

Water Science Program Review 2012 – 2013

1. Program/Department Description

1A. Description

The Water Science program at Ventura College provides students with the technical training they need to pursue a career in the municipal potable water and wastewater industries. Waterworks operators protect public health by ensuring that plant operations comply with state and federally mandated drinking water and wastewater disposal standards.

This program contains twelve courses that enable students to understand and apply knowledge and hands-on skills in drinking water treatment, water distribution, advanced water treatment methodologies, wastewater treatment, wastewater collection, backflow protection, instrumentation, controls, pumps, motors, specialized water mathematics, microbiology, chemistry, and utility management protocols. In addition to the twelve regular courses, there are two internships. The Ventura College Water Science program offers more courses than any other California community college. Considering that the State has predicted more than 8000 jobs in this industry to become available within the next three years, it is important to provide the necessary training that the students require. The Water Science program includes five courses that allow a student to take a single course which prepares them for that specific State exam.

Students seeking an Associate's Degree in Water Science may choose the Water option to prepare them for a career in potable water treatment or the Wastewater option to prepare them for a career in wastewater sanitation. Regardless of the option chosen, both paths lead to rewarding careers protecting the health of both the community and the environment at local, state, and federal levels.

Degrees/Certificates

Program's courses are designed to satisfy State requirements for operator exams.

Associate in Science – Water Treatment

Associate in Science – Wastewater Treatment

Certificate of Achievement:

Water Treatment

Wastewater Treatment

Courses that allow State testing

Water Treatment

Distribution

Backflow Apparatus Tester

Wastewater Collection

Wastewater Treatment

Water Science Program Review 2012 – 2013

1B. 2012-2013 Estimated Costs (Certificate of Achievement ONLY)

Required for Gainful Employment regulations.

Water Treatment	Cost	Wastewater Treatment	Cost
Enrollment Fees	\$780 - \$1539	Enrollment Fees	\$780 - \$1539
Books/Supplies	\$1,500- \$2,500	Books/Supplies	\$1,500- \$2,500
Total	\$2,280- \$4,039	Total	\$2,280- \$4,039

1C. Criteria Used for Admission

Open admission with no pre-requisites.

1D. College Vision

Ventura College will be a model community college known for enhancing the lives and economic futures of its students and the community.

1E. College Mission

Ventura College, one of the oldest comprehensive community colleges in California, provides a positive and accessible learning environment that is responsive to the needs of a highly diverse student body through a varied selection of disciplines, learning approaches and teaching methods including traditional classroom instruction, distance education, experiential learning, and co-curricular activities. It offers courses in basic skills; programs for students seeking an associate degree, certificate or license for job placement and advancement; curricula for students planning to transfer; and training programs to meet worker and employee needs. It is a leader in providing instruction and support for students with disabilities. With its commitment to workforce development in support of the State and region's economic viability, Ventura College takes pride in creating transfer, career technical and continuing education opportunities that promote success, develop students to their full potential, create lifelong learners, enhance personal growth and life enrichment and foster positive values for successful living and membership in a multicultural society. The College is committed to continual assessment of learning outcomes in order to maintain high quality courses and programs. Originally landscaped to be an arboretum, the College has a beautiful, park-like campus that serves as a vital community resource.

Water Science Program Review 2012 – 2013

1F. College Core Commitments

Ventura College is dedicated to following a set of enduring Core Commitments that shall guide it through changing times and give rise to its Vision, Mission and Goals.

- Student Success
- Respect
- Integrity
- Quality
- Collegiality
- Access
- Innovation
- Diversity
- Service
- Collaboration
- Sustainability
- Continuous Improvement

1G. Program/Department Significant Events (Strengths and Successes)

-We have a strong water faculty with a combined water industry experience spanning more than 60 years. Our students' portfolios are strong because their education has been rooted in fundamentals while our wide range of classes at different levels has allowed students to gain the skills they need to be competitive at the next level.

-Of the 35 California state colleges and universities that offer Water Science courses, Ventura College has one of the most comprehensive programs, providing the vital training required by the state Dept. of Public Health and Water Resource Board for certification and licensure.

-Those students who receive the Ventura College Associate Degrees in Water Science have established the foundation for both management positions in the water industry and for higher -degrees in related fields such as environmental or engineering from other institutions.

The Water/Wastewater sector is probably the most stable industry in the United States. There are no lay-offs or permanent shut-downs. The public must have drinking water, and the public health must be protected through wastewater treatment.

-The Ventura College Water Science program has a licensure pass rate of about 80% for the first attempt and a 95% pass rate, which strongly contrasts with the national average of 30 – 40%.

- Through faculty contacts within the water industry, we have numerous guest speakers that bring new perspectives to the students.

Water Science Program Review 2012 – 2013

1H. Organizational Structure

President: Robin Calote, Executive Vice President: Ramiro Sanchez
Dean: Kathleen Schrader, Department Chair: Casey Mansfield

Instructors and Staff

Name	Richard Forde
Classification	Assistant Professor
Year Hired	2011
Years of Work-Related Experience	25
Degrees/Credentials	Ph.D.- Environmental Engineering B.S. – Environmental Microbiology Drinking Water License Distribution License Backflow Certification ISO - Registered Environmental Auditor CEI - Certified Environmental Inspector CLA - Certified Laboratory Analyst

Name	Joe Richardson
Classification	Adjunct Professor
Year Hired	1989
Years of Work-Related Experience	30
Degrees/Credentials	A.S. – Water Science

Name	Wes Richardson
Classification	Adjunct Asst. Professor
Year Hired	2006
Years of Work-Related Experience	10
Degrees/Credentials	A.S. – Water Science

Water Science Program Review 2012 – 2013

2. Performance Expectations

2A. Student Learning Outcomes

2A1. 2012-2013 - *Institutional* Student Learning Outcomes

1. Communication - written, oral and visual
2. Reasoning - scientific and quantitative
3. Critical thinking and problem solving
4. Information literacy
5. Personal/community awareness and academic/career responsibilities

2A2. 2012-2013- *Program* Level Student Learning Outcomes

For programs/departments offering degrees and/or certificates

1. Analyze the fundamentals of chemistry, biology and hydraulics, as they relate to the water industry.
2. Evaluate water quality management, water source, and the prevention of contamination.
3. Analyze the principles involved in the treatment, processing and distribution of potable water.
4. Evaluate the collection and treatment of waste water.
5. Understand the state licensing requirements for employment in the water industry .

2A3. 2012-2013 - *Course* Level Student Learning Outcomes

Attached to program review (See appendices).

2B. 2012-2013 Student SUCCESS Outcomes

1. The program will increase its retention rate from the average of the program's prior three-year retention rate. The retention rate is the number of students who finish a term with any grade other than W or DR divided by the number of students at census.
2. The program will increase its retention rate from the average of the college's prior three-year retention rate. The retention rate is the number of students who finish a term with any grade other than W or DR divided by the number of students at census.
3. The program will increase the student success rates from the average of the program's prior three-year success rates. The student success rate is the

Water Science Program Review 2012 – 2013

percentage of students who receive a grade of c or better.

4. The program will increase the student success rates from the average of the college's prior three-year success rates. The student success rate is the percentage of students who receive a grade of C or better.
5. Students will complete the program earning certificates and/or degrees.

2C. 2012-2013 Program OPERATING Outcomes

1. The program will maintain WSCH/FTEF above the 525 goal set by the district.
2. Inventory of instructional equipment is functional, current, and otherwise adequate to maintain a quality-learning environment. Inventory of all equipment over \$200 will be maintained and a replacement schedule will be developed. Service contracts for equipment over \$5,000 will be budgeted if funds are available.
3. The Water Science Program will continue to improve its curriculum and learning environment. The program should review curriculum and assess equipment needs including maintenance, to assure that student needs are being met.
4. The program will maintain a full-time to part-time FTEF ratio of one-to-one or greater.

2D. Mapping of Student Learning Outcomes

Course to Program-Level Student Learning Outcome Mapping (CLSLO)

I: This program-level student learning outcome is INTRODUCED

P: This program-level student learning outcome is PRACTICED

M: This program-level student learning outcome is MASTERED

Courses	PLSLO #1	PLSLO #2	PLSLO #3	PLSLO #4	PLSLO #5
WS v10	I,P	I,P	I,P	I,P	I,P,M
WS v11	I,P	I,P	I,P	I,P	I,P
WS v12	I,P	I,P	I,P	I,P,M	I,P
WS v13	I,P	I,P	I,P	I,P	I,P
WS v14	I,P	I,P	I,P	I,P	I,P
WS v15	I,P	I,P	I,P	I,P	I,P
WS v16	I,P	I,P,M	I,P	I,P	I,P
WS v17	I,P	I,P	I,P	I,P	I,P
WS v18	I,P	I,P	I,P	I,P	I,P
WS v19	I,P	I,P	I,P,M	I,P	I,P
WS v21	I,P,M	I,P	I,P	I,P	I,P
WS v25	I,P	I,P	I,P	I,P	I,P

Water Science Program Review 2012 – 2013

3. Operating Information

3A. Productivity Terminology Table

Sections	A credit or non-credit class. Does not include not-for-credit classes (community education).
Census	Number of students enrolled at census (typically the 4 th week of class for fall and spring).
FTES	Full Time Equivalent Students A student in the classroom 15 hours/week for 35 weeks (or two semesters) = 525 student contact hours. 525 student contact hours = 1 FTES. Example: 400 student contact hours = $400/525 = 0.762$ FTES. The State apportionment process and District allocation model both use FTES as the primary funding criterion.
FTEF	Full Time Equivalent Faculty A faculty member teaching 15 units for two semesters (30 units for the year) = 1 FTE. Example: a 6 unit assignment = $6/30 = 0.20$ FTEF (annual). The college also computes semester FTEF by changing the denominator to 15 units. However, in the program review data, all FTE is annual. FTEF includes both Full-Time Faculty and Part-Time Faculty. FTEF in this program review includes faculty assigned to teach extra large sections (XL Faculty). This deviates from the prior practice of not including these assignments as part of FTEF. However, it is necessary to account for these assignments to properly represent faculty productivity and associated costs.
Cross Listed FTEF	FTEF is assigned to all faculty teaching cross-listed sections. The FTEF assignment is proportional to the number of students enrolled at census. This deviates from the practice of assigning load only to the primary section. It is necessary to account for these cross-listed assignments to properly represent faculty productivity and associated costs.
XL FTE	Extra Large FTE: This is the calculated assignment for faculty assigned to extra large sections (greater than 60 census enrollments).The current practice is not to assign FTE. Example: if census > 60, 50% of the section FTE assignment for each additional group of 25 (additional tiers).
WSCH	Weekly Student Contact Hours The term "WSCH" is used as a total for weekly student contact hours AND as the ratio of the total WSCH divided by assigned FTEF. Example: 20 sections of 40 students at census enrolled for 3 hours per week taught by 4.00 FTEF faculty. $(20 \times 40 \times 3) = 2,400$ WSCH / 4.00 FTEF = 600 WSCH/FTEF.
WSCH to FTES	Using the example above: $2,400$ WSCH x 35 weeks = 84,000 student contact hours = $84,000 / 525 = 160$ FTES (see FTES definition). Simplified Formulas: $FTES = WSCH/15$ or $WSCH = FTES \times 15$
District Goal	Program WSCH ratio goal. $WSCH/FTEF$ The District goal was set in 2006 to recognize the differences in program productivity.

Water Science Program Review 2012 – 2013

3B: Student Success Terminology

Census	Number of students enrolled at Census (typically the 4 th week of class for fall and spring). Census enrollment is used to compute WSCH and FTES for funding purposes.
Retain	Students completing the class with any grade other than W or DR divided by Census Example: 40 students enrolled, 5 students dropped prior to census, 35 students were enrolled at census, 25 students completed the class with a grade other than W or DR: Retention Rate = 25/35 = 71%
Success	Students completing the class with grades A, B, C, CR or P divided by Census Excludes students with grades D, F, or NC.

