provost in anticipation that some avenue of ongoing support can be found (e.g. marketing). Where the remedial / developmental redesign is concerned, the funding available has always been through the substantial revenue generation. MCS expects that to be adequate for the redesign project. However, it appears that state level funding opportunities may be emerging and could be applied for if needed.

3. What are the Department's projected needs for space, acquisitions, and capital equipment for the next five years? Provide any estimated cost and rationale for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?

   MCS moved into the new Swenson hall just 3 years ago. Via extensive cooperation with the building committee, appropriate space was allocated. MCS does not anticipate a change in space needs (either greater or less than currently allocated) during the next 5-10 years.

   As part of that space, MCS was allocated primary use of some computer labs and a networking room. The technology in these labs needs to be replaced during roughly 5 year cycles (as dictated by the current nature of technology in the world). These labs are primarily but not exclusively MCS use. MCS anticipates that campus wide consideration of how to deal with the issue of continuously updating technology will mostly deal with this issue. However, MCS also anticipates that, if needed, it would tap some of the revenue available to it via remedial / developmental revenues to update labs since the labs will likely be serving in a more significant role for the redesigned remedial / developmental math program.

   The MCS chair meets regularly (weekly) as part of a departmental subcommittee to assess and plan for budgetary concerns.

4. What are the Department's needs for support resources for the next five years? Provide any estimated cost and rationale and benchmark for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?

   Again, MCS has well defined and relatively modest specific needs here. Please see the response to question 3 above.

5. What are the Department projected needs for instructional information technology for the next five years? Provide any estimated cost and rationale and benchmark for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?

   Again, MCS has well defined and relatively modest specific needs here. Please see the response to question 3 above.

Academic Program Review

For Mathematics (MATH)

I.   Program Mission and Alignment

Mission and Alignment seeks to establish the degree to which this program is compatible with the mission of UW-Superior and its strategic priorities.

A.   Program Mission

1. Provide the current version of your Program's mission.

2. When was the current mission statement adopted or revised?

3. What process was used in the adoption and/or revision of the Program's mission statement?

B.   Alignment of Program Mission to the Institutional Mission

1. Please address the means by which your Program ensures that its mission, expectations, and objectives align with the University's liberal arts mission and high impact practices, as well as its Liberal Education Learning Goals.

C.   Unique Aspects of the Program

1. Describe the unique aspects of the Program in terms of subject matter taught and students served.

D.   Specialized Accreditations

1. Does the Program carry a specialized accreditation or membership? If so, identify the accrediting body, the lengths of time accredited and when the next accreditation review is to occur.

2. Why did the Program pursue the accreditation(s) or membership(s)? Why does the Program continue to carry the accreditation(s) or membership(s)?

3. If specialized accreditations or memberships are available and not pursued, why are they not pursued? If an accreditation has been discontinued, please explain what occurred.

E.   Response to the Recommendations Made in the Previous Review

1. What recommendations were made to the Program at the time of the last review?

2. How did the Program address the recommendations?

3. Did any kind of assessment and/or strategic planning take place to address the recommendations? If so, what did these entail and what actions were taken to address the recommendations? If not, explain why the recommendations were not addressed.

4. If additional response to recommendations is provided elsewhere in this document, please specify where.

II.   Student Learning Outcome Assessment (Helping Students Learn)

This section focuses on the teaching-learning-assessment process, and also addresses how the entire Department contributes to helping students learn in each Program and overall student development.

1. What are the Program-specific student learning outcomes? When did your Program determine these outcomes? Who was involved in setting these outcomes?

    The Math program SLOs are taken from the following list:

    MATH and CSCI Learning Outcomes:
    1. Applies an appropriate formal process (or formal language) to write a solution to a given problem and to evaluate the validity and effectiveness of a given written solution.
    2. Solves multipart problems by performing appropriate analysis and complex calculations.
    3. Adopts best practices of software engineering, including documentation, teamwork, and integration, to create large software projects; presents results in oral and visual format.
    4. Understands and effectively utilizes both high- and low-level programming concepts and languages.
    5. Demonstrates fluency in the definitions, results, analysis, and reasoning of a given axiomatically defined system.
    6. Understands the organization of modern computing devices, both intra-machine and inter-machine.
    7. Produces a well-written article synthesizing existing results or proving original results spanning multiple areas of mathematics. (WID)
    8. Uses current classroom technology to demonstrate mathematical concepts.
    9. Demonstrates the necessary skills in both mathematical content and pedagogy to meet the curricular goals for middle school/high school preservice teachers.

    These SLOs are applied to the Math program as follows:
    Mathematics Major (Non-Comprehensive): SLOs 1, 2, 5, 7.
    Discrete Applied Mathematics Major (Comprehensive): SLOs 1, 2, 4, 5, 7.
    These outcomes were determined in Academic Year 2010-11 and put into their current form in 2011-12. Most of the members of the department who taught mathematics were involved in determining these outcomes: Steve Rosenberg, Chad Scott, Uwe Leck, Heather Kahler, and Marilyn Toscano.

2. ~~What sources of evidence for student learning outcomes does your Program collect and analyze regularly? Describe the methods of collection and analysis.~~

3. What sources of evidence for the Liberal Education Learning Goals (i.e., campus-wide common student learning outcomes) does your Program collect and analyze regularly? Describe the methods of collection and analysis.

The sources of evidence for achievement of the LELGs have included senior capstone papers with accompanying oral presentations; homework assignments embedded in regular course offerings; and exams embedded in regular course offerings, including planned pre- and post-tests to evaluate cohort improvement. For the paper presentations, rubrics are distributed among all department members in attendance, scored by each department member, and returned to the department assessment liaison for analysis. For the course-embedded assignments and exams, the instructor of record has collected and analyzed the data.

4. ~~Describe any changes in the Program that directly reflected the results of assessment of Program-level and campus-wide student learning outcomes.~~

5. ~~Based on the findings for the current Program-level learning outcomes and the Liberal Education Learning Goals, what action priorities has your Program set for improvement? Who was involved in setting these action priorities?~~

6. How has your Program communicated the current state of student learning outcomes and Program improvement priorities to students, faculty, staff, administrators, and other appropriate stakeholders?

   The Math program has filed reports with the campus Assessment Office and as part of the Department's annual report. In addition, instructors are encouraged to include on their syllabus all learning outcomes to be assessed in the course. Other than these methods of communication, the results of assessment have mostly been confined to department meetings where these results are discussed and program changes based on them are implemented.

7. ~~Referring to the data in the APR Data Sets and other sources, discuss trends in student enrollment and completion in your program and efficiency of your course offerings as pertains to student's ability to graduate from the Program in a four-year period.~~

8. ~~Referring to the data in the APR Data Sets, discuss the costs associated with your Program. If the cost per student FTE of your Program deviates significantly from the average cost per student FTE for the University, discuss where in the Program plausible causes reside.~~

9. How has your Program determined and communicated to prospective and current students what preparation is necessary to succeed in the Program's curricula, courses, and learning?

   The UW System administers a state-wide mathematics placement exam which is given to all incoming students who do not come in with other means of determining math preparation and skill level. The placement exam is keyed to groups of math courses at UW-Superior which have been chosen to correspond to the appropriate level of preparedness. Our campus, like all UW System 4-year campuses, seats a member on the

System-wide math placement exam committee and this member attends meetings (usually in Madison) approximately twice each year.

10. How does your Program advise students? What advisement plan does your Program have? How does your Program assure the timely and effective advisement of students?

The Math program utilizes both faculty and academic instructional staff as advisers. One of our members, Kris Glesener, has prepared a clear set of color-coded flowcharts to assist advisers and students through the course array in each of our department's programs. The following is a screenshot of the non-comprehensive math major advisement flowchart. Advisers in the program either post sign-up sheets on their doors for advisement, and/or send email to all advisees requesting that they schedule meetings for advisement.

