



Mathematics Program Portfolio

Description of Program

The BA/BS in Mathematics is based on the recommendations of the Committee on the Undergraduate Program in Mathematics (CUPM), a working committee of the Mathematical Association of America. These recommendations acknowledge the need for people trained in disciplined, logical reasoning and who understand the basic methods and models of the mathematical sciences and who are able to convey their mathematical knowledge orally and in writing. The result is a program that provides broad coverage of the main branches of mathematics and yet includes opportunities for in-depth examination of special topics such as probability, statistics, operations research, and discrete mathematics.

Students majoring in mathematics may elect to take the three required quarters of Calculus (Math 251, 252 and 253) in their freshman year.

Two quarters of Linear Algebra (Math 261 and 262) follow in the sophomore year. Discrete Mathematics (Math 231) is a spring term offering. During the sophomore year students also enroll in Principles of Statistics (STAT 315) and Introduction to Statistical Computing (STAT 316).

Program requirements typically presented to juniors are Structure of Number Systems (MATH 382), Abstract Algebra (MATH 447) and Real Analysis (MATH 415).

The only required course scheduled for the fourth year for mathematics majors who completed Calculus in their freshman year is the three credit capstone seminar (MATH 407). In this course students and faculty work together to design appropriate studies that integrate material from a variety of courses in the mathematics curriculum.

The four-year plan described above constitutes the required course core of the Mathematics program. In addition to the core a Mathematics degree candidate must complete twenty-four credits in mathematics courses numbered 254 or above. Mathematics majors must also complete at least seven hours of computer science courses.

An alternate route through the mathematics program begins with College Algebra and Precalculus (MATH 111-112) taken in the freshman year. After completion of these courses students enroll in Math 251, which is offered in the spring quarter. The next three years, typically, focus on the core of required math courses identified previously, plus electives, the capstone seminar and the general education requirements necessary to round out any Bachelor of Science degree program.

The mathematics program also provides course work for students who need to review in basic skills. Additionally, the program offers a yearlong sequence in Foundations of Elementary Mathematics I, II, and III (MATH 211, 212, 213) introducing basic concepts of elementary mathematics, leading to an understanding and appreciation of the nature, structure, philosophy, and history of mathematics. MATH 212 and 213 fulfill requirements for general education program's communication and critical thinking component. Loans and Lotteries (MATH 105) is a course developed specifically to serve the needs of the general education program, for students who will not be studying further mathematics.

Every student pursuing a Bachelor of Science degree at the University must take at least one mathematics (or statistics) course. Among those programs requiring *more* than one course are the following: Agricultural Sciences; Biochemistry; Biology; Business/Economics; Business Administration; Chemistry; Computer Science; Multimedia; Nursing; Physical Education and Health; Physics; Pre-professional programs in the health sciences; Engineering.

How Program serves the Mission of the University and needs of region

The mathematics program supports the mission of the university by providing the necessary mathematical and statistical support courses for students in many disciplines, including computer science, physical and biological sciences, social science, business and economics, education, and health. The program plays a major role in the preparation of highly qualified teachers of mathematics for elementary, middle, and secondary schools. Graduates also find employment in the private sector. The program serves the region by promoting outreach activities such as the annual high school mathematics contest.

EOU Mission (proposed) n: EOU is an exemplary student-centered institution serving rural Oregonians. As an educational, cultural and scholarly center, we are dedicated to serving rural Oregon and beyond through intellectually challenging and flexible programs of instruction, faculty and student research, and engaged service (civic engagement). We have a special commitment to the educational, social, cultural, and economic needs (and benefits) of eastern Oregon.

Program Objectives/Outcomes

The goals and objectives of the mathematics program at Eastern Oregon University are as follows:

1. Provide a major in mathematics which will develop attitudes of mind and analytical skills required for effective use, understanding, and further study of mathematics.
2. Prepare highly qualified teachers of mathematics for elementary, middle, and secondary schools.
3. Provide the necessary support courses in mathematics and statistics for other disciplines including the natural sciences, social sciences, business and economics, nursing, computer science and multimedia, and engineering transfer programs.
4. Provide mathematical and statistical consulting services to the residents of eastern Oregon.

