### 90-0059 --- USSP --- SUMMARY

California Community Colleges  
Curriculum and Instructional Resources Division

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<tr>
<th>FISCAL YEAR</th>
<th>ID NUMBER</th>
<th>COLLEGE</th>
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<tr>
<td>1990-91</td>
<td>90-0059</td>
<td>Cabrillo</td>
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#### PROJECT TITLE

Promoting Minority Transfer in Math, Science, and Engineering through Academic Outreach and Support

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<td>D --- Ed Services for New Clientele</td>
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<th>PROJECT DIRECTOR</th>
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<tr>
<td>Eva Costa, Director</td>
<td>Claire Biancalana, Dean of Instruction</td>
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#### PROPOSAL DESCRIPTION

Cabrillo College will implement an academic outreach and support program for under-represented students for the purpose of increasing enrollment of these students at Cabrillo and their subsequent transfer to a four-year institution. The project directly address the problem of too few African American, Hispanic-Latino, Native America, and Filipino mathematics and science students who pursue and complete college degrees. The college which will be joined by Pajaro Valley Unified School District in the project, will build on the concepts of the MESA program (Math, Engineering, Science Achievement) established by the University of California.

Components of the program include: (1) increased course articulation with the high schools and universities; (2) development of scholarships programs; (3) outreach to middle and high school students and their parents; (4) development of a program of community mentors as role models; (5) tutoring and supplemental instruction for skill building of students; (6) career counseling and advisement; and (7) linking these new activities to the existing MESA program.
Cabrillo College will implement an academic outreach and support program for under-represented students. The program will increase the number of ethnic minority students who enroll at Cabrillo and subsequently transfer to the University of California and California State University to study mathematics, science, and engineering.

This program will directly address the problem of too few African-American, Hispanic-Latino, Native American, and Filipino mathematics and science students who pursue and complete college degrees. Minority populations are historically under-represented in higher education for several reasons: a high attrition rate in high school; inadequate academic preparedness for college level work; few role models; and inadequate parental involvement in education. In order to overcome these barriers to academic success, students need support and encouragement long before they reach college. This program is designed to include outreach and support beginning with students in middle school and continuing through their studies at Cabrillo College.

The Pajaro Valley Unified School District (PWSD) will join Cabrillo College in this project. The feeder high schools in this district have a 59 percent minority enrollment and are ninth in the state in the number of Limited English Proficient (LEP) students enrolled. The PVUSD has been engaged in articulation and outreach activities with Cabrillo College for more than 4 years and is eager to expand these efforts.

The Cabrillo College program will build on the concept of the Math, Engineering, Science Achievement (MESA) program established by the University of California. Cabrillo has participated in this program that has served 60 local students in the last two years. This proposal is based on the experience gained from that pilot program and adds proven strategies to promote student success.

Components of this program include: (1) increased course articulation with the high schools and universities; (2) development of scholarship programs; (3) outreach to middle and high school students and their parents; (4) development of a program of community mentors as role models; (5) tutoring and supplemental instruction for skill building of students at Cabrillo and in high school; (6) career counseling and advisement; (7) linking these new activities to the existing MESA program.
Promoting Minority Student Transfer in Math, Science and Engineering through Additional Outreach and Support

1. Specific Educational Program Being Addressed

EDUCATIONAL PROGRAM AND SERVICES ADDRESSED
Cabrillo College will implement an academic outreach and support program for under-represented students. The mission of this program is to increase the number of students from ethnic minority groups historically under-represented in mathematics, science, and engineering who transfer from Cabrillo College to four-year universities. The program will provide academic outreach and support services for African-American, Chicano-Latino, Native American, and Filipino mathematics and science students from junior high school through community college graduation.

This Cabrillo College program takes as its starting point the Math, Engineering, Science Achievement (MESA) program established by the University of California. Cabrillo College’s experience with a limited MESA program has demonstrated not only the effectiveness of the MESA approach, but the need for increased effort. For the last two years, in cooperation with the University of California at Berkeley program, a Cabrillo College faculty member has worked with a mathematics faculty member at Watsonville High School. In this time sixty students were served. An analysis of this limited program and the need of these students provides the basis for developing the activities outlined in this proposal. Cabrillo College intends to develop new components to initiate a more complete and effective MESA project. This project will include both incentives and support services for students. The following are educational programs and services addressed in this project:

1. Articulation

Cabrillo College faculty and high school teachers will review and expand high school articulation agreements in mathematics and science. The college will build on existing guaranteed transfer agreements as well as course articulations already in place with the campuses of the University of California and California State University.
Working with the Pajaro Valley Unified School District (PVUSD), Cabrillo College will organize visits by high school mathematics, science, and engineering students to the Cabrillo College campus and the Cabrillo College Watsonville Center. Further, tours to nearby California universities will be arranged.