University of Wisconsin-Superior – 2014 Catalog
Mathematics Major (36 Credits)

1. All Core classes are required.
2. Precalculus is typically taken in high school.
3. Need one Probability, Statistics, or Modeling class.
4. Need two Advanced Topics classes.

A. **Solid Background** – typically offered each semester.
B. **Shaded Background** – typically offered in the fall.
C. **White Background** – typically offered in the spring.

MATH 240
Calculus and Analytic Geom. I
(4 credits)
F14, S15, F15, S16

MATH 115
Precalculus
(5 credits)
F14, S15, F15, S16

CSCI 201
Intro to Programming
(3 credits)
F14, S15, F15, S16

MATH 241
Calculus and Analytic Geom. II
(4 credits)
F14, S15, F15, S16

MATH 370
Probability
(3 credits)
F15

MATH 310
Introduction to Abstract Math.
(3 credits)
F14, S15, F15, S16

MATH 315
Linear Algebra
(3 credits)
S15, S16

MATH 242
Calculus and Analytic Geom. III
(4 credits)
S15, S16

MATH 371
Statistics
(MATH 242 & 370 recommended, 4 credits)
F14

MATH 320
Discrete Structures
(Not Required, 4c)
F14, F15

Or MATH 370

MATH 380
Intro to M.Modeling
(MATH 242 recommended, 4 credits)
On Demand

MATH 421
Theory of Computation
(4 credits)
F15

MATH 437
Cryptography
(4 credits)
S15

MATH 450
Topology
(4 credits)
F14

MATH
3+ Credit Elective
300-Level or Higher

MATH 471
Intro to Complex Variables
(4 credits)
F14

MATH 440
Real Analysis
(4 credits)
S15

MATH 455
Abstract Algebra
(4 credits)
S16

MATH 498
Mathematics Capstone
(1 credit)

11. How has your Program determined and documented effective teaching and learning? In what ways has your Program engaged students in high impact practices? How were these pedagogical expectations communicated to full-time and part-time faculty and staff?

12. How does your Program monitor the relevance and effectiveness of its curriculum? What process is in place for changing or discontinuing the Programs and courses?

III.   Other Distinctive Objectives

Other Distinctive Objectives addresses the processes that contribute to the achievement of your Program's major objectives that complement student learning and fulfill other portions of your mission. These objectives may include pure and applied research and scholarship, professional and public service, institutional citizenship, service learning, centers or institutes, economic stimulation and development of the community, creative and cultural enrichment, or any other major activities to which the Program commits substantial resources, energy, and attention.

1.   ~~What are your Program's distinct objectives that complement student learning and/or fulfill other elements of the Program, Departmental, or University Mission?~~

2.   How does your Program determine your other distinctive objectives? Who is involved in setting these objectives?

    "Other distinctive objectives" are spelled out in the Department's bylaws, which are determined by the voting members of the Department. The Math program does not have separate bylaws. These objectives are listed as expectations and criteria for retention, tenure, and promotion.

3.   How are these objectives assessed and reviewed? Who is involved and how is their feedback incorporated in readjusting the objectives or the processes that support them?

    The bylaws are reviewed sporadically, usually when institution-wide initiatives require a re-examination for purposes of compliance with new or existing university policies.

4.   What are the results in accomplishing these objectives? Looking at your results for Accomplishing Other Distinctive Objectives, comment on the positive results as well as those in need of improvement.

    The Math program encourages research and scholarship by awarding faculty and staff development funds to program members for the purpose of attending professional conferences and events; of buying relevant books and technology; and by encouraging members to give talks at peer institutions by crediting this as service for purposes of retention, promotion, and tenure.

5.   ~~What specific improvement priorities is your Program targeting and how will these be addressed?~~

6.   How does your Program communicate the current results and improvement priorities to students, faculty, staff, administrators, and stakeholders?

    The Math program operates as an integral part of the MCS Department, but does not usually convene separate program-level meetings; indeed, members of the MCS Department often identify as both math and computer science program members, and

their teaching loads reflect this. Therefore, communication is done most often through the Department in the form of annual reporting and catalog copy. Noteworthy accomplishments, such as members giving keynote talks at major conferences, organizing international conferences, winning awards, etc., are communicated through university relations if at all.

IV. Understanding Students and Other Stakeholders Needs

This section addresses issues outside of the classroom setting, such as student organizations, advising, and course scheduling/availability. Explain how your Program works actively to understand and address student, alumni, parent, employer and other stakeholder needs.

1. ~~Discuss local/regional/national/global job markets needs, external support of and stakeholder's aspirations for your Program. Explain the sources of evidence used in these discussions.~~

<u>Students</u>

2. How does your Program identify the changing needs of student groups? What is the process for analyzing and selecting a course of action regarding these needs? Provide some examples of actions taken since the last review.

   The ongoing process of examining the math programming takes place at least biennially for catalog purposes. Since the last program review, the math program has been streamlined and simplified by dropping graduate-level cross-numbered undergraduate/graduate courses and by removing cross-listings across math/computer science in favor of one or the other subject prefix. We have also responded to the lack of student demand in some courses by removing these courses from the line-up of regular offerings; examples include Math 380 (Mathematical Modeling) and Math 475 (Numerical Analysis), which had trial offerings in recent years and were determined not to merit additional regular offerings. On the other hand, successful pilot courses in areas central to modern mathematics have been incorporated into the catalog and the math major; an example is Math 450 (Topology). Membership and participation in national mathematics organizations, such as the National Council of Teachers of Mathematics, the Mathematical Association of America, and the American Mathematical Society, also serve to inform the Math program regarding trends and best practices in mathematics pedagogy and content.

3. What process does your Program have for students to report complaints? How does your Program analyze students' feedback both in a formative and summative manner and select a course of action? How does your Program communicate those actions to students?

   The complaint reporting process in the Math program conforms to university standards: a student who has a complaint is to first discuss it with the instructor, if possible/comfortable; then with the Department chair. Student feedback in the form of messages to the effect that certain instructors were not performing their duties have been handled appropriately by the Department chair, and have resulted in non-retention of instructors in some extreme cases.

4. What measures of student satisfaction does your Program collect and analyze regularly?

The Math program collects student evaluation of teaching forms for each individual course offering, but not for the program as a whole.

5. What are the results for student satisfaction with your Program?

    Students typically rate the mathematics major courses in the 3 to 5 range overall, on a scale of 1 to 5, where 5 is best.

Other Key Stakeholders

6. How does your Program identify the changing needs of other stakeholder groups? What is the process for analyzing and selecting a course of action regarding these needs? Provide some examples of actions taken since the last review.

    We do not specifically seek input from employers or alumni regarding the changing needs of a mathematics program; most input is identified in the response to Question 2 of this section.

7. What measures of stakeholder satisfaction does your Program collect and analyze regularly?

    (None)

8. What are the results for stakeholder satisfaction with your Program?

    (None)

9. With regard to the needs of your Program's key stakeholder groups, how are the targets for improvement set?

    (Not applicable)

10. What specific improvement priorities is your Program targeting and how will these be addressed?

    (None)

V.   Valuing People
(Complete at the Department or Program level as appropriate)

Valuing People explores commitment to the development of faculty and staff.

1. What key faculty/staff orientation, enhancement and mentoring initiative are currently being undertaken or planned for the next one to three years?

   See Department-level response.

2. What support is provided to faculty for the professional development, retention, tenure, and promotion process?

3. What support is provided to staff for their professional development and retention?

4. ~~Using data from the APR Data Sets, discuss faculty and staff (full and part-time) load.~~ Explain any significant deviations from expected University standard load. Explain any load reassignments and the process used to determine them.

5. Using data from the APR Data Sets, discuss the average size of undergraduate and graduate classes. Explain any class that on average enrolls less than 10 students (undergraduate) or 8 students (graduate).