The program seeks to inculcate in each student a strong background in the foundational content of contemporary mathematical practice and dialogue, including, but not limited to elementary algebra, calculus, geometry (both as an example of axiomatic development and its relation to algebra and analysis), abstract algebra and analysis, topics in linear algebra and discrete mathematics.

Students should, over the course of study, develop the skills of independent, careful analysis of mathematical exposition. They should develop problem-solving skills in the context of mathematics, and the ability to apply techniques learned in the study of specific topics in new areas. They should develop skills of inquiry and conjecture at every level based on a thorough investigation of fundamental ideas and procedures. Students in mathematics will (2003):

- Demonstrate an understanding of the fundamental areas of mathematics: calculus, linear algebra, probability and statistics, applications of mathematics, algebraic structures, and real analysis;

- Develop and employ skills in logical reasoning and mathematical rigor;
- Develop and employ skills in problem solving and modeling;
- Develop and employ skills in computer programming and effective use of mathematical software.

Program Objectives (2006-08 catalogue):

The program in mathematics has three primary objectives:

- To provide a major in mathematics that develops the attitude of mind and analytical skills required for effective use and understanding of mathematics.
- To prepare highly qualified teachers of mathematics for elementary, middle, and secondary schools.
- To provide the necessary mathematical and statistical support courses for students in other disciplines, including computer science, physical and biological sciences, social science, business and economics, and health.
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If you were asked what three or four things a student would take away from the University after having graduated in the major, what key things would these be?

Outcomes are traits that the student carries with them as a result of their education—knowledge, skills, attitudes, proclivities, abilities, conceptual understandings, etc. The challenge is to limit these major outcomes into a simple handful, to a long laundry list of what every student should know.

Anything that is listed as an outcome should be able to be assessed in some way, so the fewer things that are on the list, the fewer things will need to be tracked.

Optional picture of students engaged in the discipline breaks up the text here and provides a visual example of students doing something in the discipline.

Recent Programmatic Changes

The Mathematics program's collaboration with other disciplines has led to the development of new courses, including the addition this year of a 200-level course in discrete mathematics to support the computer science program. Faculty members regularly review the program's core and elective courses to assure that it is up-to-date and aligned with current national recommendations and standards. The recent addition of an elective course in mathematical modeling exemplifies the Mathematics program's responsiveness to student needs and interests.

The number of students pursuing a Mathematics Major has remained steady, while those enrolled in service courses or pursuing the minor has grown rapidly from 2001-2003.

The Mathematics Program has undergone only modest curricular change since 1998, but the face of the program has changed significantly, as only two of the current faculty members were here in 1998.

The only change to the major is the addition of Math 231, Discrete Mathematics, to the list of major requirements, and a corresponding decrease in the number of electives required.

We have also changed the credits associated with several courses, reducing Differential Equations from five credits to four, and increasing Complex Variables and Fourier Analysis from three to four.

There have been some additional sections of certain courses added as demand from client disciplines has increased. In particular, we offer more statistics classes than in 1998. We have also increased our distance offerings. We now offer distance versions of Math 105, Math 111, Math 211-213, Math 241, and Stat 311-312 (equivalent to Stat 315).

Key Programmatic Curricular Assessment Features

Student achievements assessed for outcomes include midterm and comprehensive final examinations, homework exercises and quizzes, individual and group projects, classroom presentations, term papers, and a capstone project. For example, students generally demonstrate their mastery of fundamental areas of mathematics through performance on examinations. Skills in logical reasoning are demonstrated either by constructing rigorous proofs of mathematical theorems, or constructing counterexamples if applicable. In addition to regular course work, problem-solving skills may be demonstrated through participation in the Mathematical Contest in Modeling. Classroom presentations enable students to develop skills in communicating mathematical ideas and subtleties to their peers. Every graduating senior completes a capstone project demonstrating the student's development in multiple areas.

During the winter term of 2005, the Mathematics Program will be assessing two classes – Math 252 (Calculus II) and Math 407 (Capstone Seminar). Both courses are a part of the major in mathematics; the former is usually taken during the freshman or sophomore year and the latter at the end of the senior year.