2. Counseling

This project will develop middle school, high school, and Cabrillo counseling programs designed to meet the needs of minority students in mathematics, science, and engineering.

3. Mentor Program

Minority engineers and scientists from the Santa Cruz County community will be recruited to serve as tutors and mentors for high school science, engineering, and mathematics students.

4. Parent Involvement

Recruitment activities will be developed to reach the middle school parents of minority students. Their participation will be encouraged through a Saturday mathematics program in which parents will learn to assist with their children’s study.

5. Supplemental Instruction

The project will develop supplemental instruction for students at the college and the high schools. This approach to skill building is based on a successful program initiated by Uri Triesman, a professor of mathematics at the University of California at Berkeley. His learning assistance program has demonstrated an increase in minority student success in mathematics.

6. Scholarship Program

This project will include the establishment of a connection with the Cabrillo College Foundation in order to develop a scholarship program. The scholarship program will provide the incentive and necessary financial support to keep students on track.

7. Link to MESA Activities

In addition, the college will tie into the established MESA statewide activities such as the MESANet newsletter for advisors and students, summer training for high school mathematics and science teachers, the MESA Day trip and competition, MESA Saturday academies, MESA awards event, and involvement of private sector professionals in the education of students.
2. Specific Problems Being Addressed

SPECIFIC PROBLEMS TO BE ADDRESSED
One of the major problems facing Cabrillo College is the inadequate numbers of minority students transferring to the University of California and the California State University in the areas of mathematics, science, and engineering. Specifically, the problems to be addressed are:

1) The high school attrition rate in the Pajaro Valley Unified School District is high; therefore, the pool of entering mathematics, science, and engineering students at Cabrillo is low. The schools in the unified district have a 67.9 percent Hispanic enrollment. The drop-out rate of Hispanics is far greater than that of the total high school population.

The Pajaro Unified School District reports that there is a high loss of students between the eighth and ninth grades. The second highest loss of students occurs between the tenth and eleventh grades. There is significant concern in this community over the number of students who begin but do not finish high school.

2) Students arriving at Cabrillo are underprepared. Sixty-nine percent of all students entering Cabrillo who are assessed in mathematics are not prepared for college level mathematics courses. A recent survey of more than 600 Cabrillo College students in mathematics classes demonstrated that over 50 percent expressed the need for help in improving mathematics skills

3) An analysis of the student attrition problem reveals that absence or insufficiency of social and academic support systems limits student success. This inadequacy of support is especially significant for the growing number of minority students. In addition to being poorly prepared for college level work, these students frequently lack the family support which is necessary to succeed in school. There is often little support in the student's world to reinforce the original notion that education is worth the effort and sacrifice it requires. Many minority students are the first ones in their families to seek a college education, and they often come from ethnic groups who have not traditionally been successful at the college level.

4) High School counselors report parents are not adequately involved in the education of their children. This involvement is necessary in middle schools and high schools to motivate students in their enjoyment and pursuit of education. Parental involvement at the college level is also necessary to alleviate students' fear of the unknown world of higher education.

5) Faculty are confronted with increased diversity of student backgrounds. They are in need of new teaching strategies and support in promoting student success. Faculty at
middle schools, high schools, and the college need to be more involved in the areas of recruiting and retaining students.
3. Population To Be Served

POPULATION TO BE SERVED

The population to be served in this project is the Chicano-Latino, Native American, African-American and Filipino population of the Pajaro Valley Unified School District (PVUSD) and Cabrillo College. Minorities constitute 67 percent of the students in the district’s middle schools and 59 percent of the district's high school enrollment. Hispanics constitute the largest minority group in the PVUSD. The district is ranked ninth in the state for the number of limited English proficient (LEP) students enrolled in its schools. Within the last 5 years the minority enrollment at Cabrillo College has increased by 71 percent.
4. Objectives