Student Success by Subject, Fiscal Year, Term, Course *Ventura College*

WS Comparative Summary

Fiscal Year	A	B	C	P CR	D	F	NP NC	W	Graded	I	Completed	Success		
FY09	87	43	30	1	2	19	0	25	207	0	182	88%	161	78%
Distribution %	42%	21%	14%	0%	1%	9%	0%	12%						
FY10	96	47	31	0	5	17	0	19	215	0	196	91%	174	81%
Distribution %	45%	22%	14%	0%	2%	8%	0%	9%						
FY11	112	64	33	0	1	24	0	20	254	0	234	92%	209	82%
Distribution %	44%	25%	13%	0%	0%	9%	0%	8%						
WS Prior Three Year Average	98	51	31	0	3	20	0	21	225	0	204	91%	181	80%
	44%	23%	14%	0%	1%	9%	0%	9%						
FY12	244	102	32	0	1	20	0	42	441	0	399	90%	378	86%
Distribution %	55%	23%	7%	0%	0%	5%	0%	10%						
College Prior Three Year Average	33%	19%	13%	4%	5%	10%	1%	15%						

WS Course Detail for Spring, 2012 Fiscal Year = FY12 Term Code = 201203

CourseID	Water Treatment	A	B	C	P CR	D	F	NP NC	W	Graded	I	Completed	Success		
WSV11	Water Treatment	22	7	2	0	0	0	0	2	33	0	31	94%	31	94%
WSV13	Wastewater Collection	31	0	1	0	0	0	0	3	35	0	32	91%	32	91%
WSV16	Water Quality Protect&C	9	5	5	0	1	3	0	5	28	0	23	82%	19	68%
WSV18	Motors&Pumps Maint &	21	21	1	0	0	1	0	3	47	0	44	94%	43	91%
WSV19	Advanced Water Treatm	11	5	0	0	0	2	0	7	25	0	18	72%	16	64%
WSV21	Water Chemistry&Bacter	17	4	2	0	0	0	0	3	26	0	23	88%	23	88%

Water Science Program Review 2012 – 2013

WSV25	Water & Wastewater Ma	13	1	1	0	0	0	0	2	17	0	15	88%	15	88%
	Spring	124	43	12	0	1	6	0	25	211	0	186	88%	179	85%
	Distribution %	59%	20%	6%	0%	0%	3%	0%	12%						

WS Course Detail for Fall, 2011		Fiscal Year = FY12										Term Code = 201107			
CourseID	Basic Water & Wastewa	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV10	Basic Water & Wastewa	20	8	1	0	0	0	0	2	31	0	29	94%	29	94%
WSV12	Wastewater Treatment	19	16	1	0	0	1	0	1	38	0	37	97%	36	95%
WSV13	Wastewater Collection	9	6	0	0	0	3	0	4	22	0	18	82%	15	68%
WSV14	Water Distribution	30	6	3	0	0	1	0	0	40	0	40	100%	39	98%
WSV16	Water Quality Protect&C	13	7	4	0	0	3	0	2	29	0	27	93%	24	83%
WSV17	Water&Wastewater Hydr	12	9	5	0	0	2	0	8	36	0	28	78%	26	72%
	Fall	103	52	14	0	0	10	0	17	196	0	179	91%	169	86%
	Distribution %	53%	27%	7%	0%	0%	5%	0%	9%						

WS Course Detail for Summer, 2011		Fiscal Year = FY12										Term Code = 201105			
CourseID	Basic Water & Wastewa	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV10	Basic Water & Wastewa	17	7	6	0	0	4	0	0	34	0	34	100%	30	88%
	Summer	17	7	6	0	0	4	0	0	34	0	34	100%	30	88%
	Distribution %	50%	21%	18%	0%	0%	12%	0%	0%						
	FY12	244	102	32	0	1	20	0	42	441	0	399	90%	378	86%
	Distribution %	55%	23%	7%	0%	0%	5%	0%	10%						

WS Course Detail for Spring, 2011		Fiscal Year = FY11										Term Code = 201103			
CourseID	Water Treatment	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV11	Water Treatment	15	14	4	0	0	1	0	3	37	0	34	92%	33	89%
WSV15	Water Systems Instrum	7	14	4	0	1	3	0	6	35	0	29	83%	25	71%
WSV16	Water Quality Protect&C	6	2	5	0	0	1	0	2	16	0	14	88%	13	81%
WSV25	Water & Wastewater Ma	20	1	2	0	0	5	0	2	30	0	28	93%	23	77%
	Spring	48	31	15	0	1	10	0	13	118	0	105	89%	94	80%
	Distribution %	41%	26%	13%	0%	1%	8%	0%	11%						

WS Course Detail for Fall, 2010		Fiscal Year = FY11										Term Code = 201007			
CourseID	Basic Water & Wastewa	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV10	Basic Water & Wastewa	15	8	4	0	0	1	0	1	29	0	28	97%	27	93%

9/4/2012

WS

FY11

Page 231 of 233

Student Success by Subject, Fiscal Year, Term, Course														Ventura College	
CourseID	Water Distribution	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV14	Water Distribution	18	3	2	0	0	2	0	2	27	0	25	93%	23	85%
WSV16	Water Quality Protect&C	10	8	5	0	0	4	0	0	27	0	27	100%	23	85%
WSV21	Water Chemistry&Bacter	8	7	2	0	0	4	0	2	23	0	21	91%	17	74%
	Fall	51	26	13	0	0	11	0	5	106	0	101	95%	90	85%
	Distribution %	48%	25%	12%	0%	0%	10%	0%	5%						

WS Course Detail for Summer, 2010		Fiscal Year = FY11										Term Code = 201005			
CourseID	Basic Water & Wastewa	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV10	Basic Water & Wastewa	13	7	5	0	0	3	0	2	30	0	28	93%	25	83%
	Summer	13	7	5	0	0	3	0	2	30	0	28	93%	25	83%
	Distribution %	43%	23%	17%	0%	0%	10%	0%	7%						

Water Science Program Review 2012 – 2013

FY11	112	64	33	0	1	24	0	20	254	0	234	92%	209	82%
Distribution %	44%	25%	13%	0%	0%	9%	0%	8%						

WS Course Detail for Spring, 2010		Fiscal Year = FY10										Term Code = 201003			
CourseID	Wastewater Collection	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV13	Wastewater Collection	18	5	2	0	0	0	0	0	25	0	25	100%	25	100%
WSV16	Water Quality Protect&C	2	4	6	0	1	5	0	1	19	0	18	95%	12	63%
WSV17	Water&Wastewater Hydr	8	2	7	0	1	1	0	5	24	0	19	79%	17	71%
WSV18	Motors&Pumps Maint &	18	4	1	0	1	1	0	2	27	0	25	93%	23	85%
Spring		46	15	16	0	3	7	0	8	95	0	87	92%	77	81%
Distribution %		48%	16%	17%	0%	3%	7%	0%	8%						

WS Course Detail for Fall, 2009		Fiscal Year = FY10										Term Code = 200907			
CourseID	Wastewater Treatment	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV12	Wastewater Treatment	15	6	2	0	0	3	0	1	27	0	26	96%	23	85%
WSV14	Water Distribution	18	5	2	0	1	0	0	1	27	0	26	96%	25	93%
WSV16	Water Quality Protect&C	5	7	6	0	0	0	0	3	21	0	18	86%	18	86%
WSV17	Water&Wastewater Hydr	8	8	2	0	1	3	0	0	22	0	22	100%	18	82%
Fall		46	26	12	0	2	6	0	5	97	0	92	95%	84	87%
Distribution %		47%	27%	12%	0%	2%	6%	0%	5%						

WS Course Detail for Summer, 2009		Fiscal Year = FY10										Term Code = 200905			
CourseID	Water Distribution	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV14	Water Distribution	4	6	3	0	0	4	0	6	23	0	17	74%	13	57%
Summer		4	6	3	0	0	4	0	6	23	0	17	74%	13	57%
Distribution %		17%	26%	13%	0%	0%	17%	0%	26%						

FY10	96	47	31	0	5	17	0	19	215	0	196	91%	174	81%
Distribution %	45%	22%	14%	0%	2%	8%	0%	9%						

CourseID	Water Treatment	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV11	Water Treatment	10	14	6	0	0	0	0	5	35	0	30	86%	30	86%
WSV15	Water Systems Instrum	19	5	1	0	0	3	0	1	29	0	28	97%	25	86%
WSV16	Water Quality Protect&C	5	3	4	0	0	6	0	1	19	0	18	95%	12	63%
WSV25	Water & Wastewater Ma	12	6	2	0	0	1	0	2	23	0	21	91%	20	87%
Spring		46	28	13	0	0	10	0	9	106	0	97	92%	87	82%
Distribution %		43%	26%	12%	0%	0%	9%	0%	8%						

WS Course Detail for Fall, 2008		Fiscal Year = FY09										Term Code = 200807			
CourseID	Basic Water & Wastewa	A	B	C	P CR	D	F	NP NC	W	Graded	/	Completed	Success		
WSV10	Basic Water & Wastewa	19	3	6	0	0	0	0	8	36	0	28	78%	28	78%
WSV14	Water Distribution	14	1	2	0	2	5	0	0	24	0	24	100%	17	71%
WSV16	Water Quality Protect&C	5	4	6	1	0	2	0	5	23	0	18	78%	16	70%
WSV21	Water Chemistry&Bacter	3	7	3	0	0	2	0	3	18	0	15	83%	13	72%
Fall		41	15	17	1	2	9	0	16	101	0	85	84%	74	73%
Distribution %		41%	15%	17%	1%	2%	9%	0%	16%						

9/4/2012

WS

FY09

Page 232 of 233

Student Success by Subject, Fiscal Year, Term, Course *Ventura College*

FY09	87	43	30	1	2	19	0	25	207	0	182	88%	161	78%
Distribution %	42%	21%	14%	0%	1%	9%	0%	12%						

Water Science Program Review 2012 – 2013

3C: 2012 - 2013 Please provide program interpretation for the following:

3C1: Interpretation of the Program Budget Information

Program Review Expenses for Water Science			Funds 111, 113, 114, 128*, 445				
			FY09	FY10	FY11	FY12	Bud FY13
Total Program Review Expenses by Major Budget Categories for Water Science							
1	FT Faculty		2,955	2,718	2,692	85,932	93,326
2	PT Faculty		36,712	36,724	39,563	25,529	24,411
7	Supplies		0	2,536	3,054	8,369	3,000
8	Services		0	0	0	0	2,000
9	Equipment		0	19,474	3,877	12,095	10,000
Total Expenses for Water Science			39,668	61,451	49,185	131,925	132,737
I							
Budget by Major Budget Category		Program: 095800 - Water and Wastewater Technology					
1	FT Faculty		2,955	2,718	2,692	85,932	93,326
2	PT Faculty		36,712	36,724	39,563	25,529	24,411
3	Classified		0	0	0	0	0
4	Student Hourly		0	0	0	0	0
5	Supervisors		0	0	0	0	0
6	Managers		0	0	0	0	0
7	Supplies		0	2,536	3,054	8,369	3,000
8	Services		0	0	0	0	2,000
9	Equipment		0	19,474	3,877	12,095	10,000
Totals by Major Budget Category			39,668	61,451	49,185	131,925	132,737
111	Unrestricted General Fund	30086 Industrial Mfg Technology	095800 Water and Wastewater Technology				
111 30086 1110 095800	Faculty - Full Time Instructional		0	0	0	54,730	0
111 30086 1311 095800	Faculty Summer Instructional Hourly		0	2,856	2,856	2,856	2,856
111 30086 1321 095800	Faculty Fall Instructional Hourly		18,952	16,000	19,189	8,572	8,572
111 30086 1331 095800	Faculty Spring Instructional Hourly		15,714	15,714	15,142	12,858	11,000
111 30086 1340 095800	Faculty Facilitr/Coord/Hrly Stipend		1,000	1,000	1,000	500	1,000
111 30086 1342 095800	Faculty - Office Hours - PT Faculty		157	226	157	78	295
111 30086 3XX1 095800	Benefits FT Faculty		2,955	2,718	2,692	31,202	1,495
111 30086 3XX2 095800	Benefits PT Faculty		890	928	1,219	665	688
111	Unrestricted General Fund	30161 ESL/BESL	095800 Water and Wastewater Technology				
111 30161 1110 095800	Faculty - Full Time Instructional		0	0	0	0	57,013
111 30161 3XX1 095800	Benefits FT Faculty		0	0	0	0	34,819
121	State Categorical	37010 Perkins IV, Title I, Part C	095800 Water and Wastewater Technology				
121 37010 4100 095800	Instructional Supplies and Material		0	2,536	3,054	8,369	3,000
121 37010 5242 095800	Other Faculty Travel		0	0	0	0	2,000
121 37010 6413 095800	Equip-Instruc Equip-\$200-\$999		0	5,550	2,095	3,931	3,000
121 37010 6443 095800	Equip-Instruc Equip-\$1000+		0	13,924	1,781	8,164	7,000
095800	Water and Wastewater Technology		FY09	FY10	FY11	FY12	Bud FY13
Program Review Expenses Detail Total			39,668	61,451	49,185	131,925	132,737

