Peralta Community College District

Program Review Template 2012-13

Below please find the program review form, to be filled out by department chairs and program leaders. These will be reviewed at the college level and then forwarded to the district-wide planning and budgeting process. The information on this form is required for all resource requests – including faculty staffing requests – for the 2013-14 budget year.

I. Overview

Date Submitted:	November 1, 2012	Administrator:	L. Berry, L. Celhay
BI Download:		Dept. Chair:	Mary Jennings
Dept./Program(s): (List departments and programs, including all associate degrees and certificates and components of general education and basic skills)	Mathematics: AS-T degree Mathematics: General Education Area 2, Mathematical Concepts and Quantitative Reasoning Basic Skills Mathematics		
Campus:	Berkeley City College		
Mission	The mission of the Berkeley City College Mathematics Department is to ensure that every student graduates, transfers or progresses into a career as a disciplined, literate and ethical individual proficient at using mathematics and quantitative reasoning appropriately to analyze and solve complex problems in the real world.		

II. Goals and Outcomes (add lines as needed)

II.a. Goals (for each one, cite Institutional Goal(s), Appendix II)

Explore and develop innovative models of basic skills instruction in order to improve student success rates and accelerate student progress toward transfer- or career-level work. (Institutional Goals: A. Advance Student Access, Success and Equity; B. Engage our Communities and Partners; C. Build Programs of Distinction; D. Create a Culture of Innovation and Collaboration)

Undertake more uniform departmental assessment across the mathematics curriculum in order to achieve smoother course-to-course and school-to-school transitions (including transfers) and to improve student success rates. (Institutional Goals: A. Advance Student Access, Success and Equity)

Further develop the new AS-T program in mathematics which was formally approved by our district in September 2012. (Institutional Goals: A. Advance Student Access, Success and Equity; C. Build Programs of Distinction)

Further develop distance education in the mathematics department. (Institutional Goals: A. Advance Student Access, Success and Equity; B. Engage our Communities and Partners; C. Build Programs of Distinction; D. Create a Culture of Innovation and Collaboration; E. Develop Resources to Advance and Sustain Our Mission)

Make broad and effective use of the innovative mathematics lab that we built in 2011-2012 to improve student success rates. (Institutional Goals: A. Advance Student Access, Success and Equity; E. Develop Resources to Advance and Sustain Our Mission)

Explore the possibility of establishing an AS-T degree program in probability and statistics. (Institutional Goals: C. Build Programs of Distinction)

Create new or update/reactivate existing mathematics courses such as Discrete Mathematics, Intermediate Probability and Statistics, Introduction to Numerical Analysis and/or Mathematics for Liberal Arts Majors (Institutional Goals: A. Advance Student Access, Success and Equity; C. Build Programs of Distinction)

Launch our revised Real Number Systems course in support of a new liberal arts AA-T degree intended largely for students who wish to transfer into programs of study that will prepare them to become teachers at the elementary level. (Institutional Goals: A. Advance Student Access, Success and Equity; B. Engage our Communities and Partners; C. Build Programs of Distinction)

II.b. Program Outcomes [for each one, cite ILO(s), Appendix I]

PROGRAM OUTCOMES(Mapped to Institutional Learning Outcomes, Appendix I):

PROGRAM 1: AS-T in Mathematics

Students successfully completing the AS-T program of study in mathematics will be able to demonstrate competency in each of the following areas:

Communication
Students show that they communicate well in the context of mathematics when they
• *critically read, write, and communicate mathematics interpersonally, with audience awareness;*
• *analyze mathematical communications for meaning, purpose, effectiveness, and logic.*

Critical Thinking
Students demonstrate critical thinking skills when they
• *identify appropriate methods for solving problems;*
• *use information and sound reasoning to justify solutions to problems;*
• *generate multiple solutions to problems;*
• *conceive and interpret solutions to real-world problems.*

Computational Skills
Students demonstrate computational skills when they
▪ *master properties of the real number system and apply them to concrete problems;*
▪ *demonstrate algorithmic competence.*

Ethics and Personal Responsibility
Students show the ability to behave ethically and assume personal responsibility when they
• *analyze the consequences of their actions and the impact of these actions on society and the self;*
• *demonstrate collaborative involvement in community interests.*

Global Awareness & Valuing Diversity
Students demonstrate global awareness and show that they value diversity when they
• *identify and explain diverse approaches to mathematical problem solving;*
• *analyze how cultural, historical, and geographical issues have shaped and continue to shape mathematical problem solving.*

Information Competency
Students demonstrate information competency when they
• *find, evaluate, use, and communicate information in all its various formats;*
• *use library and online resources and research methodology effectively; and*
• *use technology effectively.*

Self-Awareness & Interpersonal Skills
Students demonstrate self-awareness and interpersonal skills when they
• *analyze their own actions and the perspectives of other persons; and*
• *work effectively with others in groups.*

General Education component(s): IGETC Area 2: Mathematical concepts and quantitative reasoning

Basic Skills component(s): Arithmetic competence in computation and basic understanding of abstract concepts underlying computation and algorithms

III. Evidence

III.a. Institutional Data

Enrollment	Fall 2009	Fall 2010	Fall 2011
Census Enrollment (duplicated)	1915	1935	1770
Sections (master sections)	48	47	43
Total FTES	267.75	265.86	242.75
Total FTEF	26.48	25.86	23.2
FTES/FTEF	20.23	20.56	20.93
Retention			
Enrolled	1928	1981	1772
Retained	1413	1408	1179
% Retained	73%	71%	67%
Success			
Total Graded	1824	1859	1662
Success	1076	1079	963
% Success	59%	58%	58%

Faculty Data (ZZ assignments excluded)

	Fall 2009	Fall 2010	Fall 2011
Contract FTEF	2.60	3.17	3.15
Hourly FTEF	9.57	8.93	7.80
Extra Service FTEF	1.07	0.83	0.65
Total FTEF	26.48	25.86	23.20
% Contract/Total	0.20	0.24	0.27

