A. ASSESSMENT OF INTERNAL AND EXTERNAL FACTORS AND STUDENT SUCCESS: Perform a SWOT analysis of your program, indicating the STRENGTHS, WEAKNESSES, OPPORTUNITIES, and THREATS in relation to program goals and available resources, including an evaluation of the curriculum in terms of student needs. Analyze the external factors affecting program goals and performance, e.g., changes in demographic, educational, social, economic, workforce, or global trends; evolving technology; demand (based on enrollment trends or other factors); linkage with other related campus programs, services, or committees; local availability of similar programs; availability of auxiliary funding. Include supplemental survey results and other data whenever available. (References: Educational Master Plan; Curriculum Sheet; Department and All-College Program Review Data (Retention, Success); 1999-2000 Program Planning Summary; Other_________)

1. Internal factors: For the last three years Math has been the largest program on campus enrolling about 3,000 students each quarter. Math serves two major groups of students with subsets in each group. The first group includes students needing developmental course work at the pre-collegiate level. Over 50% of the incoming students, who take the placement test, are identified as needing developmental course work in mathematics (Math 105 or lower). The second group is for college transfer level math either in general fields or fields related to the sciences and engineering. At San Jose State University engineering is the second or third most popular transfer major, with business being number one. Preparation in math is essential for both of these disciplines. To support these divergent student groups the department operates a Math Center, which is staffed by faculty and instructional associates and open five days a week for an average of 6.2 hours each day. Students receive assistance with learning, clarifying issues, and mastery of math concepts presented in all departmental courses.

2. External factors: As cited above, many of the students entering Foothill and higher education lack fundamental math skills to succeed in college. Over 50 percent of the students entering CSU are not ready for college level math, and that system selects from the top third of the high school graduating class. After one year at a CSU system school, students who are not qualified for college level math courses will be dropped. San Jose State has dropped over 600 students each year for the last two years. Foothill is anticipating many of these students will show up in our courses. Qualified and skilled teachers remain a limiting factor in Foothill’s ability to respond to this need. The State budget deficit will further restrict Foothill’s ability to respond as there has been a district wide hiring freeze in place for full time instructors, in addition other budget cuts will restrict the hours and staffing of the Math Center for the 2003-2004 academic year.

B. STUDENT SUCCESS EVALUATION: Briefly discuss how the program is performing relative to program and college projections for student success. Comment on specific student success programs or services provided by the college that you perceive to be particularly valuable to your students. Identify unmet needs related to student success. (References: Educational Master Plan; Curriculum Sheet; Department and All-College Program Review Data (Success); 1999-2000 Program Planning Summary; Other_________)

Overall at Foothill student success rates in math courses is 65%. This is about 15% below the college average for all other courses. Students in college level math courses tend to do better than the department average while the success rate in lower level courses tends to be lower. Success in the next level course for basic skills math, as reported by the State of California, is around 35% to 38%, which ranks Foothill in the highest 10% for community colleges, as our success rates are much higher.

C. STUDENT EQUITY/DIVERSITY ANALYSIS: Student equity may already be defined as a factor in the above assessments. Use this section to offer additional observations and to specify other needs related to bringing your program into alignment with college or program goals for student equity. (References: Educational Master Plan; Division and All-College Program Review Data (Success by Ethnicity, Gender, Age); Other_______________)

All students perform at a level below the campus average in math courses. Asians and white students do best at 72 percent and 68 percent success rates. Success rates for Pacific Islander (40%), Native American (42%), African American (48%), and Hispanic/Latino (52%) are significantly below the averages for other groups of students in math. Compared to the all college average for similar cohorts, Asian and white
students in math succeed at a lower level (10% less). While the minority groups listed above perform at a rate nearly 30 percent below similar cohorts all college average. Although math success rates are less than Foothill campus averages, it is true that Foothill campus averages are much higher than state success rates, and success rates in math are historically less than success rates in other programs across the country.

Enrollment in math courses by ethnicity is essentially proportional to the all college composition. However, Asians are slightly over represented while whites are slightly under represented compared to the campus population.

D. ACTION PLANS AND PROPOSED PROGRAMMATIC CHANGES: Review the Education Master Plan (EMP), Partnership for Excellence (PFE) goals, Curriculum Sheet, and Department Program Review Data. Using measurable terms, describe the program's goals related to these documents. (Examples: “The number of students issued a Career Certificate will increase by five over last year's figure.” “The program will initiate an advisory board.” “Faculty will examine learning goals for their programs and courses.” Etc.)

1. Program Goals Related to Educational Master Plan and Partnership for Excellence:

PFE funding for basic skills math, math center, and faculty reassigned time is being reduced for 2003-04 as part of the State budget reductions. This has the potential for reduced service to students, lower PFE performance measures, reduced enrollment, and an inability to respond to improving student success.