Water Science Program Review 2012 – 2013

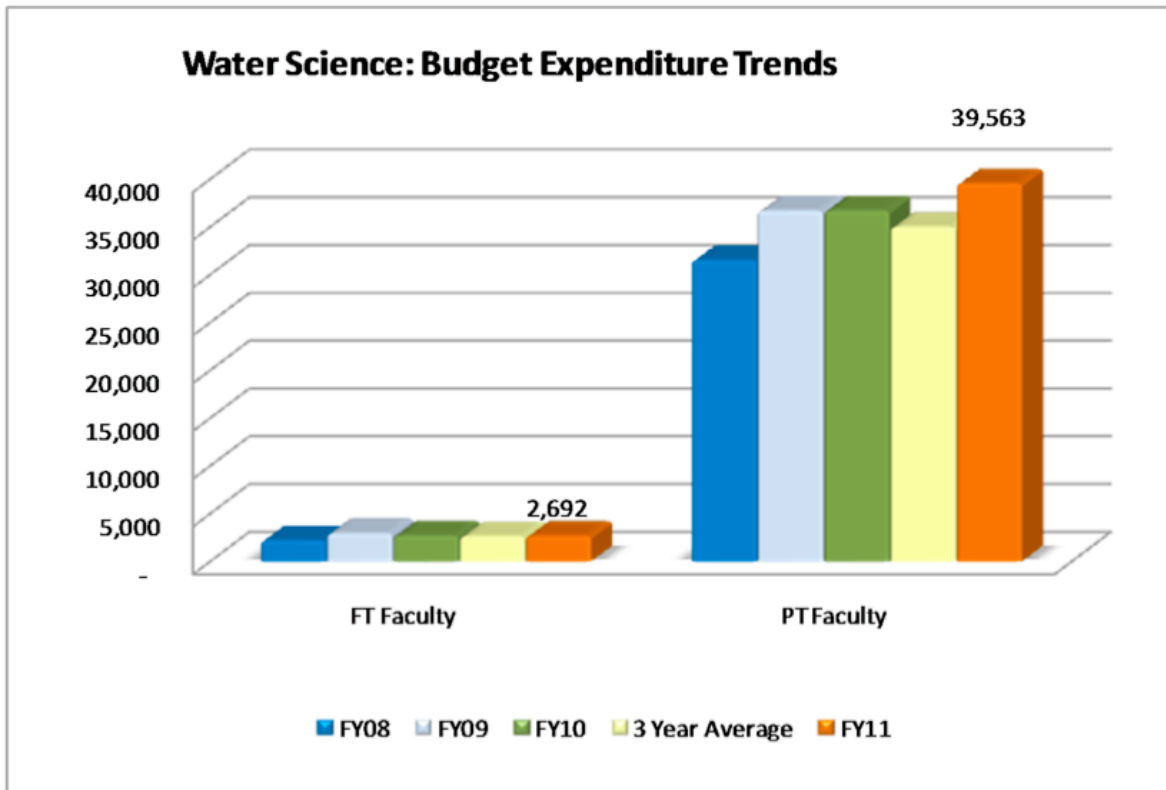
A1: Budget Summary Table

To simplify the reporting and analysis of the Banner budget detail report, the budget accounts were consolidated into nine expense categories. The personnel categories include employee payroll expenses (benefits). The “3 Year Average” was computed to provide a trend benchmark to compare the prior three year expenses to the FY11 expenses. The “FY11 College” expense percentages are included to provide a benchmark to compare the program’s expenses to the overall college expenses.

Category	Title	FY08	FY09	FY10	3 Year Average	FY11	FY11 Program	FY11 College
1	FT Faculty	2,200	2,955	2,718	2,624	2,692	3%	12%
2	PT Faculty	31,523	36,712	36,724	34,986	39,563	13%	-10%
	Total	33,723	39,667	39,442	37,611	42,255	12%	0%

A2: Budget Summary Chart

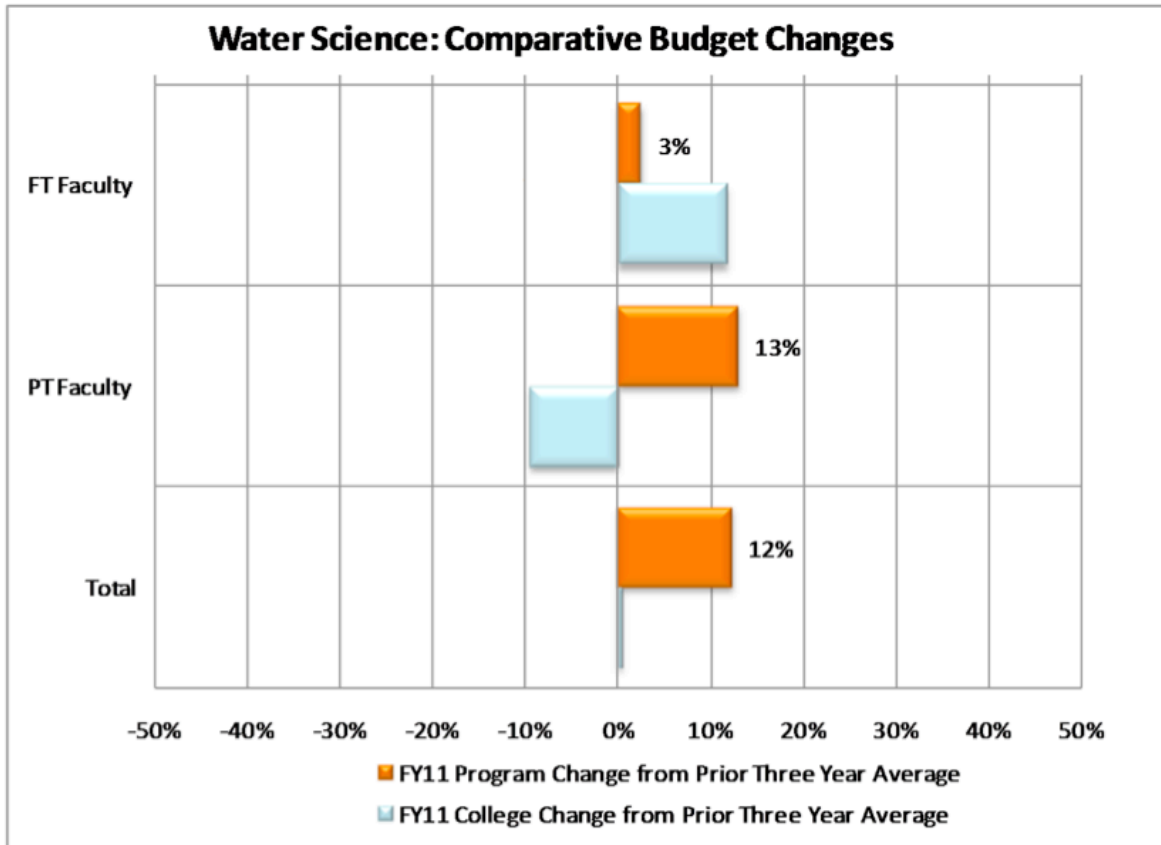
This chart illustrates the program’s expense trends. The data label identifies the FY11 expenses (the last bar in each group). The second-to-last bar is the program’s prior three year average.



A3: Comparative Budget Changes Chart

This chart illustrates the percentage change from the prior three year average expense to the FY11 expenses. The top bar for each budget category represents the program’s change in expenses and includes the data label. The second bar represents the college’s change in expenses.

Water Science Program Review 2012 – 2013



A4: Budget Detail Report

The program's detail budget information is available in *Appendix A – Program Review Budget Report*. This report is a PDF document and is searchable. The budget information was extracted from the District's Banner Financial System. The program budget includes all expenses associated to the program's Banner program codes within the following funds: general fund (111), designated college equipment fund (114-35012), State supplies and equipment funds (128xx), and the technology refresh fund (445). The *Program Review Budget Report* is sorted by program (in alphabetical order) and includes the following sections: total program expenses summary; subtotal program expenses for each different program code; detail expenses by fund, organization and account; and program inventory (as posted in Banner). To simplify the report, the Banner personnel benefit accounts (3xxx) were consolidated into employee type benefit accounts (3xxx1 = FT Faculty, 3xxx2 = PT Faculty, 3xxx3 = Classified, etc.).

A5: Interpretation of the Program Budget Information

The program shows a only a 3% increase in average FT faculty expenditures and a 13% increase in average PT faculty over the last three years paralleling the college average expenditures over that same period. The program did not have FT faculty during this period and was conducted entirely by PT faculty.

Water Science Program Review 2012 – 2013

3C2: Interpretation of the Program Inventory Information

B1: Program Inventory Table

This chart shows the inventory (assets) as currently posted in the Banner Financial System. This inventory list is not complete and will require review by each program. Based on this review an updated inventory list will be maintained by the college. A result of developing a complete and accurate inventory list is to provide an adequate budget for equipment maintenance and replacement (total-cost-of-ownership). The college will be working on this later this fall.

Item	Vendor	Org	Fund	Purchased	Age	Price	Perm Inv #	Serial #
#15 474 100 WATER BATH MDL 2	Fisher Scientific	37010	121	6/29/2010	1	2,310	N00022145	209405-1005
Cat #14385464 Genesys 10 VIS W	Fisher Scientific	37010	121	2/11/2010	1	3,136	N00018922	209M341003
Cat #14385464 Genesys 10 VIS W	Fisher Scientific	37010	121	2/11/2010	1	3,136	N00018921	209N014001
Subtotal Inventory for Water and Wastewater Technology						8,582		

B2: Interpretation of the Program Inventory Information

The equipment list provided by Banner is incomplete and does not reflect the program's holdings. An inventory is underway to provide an accurate equipment list.

3C3: Interpretation of the Program Productivity Information

C2: Productivity Summary Table

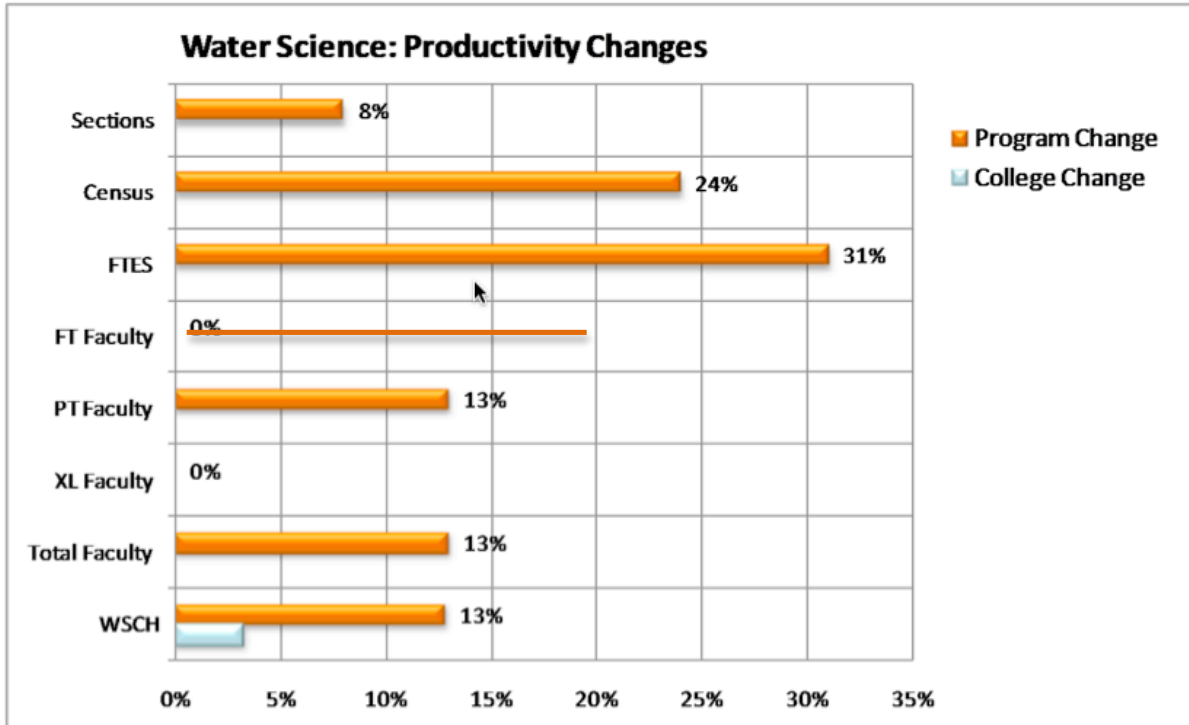
This table is a summary of the detail information provided in the *Program Review Productivity Report*. The "3 Year Average" was computed to provide a trend benchmark to compare the results of the prior three years to the FY11 results. The "FY11 College" percentages are included to provide a benchmark to compare the program's percentages.