   Only in very recent years have we been confronted with a "target" enrollment of 10 or more students. Traditionally, the department has viewed its programming holistically, noting that lower-enrolling upper-division courses are balanced by, or "subsidized by" if you will, the higher-enrolling lower-division service courses. Additionally, the department has placed most upper-division lower-enrolling courses on a once-every-two-years basis, which is the lowest frequency compatible with a 4-year graduation plan. It is also perhaps worth noting that some of the apparent low enrollment is due to cross-listed courses, such as MATH/CSCI 320, which has since been de-cross-listed as MATH 320; in past offerings, the enrollments of the two courses, MATH 320 and CSCI 320, should be combined to reflect the accurate total in one physical course. Additionally, certain apparently low-enrolling offerings are due to off-catalog special offerings of courses requested or needed by small groups of students, taught as unpaid overload on top of a full course load; examples of this include the Spring 2014 Math 370, Spring 2010 Math 371, and the offered-on-demand course Math 390 (Spring 2014).

6. Using data from the APR Data Sets, discuss student credit hour production among and across faculty/staff.

   Student credit hour production varies from around 75 to over 300 credit hours per semester, with most falling into the 100-250 range. Given that most upper-division courses can only be taught by faculty with the relevant expertise, and that upper-division courses tend to enroll fewer students than lower-division courses, it is a reality that non-faculty instructors tend to have higher credit hour production than faculty.

7. If faculty and staff credit loads are higher than the University standard, what processes are used to insure that Program quality does not deteriorate and academic standards are upheld?

   Credit loads are generally in line with the contractual amount (12 credits per semester).

8. How does the work environment contribute to civil and open communication and promotion of cooperation, innovation, and skill sharing?

9. Using data from the APR Data Sets, discuss how diversity among faculty and staff is advanced and supported.

10. What assessment and planning processes are used to determine what faculty resources the Program will need?

11. What is the process for analyzing and selecting a course of action for improving current processes and systems for valuing people? Provide some examples of actions taken since the last review.

VI. Program Planning for Continuous Improvement

Planning continuous improvement examines planning and assessment processes and how strategies and action plans are helping achieve the Program mission.

1. Summarize the main findings for the Program associated with successful completion of the APR process. Describe this in terms of current program strengths and opportunities (i.e., areas in need of attention) for future planning.

2. ~~What is the Program's vision of what it will be like in the next 5-10 years?~~

3. ~~Discuss the plan for funding projects for your Program to meet its objectives.~~

4. ~~What are the Program's projected needs, space, acquisitions, and capital equipment for the next five years? Provide any estimated cost and rationale for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?~~

~~Statement of Need~~	~~Cost (if any)~~	~~Rationale and Method of Evaluation~~	~~Planning Processes To Secure Resources~~

5. ~~What are the Program's needs for support resources for the next five years? Provide any estimated cost and rationale and benchmark for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?~~

~~Statement of Need~~	~~Cost (if any)~~	~~Rationale, Benchmark, and Method of Evaluation~~	~~Planning Processes To Secure Resources~~

6. ~~What are the Program's projected needs for instructional information technology for the next five years? Provide any estimated cost and rationale and benchmark for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?~~

~~Statement of Need~~	~~Cost (if any)~~	~~Rationale, Benchmark, and Method of Evaluation~~	~~Planning Processes To Secure Resources~~

Academic Program Review

For Computer Science (CSCI)

I. ~~Program Mission and Alignment~~

~~Mission and Alignment seeks to establish the degree to which this program is compatible with the mission of UW-Superior and its strategic priorities.~~

A. ~~Program Mission~~

    4. ~~Provide the current version of your Program's mission.~~

    5. ~~When was the current mission statement adopted or revised?~~

    6. ~~What process was used in the adoption and/or revision of the Program's mission statement?~~

B. ~~Alignment of Program Mission to the Institutional Mission~~

    2. ~~Please address the means by which your Program ensures that its mission, expectations, and objectives align with the University's liberal arts mission and high impact practices, as well as its Liberal Education Learning Goals.~~

C. ~~Unique Aspects of the Program~~

    2. ~~Describe the unique aspects of the Program in terms of subject matter taught and students served.~~

D. ~~Specialized Accreditations~~

    4. ~~Does the Program carry a specialized accreditation or membership? If so, identify the accrediting body, the lengths of time accredited and when the next accreditation review is to occur.~~

    5. ~~Why did the Program pursue the accreditation(s) or membership(s)? Why does the Program continue to carry the accreditation(s) or membership(s)?~~

    6. ~~If specialized accreditations or memberships are available and not pursued, why are they not pursued? If an accreditation has been discontinued, please explain what occurred.~~

E. ~~Response to the Recommendations Made in the Previous Review~~

    5. ~~What recommendations were made to the Program at the time of the last review?~~

6. How did the Program address the recommendations?

7. Did any kind of assessment and/or strategic planning take place to address the recommendations? If so, what did these entail and what actions were taken to address the recommendations? If not, explain why the recommendations were not addressed.

8. If additional response to recommendations is provided elsewhere in this document, please specify where.

II.   Student Learning Outcome Assessment (Helping Students Learn)

This section focuses on the teaching-learning-assessment process, and also addresses how the entire Department contributes to helping students learn in each Program and overall student development.

> 13. What are the Program-specific student learning outcomes? When did your Program determine these outcomes? Who was involved in setting these outcomes?

Upon completing the Program the students should completely understand how the computer works and be able to participate in team development of computer software and hardware. This includes a clear word description of the project, splitting a problem into sub-problems, working out an algorithm for efficient solution, mathematically analyze various measures of algorithm complexity (memory, time, etc.), prove algorithm correctness, select programming language for efficient algorithm implementation, write and debug programs of moderate to high complexity.

The outcomes were determined at the time the Computer Science program was developing in 1999. The program outcomes and the program structure was developed by following the ACM (Association of Computer Machinery) guidelines. The entire department was participating in that process.

> 14. What sources of evidence for student learning outcomes does your Program collect and analyze regularly? Describe the methods of collection and analysis.

> 15. What sources of evidence for the Liberal Education Learning Goals (i.e., campus-wide common student learning outcomes) does your Program collect and analyze regularly? Describe the methods of collection and analysis.

The students have to present their individual and/or collective work orally and in written form to the Department at special sessions scheduled at the end of every semester. Moreover, many courses in the program assume student presentations for that course. The students are also provided a possibility to work with instructors on individual projects that match their interest. The projects must also be presented orally at the end of semester. Every department faculty supervises several such student projects in every semester. During the oral presentations every student work is evaluated by the department members from various aspects and a decision of passing the course is then made.

> 16. Describe any changes in the Program that directly reflected the results of assessment of Program-level and campus-wide student learning outcomes.

> 17. Based on the findings for the current Program-level learning outcomes and the Liberal Education Learning Goals, what action priorities has your Program set for improvement? Who was involved in setting these action priorities?

> 18. How has your Program communicated the current state of student learning outcomes and Program improvement priorities to students, faculty, staff, administrators, and other

All faculty are supposed to present at students end-of-semester presentations of their Senior Projects. For specific course presentations (e.g., Embedded Systems Programming or Software Development Practices), the instructors usually inform the department on such presentations and invite other faculty to attend. The student outcomes are often discussed at the department meetings. Outstanding projects are recommended by the department for a presentation at external events, such as Posters in Rotunda or celebration of undergraduate student research.

19. ~~Referring to the data in the APR Data Sets and other sources, discuss trends in student enrollment and completion in your program and efficiency of your course offerings as pertains to student's ability to graduate from the Program in a four-year period.~~

20. ~~Referring to the data in the APR Data Sets, discuss the costs associated with your Program. If the cost per student FTE of your Program deviates significantly from the average cost per student FTE for the University, discuss where in the Program plausible causes reside.~~

21. How has your Program determined and communicated to prospective and current students what preparation is necessary to succeed in the Program's curricula, courses, and learning?