2. Other Program Improvement Plans:

The math department is currently working to improve the basic skills program by upgrading course outlines, supporting revisions and additions to existing curricula with manuals written by department faculty, trying alternate approaches to a traditional lecture/discussion delivery of content, and looking at the possible addition of a study skills course. The other area of planned improvement is in upgrading hardware and software in the Math Center, as well as in finding alternate ways to maintain the Math Center’s current level of service to the campus in light of state budget reductions already noted in (1) above. Success in planned basic skills improvements will be measured by retention and success rates in a current class as well as in success rates in the next course of the sequence. Success in the Math Center’s improvements can be measured by WSCH generated by the Math Center as well as in the overall success and retention rates of the Math department, which benefits as a whole from the services provided by the Math Center.

E. ENROLLMENT AND PRODUCTIVITY GOALS (References: Program Review Data Sheet (Enrollment and Productivity); Other________________)  

The State economy will have an increasing influence on math enrollment and productivity. As long as unemployment remains high in Santa Clara county demand for traditional courses, such as math, will remain high. CSU displaced students potentially will increase demand as well. Program growth has been orderly at about one to three percent each year and this could be sustained if all other factors were equal. However, the State budget response may have the effect of reducing our ability to serve potentially increasing demand, as insufficient growth funding, reduced PFE funding, and reduced general funds will serve to reduce Foothills ability to respond to the increased demand. If resources are available to meet the demand the department could sustain a two to three percent growth rate.

Productivity (WSCH/FTE) in math has average 587 over the last three years with a range of 562 to 620. This is well above the campus average of 551 in the same time frame and above the district goal of 530.

F. SUMMARY OF RESOURCES REQUESTED: Summarize resources needed to reach program goals and describe the expected outcomes for program improvement. (Specifically what will be the outcome of receiving these resources? What will happen if the resource requests aren't granted?) Complete any of the following sections that apply to your current program needs.

1. FULL-TIME EQUIVALENT FACULTY OR STAFF NEEDS:

The percent of instructional hours offered by full-time faculty averages around 50 percent measured by assignment type. This percentage dropped from 56 percent to 46 percent for the years 2000-01 and 2001-02. Assuming no growth and the same mix of F-T : P-T course offerings, seven additional FTEF will be required to reach the 75 : 25 target ratio.
To offset reduction in TEA employees in the Math Center, hire another full-time classified Instructional Associate to replace the loss.

2. FACILITIES NEEDS: (Include all aspects of the physical setting, e.g., room size, seating type and arrangement, multimedia equipment, lab stations, etc., that might provide a more effective student learning environment.)

In light of plans to improve the basic skills program, the department needs to find ways to expand the square footage of the Math Center or identify an additional facility. Also, more faculty are using multimedia and the Internet and existing classrooms are not set up to support the technology needs created by these changes. More classrooms that have a computer and a data projector for the instructor are needed.

3. MATERIALS AND SUPPLIES BUDGET AUGMENTATION:

Augment the math budget to put additional software in the KCI and Math Center (e.g., Mathematica, Minitab, MATLAB, etc.). Also, many of the computers in the Math Center are past their useful life and need to be replaced. A few computers are broken and unable to be fixed. Currently there is a need to replace about 8 computers in the Math Center.
PART B: PROGRAM PORTFOLIO WORKSHEET

PROGRAM NAME: MATHEMATICS
Degree/certificate options available: A.S. Degree in Mathematics

PROGRAM MISSION
The mathematics department has four basic missions: successful transfer of mathematics and science majors to four year institutes, provide a variety of courses to satisfy general education requirements, provide educational support for vocational educational programs, and basic skills, i.e. developmental coursework at the pre-collegiate level.

EXPECTED STUDENT OUTCOMES
1) Depending upon the field of study, graduates from the transfer program will have studied a variety of mathematical fundamentals of calculus, differential equations and linear algebra in preparation for further study in the client disciplines.
2) The goals for general education are to provide students with some basic mathematical maturity beyond intermediate algebra. Courses students typically take are from statistics, trigonometry, finite mathematics and calculus for business and social sciences.
3) Vocational support is provided mainly through courses in beginning and intermediate algebra.
4) Basic skills training for those individuals requiring remedial work in mathematics through courses in arithmetic and algebra.