Title	FY08	FY09	FY10	3 Year Average	FY11	Program Change	College Change
Sections	8	8	9	8	9	8%	
Census	202	208	221	210	260	24%	
FTES	20	23	22	22	28	31%	
FT Faculty	-	-	-	-	-	0%	
PT Faculty	0.80	0.87	0.90	0.86	0.97	13%	
XL Faculty	-	-	-	-	-	0%	
Total Faculty	0.80	0.87	0.90	0.86	0.97	13%	
WSCH	375	397	367	384	433	13%	3%

Water Science Program Review 2012 – 2013

C3: Comparative Productivity Changes Chart

This chart illustrates the percentage change from the prior three year average productivity to the FY11 productivity. The top bar for each budget category represents the program's change in productivity and includes the data label. The second bar represents the college's change in productivity.



C4: Interpretation of the Program Productivity Information

Water Science Program Review 2012 – 2013

Program Review Productivity and WSCH Ratios Report

WS						
WS Productivity Measures	FY09	FY10	FY11	3 Yr Avg	FY12	Change
Sections,	8	9	9	9	14	62%
Census,	208	221	260	230	445	94%
FTES,	23	22	28	24	47	93%
FT Faculty,	0.00	0.00	0.00	0.00	0.87	#Div/0!
PT Faculty,	0.87	0.90	0.97	0.91	0.60	-34%
XL Faculty,	0.00	0.00	0.00	0.00	0.00	0%
Total Faculty,	0.87	0.90	0.97	0.91	1.47	61%

WS District WSCH Ratio: WSCH / (FTFTE + PTFTE)									
Course	Title	FY09	FY10	FY11	3 Yr Avg	FY12	% Change	Dist Goal	% Goal
WSV10	Basic Water & Wastewater,	555	0	423	467	473	1%	400	118%
WSV11	Water Treatment,	525	0	570	548	570	4%	400	143%
WSV12	Wastewater Treatment,	0	420	0	420	570	36%	400	143%
WSV13	Wastewater Collection,	0	375	0	375	428	14%	400	107%
WSV14	Water Distribution,	375	381	435	393	585	49%	400	146%
WSV15	Water Systems Instrum&Control,	435	0	525	480	0	-100%	400	0%
WSV16	Water Quality Protect&Control,	308	308	338	318	428	35%	400	107%
WSV17	Water&Wastewater Hydraulics,	0	353	0	353	525	49%	400	131%
WSV18	Motors&Pumps Maint & Operation,	0	405	0	405	705	74%	400	176%
WSV19	Advanced Water Treatment,	0	0	0	0	375	0%	400	94%
WSV21	Water Chemistry&Bacteriology,	324	0	432	378	468	24%	400	117%
WSV25	Water & Wastewater Management	345	0	450	398	255	-36%	400	64%
Annual WSCH Ratio for WS		391	365	437	399	479			

WS College WSCH Ratio: WSCH / (FT FTE+PT FTE+XL FTE)									
Course	Title	FY09	FY10	FY11	3 Yr Avg	FY12	% Change	Dist Goal	% Goal
WSV10	Basic Water & Wastewater,	555	0	423	467	473	-9%	400	118%
WSV11	Water Treatment,	525	0	570	548	570	4%	400	143%
WSV12	Wastewater Treatment,	0	420	0	420	570	-100%	400	143%
WSV13	Wastewater Collection,	0	375	0	375	428	-100%	400	107%
WSV14	Water Distribution,	375	381	435	393	585	11%	400	146%
WSV15	Water Systems Instrum&Control,	435	0	525	480	0	9%	400	0%
WSV16	Water Quality Protect&Control,	308	308	338	318	428	6%	400	107%
WSV17	Water&Wastewater Hydraulics,	0	353	0	353	525	-100%	400	131%
WSV18	Motors&Pumps Maint & Operation,	0	405	0	405	705	-100%	400	176%
WSV19	Advanced Water Treatment,	0	0	0	0	375	0%	400	94%
WSV21	Water Chemistry&Bacteriology,	324	0	432	378	468	14%	400	117%
WSV25	Water & Wastewater Management	345	0	450	398	255	13%	400	64%
Annual WSCH Ratio for WS		391	365	437	399	479			

The C2 Chart and the C3 Graph indicate that the program offerings have significantly increased over the past three years. The WSCH/FTEF ratio has been very consistent and closely aligned with the district goal of 400 and is currently exceeds the goal at 479.

WSCH by College Year

FY	Subject	Sections	Census	FTES	WSCH	FTEFx	FT FTE	PT FTE	XL FTE	D Goal	College	District
FY09	College	3,183	96,539	11,509	172,632	324.7	111.9	194.4	18.4	525	532	564
FY10	College	2,915	98,849	11,418	171,273	313.6	113.4	179.7	20.5	525	546	584
FY11	College	2,714	92,283	11,048	165,727	303.7	118.0	167.8	17.9	525	546	580
FY12	College	2,618	88,574	10,624	159,365	299.4	126.3	158.8	14.3	525	532	559

Water Science Program Review 2012 – 2013

3C4: Interpretation of the Program Course Productivity Information

WSCH by Subject Course Term					Ventura College							
Course	Title	Term CRN	Census	FTEs	WSCH	FTEfx	FT FTE	PT FTE	XL FTE	D Goal	College	District
WS Fiscal Year = FY12												
WSV10	Basic Water & Wastewater	Su 55358	35	3.20	48	0.10	0.00	0.10	0.00	400	480	480
WSV10	Basic Water & Wastewater	Fa 70587	31	3.10	47	0.10	0.10	0.00	0.00	400	465	465
FY12 Subtotal for WSV10			66	6.30	95	0.20	0.10	0.10	0.00	400	473	473
WSV11	Water Treatment	Sp 30665	38	3.80	57	0.10	0.10	0.00	0.00	400	570	570
FY12 Subtotal for WSV11			38	3.80	57	0.10	0.10	0.00	0.00	400	570	570
WSV12	Wastewater Treatment	Fa 70586	38	3.80	57	0.10	0.10	0.00	0.00	400	570	570
FY12 Subtotal for WSV12			38	3.80	57	0.10	0.10	0.00	0.00	400	570	570
WSV13	Wastewater Collection	Fa 72358	22	2.20	33	0.10	0.10	0.00	0.00	400	330	330
WSV13	Wastewater Collection	Sp 30679	35	3.50	53	0.10	0.10	0.00	0.00	400	525	525
FY12 Subtotal for WSV13			57	5.70	86	0.20	0.20	0.00	0.00	400	428	428
WSV14	Water Distribution	Fa 72515	39	3.90	59	0.10	0.10	0.00	0.00	400	585	585
FY12 Subtotal for WSV14			39	3.90	59	0.10	0.10	0.00	0.00	400	585	585
WSV16	Water Quality Protect&Cont	Fa 70970	29	2.90	44	0.10	0.00	0.10	0.00	400	435	435
WSV16	Water Quality Protect&Cont	Sp 31776	28	2.80	42	0.10	0.00	0.10	0.00	400	420	420
FY12 Subtotal for WSV16			57	5.70	86	0.20	0.00	0.20	0.00	400	428	428
WSV17	Water&Wastewater Hydraul	Fa 71476	35	3.50	53	0.10	0.00	0.10	0.00	400	525	525
FY12 Subtotal for WSV17			35	3.50	53	0.10	0.00	0.10	0.00	400	525	525
WSV18	Motors&Pumps Maint & Op	Sp 31292	47	4.70	71	0.10	0.00	0.10	0.00	400	705	705
FY12 Subtotal for WSV18			47	4.70	71	0.10	0.00	0.10	0.00	400	705	705
WSV19	Advanced Water Treatment	Sp 31315	25	2.50	38	0.10	0.00	0.10	0.00	400	375	375
FY12 Subtotal for WSV19			25	2.50	38	0.10	0.00	0.10	0.00	400	375	375
WSV21	Water Chemistry&Bacteriol	Sp 31453	26	5.20	78	0.17	0.17	0.00	0.00	400	468	468
FY12 Subtotal for WSV21			26	5.20	78	0.17	0.17	0.00	0.00	400	468	468
WSV25	Water & Wastewater Mana	Sp 30694	17	1.70	26	0.10	0.10	0.00	0.00	400	255	255
FY12 Subtotal for WSV25			17	1.70	26	0.10	0.10	0.00	0.00	400	255	255

WEXP District WSCH Ratio: WSCH / (FTFTE + PTFTE)						
Course	Title	FY09	FY10	FY11	FY12	Dist Goal
WEXPV95	Work Experience I,	0	0	0	0	2,000
WEXPV96	Work Experience II,	0	0	0	0	2,000
WEXP	Total for WEXP,	#Div/0!	#Div/0!	#Div/0!	#Num!	2,000

WS District WSCH Ratio: WSCH / (FTFTE + PTFTE)						
Course	Title	FY09	FY10	FY11	FY12	Dist Goal
WSV10	Basic Water & Wastewater,	555	0	423	473	400
WSV11	Water Treatment,	525	0	570	570	400
WSV12	Wastewater Treatment,	0	420	0	570	400
WSV13	Wastewater Collection,	0	375	0	428	400
WSV14	Water Distribution,	375	381	435	585	400
WSV15	Water Systems Instrum&Control,	435	0	525	0	400
WSV16	Water Quality Protect&Control,	308	308	338	428	400
WSV17	Water&Wastewater Hydraulics,	0	353	0	525	400
WSV18	Motors&Pumps Maint & Operation,	0	405	0	705	400
WSV19	Advanced Water Treatment,	0	0	0	375	400
WSV21	Water Chemistry&Bacteriology,	324	0	432	468	400
WSV25	Water & Wastewater Management,	345	0	450	255	400
WS	Total for WS,	391	365	437	479	400

The Water Science Program meets or exceeds our goals in every course.

Water Science Program Review 2012 – 2013

3C5: Interpretation of Program Retention, Student Success, and Grade Distribution

Student Success by Subject, Fiscal Year, Term, Course Ventura College

WS Comparative Summary

Fiscal Year	A	B	C	P CR	D	F	NP NC	W	Graded	I	Completed	Success		
FY09	87	43	30	1	2	19	0	25	207	0	182	88%	161	78%
Distribution %	42%	21%	14%	0%	1%	9%	0%	12%						
FY10	96	47	31	0	5	17	0	19	215	0	196	91%	174	81%
Distribution %	45%	22%	14%	0%	2%	8%	0%	9%						
FY11	112	64	33	0	1	24	0	20	254	0	234	92%	209	82%
Distribution %	44%	25%	13%	0%	0%	9%	0%	8%						
WS Prior Three Year Average	98	51	31	0	3	20	0	21	225	0	204	91%	181	80%
	44%	23%	14%	0%	1%	9%	0%	9%						
FY12	244	102	32	0	1	20	0	42	441	0	399	90%	378	86%
Distribution %	55%	23%	7%	0%	0%	5%	0%	10%						
College Prior Three Year Average	33%	19%	13%	4%	5%	10%	1%	15%						

WS Course Detail for Spring, 2012 Fiscal Year = FY12 Term Code = 201203

CourseID	Water Treatment	A	B	C	P CR	D	F	NP NC	W	Graded	I	Completed	Success		
WSV11	Water Treatment	22	7	2	0	0	0	0	2	33	0	31	94%	31	94%
WSV13	Wastewater Collection	31	0	1	0	0	0	0	3	35	0	32	91%	32	91%
WSV16	Water Quality Protect&C	9	5	5	0	1	3	0	5	28	0	23	82%	19	68%
WSV18	Motors&Pumps Maint &	21	21	1	0	0	1	0	3	47	0	44	94%	43	91%
WSV19	Advanced Water Treatm	11	5	0	0	0	2	0	7	25	0	18	72%	16	64%
WSV21	Water Chemistry&Bacter	17	4	2	0	0	0	0	3	26	0	23	88%	23	88%

2012 marks a record success for the Water Science program with an overall completion rate of 90% and with 86% at grade C or higher.

3C6: Interpretation of the Program Completion Information

Student Awards by Program, Term		Water Science: Water 458000				
	Term	# Certificates	# Degrees	# Female	# Male	
	200805	Summer	0	2	0	2
	200807	Fall	2	0	0	2
	200903	Spring	0	2	0	2
FY09	Water Science: Water		2	4	0	6
	200905	Summer	0	2	0	2
	200907	Fall	0	2	0	2
	201003	Spring	0	1	0	1
FY10	Water Science: Water		0	5	0	5
	201103	Spring	1	1	0	2
FY11	Water Science: Water		1	1	0	2
3 Year Average			1	3	0	4
	201105	Summer	0	1	0	1
	201107	Fall	2	0	0	2
	201203	Spring	2	2	1	3
FY12	Water Science: Water		4	3	1	6

Water Science Program Review 2012 – 2013

Student Awards by Program, Term		Water Science: Wastewater			457900	
	Term	# Certificates	# Degrees	# Female	# Male	
	200805	Summer	0	1	0	1
	200807	Fall	2	0	0	2
	200903	Spring	5	1	0	6
FY09	Water Science: Wastewater		7	2	0	9
	200907	Fall	1	1	0	2
	201003	Spring	0	1	0	1
FY10	Water Science: Wastewater		1	2	0	3
	201103	Spring	1	1	0	2
FY11	Water Science: Wastewater		1	1	0	2
3 Year Average			3	2	0	5
	201105	Summer	1	0	0	1
	201107	Fall	1	0	0	1
	201203	Spring	2	3	1	4
FY12	Water Science: Wastewater		4	3	1	6

In 2012, the Water Science program graduated 6 students with Associate Degrees and 2 with Certificates of Achievement.