Faculty Data Comparables F2011 (ZZ assignments excluded) (Z assignments excluded)

	Alameda	Berkeley	Laney	Merritt
Contract FTEF	4.86	3.15	6.64	3.31
Hourly FTEF	4.00	7.80	11.86	1.81
Extra Service FTEF	0.00	0.65	0.77	0.22
Total FTES	198.57	242.75	353.03	130.10
% Contract/Total	0.55	0.27	0.34	0.62

III.b. External Evidence

CTE and Vocational: Community and labor market relevance. Present evidence of community need based on Advisory Committee input, industry need data, McIntyre Environmental Scan, McKinsey Economic Report, licensure and job placement rates, etc.	N/A

Program Review Narrative:

1. **College: Berkeley City College**
   Discipline, Department or Program: Mathematics
   Date: November 1, 2012
   Members of the Instructional Program Review Team:
   Mary Jennings, Department Chair
   Dmitriy Zhiv, Department SLO Coordinator
   Lilia Celhay, Dean of Workforce Development and Applied Sciences

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2. **Narrative Description of the Discipline, Department or Program**:

   Please provide a general statement of primary goals and objectives of the discipline,
   department or program. Include any unique characteristics, degrees and certificates the
   program or department currently offers, concerns or trends affecting the discipline,
   department or program, and any significant changes or needs anticipated in the next three
   years.

The overall mission of the mathematics department is to help ensure that every Berkeley City College student graduates, transfers or progresses into a career as a disciplined, literate and ethical individual proficient at using mathematics and quantitative reasoning appropriately to analyze and solve complex problems in the real world. The department takes its role in every student's life very seriously because it recognizes that acquisition of strong quantitative reasoning skills is central to every student's success. Mathematics is an integral part of every discipline, but data show that students struggle with mathematics and that it is often the subject that prevents them from transferring within two years.

A recent study conducted at the Community College Research Center, Teachers College, Columbia University, with 256,672 students and 57 colleges participating concluded that as many as 75% of students who come to community colleges working three or more levels below transfer level never complete a transfer-level course in mathematics. One factor that may lead to this negative outcome is time. Students anticipate that a community college program will take two years to complete but graduation with an AA degree, satisfying transfer requirements or laying the foundation for career advancement or training can take as many as four or five years for students who arrive significantly underprepared for college coursework or employment. In an effort to address the needs of these students the department is currently piloting two new paths whose purpose is to accelerate progress through the basic skills/pre-transfer sequence into transfer- or career-level courses:

(1) an innovative self-paced, modularized system of instruction and

(2) an elementary/intermediate algebra course designed specifically to prepare non-STEM, non-nursing and non-business majors for our highest-demand gateway course, Introduction to Statistics.

Unfortunately even the measures mentioned above may not adequately engage our highest-risk students for long enough to convince them of their personal worth and potential. For this population the department is exploring and planning to develop a contextualized system of instruction in which students encounter and learn to solve basic mathematics problems they find embedded in broader, more personally appealing and relevant, real-world contexts.

The department currently offers an AS-T degree in mathematics for transfer into a four-year program of study and plans to explore the possibility of adding an AS-T degree in statistics in the near future.

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3. Curriculum:

- Is the curriculum current and effective? Have course outlines been updated within the last three years? If not, what plans are in place to remedy this?

  We are in the process of updating all of our course outlines at this time. During the past year we have updated the outlines for our Calculus I, Calculus II, Calculus III, Linear Algebra, Differential Equations and Real Number Systems courses. Updates for our two pre-calculus courses and our introductory statistics course are in progress.

- Has your department conducted a curriculum review of course outlines? If not, what are the plans to remedy this?

  Yes, in the process of updating our course outlines we are reviewing the related curriculum.

- What are the department's plans for curriculum improvement (i.e., courses to be developed, updated, enhanced, or deactivated)? Have prerequisites, co-requisites, and advisories been validated? Is the date of validation on the course outline?

  The department has developed twenty-one new courses during the past two years. This includes one accelerated elementary/intermediate algebra course to prepare non-STEM, non-nursing and non-business majors for transfer-level introductory statistics and twenty modular half-unit courses that span the basic skills/pre-transfer curriculum.

  This new ten-unit modular system accelerates student progress significantly: It is equivalent in content to the portion of our curriculum that was previously available only in the form of four courses totaling fourteen units of coursework. Important to note is that students are not blank sheets – each arrives knowing something, but as a group they arrive unevenly prepared for college work or career training. Low persistence, retention and success rates are particularly noticeable in the tails of our basic skills distribution, where the strongest students quit because they are bored by having to sit through material they already know and the weakest students quit because they fall behind - again. The new modular system acknowledges and addresses these issues by enabling students to skip modules that cover topics with which they are already familiar and to take extra time for modules they find challenging.   It completely individualizes instruction and for the most motivated, provides an opportunity for significant acceleration.

  During 2012 the department updated the Calculus I, Calculus II, Calculus III, Linear Algebra, Differential Equations and Real Number Systems course outlines to bring them into compliance with suggested standard C-ID (California higher education Course Identification Numbering System) outlines whose purpose is to ease statewide transfer and articulation. In each instance the department validated requisites and advisories. The date of validation is on each course outline.

- What steps has the department taken to incorporate student learning outcomes in the curriculum? Are outcomes set for each course? If not, which courses do not have outcomes?

  We are in our first round of creating and administering SLO assessments and have administered first-round assessments for most of our courses. We have not yet administered them for Pre-Calculus with Analytic Geometry, Calculus I, Calculus II, Calculus III, Linear Algebra, Differential Equations, Real Number Systems or any of our accelerated pilot courses. We plan to administer our first round of assessments for Calculus I and Calculus II during Fall 2012 and for Pre-Calculus with Analytic Geometry, Calculus III, Linear Algebra, Differential Equations and Real Number Systems during Spring 2013.