It is a common situation that the students are informed in class in which courses these or those aspects will be covered deeper. They are recommended to take such courses in the future. Since some of these recommended courses are elective, the students get better informed on possibilities to deepen their knowledge in particular subjects. The department has suggested plans and timelines for the course sequences to take. The prospective students are informed on the Program at the department presentation days. The students are permanently advised by their department advisors on which courses to take and in which sequence for a successful completion of them, particularly if standard plans by some reason do not quite work for them. Moverover, students are always getting suggestions from faculty which elective courses to take that match their interests in Computer Science or could be beneficial for their future work.

22. How does your Program advice students? What advisement plan does your Program have? How does your Program assure the timely and effective advisement of students?

We have a standard 4-year course sequence plan for freshmen. This plan, however, does not assume that the students took any additional AP courses in High school or UWS, so corrections by advisors is sometimes needed. Moreover, the standard plan might need corrections depending on the outcomes of the Math Placement Test. In many cases corrections are also needed for transfer and international students. In most cases advisors take care on student plans. In some circumstances decisions are made at department meetings. The faculty monitor student visits to their offices and make sure that students are advised in time.

23. ~~How has your Program determined and documented effective teaching and learning? In what ways has your Program engaged students in high impact practices? How were these pedagogical expectations communicated to full-time and part-time faculty and staff?~~

24. ~~How does your Program monitor the relevance and effectiveness of its curriculum? What process is in place for changing or discontinuing the Programs and courses?~~

III.   Other Distinctive Objectives

Other Distinctive Objectives addresses the processes that contribute to the achievement of your Program's major objectives that complement student learning and fulfill other portions of your mission. These objectives may include pure and applied research and scholarship, professional and public service, institutional citizenship, service learning, centers or institutes, economic stimulation and development of the community, creative and cultural enrichment, or any other major activities to which the Program commits substantial resources, energy, and attention.

7. ~~What are your Program's distinct objectives that complement student learning and/or fulfill other elements of the Program, Departmental, or University Mission?~~

8. How does your Program determine your other distinctive objectives? Who is involved in setting these objectives?

All department faculty are involved into individual pure/applied research or creative activities. The students are informed on the results of these activities in classrooms and Math/CS presentations and informal meetings with faculty (Get Together events). In many cases the students are invited by faculty to attend their events, such as professional seminars and conferences. In every semester we offer Programming Competitions for UWS students, whose winner names are reported to the department.

9. How are these objectives assessed and reviewed? Who is involved and how is their feedback incorporated in readjusting the objectives or the processes that support them?

Outcomes of faculty activities are regularly reviewed by the department Personnel Committee. These outcomes form a basis for the faculty annual merit evaluations, promotions, retentions, etc. They also appear in annual department report activities. By a tradition every faculty reports their individual or student summer activities at the first department meeting in September.

10. What are the results in accomplishing these objectives? Looking at your results for Accomplishing Other Distinctive Objectives, comment on the positive results as well as those in need of improvement.

In the recent years the department got more and more active in doing undergraduate summer research with students. Very often this research is then continued and extended during the semester(s). Another observed tendency is that students take many elective courses offered in the department, even if they could graduate without taking them. This is a result of a good advertisement of those courses and enthusiasm of faculty teaching them. We should probably be more active in doing some activities with prospective students at least in local High Schools.

11. ~~What specific improvement priorities is your Program targeting and how will these be addressed?~~

12. How does your Program communicate the current results and improvement priorities to

We are a small department and intensively communicate with each other due to a very good working atmosphere in the department. Thus, every faculty is pretty well aware of what the others are doing and how, so no any special communication is needed. We also organize regular (2-3 times in every semester) Get Together meetings with students. The establishments of faculty and students are advertised on the department poster boards. The administration and stakeholders are informed by a faculty/student progress by the department award/promotion recommendations, student scholarship recommendations, presentations at Math/CS Club events, proposals to represent UWS in external events (like Posters in Rotunda), and through the presentations composed by the University Relations group.

IV. Understanding Students and Other Stakeholders Needs

This section addresses issues outside of the classroom setting, such as student organizations, advising, and course scheduling/availability. Explain how your Program works actively to understand and address student, alumni, parent, employer and other stakeholder needs.

2. ~~Discuss local/regional/national/global job markets needs, external support of and stakeholder's aspirations for your Program. Explain the sources of evidence used in these discussions.~~

Students

6. How does your Program identify the changing needs of student groups? What is the process for analyzing and selecting a course of action regarding these needs? Provide some examples of actions taken since the last review.

We get a lot of feedback via Math/CS Club in the department. One faculty serves as the Club advisor. He participates in formal and informal Club meetings with students and shares the information with the department.

7. What process does your Program have for students to report complaints? How does your Program analyze students' feedback both in a formative and summative manner and select a course of action? How does your Program communicate those actions to students?

It is extremely rare that the students file complains in our program. When this, however, happens, the department chair takes care on collecting complains, which, if needed, are discussed at the department meetings. The students are informed on course of actions by the department chair.

8. What measures of student satisfaction does your Program collect and analyze regularly?

We mainly get student feedback in the form of their course evaluations collected for each offered course at the end of semester. The evaluation forms have a section devoted to recommended course improvements. The department faculty take these student comments very seriously and use them to improve their courses.

9. What are the results for student satisfaction with your Program?

We regularly get appreciation letters from our alumni, addressed as to individual faculty, as well as to the entire department. We also get addressed letters for good student preparation from some Graduate Colleges (e.g., Computer Security Program in Tulsa, OK). Most of our students retain within the department even if they find CS major to be too challenging for them. In this case they

typically change to CS minor or ITS minor.

Other Key Stakeholders

> 11. How does your Program identify the changing needs of other stakeholder groups? What is the process for analyzing and selecting a course of action regarding these needs? Provide some examples of actions taken since the last review.

In Computer Science the needs of groups are changing very fast reflecting the trends and changes in technology. The CS courses are modified on a permanent basis accordingly. We maintain good connections with our alumni and collect their opinion on what we could improve in our program from the viewpoint of industrial needs. Some faculty have industrial background, attend corresponding conferences, and work as company consultants. This way they keep track of employer's needs and incorporate them into the program. Two examples: once we figured out an increasing need in firmware developers we introduced a new track in the department courses devoted to microcontrollers. This track involves creating a new course "Embedded Systems Programming" along with founding a new hardware lab, with equipment funded from the department budget. Another example is redevelopment of the CS Capstone Project course. We collaborate with local businesses in this course (hospitals, software development companies, etc.) and develop software systems for them to be later used by the businesses. We also get a feedback from them in the form of comments made by professional developers and/or customers.

> 12. What measures of stakeholder satisfaction does your Program collect and analyze regularly?

The most regular feedback is provided by the Capstone Project customers and organizations after the students complete their project. This feedback is analyzed and taken into account for teaching many relevant courses in the department, e.g., "Software Development Practices" and Capstone Group Project, and also for selecting programming language for programming courses.

> 13. What are the results for stakeholder satisfaction with your Program?

All our graduates have no problems in getting jobs after their graduation. Many of them get summer internships with various local companies during their studies. Practically all students wishing to proceed with graduate studies are accepted by graduate programs right after the graduation. We have a good number of return students wishing to complete their degree in our program after a break in the studies.

> 14. With regard to the needs of your Program's key stakeholder groups, how are the targets for improvement set?

The targets are set after analyzing the feedback on projects done by our students for local businesses and in a communication with our alumni of what knowledge (if any) needed for their work is missing after graduating from our program.

The improving priorities in the CS program are implied by the technology changes. In particular, this concerns the programming environments including programming languages. We first taught programming courses in Pascal, then C, then C++, then Java. Now we consider switching to C#. Internet Programming course is modified practically every time when it is offered. The same concerns many other courses, for example, Computer Architectures, Netcentric Computing, Algorithm Design and Analysis.