WS Productivity Measures	FY08	FY09	FY10	3 Yr Avg	FY11	Change
Sections,	8	8	9	8	9	8%
Census,	202	208	221	210	260	24%
FTES,	20	23	22	22	28	31%
FT Faculty,	0.00	0.00	0.00	0.00	0.00	0%
PT Faculty,	0.80	0.87	0.90	0.86	0.97	13%
XL Faculty,	0.00	0.00	0.00	0.00	0.00	0%
Total Faculty,	0.80	0.87	0.90	0.86	0.97	13%

WS District WSCH Ratio: WSCH / (FTFTE + PTFTE)		FY08	FY09	FY10	3 Yr Avg	FY11	% Change	Dist Goal	% Goal
Course	Title								
WSV10	Basic Water & Wastewater,	435	555	0	495	423	-15%	400	106%
WSV11	Water Treatment,	0	525	0	525	570	9%	400	143%
WSV12	Wastewater Treatment,	345	0	420	383	0	-100%	400	0%
WSV13	Wastewater Collection,	390	0	375	383	0	-100%	400	0%
WSV14	Water Distribution,	375	375	381	378	435	15%	400	109%
WSV15	Water Systems Instrum&Control,	0	435	0	435	525	21%	400	131%
WSV16	Water Quality Protect&Control,	338	308	308	318	338	6%	400	84%
WSV17	Water&Wastewater Hydraulics,	375	0	353	360	0	-100%	400	0%
WSV18	Motors&Pumps Maint & Operation,	435	0	405	420	0	-100%	400	0%
WSV21	Water Chemistry&Bacteriology,	0	324	0	324	432	33%	400	108%
WSV25	Water & Wastewater Management	0	345	0	345	450	30%	400	113%
Annual WSCH Ratio for WS		379	391	365	378	437			

WS College WSCH Ratio: WSCH / (FT FTE+PT FTE+XL FTE)		FY08	FY09	FY10	3 Yr Avg	FY11	% Change	Dist Goal	% Goal
Course	Title								
WSV10	Basic Water & Wastewater,	435	555	0	495	423	-15%	400	106%
WSV11	Water Treatment,	0	525	0	525	570	9%	400	143%
WSV12	Wastewater Treatment,	345	0	420	383	0	-100%	400	0%
WSV13	Wastewater Collection,	390	0	375	383	0	-100%	400	0%
WSV14	Water Distribution,	375	375	381	378	435	15%	400	109%
WSV15	Water Systems Instrum&Control,	0	435	0	435	525	21%	400	131%
WSV16	Water Quality Protect&Control,	338	308	308	318	338	6%	400	84%
WSV17	Water&Wastewater Hydraulics,	375	0	353	360	0	-100%	400	0%
WSV18	Motors&Pumps Maint & Operation,	435	0	405	420	0	-100%	400	0%
WSV21	Water Chemistry&Bacteriology,	0	324	0	324	432	33%	400	108%
WSV25	Water & Wastewater Management	0	345	0	345	450	30%	400	113%
Annual WSCH Ratio for WS		379	391	365	378	437			

Water Science Program Review 2012 – 2013

3C7: Interpretation of the Program Demographic Information

Student Demographics by Subject, Year, Term, Course													Ventura College Program Review	
Course	Title	Hispanic	White	Asian	Af Am	Pac I	Filipino	Nat Am	Other	Female	Male	Other	Avg Age	
WS	Course Detail for Fall, 2007	Fiscal Year = FY08										Term Code = 200707		
WSV10	Basic Water & Wastewater	10	13	0	1	0	1	1	2	2	26	0	42	
WSV12	Wastewater Treatment	11	6	1	1	0	1	1	2	1	22	0	40	
WSV14	Water Distribution	7	15	0	0	0	0	1	2	1	24	0	43	
WSV16	Water Quality Protect&Con	7	16	0	1	0	0	0	2	1	25	0	38	
WS	Fall 2007	35	50	1	3	0	2	3	8	5	97	0	41	
		34%	49%	1%	3%	0%	2%	3%	8%	5%	95%	0%		
WS	Course Detail for Spring, 2008	Fiscal Year = FY08										Term Code = 200803		
WSV13	Wastewater Collection	9	13	0	0	0	1	1	2	2	24	0	40	
WSV16	Water Quality Protect&Con	5	11	0	0	0	2	0	1	1	18	0	45	
WSV17	Water&Wastewater Hydrau	8	12	0	0	0	1	1	3	4	21	0	42	
WSV18	Motors&Pumps Maint & Op	8	17	0	0	0	1	1	2	1	28	0	43	
WS	Spring 2008	30	53	0	0	0	5	3	8	8	91	0	42	
		30%	54%	0%	0%	0%	5%	3%	8%	8%	92%	0%		
WS	Course Detail for Fall, 2008	Fiscal Year = FY09										Term Code = 200807		
WSV10	Basic Water & Wastewater	10	18	0	1	0	2	2	3	4	32	0	37	
WSV14	Water Distribution	7	10	0	0	0	1	3	3	1	23	0	37	
WSV16	Water Quality Protect&Con	10	8	0	0	0	0	1	4	3	20	0	40	
WSV21	Water Chemistry&Bacteriol	3	10	0	0	0	1	1	3	0	18	0	42	
WS	Fall 2008	30	46	0	1	0	4	7	13	8	93	0	39	
		30%	46%	0%	1%	0%	4%	7%	13%	8%	92%	0%		
WS	Course Detail for Spring, 2009	Fiscal Year = FY09										Term Code = 200903		
WSV11	Water Treatment	11	17	2	1	0	1	1	2	2	33	0	41	
WSV15	Water Systems Instrum&C	7	13	1	1	0	2	2	3	2	27	0	42	
WSV16	Water Quality Protect&Con	4	11	1	0	0	0	0	3	2	17	0	42	
WSV25	Water & Wastewater Mana	9	9	1	1	0	1	0	2	4	19	0	41	
WS	Spring 2009	31	50	5	3	0	4	3	10	10	96	0	42	
		29%	47%	5%	3%	0%	4%	3%	9%	9%	91%	0%		
WS	Course Detail for Spring, 2010	Fiscal Year = FY10										Term Code = 201003		
WSV13	Wastewater Collection	10	11	1	0	0	0	0	3	2	23	0	40	
WSV16	Water Quality Protect&Con	9	8	0	0	0	0	0	2	1	18	0	34	
WSV17	Water&Wastewater Hydrau	12	9	0	1	0	0	1	1	1	23	0	35	
WSV18	Motors&Pumps Maint & Op	12	10	1	1	0	0	0	3	3	24	0	39	
WS	Spring 2010	43	38	2	2	0	0	1	9	7	88	0	37	
		45%	40%	2%	2%	0%	0%	1%	9%	7%	93%	0%		
WS	Course Detail for Summer, 2010	Fiscal Year = FY11										Term Code = 201005		
WSV10	Basic Water & Wastewater	14	12	0	1	0	0	0	3	2	28	0	37	
WS	Summer 2010	14	12	0	1	0	0	0	3	2	28	0	37	
		47%	40%	0%	3%	0%	0%	0%	10%	7%	93%	0%		
WS	Course Detail for Fall, 2010	Fiscal Year = FY11										Term Code = 201007		
WSV10	Basic Water & Wastewater	7	16	0	1	2	0	1	2	0	29	0	33	
WSV14	Water Distribution	6	17	0	1	0	0	1	2	0	27	0	37	

8/22/2011

WS

FY11

Page 191 of 192

Student Demographics by Subject, Year, Term, Course

Ventura College Program Review

Course	Title	Hispanic	White	Asian	Af Am	Pac I	Filipino	Nat Am	Other	Female	Male	Other	Avg Age
WSV16	Water Quality Protect&Con	7	15	1	0	0	0	1	3	0	26	1	39
WSV21	Water Chemistry&Bacteriol	8	9	0	1	0	0	1	4	2	21	0	39
WS	Fall 2010	28	57	1	3	2	0	4	11	2	103	1	37
		26%	54%	1%	3%	2%	0%	4%	10%	2%	97%	1%	

Water Science Program Review 2012 – 2013

WS	Course Detail for Spring, 2011	Fiscal Year = FY11								Term Code = 201103			
WSV11	Water Treatment	6	23	0	1	0	1	1	5	2	35	0	37
WSV15	Water Systems Instrum&C	11	19	0	0	0	0	1	4	3	32	0	33
WSV16	Water Quality Protect&Con	7	7	0	0	0	0	1	1	1	15	0	34
WSV25	Water & Wastewater Mana	7	17	0	0	0	0	2	4	1	28	1	38
WS	Spring 2011	31	66	0	1	0	1	5	14	7	110	1	36
		26%	56%	0%	1%	0%	1%	4%	12%	6%	93%	1%	

The demographics for all disciplines within the art program are trending similarly with the overall college trends.

In terms of degrees and certificates, the greatest number is being awarded to men.

Water Science Program Review 2012 – 2013

4. Performance Assessment

4A1: 2012-2013 Institutional Level Student Learning Outcomes

Institutional Level Student Learning Outcome 1	Performance Indicators
Communication	Not be analyzed at this time.
Operating Information	
Analysis – Assessment	
This ISLO has not yet been assessed.	

Institutional Level Student Learning Outcome 2	Performance Indicators
Reasoning – Scientific and Quantitative	80% of students will reach a satisfactory or higher level according to the institutional communication rubric for visual communication.
Operating Information	
This ISLO will be assessed completely in the 2012/13 academic year in the following courses: Water Science: v21	
Analysis – Assessment	

Institutional Level Student Learning Outcome 3	Performance Indicators
Critical Thinking and problem solving	This ISLO will be assessed by Art in Fall 2013 and Spring 2014 per the ISLO institutional calendar.
Operating Information	
Analysis – Assessment	

Institutional Level Student Learning Outcome 4	Performance Indicators

**Water Science Program Review
2012 – 2013**

Information Literacy	This ISLO will not be assessed
Operating Information	
Analysis – Assessment	

Institutional Level Student Learning Outcome 5	Performance Indicators
Personal/community awareness and academic / career responsibilities	This ISLO will be assessed by Art in Fall of 2014 and Spring of 2015 per the institutional ISLO calendar.
Operating Information	
Analysis – Assessment	

4A2: 2012-2013 Program Level Student Learning Outcomes - For programs/departments offering degrees and/or certificates

Program-Level Student Learning Outcome 1	Performance Indicators
Analyze the fundamentals of chemistry, biology and hydraulics, as they relate to the water industry.	Students will formulate the rationale for water quality standards, health and aesthetic aspects, aeration, zeta potential, coagulation / flocculation, sedimentation, filtration, precipitation, ion exchange, reverse osmosis and water distribution. 80% of the students enrolled in WS 11 will achieve mastery.
Operating Information	
At least 80% of the students in WS 11 are able to select the correct sequence of treatment	

Water Science Program Review 2012 – 2013

methodologies based upon raw water quality and EPA drinking water requirements.

Analysis – Assessment

The Ventura College Water Science program has a licensure pass rate of about 80% for the first attempt and a 95% pass rate, which strongly contrasts with the national average of 30 – 40%.

Program-Level Student Learning Outcome 2	Performance Indicators
Evaluate water quality management, water source, and the prevention of contamination.	Students will discover the sources of water, the chemistry and mechanical processes of treatment, microbiology and disinfection, occupational safety, water laws and regulations, and industry mathematics. 80% of the students enrolled will achieve mastery.
Operating Information	
Insufficient data is available to assess this PLSLO.	
Analysis – Assessment	
Data relating to this SLO has been collected, but further analysis of this data will be required. Additional data will need to be gathered and interpreted due to variations in instructor data collection methodologies.	

Program-Level Student Learning Outcome 3	Performance Indicators
Analyze the principles involved in the treatment, processing and distribution of potable water.	Students are questioned in class to determine understanding, plus periodic exams are administered to confirm retention of materials presented.
Operating Information	
Many students are currently employed in the water industry and are given time to explain their jobs, what classroom information has been the most useful, and the actual certification process.	
Analysis – Assessment	
These students are serious and determined to learn the processes and equipment of water treatment because these courses lead directly to state certification and jobs.	