  The department is in the process of developing and adopting common SLO-driven final exams to help incorporate SLOs into the curriculum. For each course (this year, Calculus I, Calculus II and Introduction to Statistics), teaching faculty are collaborating to compose the SLO final exams. This collaboration focuses faculty on essential course content and desired student outcomes as it provides the department with vital information about student success.

- Describe the efforts to develop outcomes at the program level. In which ways do these outcomes align with the institutional outcomes?

  First-draft program-level outcomes are currently under departmental review for alignment with desired departmental and institutional outcomes. Our first-round program assessment is scheduled for Fall 2013.

- Recommendations and priorities.

  (1) Complete first round of outcome assessments
  (2) Analyze and use outcomes to strengthen department courses and program.
  (3) Compose SLO-driven final examinations across the mathematics curriculum

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4. Instruction:

- Describe effective and innovative strategies used by faculty to involve students in the learning process. How has new technology been used by the department to improve student learning?

  The new self-paced modularized system of instruction described in Part 3, Curriculum, above, involves each student in the learning process by acknowledging and accommodating individual differences in academic background, preparation and learning style as well as by requiring him or her to take increased control of and responsibility for his or her education. The system is flexible enough to permit each student to progress according to his or her own needs and pace.

  Also as described in Part 3, Curriculum, the department is exploring and planning to develop a contextualized system of instruction in which students encounter and learn to solve basic mathematics problems they find embedded in broader, more personally appealing and relevant, real-world contexts.

  The department is making significant use of computer and internet technology in hybrid and online classes that are delivered in part or entirely by means of Moodle, an online learning management system. Students enrolled in our new self-paced modularized classes meet in an innovative math lab equipped with computers that students use to access online course materials. The entire modularized sequence is web-based.

  The department is also working with the campus Distance Education coordinator to develop a Moodle site that contains links to open source mathematics resources available on the Internet and to establish an open online tutoring site where the Berkeley City College student community will be able to access online tutoring services provided by faculty and classified personnel and student tutors.

- How does the department maintain the integrity and consistency of academic standards within the discipline?

  This is a challenge with which we grapple continuously. Our faculty is large – approximately twenty-five – and twenty of our faculty are part-time temporary. In many ways this is a blessing because the diversity of our faculty is a constant source of fresh ideas and insights. However, it can also be a problem because the aforementioned diversity can also result in significant unevenness in expectations and evaluation. In an effort to addressing some of these challenges, we have undertaken creating and adopting common syllabi and SLO-driven final examinations. Adding full-time faculty positions (at least two) would further help the department maintain consistency of academic standards.

- Discuss the enrollment trends of your department. What is the student demand for specific courses? How do you know? What do you think are the salient trends affecting enrollments?

  It is difficult to assess enrollment trends in our department at this time because of recent budget cuts. The budget cuts have resulted in increased demand for reduced numbers of course sections that fill almost immediately after enrollment opens. The classes that have been filling most rapidly have been Calculus I, Calculus II, Linear Algebra and Introduction to Statistics. Introduction to Statistics is our single highest-demand course because it serves many students as their transfer-level gateway course.

  Historically the college has offered relatively few sections of calculus, linear algebra and differential equations courses but as our school has grown the demand for these classes has also grown not only among our Berkeley City College students but also among students from neighboring schools such as Berkeley High School and the University of California, Berkeley. Beyond that, it is also important to note that the college has now adopted an AS-T degree program in mathematics, and by doing so has made a commitment to preparing students for four-year programs in STEM majors. With that commitment comes the obligation to provide enough sections of program courses (Calculus I, II, III, Linear Algebra and Differential Equations) so that students can graduate and transfer in two years. Growth and departmental program responsibilities suggest, therefore, that we will need to offer more sections of Calculus I, II, III, Linear Algebra and Differential Equations in the future.

  Enrollment data on the following pages indicate that we are filling practically every course in the program. When we have been required to cut sections for budgetary reasons, we have cut sections from courses of which we offer multiple sections in order to ensure that we continue to offer the full math program. The data also indicate that average class sizes are too high. This lowers student success, retention, and persistence. We should offer, on average, an additional two

sections per semester (a total of four per calendar year) to meet enrollment demands and , in particular, we should offer additional sections of Math 253, 201, and 203 or their modularized equivalents, Math 348UD- 248VK.

Berkeley City College

Math Course	Time of Day	Enrollment F11	Enrollment S12	2012 Total Enrollment	Avg Fall Enrollment 2010 - 2012	Avg Spr Enrollment 2010-2012
13	Day	171	160	331	206	181
13	Eve	202	251	453	175	224
1	Day	188	205	393	178	194
1	Eve	79	31	110	74	32
50	Day	0	43	43	0	39
201	Day	180	200	380	233	225
201	Eve	74	43	117	103	42
202	Eve	39	41	80	35	36
203	Day	147	97	244	155	153
203	Eve	99	177	276	90	166
251A	Day	19	61	80	16	47
251B	Day	0	4	4	0	3
16B	Eve	0	0		0	5
253	Day	78	106	184	82	90
253	Eve	44	0	44	56	26
248UP	Day	0	82	82	0	27
259	Day	0	0	0	6	22
250	Day	89	106	195	98	102
250	Eve	30	64	94	72	71
251C	Day	0	1	1	0	1
251D	Day	0	0	0	0	0
3A	Day	132	96	228	120	64
3A	Eve	0	49	49	0	47
3B	Day	40	40	80	40	40
3C	Day	40	35	75	35	33
3E	Day	42	47	89	41	44
3F	Day	38	20	58	39	24
16A	Eve	41	34	75	40	37
		1772	1993	3765		Total:

Data collected from Institutional Research site at http://www.peralta.edu. (Program Review: Enrollment by course by time all four colleges)