<table>
<thead>
<tr>
<th>PROGRAM CONTENT PROFICIENCIES/ COMPETENCIES</th>
<th>DESIRED ATTRIBUTES: What should a student be able to do upon graduation?</th>
<th>REQUIRED PROGRAM COURSES related to this outcome: Where do students acquire experience?</th>
<th>OUTCOME MEASURES — Evidence or Sample Demonstrating Deep Learning: How do we know what a student has achieved?</th>
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<tbody>
<tr>
<td>Knowledge of mathematical concepts - differentiation</td>
<td>Demonstrate an understanding of limits and differentiation to functions of a single variable and more than one variable.</td>
<td>MATH 1A, 1C</td>
<td>Direct Measures 1. Students will perform homework, collaborative projects, and take a variety of testing instruments including a comprehensive Final Exam. 2. Successful completion of the proficiencies/competencies is indicated by a grade of C or better in all courses listed.</td>
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<tr>
<td>Knowledge of mathematical concepts – Integration</td>
<td>Demonstrate an understanding of limits and integration to functions of a single variable and more than one variable.</td>
<td>MATH 1B, 1D, 2A</td>
<td>Direct Measures 1. Students will perform homework, collaborative projects, and take a variety of testing instruments including a comprehensive Final Exam. 2. Successful completion of the proficiencies/competencies is indicated by a grade of C or better in all courses listed.</td>
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<tr>
<td>Knowledge of mathematical concepts – vectors and vector calculus</td>
<td>Demonstrate an understanding of vectors and their properties, including their use in calculus and linear algebra, examples from vector fields to include, the gradient, divergence and curl, examples from linear algebra including abstract vector spaces and eigenspaces.</td>
<td>MATH 1D, 1C, 2B</td>
<td>Direct Measures 1. Students will perform homework, collaborative projects, and take a variety of testing instruments including a comprehensive Final Exam. 2. Successful completion of the proficiencies/competencies is indicated by a grade of C or better in all courses listed.</td>
</tr>
<tr>
<td>Knowledge of applications of</td>
<td>Applications to include (but not limited to) those from economics, chemistry,</td>
<td>MATH 1A, 1B, 1C, 1D, 2A, 2B</td>
<td>Direct Measures 1. Students will...</td>
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| PROGRAM CONTENT PROFICIENCIES/COMPETENCIES | DESIRED ATTRIBUTES: What should a student be able to do upon graduation? | REQUIRED PROGRAM COURSES related to this outcome: Where do students acquire experience? | OUTCOME MEASURES — Evidence or Sample Demonstrating Deep Learning: How do we know what a student has achieved? |
|------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------|
| mathematics to applied and social sciences | computer science, statistics, biology, and physics, including optimization, and mathematical modeling in these disciplines. | | homework, collaborative projects, and take a variety of testing instruments including a comprehensive Final Exam. 2. Successful completion of the proficiencies/competencies is indicated by a grade of C or better in all courses listed. |

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<tr>
<th>CORE COMPETENCIES</th>
<th>CORE COMPETENCIES: Outcomes and Attributes Distinct to This Program</th>
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</thead>
<tbody>
<tr>
<td>Communication</td>
<td>• Demonstrate effective written communication through analysis and interpretation of relevant theory learned throughout the course, as well as in applying this theory to applications in the scientific and social sciences. • Demonstrate effective oral and interpersonal communications through collaborative problem solving activities like group work, presentation of results to the class, and computer lab assignments completed in teams. • Communicate ideas through the appropriate use of technology like graphing calculators, mathematical software, and the Internet.</td>
<td>MATH 2, 10,1A, 1B, 1C, 1D, 2A, 2B, 51</td>
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<tr>
<td>Computation</td>
<td>• Express mathematical information in graphical, numeric, or symbolic form and competently use a combination of these methods to successfully solve a problem. • Model problems from various disciplines in a mathematical form and apply relevant theory or problem-solving algorithms learned in the course to solve such problems. • Break a complex problem into multiple parts and employ any combination of deductive, inductive, or symbolic reasoning to solve the problem. • Use appropriate technology to perform problem-solving tasks. • Use quantitative reasoning to decide if an answer is reasonable.</td>
<td>MATH 2, 10,1A, 1B, 1C, 1D, 2A, 2B, 51</td>
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<td>Creative, Critical &amp; Analytical Thinking</td>
<td>• Develop a curiosity about how the material learned in the course can be applied in new ways. • Apply existing knowledge to what was learned previously to successfully complete more advance coursework; learn how to learn mathematics. • Synthesize a new realization from separately learned facts over one or more courses to make conjectures about how this realization applies to existing concepts or when considering new relationships. • Recognize limitations and strengths of</td>
<td>MATH 2, 10,1A, 1B, 1C, 1D, 2A, 2B, 51</td>
</tr>
<tr>
<td>PROGRAM CONTENT PROFICIENCIES/COMPETENCIES</td>
<td>DESIRED ATTRIBUTES: What should a student be able to do upon graduation?</td>
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| Community/Global Consciousness & Responsibility | - Develop a respect and appreciation for other points of view by working collaboratively with others on problems.  
- Understand ethical issues related to the difference between sharing ideas through collaboration versus the unauthorized use of the ideas of another, especially when this misuse is manifested in the form of plagiarism or cheating; develop the integrity to value the former and have disdain for the latter.  
- Increase self-esteem and confidence through the satisfaction that comes from completing coursework this is both challenging and increasingly more difficult.  
- Gain an appreciation for mathematical thinking and how it can be applied in one’s life and the world around us; engender an interest in learning about mathematics that lasts for a lifetime. | MATH 2, 10, 1A, 1B, 1C, 1D, 2A, 2B, 51 | - Students will receive a C or better in all courses listed. |