Water Science Program Review 2012 – 2013

4A3: 2012-2013 Course Level Student Learning Outcomes - *Refer to TracDat*

2D. Mapping of Student Learning Outcomes

Course to Program-Level Student Learning Outcome Mapping (CLSLO)

I: This program-level student learning outcome is INTRODUCED

P: This program-level student learning outcome is PRACTICED

M: This program-level student learning outcome is MASTERED

Courses	PLSLO #1	PLSLO #2	PLSLO #3	PLSLO #4	PLSLO #5
WS v10	I,P	I,P	I,P	I,P	I,P,M
WS v11	I,P	I,P	I,P	I,P	I,P
WS v12	I,P	I,P	I,P	I,P,M	I,P
WS v13	I,P	I,P	I,P	I,P	I,P
WS v14	I,P	I,P	I,P	I,P	I,P
WS v15	I,P	I,P	I,P	I,P	I,P
WS v16	I,P	I,P,M	I,P	I,P	I,P
WS v17	I,P	I,P	I,P	I,P	I,P
WS v18	I,P	I,P	I,P	I,P	I,P
WS v19	I,P	I,P	I,P,M	I,P	I,P
WS v21	I,P,M	I,P	I,P	I,P	I,P
WS v25	I,P	I,P	I,P	I,P	I,P

4B: 2012-2013 Student Success Outcomes

Student Success Outcome 1	Performance Indicators
The program will increase its retention rate from the average of the program's prior three-year retention rate. The retention rate is the number of students who finish a term with any grade other than W or DR divided by the number of students at census.	The program will increase the retention rate by 2% or more above the average of the program's retention rate for the prior three years.
Operating Information	
The success rates in these courses are all below 65%. Strategies, including the addition of time management, study skills, and tutoring support, are being included in these courses.	
Analysis – Assessment	
The outcome was not met. Low success rates from several semesters indicate that intervention is required. Initiatives need to be identified.	

Water Science Program Review 2012 – 2013

--

Student Success Outcome 2	Performance Indicators
The program will increase or maintain student success rates in studio art classes.	The program will increase to or maintain student success rates of 80% in studio art classes.
Operating Information	
Student success information for the studio art classes is combined with success data from art appreciation and art history courses, making it difficult to see the success rates for studio art classes as a group. However, the data appears to show that, on average, the success rates for these courses is well over 80%. Due to cutbacks, many of these courses, however, are not being offered during the 2012/13 academic year.	
Analysis – Assessment	
The outcome was met.	

4C. 2012-2013 Program Operating Outcomes

Program Operating Outcome 1	Performance Indicators
The program will maintain WSCH/FTEF above the 525 goal set by the district	Where possible due to cap restrictions, the program will exceed the efficiency goal of 525 set by the district by 2%.
Operating Information	
Art classes were at 83% of the 525 goal. Multimedia classes were at 140% although the number of offerings was small. Photography classes were at 108% of the 525 goal.	
Analysis – Assessment	
The outcome was not met. However, art appreciation and art history classes were substantially over the goal of 600. There is an enrollment cap on studio art classes, photography classes, and classes where computers are used. The productivity goal of 600 for these classes is, therefore, unrealistic because of the 24-25 student per class limit. We can experiment with a cap of 30 in color and design classes, providing we can fit drawing tables in the room. It will be more difficult to increase the caps in other classes because of physical limitations of the spaces and our commitment to student learning. The district goal of 600 is appropriate for art appreciation, art history, and photography only.	

Program Operating Outcome 2	Performance Indicators
-----------------------------	------------------------

Water Science Program Review 2012 – 2013

<p>Inventory of instructional equipment is functional, current, and otherwise adequate to maintain a quality-learning environment. Inventory of all equipment over \$200 will be maintained and a replacement schedule will be developed. Service contracts for equipment over \$5,000 will be budgeted if funds are available.</p>	<p>A current inventory of all equipment in the program will be maintained. Equipment having a value over \$5,000 will have a service contract. A schedule for service life and replacement of outdated equipment will reflect the total cost of ownership.</p>
Operating Information	
<p>The program is doing an inventory of its equipment and is developing a schedule for maintenance and replacement.</p>	
Analysis – Assessment	

4D. Program Review Rubrics for Instructional Programs

Academic Programs

Point Value	Element	Score
Up to 6	Enrollment demand	5.5
Up to 6	Sufficient resources to support the program (ability to find qualified instructors; financial resources; equipment; space)	3.5
Up to 4	Agreed-upon productivity rate	4
Up to 4	Retention rate	3
Up to 3	Success rate (passing with C or higher)	2
Up to 3	Ongoing and active participation in SLO assessment process	3
Total Points	Interpretation	
22 – 26	Program is current and vibrant with no further action recommendation	
18 – 21	Recommendation to attempt to strength the program	
Below 18	Recommendation to consider discontinuation of the program	

TOTAL 21

Water Science Program Review 2012 – 2013

5. Findings

2012-2013 - FINDINGS

Finding 1

The curriculum though meeting the needs of Water / Wastewater operators for degree and certificates plus state certification, does not address a broader student body interested in Environmental Science, Global Water Issues and Water / Health issues. It would benefit the program, the college and the students by expanding the Water Science Program to include courses to cover these issues.

Finding 2

Currently only two courses include lab work. The Cross-Connection course uses water stands to test valves and other specialized devices. The Chemistry / Microbiology course is a combination of Classroom / Laboratory course. It would benefit the students to introduce more hands-on laboratory activities in every Water Science course.

Finding 3

The Water Science program has not made textbooks available in the campus bookstore. Starting in the Spring 2012 semester, the college bookstore will have Water Science textbooks on the shelf.

Finding 4

There is a need for students to build scale models of each of the following processes: Watershed, Water Treatment, Water Distribution, Wastewater Collection & Wastewater Treatment. Modeling materials can be purchased for a few hundred dollars and will be pursued.

Finding 5

There is the need to reach more students, especially those with full-time jobs and those with physical challenges through distance learning and other tools.

Water Science Program Review 2012 – 2013

6. Initiatives

6A: 2011-2012 - FINAL Program Initiative Priority Ratings

Program	Category	Program Priority (0,1,2,3)	Division Priority (R,H,M,L)	Committee Priority	College Priority	Initiative ID	Initiative Title	Resource Description	Estimated Cost	Adjusted Cost	Accumulated Costs	Full Time or Part Time
---------	----------	----------------------------	-----------------------------	--------------------	------------------	---------------	------------------	----------------------	----------------	---------------	-------------------	------------------------

6B: 2012-2013 INITIATIVES

Initiative Model building equipment for water/wastewater processes.

Initiative ID WS 1-12

Links to Finding 1

The Water Science curriculum, as it stands, does not directly address the Global environmental issues, of human health as it links to clean drinking water and adequate wastewater disposal. Three million people per year die of water related diseases. Many students, including those wishing to become certified water/wastewater operators are interested in these issues Benefits: By adding course curriculum to include these issues the program expands the outreach to include students from many other majors, plus fulfilling a college need for environmental science courses.

Request for Resources Budget money Funding Sources

**Water Science Program Review
2012 – 2013**

No new resources are required (use existing resources)	X
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	
Requires computer equipment funds (hardware and software)	
Requires college equipment funds (other than computer related)	
Requires college facilities funds	
Requires other resources (grants, etc.)	

Initiative Model building equipment for water/wastewater processes.

Initiative ID WS 1-12

Links to Finding 2

Currently only two courses include lab work. The Cross-Connection course uses water stands to test valves and other specialized devices. The Chemistry / Microbiology course is a combination of Classroom / Laboratory course. It would benefit the students to introduce more hands-on activities in every Water Science course.

Benefits: Students will develop a more clear understanding of these processes than textbook descriptions can provide.

Request for Resources

SEE ATTACHED GRANT REQUEST & LETTERS OF LOCAL SUPPORT – It is expected that the U.S. Dept. Of Labor Grant that was written last Spring will be awarded within the next month. The Water Science Program will receive \$216,000 for Laboratory Equipment and supplies. In addition, the Water Science classrooms and laboratory will receive \$260,000 for renovations to install the new laboratory equipment and to improve the student experience within the classrooms.

No new resources are required (use existing resources)	
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	
Requires computer equipment funds (hardware and software)	
Requires college equipment funds (other than computer related)	
Requires college facilities funds	
Requires other resources (grants, etc.)	X

Initiative Model building equipment for water/wastewater processes.

Water Science Program Review 2012 – 2013

Initiative ID WS 1-12

Links to Finding 3

The Water Science program has not made textbooks available in the campus bookstore. Starting in the Spring 2012 semester, the college bookstore will have Water Science textbooks on the shelf. Benefits: Students will develop a more clear understanding of these processes than textbook descriptions can provide.

Request for Resources

Budget money

Funding Sources

No new resources are required (use existing resources)	
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	
Requires computer equipment funds (hardware and software)	
Requires college equipment funds (other than computer related)	
Requires college facilities funds	
Requires other resources (grants, etc.)	X

Initiative ID WS 1-12

Links to Finding 4

There is a need for students to build scale models of each of the following processes: Watershed, Water Treatment, Water Distribution, Wastewater Collection & Wastewater Treatment. Modeling materials can be purchased for a few hundred dollars and will be pursued.

Benefits: Students will develop a more clear understanding of these processes than textbook descriptions can provide.

Request for Resources

SEE ATTACHED GRANT REQUEST & LETTERS OF LOCAL SUPPORT– It is expected that the U.S. Dept. Of Labor Grant that was written last Spring will be awarded within the next month. The Water Science Program will receive \$216,000 for Laboratory Equipment and supplies. In addition, the Water Science classrooms and laboratory will receive \$260,000 for renovations to install the new laboratory equipment and to improve the student experience within the classrooms.

**Water Science Program Review
2012 – 2013**

No new resources are required (use existing resources)	
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	
Requires computer equipment funds (hardware and software)	
Requires college equipment funds (other than computer related)	
Requires college facilities funds	
Requires other resources (grants, etc.)	X

Initiative To make distance learning available to students that currently cannot access the campus environment.

Initiative ID WS 1-12

Links to Finding 5

There is the need to reach more students, especially those with full-time jobs and those with physical challenges through distance learning and other tools.

Benefits: Students, that are now disadvantaged to Ventura College on-campus courses, will be able to develop new careers, learn new aspects of Environmental & Water Sciences through the World Wide Web.

Request for Resources

While the college develops the necessary curriculum and facilities for a Water Science Distance Learning system, we will work in unison with existing online programs available from the American Water Works Association and the well-respected programs from Amatrol.

No new resources are required (use existing resources)	X
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	
Requires computer equipment funds (hardware and software)	
Requires college equipment funds (other than computer related)	
Requires college facilities funds	
Requires other resources (grants, etc.)	

6A: Initiatives Priority Spreadsheet

The following blank tables represent Excel spreadsheets and will be substituted with a copy of the completed Excel spreadsheets

Water Science Program Review 2012 – 2013

Initiative to meet Perkins Core Indicators in regards to student recruitment, retention, completion and workforce employment, especially for special populations and non-traditional students.

Initiative ID WS 1-13

Links to Finding 1

There is the need to reach more students, especially those in special populations and non-traditional roles. We have begun the process by working with W.I.N.T.E.R. – Women in Non-Traditional Employment Roles.

Benefits: Students, especially women have been excluded as non-traditional in the Water & Wastewater industry.

Request for Resources.

No new resources are required (use existing resources)	X
Requires additional general funds for personnel, supplies or services (includes maintenance contracts)	
Requires computer equipment funds (hardware and software)	
Requires college equipment funds (other than computer related)	
Requires college facilities funds	
Requires other resources (grants, etc.)	

6C: 2012-2013 Program Initiative Priority Ratings

Program	Finding Number	Category	Program Priority (R, H, M, L)	Division Priority (R,H,M,L)	Committee Priority (R, H, M, L)	College Priority (H, M, L)	Initiative ID	Initiative Title	Resource Description	Estimated Cost
---------	----------------	----------	-------------------------------	-----------------------------	---------------------------------	----------------------------	---------------	------------------	----------------------	----------------

6D: PRIORITIZATIONS OF INITIATIVES WILL TAKE PLACE AT THE PROGRAM, DIVISION, COMMITTEE, AND COLLEGE LEVELS:

Program/Department Level Initiative Prioritization

Water Science Program Review 2012 – 2013

All initiatives will first be prioritized by the program/department staff. Prioritize the initiatives using the **RHML** priority levels defined below.

Division Level Initiative Prioritization

The program initiatives within a division will be consolidated into division spreadsheets. The dean may include additional division-wide initiatives. All initiatives will then be prioritized using the **RHML** priority levels defined below.

Committee Level Initiative Prioritization

The division's spreadsheets will be prioritized by the appropriate college-wide committees (staffing, technology, equipment, facilities) using the **RHML** priority levels defined below.