Berkeley City College

Math Course	Time of Day	Based on Average		Based on 2012		Number of Sections Offered Fall 11	Number of Sections Offered Spr 12
		Recommended Fall sections (40 students)	Recommended Spr sections (40 students)	Recommended Fall Sections	Recommended Spring sections to offer		
13	Day	5	5	4	4	5	4
13	Eve	4	6	5	6	4	5
1	Day	4	5	5	5	4	4
1	Eve	2	1	2	1	2	1
50	Day	0	1	0	1	0	1
201	Day	6	6	5	5	4	5
201	Eve	3	1	2	1	2	0
202	Eve	1	1	1	1	1	1
203	Day	4	4	4	2	3	3
203	Eve	2	4	2	4	2	3
251A	Day	0	1	0	2	0	1
251B	Day	0	0	0	0	0	1
16B	Eve	0	0	0	0	0	0
253	Day	2	2	2	3	2	2
253	Eve	1	1	1	0	1	0
248UP	Day	0	1	0	2	0	2
259	Day	0	1	0	0	0	0
250	Day	2	3	2	3	3	3
250	Eve	2	2	1	2	1	2
251C	Day	0	0	0	0	0	1
251D	Day	0	0	0	0	0	1
3A	Day	3	2	3	2	3	2
3A	Eve	0	1	0	1	0	1
3B	Day	1	1	1	1	1	1
3C	Day	1	1	1	1	1	1
3E	Day	1	1	1	1	1	1
3F	Day	1	1	1	1	1	1
16A	Eve	1	1	1	1	1	1
		47	49	44	50	42	48

Data collected from Institutional Research site at http://www.peralta.edu. (Program Review: Enrollment by course by time all four colleges)

- Are courses scheduled in a manner that meets student needs and demand? How do you know?

  Enrollment data (above) indicate that the department is offering a diverse set of day and evening classes for all courses.

  The department makes every effort to keep pathways and demand in mind when scheduling classes. Many community college students have jobs and complex personal lives to juggle in addition to managing school attendance. The department schedules classes in such a way as to make them available to as many students as possible while also making sure that sections meet at times that do not compete with other classes that students in our program need to take. Each semester the department schedules at least one section of each of the courses that comprise our AS-T in Mathematics degree program.

Scheduling for this department is rendered singularly complex by the part-time to full-time faculty ratio. Assigning twenty part-time faculty members to teach forty or more classes can be extremely difficult because of commitments that faculty make to other schools and sometimes this has a negative impact on the department's flexibility in planning and scheduling. This department needs more full-time faculty.   Budget cuts also enter into this picture. We have had to make so many cuts and are now so lean in our offerings that sometimes there are few decisions left for us to make.

- Recommendations and priorities.
  (1) Increase budget for course offerings
  (2) Create more full-time faculty positions
  (3) Create and adopt common syllabi and final examinations across the curriculum
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5. Student Success:

- Describe student retention and program completion (degrees, certificates, persistence rates) trends in the department. What initiatives can the department take to improve retention and completion rates?

  The department's AS-T degree program has just come into existence (approved September 2012) so we have nothing to report about program completion at this time.

  Data suggest that Fall-to-Spring persistence has increased slightly since 2008:

Berkeley persistence fall to spring

Date run: 8/2/2012

Cohort Term	Cohort	Persistence	Persistence Rate
F08	6,454	4175	65%
F09	7,649	5127	67%
F10	7,457	4928	66%
F11	6,979	4741	68%

During the same period we have seen student success in Math 250 (Arithmetic) and Math 203 (Intermediate Algebra) improve while success rates in the rest of the curriculum have either remained stable or dropped, in some instances quite significantly. Note, in particular, the success rates for Math 16A, 202, 3B, 3C and 3F in the table below.

Success Rates

Catalog Nbr	SUCCESS RATE FALL 09	SUCCESS RATE SPR 10	F09/S10 AVERAGE	SUCCESS RATE FALL 10	SUCCESS RATE SPR 11	F10/S11 AVERAGE	SUCCESS RATE FALL 11	SUCCESS RATE SPR 12	F11/S12 AVERAGE
1	58.8%	66.1%	62.5%	53.9%	62.1%	58.0%	54.2%	62.1%	58.2%
13	66.0%	66.1%	66.1%	70.8%	59.6%	65.2%	60.2%	61.5%	60.9%
16A	64.9%	55.3%	60.1%	61.8%	61.1%	61.5%	32.5%	44.1%	38.3%
16B		100.0%	100.0%						
201	49.5%	45.5%	47.5%	49.9%	42.0%	46.0%	52.1%	45.7%	48.9%
202	60.9%	69.0%	65.0%	30.0%	70.6%	50.3%	60.6%	42.9%	51.8%
203	60.8%	56.0%	58.4%	58.7%	66.2%	62.5%	68.9%	69.6%	69.3%
248UP								60.5%	60.5%
250	49.2%	31.1%	40.2%	49.2%	44.2%	46.7%	68.7%	53.9%	61.3%
251A		48.3%	48.3%	75.0%	81.3%	78.2%	89.5%	54.2%	71.9%
251B					100.0%	100.0%		50.0%	50.0%
251C					1.0%	1.0%		100.0%	100.0%
253	58.5%	45.2%	51.9%	56.3%	45.2%	50.8%	45.7%	56.5%	51.1%
3A	62.8%	56.2%	59.5%	50.0%	46.5%	48.3%	54.7%	57.6%	56.2%
3B	60.0%	56.1%	58.1%	44.4%	35.3%	39.9%	36.1%	46.2%	41.2%
3C	76.7%	58.1%	67.4%	61.3%	65.5%	63.4%	61.5%	51.6%	56.6%
3E	64.3%	80.4%	72.4%	76.3%	60.0%	68.2%	63.2%	75.6%	69.4%
3F	93.1%	71.9%	82.5%	88.9%	85.7%	87.3%	65.7%	68.4%	67.1%
50		60.0%	60.0%		30.3%	30.3%		47.5%	47.5%

Many factors influence student success. Some of these factors lie entirely outside of the control of the department, such as current economic climate. Some students who came to us unemployed have subsequently found work and left mid-semester. We note that withdrawals have increased significantly over the 2009-2011 frame of time. Other factors that

affect student success include student/faculty ratio and access to instructional assistance.   The department can – and does - actively campaign for more faculty, smaller class sizes and instructional support, but whether these are provided is again something that the department itself cannot control.