V. Valuing People
(Complete at the Department or Program level as appropriate)

Valuing People explores commitment to the development of faculty and staff.

9. What key faculty/staff orientation, enhancement and mentoring initiative are currently being undertaken or planned for the next one to three years?

The new hire will is introduced by the Search and Screen Committee Chair to the Math/CS club. The Mentoring Coordinator checks in at least monthly for the first year to see how things are progressing for the new hire.

10. What support is provided to faculty for the professional development, retention, tenure, and promotion process?

We try to accommodate each faculty/staff to teach their preferred courses. Every faculty/staff is provided an amount of moneys for professional development from the department budget. The department takes very seriously all faculty requests and needs and tries to match them. The group of faculty teaching CS courses remained stable for the last 8 years.

11. What support is provided to staff for their professional development and retention?

We currently have only 1 staff member in the CS program and he is treated the same as faculty, see above. He is granted voting rights at the department meetings.

12. ~~Using data from the APR Data Sets, discuss faculty and staff (full and part-time) load.~~ Explain any significant deviations from expected University standard load. Explain any load reassignments and the process used to determine them.

N/A for the CS program.

13. Using data from the APR Data Sets, discuss the average size of undergraduate and graduate classes. Explain any class that on average enrolls less than 10 students (undergraduate) or 8 students (graduate).

CSCI250 (new course number CSCI351) will be not offered in the future in class. It will be, however, offered as a Distance Learning class.
CSCI327 involves hardware development, manufacturing PCB (Printed Circuit board), ordering components from distributors, soldering the components on PCB, and developing the code. It is unreal to handle more than 6-8 student projects in this elective class.
CSCI331 is an elective class, but we consider it important to offer, since many students are interested in Computer Graphics and its applications to games programming.
CSCI340 and CSCI499 are for CS majors only and match our current graduation rate in CS.
CSCI371 will not be offered any more.
CSCI381 has a low enrollment by its nature "Special Projects". We usually offer this course to

address credits needs for some students and also for those who are interested to learn a topic which is not covered in other courses. This course is usually offered as an overload for faculty. CSCI421 used to be more popular in the past. We probably need to restructure it for Math majors or introduce a programming component for CS majors.

CSCI470 is usually in a healthy state. It is offered for 13 students in FS2014.

CSCI498 is an individual capstone project, and is taught as an overload for faculty.

14. Using data from the APR Data Sets, discuss student credit hour production among and across faculty/staff.

Student hour production among the faculty teaching CS courses is about the same. It fluctuates from semester to semester depending on the courses taught by that faculty. As a rule, elective classes have lower enrollment than the core classes. Concerning the entry level courses, in the past several years they are offered by the staff member, and the enrollment there is naturally higher, because these courses are also taken by not department majors/minors.

15. If faculty and staff credit loads are higher than the University standard, what processes are used to insure that Program quality does not deteriorate and academic standards are upheld?

If a faculty load gets higher than the standard, the department Chair asks the administration for a compensation. If it is not granted, the Chair tries to balance out the faculty load on an annual or biannual time period.

16. How does the work environment contribute to civil and open communication and promotion of cooperation, innovation, and skill sharing?

Some courses offered by the department are taught by various people. They make available their course material for the colleagues. This includes course outlines, suggestion and feedback on textbooks, homework and exam assignments, presentation materials, etc. We give collegial support to faculty who cannot give a class due to traveling to professional events, sickness, etc., by covering their classes.

11. Using data from the APR Data Sets, discuss how diversity among faculty and staff is advanced and supported.

Our department is very diverse and includes faculty from various countries, like China, Germany, Russia, Taiwan. The working climate in the department is very good, so the faculty with a foreign origin feel themselves as at home.

12. What assessment and planning processes are used to determine what faculty resources the Program will need?

We usually discuss the department or program needs at department meetings. The feedback is also reported on such meetings. Examples include software licenses, hardware needs (computers, servers), books, special equipment (e.g., soldering guns).

What is the process for analyzing and selecting a course of action for improving current processes and systems for valuing people? Provide some examples of actions taken since the last review.

Every department faculty is very enthusiastic in what they are doing and are involved into various professional activities outside of their contract hours. This includes research, work with undergraduate students, presenting and attending professional meetings. Those activities are highly valued and appreciated within the department. However, now more and more attention in the department is given to the undergraduate student research, which becomes an expectation from every department member.

VI. Program Planning for Continuous Improvement

Planning continuous improvement examines planning and assessment processes and how strategies and action plans are helping achieve the Program mission.

<mark>7. Summarize the main findings for the Program associated with successful completion of the APR process. Describe this in terms of current program strengths and opportunities (i.e., areas in need of attention) for future planning.</mark>

We plan to restructure the CS program by converting Comprehensive CS major into a non-comprehensive one by claiming that CS major seekers will add one of required minors (Math or ITS). The current CS Comprehensive program requires a lot of Math classes, most of which are present in our current Math minor. We expect this change to be beneficial for the program and students.

8. ~~What is the Program's vision of what it will be like in the next 5-10 years?~~

9. ~~Discuss the plan for funding projects for your Program to meet its objectives.~~

10. ~~What are the Program's projected needs, space, acquisitions, and capital equipment for the next five years? Provide any estimated cost and rationale for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?~~

~~Statement of Need~~	~~Cost (if any)~~	~~Rationale and Method of Evaluation~~	~~Planning Processes To Secure Resources~~

11. ~~What are the Program's needs for support resources for the next five years? Provide any estimated cost and rationale and benchmark for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?~~

~~Statement of Need~~	~~Cost (if any)~~	~~Rationale, Benchmark, and Method of Evaluation~~	~~Planning Processes To Secure Resources~~

12. ~~What are the Program's projected needs for instructional information technology for the next five years? Provide any estimated cost and rationale and benchmark for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?~~

~~Statement of Need~~	~~Cost (if~~	~~Rationale, Benchmark, and Method~~	~~Planning Processes To Secure Resources~~

	any)	of Evaluation	

Academic Program Review

For Information Technology and Systems

I.   Program Mission and Alignment

Mission and Alignment seeks to establish the degree to which this program is compatible with the mission of UW-Superior and its strategic priorities.

A.   Program Mission

7.   Provide the current version of your Program's mission.

8.   When was the current mission statement adopted or revised?

9.   What process was used in the adoption and/or revision of the Program's mission statement?

B.   Alignment of Program Mission to the Institutional Mission

3.   Please address the means by which your Program ensures that its mission, expectations, and objectives align with the University's liberal arts mission and high impact practices, as well as its Liberal Education Learning Goals.

C.   Unique Aspects of the Program

3.   Describe the unique aspects of the Program in terms of subject matter taught and students served.

D.   Specialized Accreditations

7.   Does the Program carry a specialized accreditation or membership? If so, identify the accrediting body, the lengths of time accredited and when the next accreditation review is to occur.

8.   Why did the Program pursue the accreditation(s) or membership(s)? Why does the Program continue to carry the accreditation(s) or membership(s)?

9.   If specialized accreditations or memberships are available and not pursued, why are they not pursued? If an accreditation has been discontinued, please explain what occurred.

E.   Response to the Recommendations Made in the Previous Review

9.   What recommendations were made to the Program at the time of the last review?

10. How did the Program address the recommendations?

11. Did any kind of assessment and/or strategic planning take place to address the recommendations? If so, what did these entail and what actions were taken to address the recommendations? If not, explain why the recommendations were not addressed.

12. If additional response to recommendations is provided elsewhere in this document, please specify where.

II.   Student Learning Outcome Assessment (Helping Students Learn)

This section focuses on the teaching-learning-assessment process, and also addresses how the entire Department contributes to helping students learn in each Program and overall student development.