College Level Initiative Prioritization

Dean's will present the consolidated prioritized initiatives to the College Planning Council. The College Planning Council will then prioritize the initiatives using the **RHML** priority levels defined below.

R: Required – mandated or unavoidable needs (litigation, contracts, unsafe to operate conditions, etc.).

H: High – approximately 1/3 of the total program/department/division's initiatives by resource category (personnel, equipment, etc.)

M: Medium – approximately 1/3 of the total program/department/division's initiatives by resource category (personnel, equipment, etc.)

L: Low – approximately 1/3 of the total program/department/division's initiatives by resource category (personnel, equipment, etc.)

Water Science Program Review 2012 – 2013

7. Process Assessment and Appeal

7A. Purpose of Process Assessment

The purpose of program review assessment is to evaluate the process for continual improvement. The process is required for accreditation and your input is very important to us as we strive to improve.

7B. 2012 - 2013 ASSESSMENT QUESTIONS

1. Did you complete the program review process last year, and if so, did you identify program initiatives?

Yes, program initiatives were developed and one was accomplished and a second appears to be funded for this year, and a third will be initiated this Fall. Two are curriculum related changes that are in progress . Two unfunded initiatives remain on list for this year.

2a. Were the identified initiatives implemented?

WS1-12	Curriculum	Global water issues
WS 2-12	Curriculum	Additional laboratory participation in each course
WS 3-12	Textbooks in VC Bookstore	Accomplished
WS 4-12	Model building equipment	Funding required
WS 5-12	Distance Learning	Not funded; on list for this year
WS 6-12	Watercad Software	Not funded; on list for this year
WS 7-12	UV Microscope	Not funded; on list for this year
WS 8-12	Microwave Digestor	Not funded; on list for this year
WS 9-12	Program Marketing	CAPS TV in Progress, High School visits in progress

Water Science Program Review 2012 – 2013

Water Science Program Review 2011-2012			
EQUIPMENT & eLearning Software PKGS			
Automotive	195,904	15,000	15,000
General Technology Electronics/Mechanics	243,607	50,000	50,000
Water Science	186,008	15,000	15,000
EQUIPMENT TOTAL	625,519	80,000	80,000
<i>(in excess of \$25,000 + major equipment)</i>	<i>459,798</i>	<i>25,000</i>	<i>25,000</i>
<i>Automotive & General Tech eLearning Software and systems \$439,511</i>			
<i>Water Science - Autoclaves for sterilization \$6800, temp controlled centrifuge-\$11000, Muffle furnace for volatile solids-\$501</i>			
<i>Chemical hoods for safe work with chemical/reactions - \$7,000, Laminar flow hoods for aseptic microbiological work - \$8,700</i>			
SUPPLIES (Instructional & Project)	77,000	35,000	25,000
<i>In addition to paper, pencils, workstations with printers, a multi-use copier</i>			
<i>Water Science supplies will include student microscopes at \$2435 ea., pH meters to measure acidity at \$1300 ea.</i>			
<i>Glassware, colorimeters, water samplers, settleometers, petri dishes, growth media, goggles, chemical gloves, test tubes</i>			
CONTRACTUAL Bldg Renovation	150,000	85,000	25,000
<i>(in excess of \$25,000)</i>	<i>125,000</i>	<i>60,000</i>	
<i>Includes electrical re-wiring, plumbing, ADA compliance upgrades, IT infrastructure</i>			

2b. Did the initiatives make a difference?

Yes.

3. If you appealed or presented a minority opinion for the program review process last year, what was the result?

No appeals or minority opinions were put forth.

4. How have the changes in the program review process worked for your area?

The extra division meeting provided the time needed for each area to present its major initiatives before the actual vote. The use of facilitators also proved helpful.

5. How would you improve the program review process based on this experience?

A more user friendly place in which to input our information would be helpful.

7C. Appeals

After the program review process is complete, your program has the right to appeal the ranking of initiatives.

If you choose to appeal, please complete the appropriate form that explains and supports your position. Forms are located at the Program Review VC website.

The appeal will be handled at the next higher level of the program review process.

Water Science Program Review

2012 – 2013

WATER SCIENCE

STUDENT LEARNING OUTCOMES

Upon successful completion of this course the student will be able to:

WS V10 – BASIC WATER & WASTEWATER SYSTEMS - 3 Units

1. Identify the major processes of water & wastewater
2. Demonstrate understanding of the water treatment

Assessment Method: Quizzes and Exams

WS V11 – WATER TREATMENT - 3 Units

1. Identify the major processes of water treatment
2. Able to pass the California Dept. of Public Health Licensure Exam

Assessment Method: Quizzes and Exams

WS V12 – WASTEWATER TREATMENT - 3 Units

1. Identify the major processes of wastewater treatment
2. Able to pass the California Water Resource Control Board Licensure Exam

Assessment Method: Quizzes and Exams

WS V13 – WASTEWATER COLLECTION - 3 Units

1. Identify the major processes of wastewater collection
2. Able to pass the California Water Environment Association Licensure Exam

Assessment Method: Quizzes and Exams

WS V14 – WATER DISTRIBUTION - 3 Units

1. Identify the major processes of water distribution
2. Able to pass the California Dept. of Public Health Licensure Exam

Assessment Method: Quizzes and Exams

WS V15 – WATER SYSTEMS INSTRUMENTATION & CONTROLS - 3 Units

1. Identify the major processes of control systems
2. Demonstrate preparedness for levels 3 & 4 state exams

Assessment Method: Quizzes and Exams

WS V16 – WATER QUALITY PROTECTION & CROSS-CONNECTION CONTROL - 3 Units

1. Identify the major processes of backflow & cross-connections
2. Able to pass the Ventura County Environmental Health Licensure Exam

Assessment Method: Quizzes, Hands-On Laboratory and Exams

WS V17 – WATER & WASTEWATER HYDRAULICS - 3 Units

1. Use of mathematical formulas to calculate complex water flow situations
2. Demonstrate preparedness for levels 3 & 4 state exams

Assessment Method: Quizzes and Exams

Water Science Program Review

2012 – 2013

WS V18 – MOTOR & PUMPS MAINTENANCE - 3 Units

1. Identify the operation & repair of process equipment
3. Demonstrate preparedness for levels 3 & 4 state exams

Assessment Method: Quizzes and Exams

WS V19 – ADVANCED WATER TREATMENT - 3 Units

1. Identify advanced treatment methodologies
2. Demonstrate preparedness for levels 3 & 4 state exams

Assessment Method: Quizzes and Exams

WS V21 – WATER CHEMISTRY AND BACTERIOLOGY - 4 Units

1. Understand & perform laboratory analyses of water & wastewater
2. Demonstrate preparedness for levels 3 & 4 state exams

Assessment Method: Quizzes, Exams & Labs

WS V25 – WATER & WASTEWATER MANAGEMENT - 3 Units

1. Identify and apply management techniques in the utility setting
2. Demonstrate preparedness for levels 3 & 4 state exams

Assessment Method: Quizzes & Exams

Water Science Program Review 2012 – 2013



CENTERS OF EXCELLENCE
Inform Connect Advance

ENVIRONMENTAL SCAN

WATER & WASTEWATER OCCUPATIONS

In Southern California

NOVEMBER 2011

Table 2 - Water and Wastewater Occupations¹⁰

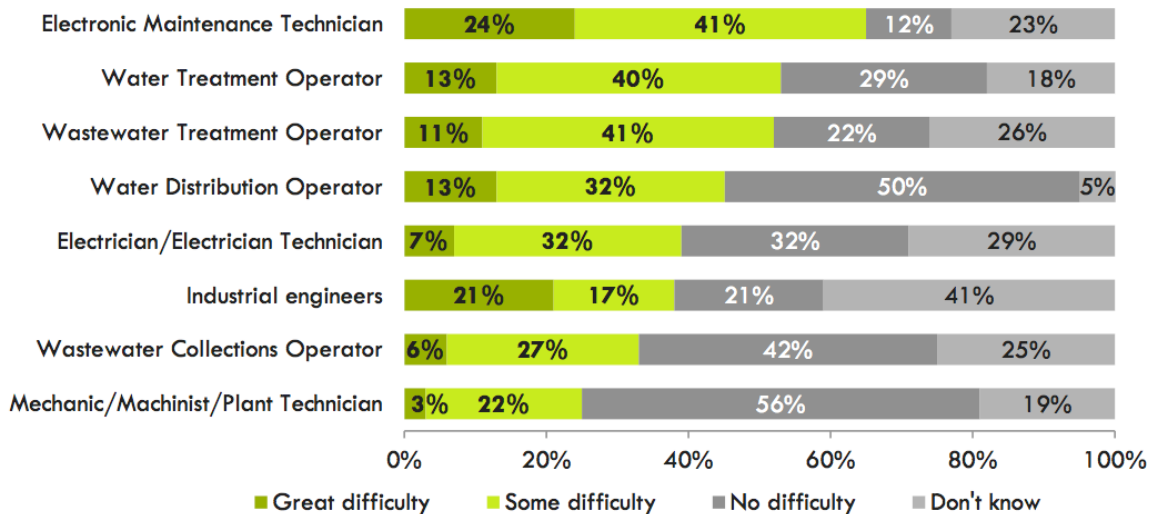
Occupation	Description
Water Treatment Operator	Performs water treatment function. T-2 certification from Department of Health Services is generally where the journey level starts
Water Distribution Operator	Operates water transmission and distribution systems (e.g. pumps and valves), often using a SCADA control system. Generally does not perform construction, maintenance, or plumbing work. D-2 certification from Department of Health Services is generally where the journey-level begins.
Wastewater Treatment Operator	Performs wastewater treatment function. Usually requires Grade 2 certification by Regional Water Quality Control Board.
Wastewater Collections Operator	Performs wastewater collections function. Sometimes requires Grade 2 certification by California Water Environment Association
Mechanic/Machinist	Maintains mechanical equipment associated with water and wastewater transmission, distribution, storage, and treatment
Electrician/Electrician Technician	Maintains, repairs, tests, installs, modifies, calibrates, and trouble-shoots electrical equipment used in the facilities and systems of water and wastewater utilities
Electronic Maintenance Technician/Instrument Technician	Maintains, repairs, tests, installs, modifies, calibrates, and trouble-shoots electronic, pneumatic, and control equipment associated with the facilities and systems of water and wastewater utilities

Water Science Program Review 2012 – 2013

Table 3 - Extrapolated 2011 Employment, 3-year Growth, and Replacement Jobs

Water/Wastewater Occupations	2011 employment	3-year employment (new jobs)	3-year growth rate	Eligible to retire in 3 years (replacement jobs)	Replacement job rate	New and replacement jobs
Water Treatment Operator	2,635	87	3.3%	419	15.9%	506
Water Distribution Operator	4,059	256	6.3%	702	17.3%	958
Wastewater Treatment Operator	3,399	92	2.7%	571	16.8%	663
Wastewater Collections Operator	2,551	161	6.3%	296	11.6%	457
Mechanic/Machinist	3,116	181	5.8%	710	22.8%	891
Electrician/Electrician Technician	1,344	78	5.8%	426	31.7%	504
Electronic Maintenance Technician/Instrument Technician	1,256	98	7.8%	293	23.3%	391
TOTAL	18,360	953	5.2%	3,417	18.6%	4,370

Figure 3 - Difficulty Hiring for Water and Wastewater Positions

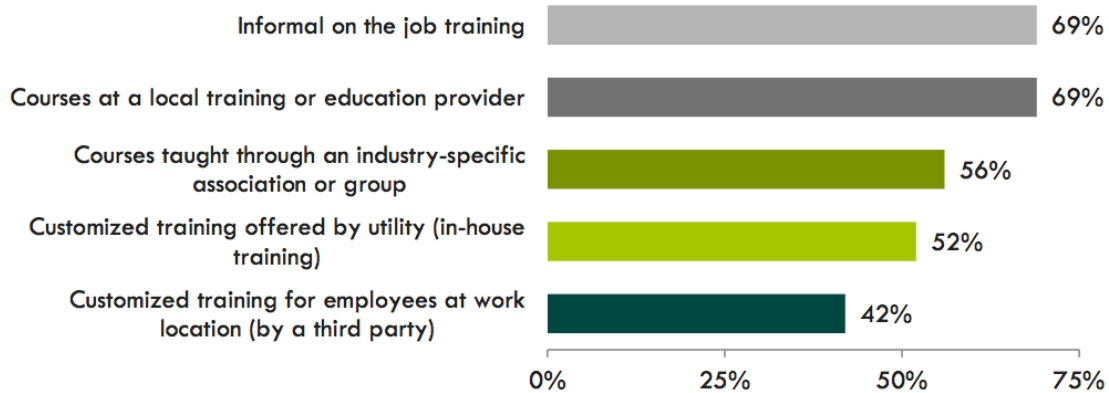


Water Science Program Review 2012 – 2013

Training and Education Offered by Firms

In an effort to assess the current training and education offered to water and wastewater workers, firms were also asked to provide insight into the type of trainings and education they offered. Figure 4 illustrates their responses (multiple responses were allowed).