Another, extremely important, factor is the style and quality of instruction. Ours is a strong, talented, hard-working faculty, but it could be improved by the addition of more full-time faculty who could dedicate themselves solely to the needs of this department. Our part-time to full-time faculty ratio is way too high:

			FTE Temp to FTE Contract Ratio (Part timers to Full Timers Ratio)			
			Berkeley	Merritt	Alameda	Laney
MATH	Year 08-09	Fall	**3.71**	0.46	1.03	1.21
		Spring	**3.19**	0.39	1.51	0.97
	Year 09-10	Fall	**3.68**	0.26	0.95	1.08
		Spring	**2.87**	0.26	0.73	0.77
	Year 10-11	Fall	**2.82**	0.04	0.77	1.02
		Spring	**3.01**	0.11	0.91	0.96
	Year 11-12	Fall	**2.48**	0.55	0.82	1.79
		Spring	**2.35**	0.68	0.56	1.28

Only about 20% of our faculty are full-time. Some of our most talented faculty must divide their efforts and attention among many campuses rather than concentrating their efforts on building excellence at a school to which they are permanently attached.

The table below makes it clear that recent budget cuts have resulted in significant increases in enrollment per section, which has grown from an average of 33 to an average of 42 since fall of 2008. This is more than a 27% increase in students per section.

			Average Class Size (Census Enrollment/Sections)
MATH	Year 08-09	Fall	33
		Spring	32
	Year 09-10	Fall	40
		Spring	41
	Year 10-11	Fall	41
		Spring	40
	Year 11-12	Fall	41
		Spring	42

The table below show that during the same period, 2008-2009 to 2011-2012, faculty productivity increased approximately 18%:

Campus   Berkeley

Subject	Academic Year	Term Type	Census Enrollment	Sections	FTES Total	Fte Temp	Fte Extra Service	Fte Contract	FTEF Total	FTES/FTEF
MATH	Year 08-09	Fall	1755	53	242.8	10.39	0.8	2.8	13.99	17.36
		Spring	1582	49	220	9.36	1	2.93	13.29	16.55
	Year 09-10	Fall	1915	48	267.8	9.57	1.07	2.6	13.24	20.23
		Spring	1789	44	244.7	8.03	1	2.8	11.83	20.69
	Year 10-11	Fall	1935	47	265.9	8.93	0.83	3.17	12.93	20.56
		Spring	1881	47	248.1	9.12	0.43	3.03	12.59	19.71
	Year 11-12	Fall	1770	43	242.8	7.8	0.65	3.15	11.6	20.93
		Spring	1645	39	222.5	7.53	0.13	3.2	10.87	20.47

This data strongly suggests that increasing class sizes due to budget cuts is having an adverse effect on student success.
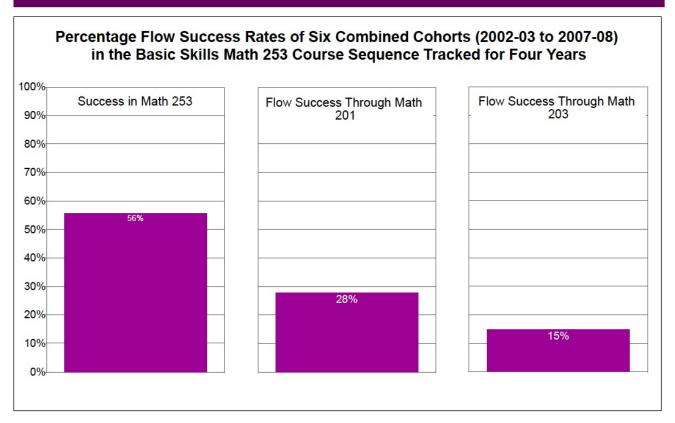
Please see Part 4 (Instruction) above for information about instructional initiatives the department is taking to improve retention and completion rates.

- What are the key needs of students that affect their learning? What services are needed for these students to improve their learning? Describe the department's efforts to access these services. What are your department's instructional support needs?

Students need financial support that is sufficient to pay for course fees, books, access codes for online resources, transportation to and from school, and living expenses. The mathematics department plays a strong role in advocating for students who need financial aid.

Students need student-teacher ratios that enable their instructors to spend time answering questions and providing informative feedback on submitted work. In addition to time and attention from their instructors, students often need instructional assistants or tutors and access to computers. The Flow Success Rates below also strongly suggest the need for additional student support in the form of tutors and/or alternate forms of course delivery.

Berkeley City College

Percentage Flow Success Rates of Six Combined Cohorts (2002-03 to 2007-08) in the Basic Skills Math 253 Course Sequence Tracked for Four Years

Success in Math 253	Flow Success Through Math 201	Flow Success Through Math 203
56%	28%	15%

The department is optimistic that the modularized pre-transfer-level courses it developed during 2011-2012 and is piloting in 2012-2013 will improve persistence rates. Last year we added an innovative math lab to our facilities to provide some of these services. We need to add staff and more computers to that lab before it can become fully functional.

- Describe the department's effort to assess student learning at the course level. Describe the efforts to assess student learning at the program level. In which ways has the department used student learning assessment results for improvement?

    As mentioned above, the department is currently conducting its first round of student learning assessments and plans to analyze and use the results to improve outcomes in the future.

- Recommendations and priorities.

    (1) Increase budget for course offerings
    (2) Increase full-time faculty
    (3) Institutionalize funding to sustain math lab operation and staffing
    (4) Procure additional computers for the math lab

_____

6. Human and Physical Resources (including equipment and facilities)

- Describe your current level of staff, including full-time and part-time faculty, classified staff, and other categories of employment.

  We have four full-time and twenty part-time faculty members in our department.

- Describe your current utilization of facilities and equipment.