25. What are the Program-specific student learning outcomes? When did your Program determine these outcomes? Who was involved in setting these outcomes?

    The Information Technology and Systems (ITS) student learning outcomes are listed as follows.

    1) Outcome of Computer Application Skills: Student will be able to use computer productivity applications to enhance personal and professional productivity.

        Select one of the following computer application skills courses:
        ITS 148 Computer Applications for Productivity (3 cr)
        ITS 108 Business Computer Applications (3 cr)
        Select electives (Total 12 credits)
        ITS 335 Web Page Authoring (3 cr)
        ITS 346 Database Management (3 cr)
        ITS 380 Global E-commerce Systems (3 cr)

    2) Outcome of Information Technology Survey: Students will be familiar with the disciplines associated with information technology and systems, uses of information technology, career opportunities, and various applications for modern life.

        Select one of the following survey courses:
        ITS 230 Introduction to Information Technology and Systems (3 cr)
        ITS 310 Information Technology Operations (3 cr)
        Select electives (Total 12 credits)
        ITS 350 Networking and Communications (3 cr)
        ITS 360 Cyber Forensics (3 cr)
        ITS 364 Digital Multimedia (3 cr)
        ITS 370 Information Security (3 cr)
        Senior Experience
        ITS 499 Capstone Project (1 cr)

    3) Outcome of Programming: Students will understand basic programming concepts and be able to design, implement, and debug programs.

        Select one of the following programming courses:
        ITS 211 Fundamentals of Visual Programming (3 cr)
        CSCI 201 Introduction to Programming (3 cr)

    The ITS program determined these outcomes when the campus-wide Liberal Education

Learning Goals Assessment Action Plan took place in fall 2010. Two key ITS faculties were involved in setting these outcomes.

26. ~~What sources of evidence for student learning outcomes does your Program collect and analyze regularly? Describe the methods of collection and analysis.~~

27. What sources of evidence for the Liberal Education Learning Goals (i.e., campus-wide common student learning outcomes) does your Program collect and analyze regularly? Describe the methods of collection and analysis.

The sources of evidence for the UW-Superior Liberal Education Learning Goals (LELGs) include all five goals as follows.

- *The ability to think and make connections across academic disciplines*
- *The ability to express oneself in multiple forms*
- *The ability to analyze and reflect upon multiple perspectives to arrive at a perspective of one's own*
- *The ability to think and engage as a global citizen*
- *The ability to engage in evidence-based problem solving*

The ITS program has started to collect and analyze the assessment tool by creating a new course of ITS 499 Capstone Project in Fall 2012. We ask students to submit a final paper by describing how ITS help students accomplish their major capstone project. From the final paper, we use the following form as the assessment tool to determine corresponding scores for each student learning outcome.

	4 *Exemplary*	*3* *Satisfactory*	*2* *Weak*	*1* *Unacceptable*
Content	*All components are excellent throughout*	*All components are present, but some are deficient in places*	*One or two components are consistently deficient or absent, but at least component (1) is present in places*	*All components are absent or deficient throughout*
Analysis	*All components are excellent throughout*	*All components are present in most of the solution, but some are deficient in places*	*Some components are deficient throughout most of the solution, but at least one is well-handled in places*	*All components are absent or deficient throughout*
Integration	*All components were successfully integrated into an empirical case*	*All components were integrated, but incompatibility or technical issues remain*	*Most components were integrated, but some were not; technical obstacles were worked on but largely not overcome*	*Major system components were not integrated; overcoming technical obstacles was not attempted*
Presentation	*All components are excellent*	*All components are present, but some*	*One or two components are*	*All components are absent or deficient*

	throughout	*are deficient in places*	*consistently deficient or absent, but at least (2) is mostly present*	*throughout*

28. ~~Describe any changes in the Program that directly reflected the results of assessment of Program-level and campus-wide student learning outcomes.~~

29. ~~Based on the findings for the current Program-level learning outcomes and the Liberal Education Learning Goals, what action priorities has your Program set for improvement? Who was involved in setting these action priorities?~~

30. How has your Program communicated the current state of student learning outcomes and Program improvement priorities to students, faculty, staff, administrators, and other appropriate stakeholders?

    Each semester the ITS program coordinator reviews the ITS course process and discuss outcomes with another ITS key faculty for each course taught. The coordinator also analyzes the ITS 499 Capstone Project final report carefully and seeks the improvement priorities. The coordinator is carrying out a plan to collect assessment data on student learning and development. This plan will connect the curriculum to assessment. The results of the assessment of the plan will be given to appropriate students, faculty, staff, administrators, and other appropriate stakeholders.

31. ~~Referring to the data in the APR Data Sets and other sources, discuss trends in student enrollment and completion in your program and efficiency of your course offerings as pertains to student's ability to graduate from the Program in a four-year period.~~

32. ~~Referring to the data in the APR Data Sets, discuss the costs associated with your Program. If the cost per student FTE of your Program deviates significantly from the average cost per student FTE for the University, discuss where in the Program plausible causes reside.~~

33. How has your Program determined and communicated to prospective and current students what preparation is necessary to succeed in the Program's curricula, courses, and learning?

    The ITS program coordinator distributes the ITS curriculum flyers to prospective and current students who are taking 100-level courses each semester. In addition, the ITS program uses the University catalog on the web site and the academic advisement processes to communicate the preparation required of students for completing its majors and minors.

34. How does your Program advice students? What advisement plan does your Program have? How does your Program assure the timely and effective advisement of students?

    The ITS program compliments students pursuing a major of study. Faculty members in

the program advise students as needed to help guide individuals navigate the curriculum.

35. ~~How has your Program determined and documented effective teaching and learning? In what ways has your Program engaged students in high impact practices? How were these pedagogical expectations communicated to full-time and part-time faculty and staff?~~

36. ~~How does your Program monitor the relevance and effectiveness of its curriculum? What process is in place for changing or discontinuing the Programs and courses?~~

III.   Other Distinctive Objectives

Other Distinctive Objectives addresses the processes that contribute to the achievement of your Program's major objectives that complement student learning and fulfill other portions of your mission. These objectives may include pure and applied research and scholarship, professional and public service, institutional citizenship, service learning, centers or institutes, economic stimulation and development of the community, creative and cultural enrichment, or any other major activities to which the Program commits substantial resources, energy, and attention.

13. ~~What are your Program's distinct objectives that complement student learning and/or fulfill other elements of the Program, Departmental, or University Mission?~~

14. How does your Program determine your other distinctive objectives? Who is involved in setting these objectives?

    The ITS program determines other distinctive objectives in an ad hoc manner based on perceived needs and opportunities available to the two primary faculty members along with resources available to pursue the objective. Currently, two distinctive objectives are being pursued that include incorporating service learning in several courses in the ITS program and developing the technology infrastructure to support the department's mission.

15. How are these objectives assessed and reviewed? Who is involved and how is their feedback incorporated in readjusting the objectives or the processes that support them?

    The two members of the ITS faculty meet and discuss other distinctive objectives as necessary or when a potential opportunities avails themselves. This approach has proven to be efficient and timely. No formal mechanism is used to assess the objectives given that only two individuals spearhead the program and existing objectives serve the primary mission of the department and university.

16. What are the results in accomplishing these objectives? Looking at your results for Accomplishing Other Distinctive Objectives, comment on the positive results as well as those in need of improvement.

    Dr. Tucker has coordinated and overseen 20 academic service-learning projects for 18 different organizations in the region since Fall Semester 2010. Students in her ITS 335 Web Page Authoring and ITS 346 Database Management classes work in groups to complete projects for not-for-profit organizations that normally would have a difficult time acquiring the talent and technical know-how needed to create web sites and databases necessary to promote their mission. Feedback from the project sponsors has been very positive and in many cases greatly exceed their expectations. Students in her classes gain tremendously from the experience. Not only do they learn the technologies involved, but develop collaboration and communication skills necessary for the world of practice. Dr. Tucker works closely with the Center for Academic Service Learning and

provides expertise in the department regarding academic service learning projects.