[SEE “WORKPLAN” IN THIS DOCUMENT.]
5. Workplan Narrative

WORK STATEMENT: OBJECTIVES, BUDGET, TASKS, TIMELINES, AND PERSONNEL

1. To increase the number of students who are prepared and motivated to enter Cabrillo College and transfer to the University of California and California State University in the disciplines of mathematics, science and engineering, Cabrillo College will increase its articulation activities with high schools and four-year colleges. $28,019

1.1 Establish program advisory committee -- Fall 1990 (high school, college and university representatives, Program Director, Dean of Instruction, Articulation Officer)

1.2 Counselors' breakfast and seminar -- Fall 1990 (counselors, Program Director, Student Development Director, Articulation Program Assistant, Food Services Technology faculty and students)

1.3 Training for Cabrillo College engineering and Watsonville Center counselors -- Fall 1990 (mathematics, science, and engineering faculty of high schools, Cabrillo College, and four-year universities, MESA representative, counselors, Program Director)

1.4 Update mathematics, science, and engineering articulation agreements with Watsonville and Aptos High Schools -- Fall 1990 (mathematics, science, and engineering faculty of high schools and Cabrillo College, Articulation Program Assistant)

1.5 Counselors' breakfast -- Spring 1991 (counselors, Program Director, Student Development Director, Articulation Program Assistant, Food Services Technology faculty and students)

1.6 Expand transfer guarantees and course articulation with University of California and California State University -- Spring 1991 (engineering faculty of Cabrillo College and four year university, Articulation Officer at Cabrillo College, California State University, and University of California, Cabrillo College Transfer Center Director)

1.7 Cabrillo College visitations by middle and high school students -- Fall 1990 and Spring 1991 (Program Director, mathematics, science, and engineering faculty and counselors from all segments)
1.8 Tours by Cabrillo College students of California universities -- Spring 1991
(students, faculty, counselors, Transfer Center Director)

2. To increase the number of minority students who are prepared and motivated to enter
Cabrillo College and major in mathematics, science, and engineering, Cabrillo College
will develop mentor and family support programs for middle school and high school
students. $13,207

2.1 Speakers program in the middle schools and high schools -- Fall 1990 and
Spring 1991 (Program Director, Santa Cruz County engineers and scientists, college faculty)

2.2 Role model/mentor program -- Fall 1990 and Spring 1991 (Program Director, Santa Cruz County engineers and scientists, college students)

2.3 Family mathematics program -- Fall 1990 (Parents, faculty, Program Director, EOPS director, counselor)

2.4 Day trips to corporate and industry sites - Spring 1991 (MESA staff, high school
faculty and counselors, Project Director)

3. To increase the number of minority students who are prepared and motivated to enter,
succeed, and transfer from Cabrillo College in the areas of mathematics, science, and
engineering, the college will develop a supplemental instruction program. $36,750

3.1 College faculty training and professional development -- early Fall 1990

3.2 Tutor training -- Summer 1990 (Cabrillo College faculty and students, Program
Director)

3.3 Tutoring for high school mathematics and science students at the Cabrillo
College Watsonville Center -- Fall 1990 and Spring 1991 (Cabrillo College
students, Program Director, Watsonville Center Director, high school
mathematics and science faculty)

3.4 Tutoring for Cabrillo College mathematics and engineering students -- Fall 1990
and Spring 1991 (Cabrillo College students, Program Director, tutors)

3.5 Inservice training for middle and high school mathematics and science teachers
-- Summer 1990 (MESA staff, Program Director, middle and high school
mathematics and science teachers) Cabrillo College
4. To increase the number of minority students who are prepared and motivated to enter Cabrillo College, the college will integrate MESA activities into the program. $14,257

   4.1 MESA hands-on teacher training -- Summer 1990 (MESA staff, middle and high school teachers, Program Director)

   4.2 Cabrillo college and middle and high school mathematics, science and engineering faculty meetings -- Fall 1990 and Spring 1991 (faculty and Program Director)

   4.3 Pajaro Valley Unified School District mentor program -- Fall 1991 and Spring 1992 (District faculty and administration)

   4.4 MESA competition -- Fall 1990 (MESA staff, high schools and Cabrillo College faculty, Project Director)

5. To increase the number of minority students who receive financial assistance to promote their entry into, success at, and transfer from Cabrillo College, the college will develop a scholarship program. $12,141

   5.1 Establish a scholarship program through the Cabrillo College Foundation -- Fall 1990 (College President, Program Director, foundation board)