  Most of the Berkeley City College classrooms in which we teach mathematics are smart classrooms. They are equipped with whiteboards and multimedia equipment. Faculty use the available technology to access the internet for purposes of instruction, to play pertinent video clips, to make PowerPoint presentations, to demonstrate Excel, to project printed documents, and so on. However, we need more classrooms. Some of our faculty are forced to teach off-campus in borrowed or rented spaces , some of which were not designed to be classrooms, and some at sufficient walking distance from the Berkeley City College campus to complicate class scheduling.

  We built a new math lab during 2011-2012 and are now using it for our new modularized, self-paced, web-based classes. The math lab has seventeen student computers and one faculty computer as well as multimedia equipment, a document projector, a scanner and a printer.

- Are the human and physical resources, including equipment and location, adequate for all the courses offered by your department (or program)? What are your key staffing and facilities needs for the next three years? Why?

  No, this department needs more human and physical resources to address the needs of a large and growing student population:

  (1) We need more classrooms. Some of our faculty are forced to teach off-campus in borrowed or rented spaces , some of which were not designed to be classrooms, and some at sufficient walking distance from the Berkeley City College campus to complicate class scheduling.

  (2) We need more full-time faculty. The table below shows how unfavorably the Berkeley City College mathematics department's part-time to full-time faculty ratio compares with those of the other Peralta colleges:

			FTE Temp to FTE Contract Ratio (Part timers to Full Timers Ratio)			
			Berkeley	Merritt	Alameda	Laney
MATH	Year 08-09	Fall	**3.71**	0.46	1.03	1.21
		Spring	**3.19**	0.39	1.51	0.97
	Year 09-10	Fall	**3.68**	0.26	0.95	1.08
		Spring	**2.87**	0.26	0.73	0.77
	Year 10-11	Fall	**2.82**	0.04	0.77	1.02
		Spring	**3.01**	0.11	0.91	0.96
	Year 11-12	Fall	**2.48**	0.55	0.82	1.79
		Spring	**2.35**	0.68	0.56	1.28

  (3) We need our math lab. At this time two things prevent us from making optimal use of our new math lab:

  (a) enough computers for an entire 36-student class to use simultaneously (our budget has limited us to seventeen computers), and

  (b) funding for staff. (We have not been able to hire anyone to staff the lab during hours when our modularized classes are not meeting.) We would prefer to have open lab hours when the broader student population can come in for tutoring or computer access to instructional software.

Last year the college provided funds to the mathematics department for creating a mathematics lab and modularizing the Math 250, 253, 201, and 203 (pre-transfer-level) sequence. Berkeley City College has already invested in the creation of a math lab. Now we need an annual budget to sustain it. That budget needs to include classified staff hours to supervise students and student tutors during open lab hours. It also needs to support student tutors for the lab. A small budget for supplies such as a few textbooks and office supplies per year should suffice. Mathematics represents at least 10% of the course offerings of the college. The college should invest heavily into the success of the department.

- Recommendations and priorities.
  (1) Staff the math lab
  (2) Furnish the math lab with (19) more computers
  (3) Acquire/provide more proper classroom space
  (4) Create more full-time teaching positions for the mathematics department

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7. Community Outreach and Articulation

*For vocational programs***:**

- Describe the department's connection with industry. Is there an Advisory Board or Advisory Committee for the program? If so, how often does it meet? Is the program adequately preparing students for careers in the field? How do you know?

  Although the mathematics department is clearly not a vocational program, it is an important player in the larger vocational scheme of things.   It therefore bears mentioning that the department is currently seeking to contextualize basic skills instruction to improve the retention and success rates of students who come to Berkeley City College to prepare for careers in many fields. As a first step in this direction the mathematics department is currently partnering with the multimedia arts department toward the end of creating a contextualized basic skills mathematics course in animation. This project is currently at the exploratory stage but we hope to launch a pilot course in Fall 2013.

- Have students completing the program attained a foundation of technical and career skills? How do you know? What are the completion rates in your program?

- What are the employment placement rates? Include a description of job titles and salaries. What is the relationship between completion rates and employment rates?

- What industry trends are most critical for the future viability of the program? How do you know? What are the implications of these trends for curriculum development and improvement?

  The mathematics department is currently conducting research to learn where areas of student career interest and industry trends intersect.   The department plans to use this information to capitalize on opportunities to richly contextualize mathematics instruction.

*For transfer programs***:**

- Describe the department's efforts in meeting with and collaborating with local 4-year institutions. Is the program adequately preparing students for upper division course work? How do you know?

  Our articulation officer meets regularly with representatives of the University of California and California State University systems and in particular with representatives of the Office of the President of the University of California Berkeley. Through these meetings he keeps us informed of any transfer or articulation issues that we need to address. He has also been guiding us through the process of bringing our course outlines into compliance with California's statewide standard C-ID (Course Identification Numbering System) outlines. The department also sends representatives to California Community College Success Network conferences to stay abreast of developments that have an impact on our relationships with four-year colleges across the state.

*For all instructional programs***:**

- Describe the department's effort to ensure that the curriculum responds to the needs of the constituencies that it serves.

  Everything above describes these efforts.

- Recommendations and priorities.

  (1) Explore, plan and develop contextualized courses for students on alternative (non- transfer, career) pathways.
  (2) Explore outreach to at-risk Berkeley High School students.

III.c. Program Outcome Assessments (add rows as needed)	Findings	Action Plans
PROGRAM 1:		
PROGRAM 2:		
General education component:		
Basic skills component:		

Program Outcome Assessments Narrative*:

We describe Student Learning Outcomes that report on Math 203, Intermediate Algebra, below. The full report on Mathematics Department SLO's is on Taskstream.

Outcome set:

1-Advanced understanding and application of functions, equations and inequalities

Measure: Locally developed tests and student self-assessment

Direct - Other

Details/Description: All instructors that taught Math 203, Intermediate Algebra, at BCC in Fall 2010 gave the same test in order to evaluate student performance in core areas of the subject. 141 students took the test.