Dr. Lynch designed, deployed, and oversees the department's computing infrastructure that serves nearly 400 students per year for over one-third of the total classes offered by the department per semester (13 of 36 classes as of Fall 2014) since 2010. The system currently consists of fifty workstations distributed between two advanced computing laboratories, approximately two dozen physical and virtual servers, a virtual desktop infrastructure able to host 25 virtual workstations, and a dozen or so sandbox systems. In 2012, Dr. Lynch and Ms. Toscano created the Math and Computer Science Learning Lab to provide faculty teaching developmental and general education math and computer science courses to learn about and incorporate new technologies to enhance student learning. Dr. Lynch also serves as the primary technology procurement agent for the department coordinating budget activities and acquisition of technology for the computing infrastructure, Hardware Lab, and Learning Lab.

17. ~~What specific improvement priorities is your Program targeting and how will these be addressed?~~

18. How does your Program communicate the current results and improvement priorities to students, faculty, staff, administrators, and stakeholders?

    The ITS program communicates the results of distinctive objectives directly through their existence. Without these distinctive objectives, courses utilizing service learning activities would cease to have hands-on projects that serve community organizations, and students and faculty in the department would not have the computing resources necessary to teach their classes. Additional communication about these distinctive objectives are included in activity reports and annual reviews.

IV. Understanding Students and Other Stakeholders Needs

This section addresses issues outside of the classroom setting, such as student organizations, advising, and course scheduling/availability. Explain how your Program works actively to understand and address student, alumni, parent, employer and other stakeholder needs.

3. ~~Discuss local/regional/national/global job markets needs, external support of and stakeholder's aspirations for your Program. Explain the sources of evidence used in these discussions.~~

Students

10. How does your Program identify the changing needs of student groups? What is the process for analyzing and selecting a course of action regarding these needs? Provide some examples of actions taken since the last review.

    ITS faculties are actively engaged with local and nation-wide professional organizations that regularly monitor student needs and trends. This information is shared with the department and helps to drive curricular changes. For example, the ITS program offers a new course of ITS 310 Information Technology Operations to introduce modern IT operations. Students work with open source and proprietary software using state-of-art virtualization tools to model system configurations.

11. What process does your Program have for students to report complaints? How does your Program analyze students' feedback both in a formative and summative manner and select a course of action? How does your Program communicate those actions to students?

    The ITS program processes information from course evaluations each semester; these provide formal documentation of student concerns. Program coordinators review course evaluations for potential problems and address these as appropriate with the instructor. If issues persist, they may be brought into the discussion. These course evaluations are disseminated to all departmental faculty members as part of the annual personnel review process. Otherwise, complaints are student-generated. The department Chair or a program coordinator, hearing there is a difficulty, will inform students regarding their rights under the campus grievance policy in published student handbooks and is available on the website. Students follow the grievance procedure in pursuing their concerns.

12. What measures of student satisfaction does your Program collect and analyze regularly?

    The ITS program processes student-satisfaction information from course evaluations and student-generated emails. Results of student satisfaction are shared during personnel processes each year. Sometimes student satisfaction are also shared in program faculty meetings.

13. What are the results for student satisfaction with your Program?

   Generally, students are pleased with the instructions they receive in the ITS program. For example, one of student-generated emails states as follows.

   My name is xxx, and I graduated from UWS in May 2013 with a Business Admin, Int'l Business degree. My last semester in school, I took your ITS 342 class "Management Information Systems." I am now working in an office setting in Duluth, and I just wanted to let you know that your ITS 342 class I took is by far the most important class I took in terms of my current job. The skills I learned in your class is one of the main reasons I was hired and am actually able to comfortably pay off my student loans.

   So thank you for the skills and concepts you taught, as they have been paramount in finding a job after graduation.

   Thank you

   From time to time, business majors walk in to the ITS faculty's office and indicate that the ITS courses are the most useful course for their entire degree plan.

Other Key Stakeholders

16. How does your Program identify the changing needs of other stakeholder groups? What is the process for analyzing and selecting a course of action regarding these needs? Provide some examples of actions taken since the last review.

   ITS faculties are actively engaged with local and nation-wide professional organizations and regularly discuss with other stakeholder groups regarding market needs and future trends. We ask for and receive feedback from them. Consistently, feedback has been supportive of the Program and its direction.

17. What measures of stakeholder satisfaction does your Program collect and analyze regularly?

   The measures of stakeholder satisfaction are frequent conversations with them.

18. What are the results for stakeholder satisfaction with your Program?

   In general, stakeholders seem to be satisfied with the Program. Consistently, there are phone calls or emails pertaining to seeking student workers or internship applicants.

19. With regard to the needs of your Program's key stakeholder groups, how are the targets for improvement set?

   After reviewing our student success and stakeholder reports, we try to refine our curriculum to improve our efficiency and productivity. The assessment plan for our programs should help this endeavor. The market trends of the cutting-edge technology is

a target for improvement of the Program.

20. What specific improvement priorities is your Program targeting and how will these be addressed?

   The market trends of the cutting-edge technology is a target for improvement of the Program. Program faculties actively engaging with local and nation-wide professional organizations and regularly discussing with other stakeholder groups regarding market needs and future trends are vital.

V.   Valuing People
(Complete at the Department or Program level as appropriate)

Valuing People explores commitment to the development of faculty and staff.

17. What key faculty/staff orientation, enhancement and mentoring initiative are currently being undertaken or planned for the next one to three years?

The existing faculty in the ITS program are both tenured, full professors so there is not an immediate need to revise an existing or develop a new mentoring program for the next one to three years.

18. What support is provided to faculty for the professional development, retention, tenure, and promotion process?

See response in Question 3.

19. What support is provided to staff for their professional development and retention?

Support for professional development comes from various source including from the department's supply and expenses budget (~$600), faculty development grant (max $1,000), and special activities promoted through administration or funded through grants. Funding for professional development is decreasing and becoming more competitive as state budget cuts reduce available funds. For instance, a 15% budget cut to department supply and expense budget in 2014-15 will dramatically reduce the few resources available for faculty development.

20. ~~Using data from the APR Data Sets, discuss faculty and staff (full and part-time) load.~~ Explain any significant deviations from expected University standard load. Explain any load reassignments and the process used to determine them.

The workload of the two faculty members in the ITS program have not deviated from the expected workload in any ongoing significant way. There have been reallocation of load due to administrative assignments (Shaun Lynch, 3 credits Department Chair reassignment, Fall 2010 – Spring 2013) and taking on additional load due to one of the faculty members taking sabbatical (Shaun Lynch, 3 credits Fall 2013). Shin-Ping Tucker routinely teaches a distance learning section of ITS 108 Business Computer Applications each semester for an extra three credits.

21. Using data from the APR Data Sets, discuss the average size of undergraduate and graduate classes. Explain any class that on average enrolls less than 10 students (undergraduate) or 8 students (graduate).

The following ITS classes have an average enrollment less than ten students (Fall 2008-Spring 2014): ITS 350 Networking and Communications (8.75), ITS 360 Computer Law, Ethics, and Intellectual Property (8.33), and ITS 370 Information Assurance and Security

(8.66). Nothing more that anecdotal evidence can be offered to explain why this is occurring. Nonetheless, these courses round out a program in information technology and systems are essential to provide students the breadth of skills needed to be minimally functional in the field.

22. Using data from the APR Data Sets, discuss student credit hour production among and across faculty/staff.

Dr. Tucker's student credit hour production averages around 284 (excluding sabbatical year); while Dr. Lynch's credit hour production averages around 132. Although there appears to be a significant difference in credit hour production, the measurement includes credit production from teaching distance learning courses (Dr. Tucker) and does not include other non-credit production activities such as serving as department chair (Dr. Lynch). In addition, the types of courses taught whether a service course or elective and the number of preparations is not considered in this one particular measure.