   5.2 Disseminate information on scholarships -- Fall 1990 (Scholarship Office)

   5.3 Award scholarships to entering and transferring project students-- Spring 1991 (College President, scholarship office personnel)

6. To establish and maintain a program management component to implement the activities, evaluate the effectiveness of the activities, and to disseminate information on the program. $9,384

   6.1 Reassign a Cabrillo College faculty member 50 percent to direct this program -- Fall 1990 and Spring 1991 (faculty and administration of Cabrillo College)

   6.2 Administer surveys to students and faculty and analyze results -- Spring and Summer 1991 (Program Director, Research Office)

   6.3 Develop record keeping system on students -- Fall 1990 (Program Director, Research Office)

   6.4 Write report which can be distributed to other California Community Colleges -- Summer 1991 (Program Director)
6.5 Submit to California Association of Community Colleges a request to present the project - Spring 1991 (Program Director, Dean of Instruction)

PROJECT MANAGEMENT

Administrative leadership for this project will be provided by Claire Biancalana, Dean of Instruction. Eva Acosta will serve as the project director. The project director will be responsible for coordination of the project advisory committee, management of the project staff and budget, coordination and monitoring of all project activities, evaluation of the project, coordination of documentation and dissemination of information on the project, and planning for institutionalization of the project.

A program advisory committee will be formed to facilitate articulation and development and evaluation of the project components. Membership on the committee will include a representative from the Pajaro Valley Unified School District, the University of California at Santa Cruz, San Jose State University, MESA, and the community, as well as the Articulation Officer, the Dean of Instruction, the Transfer Center Director, and project director from Cabrillo College. Resumes for grant managers are in Appendix A.

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COMMITMENT TO THE PROJECT

This project is supported by the Cabrillo College High School Articulation Council and the MESA program. Evelyn Bachelor, Assistant Superintendent of the Pajaro Valley Unified School District, Fred Easter of the University of California MESA program, Rich Hart, Cabrillo College engineering faculty member, and Claire Biancalana, Cabrillo College Dean of Instruction, developed the goals and activities proposed in this project. Participants at all levels of this project are committed to this program and its goals.
6. Expected Outcomes

EXPECTED IMPACT

The goals which will be achieved as a result of this project are:

1. By June 1991, the number of scholarships awarded to minority mathematics and science students will increase.

2. By May 1991, 200 students will be participating in the program activities demonstrating a commitment to study mathematics, science, and engineering.

3. By June 1991, the course completion rates of minority mathematics, science, and engineering students at Cabrillo will increase.

4. Within two years the number of minority students who are prepared and motivated to enter Cabrillo and major in mathematics, science, and engineering will increase.

5. Within three years the number of minority mathematics, science, and engineering students transferring to University of California and California State University from Cabrillo College will increase.

6. By July 1991, an academic outreach and support program which can be replicated in other California Community Colleges will be in place.

Included is commitment from MESA to make their components available for replication as part of this project. We believe that by providing incentives and greatly expanded support systems, we will achieve our goals.
7. Evaluation Plan

EVALUATION PLAN

A summative evaluation of student gains in mathematics, science, and engineering performance will be carried out as follows:

1) Student participant course and grade data will be collected and analyzed for the life of the project, comparing their persistence and success to that found for similar nonparticipant students.

2) Pre- and post-program attitudinal surveys will be administered to student participants to measure changes in interest and self confidence towards mathematics, science, and engineering.

3) Numbers of minority students entering Cabrillo mathematics, science, and engineering programs will be compared to non-program years.

4) Numbers of minority students transferring to four-year university engineering programs will be compared to non-program years.

A summative evaluation of teachers' pedagogical improvements will be carried out as follows:

1) Pre- and post-program self-report inventories will be collected to measure changes in pedagogical style, classroom atmosphere, and student performance.

2) Members of the Articulation Council, key administrators and faculty will complete an evaluation survey that determines their assessment of the impact of the project on mathematics and science education in the middle and high schools with particular emphasis on under-represented students.

Formative evaluation will be conducted by the program director and participating faculty throughout the life of the project and adjustments will be made as the need occurs.
8. Dissemination Plan

DISSEMINATION AND TRANSFERABILITY
This project will be fully documented as to its success and failures. A report will be made available to each of the 107 California Community Colleges. Further, attempts will be made to show case the project at statewide conferences such as the California Association of Community Colleges Conference.
9. Budget Narrative

[NO “BUDGET NARRATIVE” ACCOMPANIES THIS DOCUMENT.]