Acceptable Target: 60%

Ideal Target: 75%

Implementation Plan (timeline): Administer the test before or after the final

Key/Responsible Personnel: Math Department Faculty 2010

Findings for locally developed tests and student self-assessment

Summary of Findings: 1) Advanced understanding and application of functions, equations and inequalities

a) Linear inequalities: 1 problem. 95/141 answers were correct, which is more than 67%

b) Absolute value equalities and inequalities: 2 problems. 2x141= 282 answers. 129/282 were correct, which is less than 46%

c) Quadratic equations: 2 questions. 2x141= 282 answers. 149/282 were correct, which is less than 53%

Results: Acceptable Target Achievement: Not Met

Recommendations: Place additional emphasis on instruction and practice toward advanced understanding and application of functions, equations and inequalities.

2-Understanding and application of fundamental algebraic laws, concepts, techniques, symbols, terms, expressions, and equations to formulate and solve problems including quantitative problems arising in science and engineering

Measure: Locally developed tests and comprehensive final

Direct - Student Artifact

Details/Description: All instructors that taught Math 203 Intermediate Algebra at BCC in FALL 2010 gave the same test in order to evaluate student performance in core areas of the subject. 141 students took the test.

Acceptable Target: 60%

Ideal Target: 75%

Implementation Plan (timeline): Administer the test before or after the final

Key/Responsible Personnel: Math Department Faculty 2010

Findings for Locally developed tests and comprehensive final

Summary of Findings: 2-Understanding and application of fundamental algebraic laws, concepts, techniques, symbols, terms, expressions, and equations to formulate and solve problems including quantitative problems arising in science and engineering

a) Solving systems of linear equations : 1 problem. 106/141 answers were correct, which is more than 75%

b) Factoring algebraic monomials: 1 problem. 57/141 answers were correct, which is approximately 40%

Results: Acceptable Target Achievement: Not Met

Recommendations: Place additional emphasis on instruction and practice toward understanding and application of fundamental algebraic laws, concepts, techniques, symbols, terms, expressions, and equations to formulate and solve problems including quantitative problems arising in science and engineering

3-Understanding and operating with various algebraic functions
Measure: Locally developed tests and comprehensive final
Direct - Student Artifact
Details/Description: All instructors that taught Math 203 Intermediate Algebra at BCC in FALL 2010 gave the same test in order to evaluate student performance in core areas of the subject. 141 students took the test.
Acceptable Target: 60%
Ideal Target: 75%
Implementation Plan (timeline): Administer the test before or after the final
Key/Responsible Personnel: Math Department Faculty Fall 2010

Findings for Locally developed tests and comprehensive final

Summary of Findings: 3) Operating with Algebraic Functions
a) Logarithmic functions: 2 problems. 2x141= 282 answers. 107/282 were correct, which is less than 38%
b) Exponential functions : 1 problem. 22/141 were correct, which is below 16%
Results: Acceptable Target Achievement: Not Met
Recommendations: Place additional emphasis on instruction and practice toward success in operating with algebraic functions.

Credit for Mathematics Department progress with SLO's goes to Jenny Lowood, Dmitriy Zhiv and Rick Wing

III.d. PCCD Institutional Goals -- Narrative	
Check all that apply. Advance Student Access, Success & Equity Increase Transfer and Program Completion Rates Engage our Communities & Partners Build Programs of Distinction Create a Culture of Innovation & Collaboration Develop Resources to Advance & Sustain Mission	**To advance student access, success and equity,** the mathematics department is ▪ exploring and developing innovative models of instruction for pre-transfer/basic skills classes to accelerate student progress into transfer- or career-level work; ▪ exploring and developing contextualized models of instruction for pre-transfer/basic skills classes to increase persistence, retention and success and to accelerate student progress into transfer- or career-level work; ▪ training faculty (on-the-job) to teach online (distance education) mathematics courses. **To increase transfer and program completion rates,** the mathematics department is ▪ undertaking more uniform departmental assessment for all mathematics classes to achieve smoother course-to-course and school-to-school transitions (including transfers) and to improve student success rates**;** ▪ offering a new AS-T degree in mathematics ▪ exploring the possibility of creating a new AS-T degree in probability and statistics **To build programs of distinction.** the mathematics department is ▪ piloting an innovative self-paced modularized system of instruction for the pre-transfer mathematics curriculum to improve student success rates and accelerate student progress into transfer- or career-level mathematics courses; ▪ exploring and developing a contextualized system of instruction for the pre-transfer mathematics curriculum to improve student success rates and accelerate student progress into transfer- or career-level mathematics courses; ▪ developing and administering Student Learning Outcome assessments and using the results to improve curriculum and instruction. **To create a culture of innovation and collaboration,** the mathematics department is ▪ drawing upon substantial innovative and collaborative efforts on the part of faculty, counseling, administrative, Basic Skills Initiative, Title III and CTE staff to develop and implement the major innovations in basic skills instruction mentioned above; ▪ developing an online mathematics curriculum; ▪ working in collaboration with Berkeley and Aspire High Schools to provide advanced coursework to high school students; ▪ planning outreach to Berkeley High School in the hope of engaging students at risk by means of contextualized instruction. **To develop resources to advance and sustain mission,** the mathematics department is building an innovative mathematics lab at Berkeley City College in collaboration with administration and Title III and Learning Resources Center staff for the purpose of providing vital instructional support to our student population

IV. Action Plans

Please describe your plan for responding to the above data. Consider program learning outcomes, institutional goals, external evidence, and BI data. Also, please reference any cross district collaboration with the same discipline at other Peralta colleges.

Include overall plans/goals and specific action steps. Add rows as needed.