23. If faculty and staff credit loads are higher than the University standard, what processes are used to insure that Program quality does not deteriorate and academic standards are upheld?

Instructors volunteering to teach additional class sections (notably, for an online audience through distance learning) are left to their own to determine if academic standards are being upheld. If an instructor is required to teach additional sections to minimally maintain the program array or to accommodate a surge in enrollment, then it usually is for a relatively short period such as a semester or two.

24. How does the work environment contribute to civil and open communication and promotion of cooperation, innovation, and skill sharing?

Since the ITS program has only two faculty members, civil and open communication and promotion of cooperation, innovation, and skill sharing is usually accomplished by simple face-to-face communication.

25. Using data from the APR Data Sets, discuss how diversity among faculty and staff is advanced and supported.

The APR categorizes the faculty of the ITS in the following manner: Shin-Ping Tucker – Female, Asian; Shaun Lynch – Male, White.

26. What assessment and planning processes are used to determine what faculty resources the Program will need?

Since the essence of the ITS program revolves around the use and application of computing technology, having the appropriate computing hardware, networking infrastructure, and software applications in the classroom and available to faculty is critical to the success of the program. Dr. Lynch is the principle individual responsible

for designing, acquiring, and deploying technology in the department for all whom depend on a functional computing infrastructure. Planning is primarily driven by resources available, such as money, time, and availability of qualified student assistants. The need for various technologies varies considerably from class to class and semester to semester creating a dynamic landscape the technology resource must be adapt to; therefore, the sole assessment criteria being used is whether the current suite of technologies can accommodate the needs of instructors at any given time.

27. What is the process for analyzing and selecting a course of action for improving current processes and systems for valuing people? Provide some examples of actions taken since the last review.

The processes currently being employed, albeit an ad hoc process, is sufficient for a program that has two faculty members. Face-to-face discussion is simple to implement in a resource constrained environment and offer solutions that are effective and timely.

VI. Program Planning for Continuous Improvement

Planning continuous improvement examines planning and assessment processes and how strategies and action plans are helping achieve the Program mission.

13. Summarize the main findings for the Program associated with successful completion of the APR process. Describe this in terms of current program strengths and opportunities (i.e., areas in need of attention) for future planning.

    The ITS program is designed to complement existing liberal arts programs by providing students with the knowledge, skills, and abilities to use information technology in their field of interest. It is tailored for the student with an interest in information technology who wishes to enhance their career opportunities. The program emphasizes choice and allows students to select from a range of topics applicable to their discipline or that pique their curiosity. There are plans to continue developing curriculum and implementing an assessment plan. One opportunity for improvement is in having program review then implementing an outcomes process for student learning objectives.

14. ~~What is the Program's vision of what it will be like in the next 5-10 years?~~

15. ~~Discuss the plan for funding projects for your Program to meet its objectives.~~

16. ~~What are the Program's projected needs, space, acquisitions, and capital equipment for the next five years? Provide any estimated cost and rationale for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?~~

~~Statement of Need~~	~~Cost (if any)~~	~~Rationale and Method of Evaluation~~	~~Planning Processes To Secure Resources~~

17. ~~What are the Program's needs for support resources for the next five years? Provide any estimated cost and rationale and benchmark for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?~~

~~Statement of Need~~	~~Cost (if any)~~	~~Rationale, Benchmark, and Method of Evaluation~~	~~Planning Processes To Secure Resources~~

18. ~~What are the Program's projected needs for instructional information technology for the next five years? Provide any estimated cost and rationale and benchmark for this projection. What method of evaluation led to this statement of needs? What planning processes are in place to secure the internal and external resources necessary to meet these needs?~~

Statement of Need	Cost (if any)	Rationale, Benchmark, and Method of Evaluation	Planning Processes To Secure Resources

Appendices

Appendix A. Curriculum

The MCS catalog pages have been included with this document as PDF using filename prefix AppA. Unfortunately, the native file type of those pages is html and consequently a conversion to PDF was required which resulted in a less than perfect representation of the pages.

Appendix B. APR Data Sets

The APR Data Sets are included here as the files named:

    a. Mathematics & Computer Science Course Enrollment
    b. Mathematics & Computer Science Data Set 2013-14
    c. MCS Faculty Instructional Workload 2011-12 & 2013-14
    d. MCS Ret-Grad Data 2013-14

Appendix C. Technology in the Classroom

Out of 11 surveyed, only Hossain Khoroosi is occasionally not full time. He is the only respondent that is not either full time renewable academic staff or regular faculty. Most semesters he is full time between his work for remedial and filling in for things such as chair release.

Technology	Number of Faculty Who Regularly Use	Number of Faculty Who Would Use If Available
Overhead	6	IS available
VCR/DVD	0	IS available
Slide Projector	0	0
Integrate tech. equipment (digital cameras, laptops, handheld computers, etc.)	10	IS available
Computer lab	9	IS available
Multimedia presentations by faculty	5	IS available
Multimedia presentations by students	4	IS available
Internet use in classroom presentations	8	IS available
Online syllabi	9	IS available
Internet assignments	9	IS available
Chat rooms for student interaction	1	IS available
Online bulletin boards/discussion boards	4	IS available
Online quizzes or exams	5	IS available
Online lecture notes or handouts	8	IS available
Faculty web page	4	IS available
Resource links provided to students	7	IS available

Wireless network	7	IS available
D2L	8	IS available
Electronic Reserves	???	???
Other (identify)		

Appendix D. Academic Department Revenue Not Included in S&E Budget*

To fit into the table format provided, this is truncated to the thousand and reported in thousands.

Source	2008	2009	2010	2011	2012	2013	2014
136 Remedial Ed Math	$62	$63	$61	$54	$58	$67	$68
136 DLC Support	$1	$1	$0	$1	$1	$2	$1

Appendix E. Capital Equipment* Request for Continuous Improvement

Summarized below are the capital equipment needs projections between now and the next APR (in approximately 7 years) aggregated in, hopefully, useful ways. A more detailed picture of actuals since 2011 and projections to 2024 can be found in the spreadsheet included here titled MCS Technology Budget.

Note that the second row may or may not need to be included here. MCS did an accounting for SWE 2011 and 1017 since these classrooms are generally used for ITS and CSCI courses. However, they are campus labs and those courses are subject to use by other departments. Consequently, there may be more general lab maintenance plans for the campus under consideration. But, as a matter of completeness, it was included here.

Requested Capital Equipment	Cost	Rationale
Replacement work stations	**$30,000**	**Such equipment needs to be replaced every 5 years or so. MCS has had its work stations for 3 years now so they will certainly need to be replaced sometime before the next review in approximately 2021. This is 12 stations at about $2500 each.**
Swenson Labs (e.g. SWE 1017 and SWE 2011)	**$115,442**	**Again, roughly every 5 years such technology needs to be replaced. The equipment is currently 3 years old. This includes equipment and software.**
Network Infrastructure	**$64,772**	**This represents equipment used for departmental networking equipment. This serves not only standard purposes as in every department but for MCS it reflects an environment suitable for teaching the relevant**

		array of concepts for courses in ITS and CSCI.

* This refers to anything costing more than $5,000 that has a useful life of more than one year.

Appendix F. Formal Program Articulations with Other Institutions

No new articulations during this time period. We have an old one with LSC from 2005 but it hasn't been updated. I've included it here under the filename LSC_Articulation_2005.

Appendix G. Strategic Plan

MCS does not (to the best that the writer of this document could discern) have a written and endorsed strategic plan different from simply fulfilling its role within the campus wide strategic plan.

Appendix H. Mentoring Plan

The mentoring plan that was used in our last few searches is included here under the filename MCS_Mentoring.