Upper Division Course – Math 407 (Capstone Seminar)

A substantial portion of the evaluated work in the Capstone Seminar is a 40-minute oral presentation followed by a question-and-answer period. Each student must research, organize, and present on a mathematical topic of their choice and approved by the instructor. These presentations are judged on a student's organization, ability to communicate ideas, depth and audience-appropriateness of content, accuracy of understanding, and effective use of classroom media. For each of these five categories, each student will be judged to be either (Unacceptable, Satisfactory, or Exceptional); a rubric for each category is attached. These criteria effectively evaluate one of the Mathematics Program objectives: "To prepare highly qualified teachers of mathematics for elementary, middle, and secondary schools" and the learning outcome "To develop and employ skills in logical reasoning and mathematical rigor".

Lower Division Course – Math 252 (Calculus II)

Catalogue Description – Topics from elementary real analysis, i.e., limit concept, continuity, differentiability, integration, infinite sequences, series, multi-variate calculus and applications.

Math 252 is both a lower division requirement for the mathematics major and a general education course in the area of Quantitative Reasoning. The calculus sequence helps mathematics meet two learning outcomes – "To develop and employ skills in problem solving and modeling" and "To demonstrate an understanding of the fundamental areas of mathematics". The Quantitative Reasoning general education outcomes require that "Students should be able to use mathematical abilities to solve problems and communicate such analyses effectively via writing and graphics". Both the program outcomes and general education outcomes will be assessed using embedded questions on a midterm and a final exam. The problem solving objectives will be assessed through a computational question on the midterm and final. The fundamental understanding objective will

be assessed through a conceptual question on the midterm and final exam. A rubric for judging each answer as EXEMPLARY, PROFICIENT, MARGINAL, or UNSATISFACTORY is attached.

Each major and selected minor will need to identify the key features that will be used to determine if students are attaining the goals of the program and, more importantly, in how successful the program is in imparting these goals. Course grades are not a sufficient measure of student achievement because they offer no insight on the success of a program. If all students received A's or C's or whatever grade, for that matter, what does it say about the efficacy of the program? Course grades may be used to determine the amount of knowledge or skills a student may obtain, but it provides no reference to how well the program facilitates the learning outcomes. Significant projects, capstones, summative tests, senior projects, presentations, or key assessments in particular courses are better ways of determining the summative outcome of the program.

The assessment plan offered here is a summary of what the major will do to determine program efficacy. A complete plan includes the specific assessments, the benchmarks or expectations concerning the level of achievement expected, the cycle for how often these assessments will be applied, collected and stored, and finally, the process by which the faculty will take to determine the import of these data on curriculum modification or teaching adjustments required.

Current Programmatic Assessment Reflections/Recommendations of Curriculum and Instruction

The Mathematics Program performed a self-assessment in 2005, with a focus on two courses: Math 252 (Calculus II), and Math 407 (Capstone).

For Math 252, program outcomes and general education outcomes were assessed using embedded questions on a midterm and a final exam. The problem solving objectives were assessed through a computational question on the midterm and final. The fundamental understanding objective was assessed through a conceptual question on the midterm and final exam. A rubric for judging each answer as EXEMPLARY, PROFICIENT, MARGINAL, or UNSATISFACTORY was developed. Please consult the referenced document for the analysis and conclusions.

In Math 407, a two-term course, student's winter presentations were evaluated on five criteria – Organization, Effectiveness of Communication, Depth of Content, Accuracy of Understanding, and Effective Use of Media. Each category was rated as Exemplary, Satisfactory, or Unacceptable. Please see the referenced document for the rubrics, data, and conclusions.

The most important feature of programmatic assessment is the faculty's reflection on the data. By monitoring student success at a summative point one can reflect on any deficits or weaknesses that may have resulted in a weakness of the program itself. Faculty must be able to ultimately ask the question about their curriculum and practice: "What can we learn from looking at our graduates' achievements and how can we adjust the program to better serve students? This is the, so called, "closing the loop" of the assessment cycle. If we do not get to this stage in our development with our regional body, then we will be required to revisit this area until we do.

Student Accomplishments

Connected to the outcomes listed above, key samples of student work are important artifacts. A summary of student projects, papers, research, etc should be discussed here with a flag to an appendix with sample work.