Action Item	Steps/Timeline	Person(s) Responsible	Supporting Data Source (check all that apply)
Support and further develop Mathematics AS-T degree program.	**Program approved at district level and ready to launch in 2013.**	**Mathematics Department**	__Assessment Findings __BI Data _X_Institutional Goals __Other
Bring the math lab up to full functionality by furnishing it with (19) more computers and staff it to make it and its services accessible to the general BCC student population.	**2012-2013**	**Berkeley City College Administration**	__Assessment Findings __BI Data _X_Institutional Goals __Other
Pilot, assess and institutionalize new self-paced, modularized, accelerated system of instruction in basic skills mathematics.	**Streamlined self-paced modularized system of instruction developed in 2011-2012 is now a pilot program in progress. Assessment is planned for January and June 2013. Institutionalization expected in Fall 2013.**	**Mathematics Department**	_X_Assessment Findings __BI Data _X_Institutional Goals __Other
Pilot our accelerated prestatistics course and assess student success rates in successor (introductory statistics) course.	**Pilot in progress. Assessments scheduled for January 2013 and June 2013.**	**Mathematics Department**	_X_Assessment Findings __BI Data __Institutional Goals __Other
Explore the possibility of establishing an AS-T degree program in probability and statistics.	**2013-2015**	**Mathematics Department**	__Assessment Findings __BI Data _X_Institutional Goals __Other
Add two new full-time faculty to improve full-time-to-part-time faculty ratio in the mathematics department.	**2012-2013**	**Mathematics Department, Berkeley City College Administration**	__Assessment Findings _X_BI Data __Institutional Goals __Other
Build curriculum: Discrete Mathematics, Advanced Statistics and Probability, Introduction to Numerical Analysis, Mathematics for Liberal Arts Majors	**2013-2015**	**Mathematics Department**	__Assessment Findings __BI Data _X_Institutional Goals __Other
Foster a sense of shared professionalism among faculty in the mathematics department	**In progress**	**Mathematics Department**	__Assessment Findings __BI Data _X_Institutional Goals __Other

V. Resource Needs	Link to Action Plans (Section)
Please describe and prioritize any **faculty, classified, and student assistant** needs. 1. More FTES to meet student demand 2. At least two more full-time faculty positions 3. A designated instructional assistant to run our math lab 4. Two part-time student teaching assistants to work with the instructional assistant in the math lab	**Add two new full-time faculty to improve full-time-to-part-time faculty ratio in the mathematics department.** **Bring the math lab up to full functionality by furnishing it with (19) more computers and staff it to make it and its services accessible to the general BCC student population**
Please describe and prioritize any **equipment, material, and supply** needs. 1. Equipment: Nineteen computers to complete our new math lab 2. Supplies: Two classroom sets of calculators to enable us to provide uniform testing conditions in calculus and statistics classes, whiteboard geometry tools, math manipulatives for elementary education majors taking Math 18, Real Number Systems, in preparation for transfer into an elementary education program. 3. Continuing Education for faculty: Small library with one copy of each text used in our curriculum and the undergraduate curricula of UC Berkeley, CSU East Bay, SFSU 4. Continuing Education for faculty: Subscriptions to mathematical journals published by the American Mathematical society, the Mathematical Association of America and the National Council of Teachers of Mathematics	**Support and further develop AS-T degree program in Mathematics** **Bring the math lab up to full functionality by furnishing it with (19) more computers and staff it to make it and its services accessible to the general BCC student population** **Build curriculum:** **Discrete Mathematics,** **Advanced Statistics and Probability,** **Introduction to Numerical Analysis,** **Mathematics for Liberal Arts Majors** **Foster a sense of shared professionalism among faculty in the mathematics department**
Please describe and prioritize any **facilities** needs. 1. More classrooms fully equipped with ample dry erase boards and smart technology 2. At least one more office with desks, computers and cabinet/bookshelf space for use of both contract and hourly faculty	**Add new courses:** **Discrete Mathematics,** **Advanced Statistics and Probability** **Introduction to Numerical Analysis,** **Mathematics for Liberal Arts Majors** **Foster a sense of shared professionalism among faculty in the mathematics department**

Appendix I

Berkeley City College Institutional Learning Outcomes

Berkeley City College's Institutional Learning Outcomes, as described below, are the skills and knowledge that students are expected to attain as a result of completing an instructional program at BCC. Students completing an A.A. or A.S. at BCC will be able to demonstrate all of the BCC Institutional Learning Outcomes. All BCC courses and certificates are designed to teach some or all of the ILO's. In addition, students achieve these ILO's throughout their experiences at BCC, for example, with student services and student clubs.

Communication
Students show that they communicate well when they
• *Critically read, write, and communicate interpersonally, with audience awareness; and*
• *analyze communications for meaning, purpose, effectiveness, and logic.*

Critical Thinking
Students demonstrate critical thinking skills when they
• *identify problems or arguments and isolate facts related to arguments;*
• *use evidence and sound reasoning to justify well-informed positions; and*
• *generate multiple solutions to problems and predict consequences.*

Computational Skills
Students demonstrate computational skills when they
▪ *master computational concepts and apply them to concrete problems; and*
▪ *demonstrate algorithmic competence.*

Ethics and Personal Responsibility
Students show the ability to behave ethically and assume personal responsibility when they
• *analyze the consequences of their actions and the impact of these actions on society and the self; and*
• *demonstrate collaborative involvement in community interests.*

Global Awareness & Valuing Diversity
Students demonstrate global awareness and show that they value diversity when they
• *identify and explain diverse customs, beliefs, and lifestyles; and*
• *analyze how cultural, historical, and geographical issues shape perceptions.*

Information Competency
Students demonstrate information competency when they
• *find, evaluate, use, and communicate information in all its various formats;*
• *use library and online resources and research methodology effectively; and*
• *use technology effectively.*

Self-Awareness & Interpersonal Skills
Students demonstrate self-awareness and interpersonal skills when they
• *analyze their own actions and the perspectives of other persons; and*
• *work effectively with others in groups.*

Institutional Goals

Berkeley City College's Institutional Goals are aligned with the PCCD Strategic Goals, and are listed below:

A. Advance Student Access, Success & Equity
B. Engage our Communities & Partners
C. Build Programs of Distinction
D. Create a Culture of Innovation & Collaboration
E. Develop Resources to Advance & Sustain Mission