Programmatic Assessment: Synthesis and Recommendations

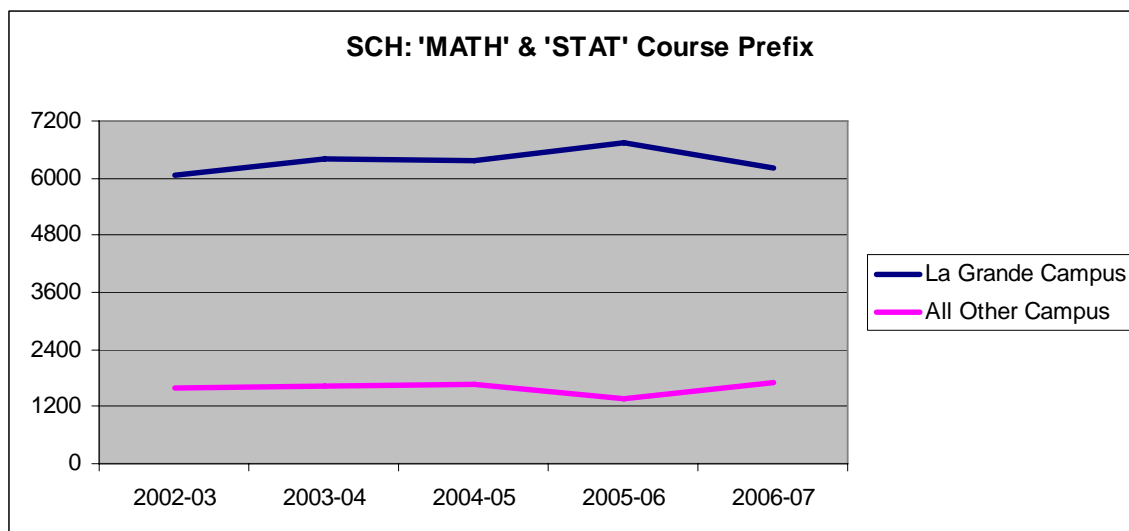
The results of the earlier assessment have led to some changes in the Math 407 course, and further changes will be implemented next year. The overall goal is to increase the depth and quality of the scholarship pursued by students in the course. To this end, it is recommended the instructor and students identify each student's overall project by end of week seven of winter term. This will allow students to begin preliminary discussion of their work before the end of winter term. This year each student is making regular, but short, presentations throughout spring term. We have found that the requirement of these preliminary discussions provides the primary motivation that serves to help students focus their efforts and energy. The requirement of regular update presentations is proving to be effective in raising the standards for both scholarship and presentation.

With regard to the Program's responsibility and goal of effectively preparing teachers, we refer to the data provided by the College of Education on student success in the Praxis examinations. Records kept since 2001 indicate that all twenty-five EOU mathematics graduates entering the EOU MTE program have successfully passed the required Praxis exams.

Based on the program assessments, the data collected, and the analysis of student performance, what recommendations for change are made by the faculty? A bulleted action list may suffice here.

Enrollment Program Performance

5 Year Student Credit Hours Generated by 'MATH' & 'STAT' Course Prefix



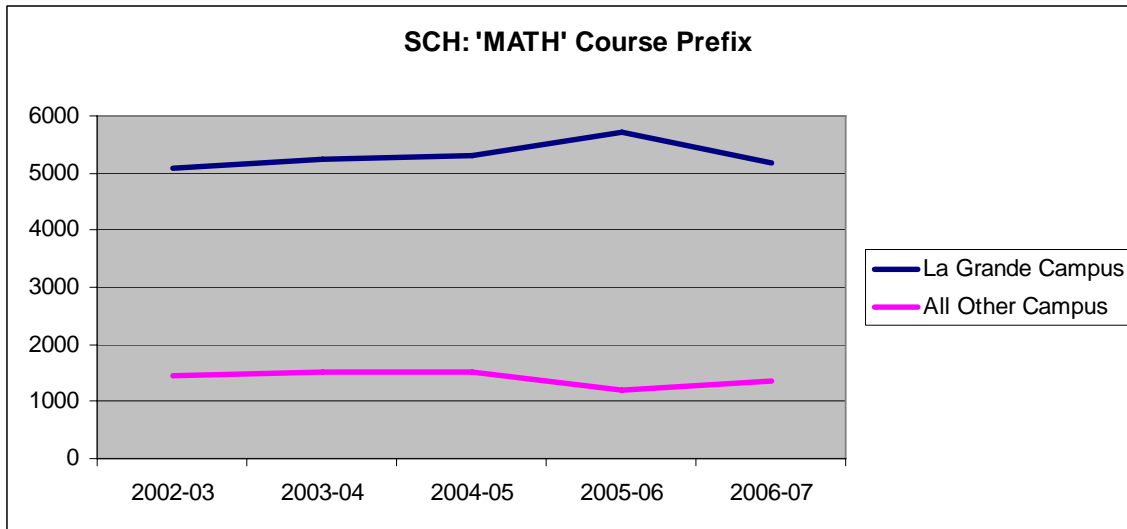
	2002-03	2003-04	2004-05	2005-06	2006-07
La Grande Campus	6046	6395	6367	6755	6222
All Other Campus	1598	1632	1680	1368	1694

Total	7644	8027	8047	8123	7916
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*SCH includes all terms effective end of term

Eastern Oregon University

5 Year Student Credit Hours Generated by 'MATH' Course Prefix

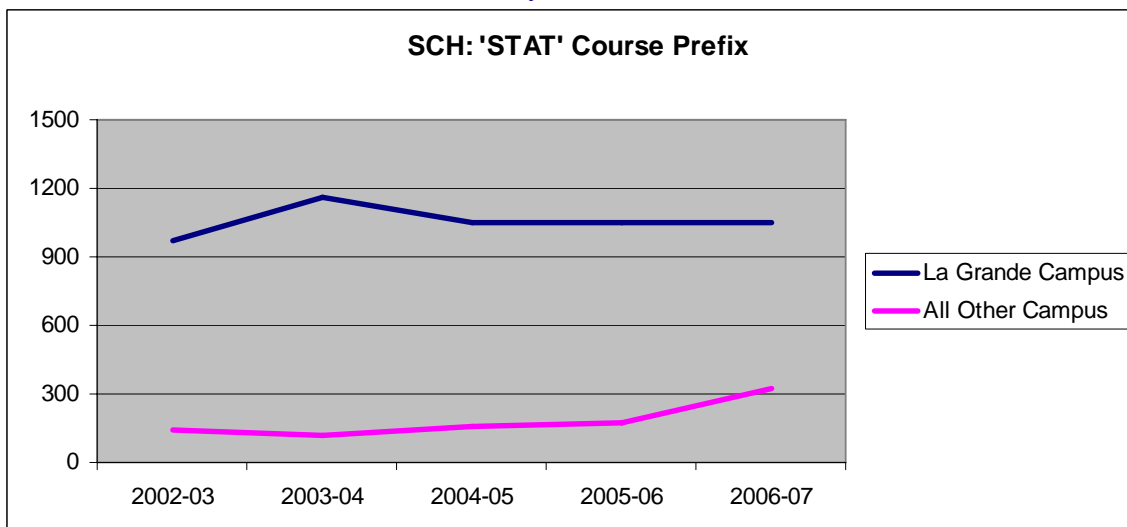


	2002-03	2003-04	2004-05	2005-06	2006-07
La Grande Campus	5073	5233	5316	5706	5170
All Other Campus	1453	1512	1520	1196	1373

Total	6526	6745	6836	6902	6543
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*SCH includes all terms effective end of term

5 Year Student Credit Hours Generated by 'STAT' Course Prefix



	2002-03	2003-04	2004-05	2005-06	2006-07
La Grande Campus	973	1162	1051	1049	1052
All Other Campus	145	120	160	172	321

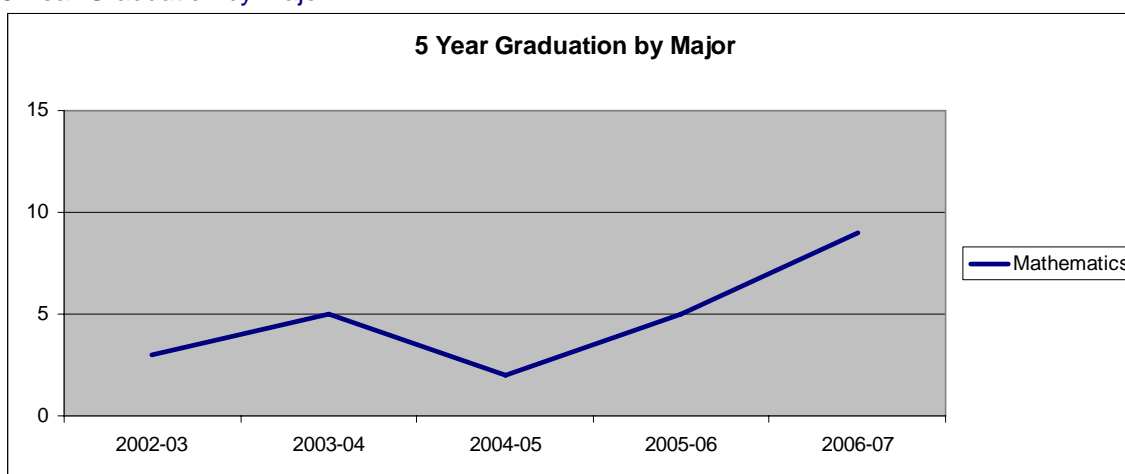
Total	1118	1282	1211	1221	1373
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*SCH includes all terms effective end of term

The data are provided by the Provost's Office. These data are Banner polled based on prefix for SCH and by major for graduates. If the data seems in error in anyway, then each program must provide notes.

Commentary on Enrollment and Graduate Trends

5 Year Graduation by Major



	2002-03	2003-04	2004-05	2005-06	2006-07
Mathematics	3	5	2	5	9

The program faculty are welcome to summarize or note these data giving any conditions of considerations in their interpretation.

Program and Course Scheduling Requirements

Each program shall determine the minimum model necessary to support the success of students in completing the major and in support the needs of general education and service courses for other majors. Careful consideration must be given to smaller section sizes. If small (less than 15) then examine the possibilities of collapsing sections in such a way as they are offered once every two years.

General Education and Service Course Schedule

FALL YEAR 1

	Load	Mean
Course	Hours	Enroll

FALL YEAR 2

	Load	Mean
Course	Hours	Enroll

WINTER YEAR 1

Course	Load Hours	Mean Enroll
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WINTER YEAR 2

Course	Load Hours	Mean Enroll
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SPRING YEAR 1

Course	Load Hours	Mean Enroll
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SPRING YEAR 2

Course	Load Hours	Mean Enroll
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TOTAL

TOTAL

Major Course Requirements

FALL YEAR 1

Course	Load Hours	Mean Enroll
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FALL YEAR 2

Course	Load Hours	Mean Enroll
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WINTER YEAR
1

Course	Load	Mean
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WINTER YEAR 2

Course	Load	Mean
--------	------	------

Hours Enroll

Hours Enroll

SPRING YEAR 1

	Load	Mean
Course	Hours	Enroll

SPRING YEAR 2

	Load	Mean
Course	Hours	Enroll

Compute the total SCH Required per academic year (General Education and service courses and major courses)

Staffing

Faculty: Pedro Dabalsa, M.S., Instructor; Kay Firor, B.S., Instructor; Kazue K. Marlette, BS, Instructor; Stephen Tanner, Ph.D., Assistant Professor; John Thurber, Ph.D., Associate Professor; D. James Tooke, Ph.D.; Professor; Jane Whitmire, Ph.D., Visiting Assistant Professor.

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

Cost Ratios

Load/Faculty On Campus

The Provosts Office will help make these calculations for each major/minor. We will provide the raw data and computations for these areas. Prepares should

make notes or –provide clarifications if the data are inadequate to communicate the entire truth.

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

Total SCH is -----

ON Campus SCH -----

ONLINE SCH -----

ON SITE SCH -----

SCH/Faculty ratios:

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

Summary Recommendations/Observations

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

Administrative Review of Program

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