Figure 4 – Current Training & Education Practices Among Water & Wastewater Firms



Water distribution: There are five levels of certifications from D1 to D5 offered by the California Department of Public Health.¹²

Water treatment: There are five levels of certifications from T1 to T5 offered by the California Department of Public Health.¹³

Wastewater collection: There are four levels of certification in collection system maintenance offered by California Water Environment Association (CWEA).¹⁴

Wastewater treatment: There are five levels of certifications offered by State Water Resources Control Board.¹⁵

Backflow prevention and cross connection control: There is one certification level but it is offered by many agencies. Riverside, San Bernardino, Orange and Los Angeles counties offer certification which is valid to practice in a respective county.

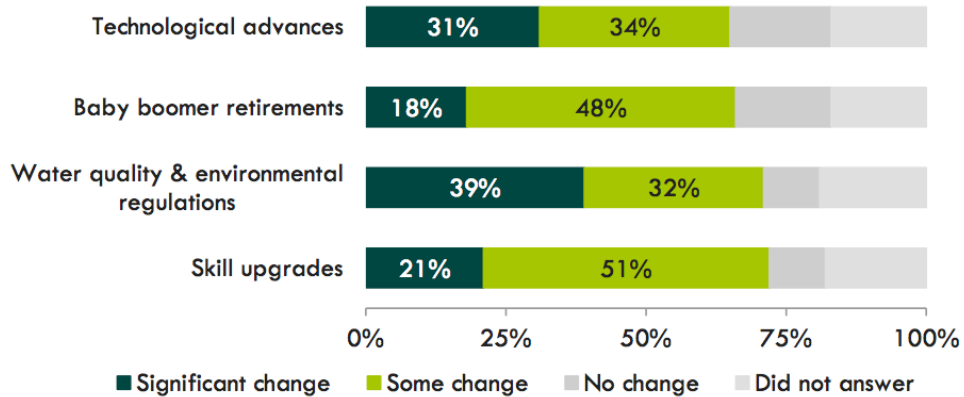
Water conservation or water use efficiency: There are two levels offered by the American Water Works Association (AWWA).¹⁶

Other: In addition to the wastewater collection certification, CWEA provides certification in areas such as laboratory analysis, plant maintenance, mechanical technologist, and electrical/instrumentation.

AWWA also offers certifications in other fields – backflow, water distribution, treatment, laboratory analyst, etc.¹⁷ It is an alternative to the state certification options.

Water Science Program Review 2012 – 2013

Figure 5 – Factors Impacting Water and Wastewater Workforce



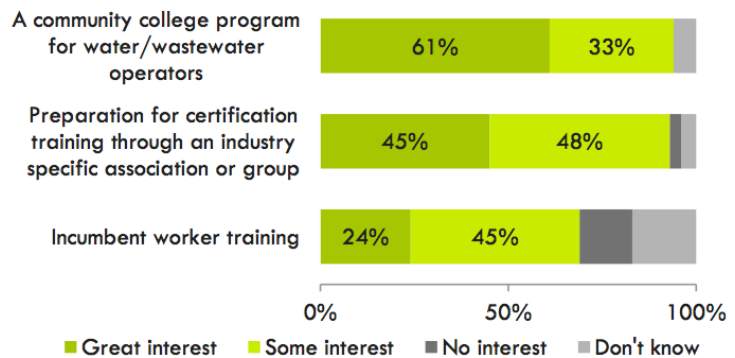
The challenges within the water and wastewater industries demonstrate the need for trainings, programs, and certificates that will provide training and education to current and prospective water and wastewater workers. Appropriate training and education would meet the needs of water and wastewater firms in two ways. First, it would increase the number of qualified applicants entering the workforce in the water and wastewater industries. Second, it would provide the training needed to ensure that workers are proficient in water and wastewater competencies and skills, and up-to-date with water and wastewater technologies.

Water Treatment Operators

The following was reported by firms employing Water Treatment Operators:

- Over 90% of these firms reported interest in a community college program for water and wastewater operators
- More than 90% of these firms also reported interest in preparation for certification training through an industry specific association or group
- 7 out of 10 employers reported interest in incumbent worker training

Figure 6 – Training and education preferences for Water Treatment Operators (N = 38)



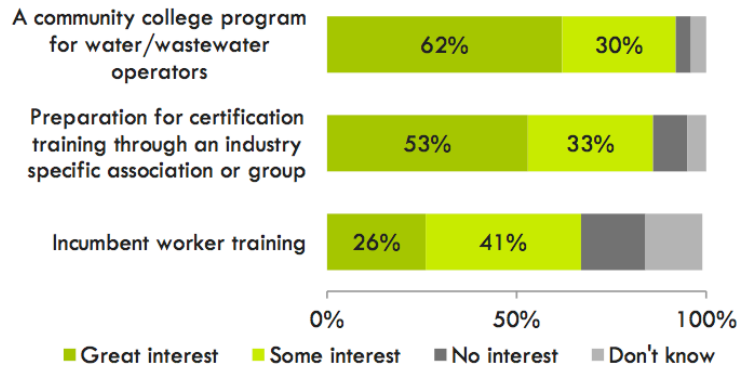
Water Science Program Review 2012 – 2013

Water Distribution Operators

The following was reported by firms employing Water Distribution Operators:

- Over 90% of these firms reported interest in a community college program for water and wastewater operators
- About 85% of these firms expressed interest in preparation for certification training through an industry specific association or group
- Two-thirds of the employers reported interest in incumbent worker training

Figure 7 – Training and education preferences for Water Distribution Operators (N = 57)

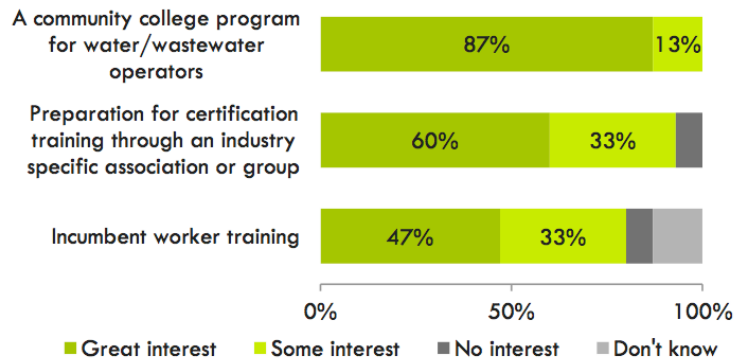


Wastewater Treatment Operators

The following was reported by firms employing Wastewater Treatment Operators:

- 100% of firms reported interest in a community college program for water and wastewater operators
- Over 90% of these firms expressed interest in preparation for certification training through an industry specific association or group
- About 4 out of 5 employers reported interest in incumbent worker training

Figure 8 – Training and education preferences for Wastewater Treatment Operators (N = 16)

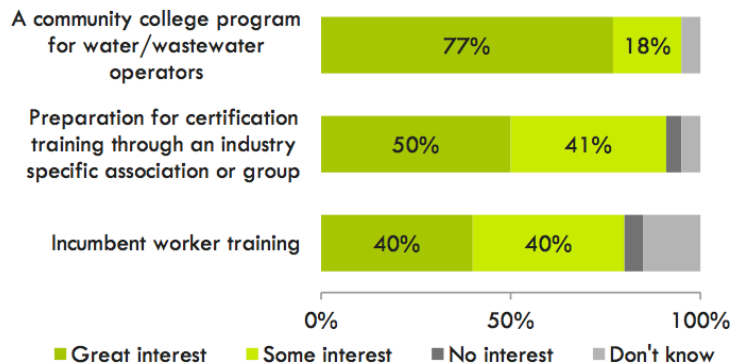


Wastewater Collections Operators

The following was reported by firms employing Wastewater Collections Operators:

- 95% of the firms employing Wastewater Collections Operators reported interest in a community college program
- Over 90% of these firms expressed interest in preparation for certification training through an industry specific association or group
- Four out of 5 employers reported interest in incumbent worker training

Figure 9 – Training and education preferences for Wastewater Collections Operators (N = 23)



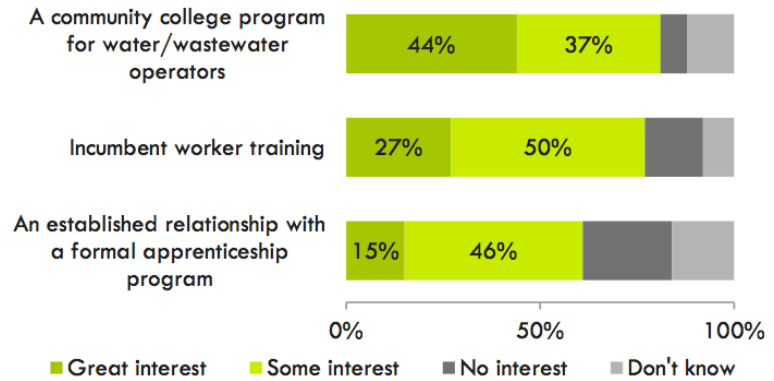
Water Science Program Review 2012 – 2013

Mechanics/Machinists/Plant Technicians

The following was reported by firms employing Mechanics/Machinists/Plant Technicians:

- About 80% of the firms reported interest in a community college program
- 77% of these firms reported interest in incumbent worker training
- About 6 out of 10 firms expressed interest to establish a relationship with a formal apprenticeship program

Figure 10 – Training and education preferences for Mechanics/Machinists/Plant Technicians (N = 28)

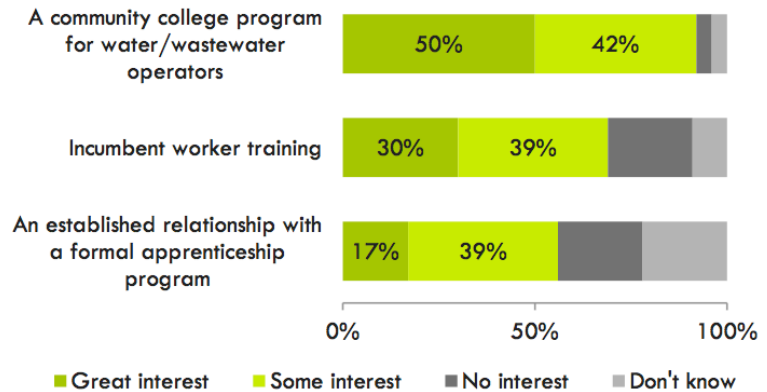


Electricians/Electrician Technicians

The following was reported by firms employing Electricians/Electrician Technicians:

- Over 90% of the firms employing Electricians/Electrician Technicians reported interest in a community college program
- About 7 out of 10 firms reported interest in incumbent worker training
- 56% of the firms expressed interest in an established relationship with a formal apprenticeship program

Figure 11 – Training and education preferences for Electricians/Electrician Technicians (N = 35)

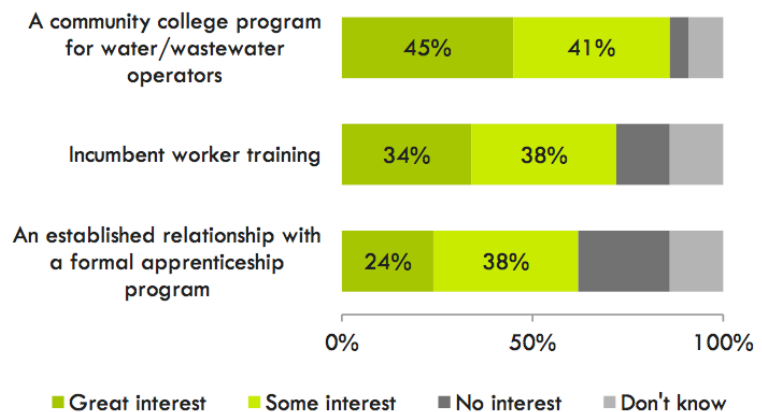


Electronic Maintenance Technician/Instrument Technician

The following was reported by firms employing Electronic Maintenance Technician/Instrument Technician:

- 86% of the firms employing Electronic Maintenance Technicians reported interest in a community college program
- 72% of these firms reported interest in incumbent worker training
- About 6 out of 10 firms expressed interest in an apprenticeship program.

Figure 12 – Training and education preferences for Electronic Maintenance Technician/Instrument Technician (N = 29)



Water Science Program Review 2012 – 2013

**Figure 13 – Occupations Water Technology Programs Train for
(Multiple choices were allowed)**

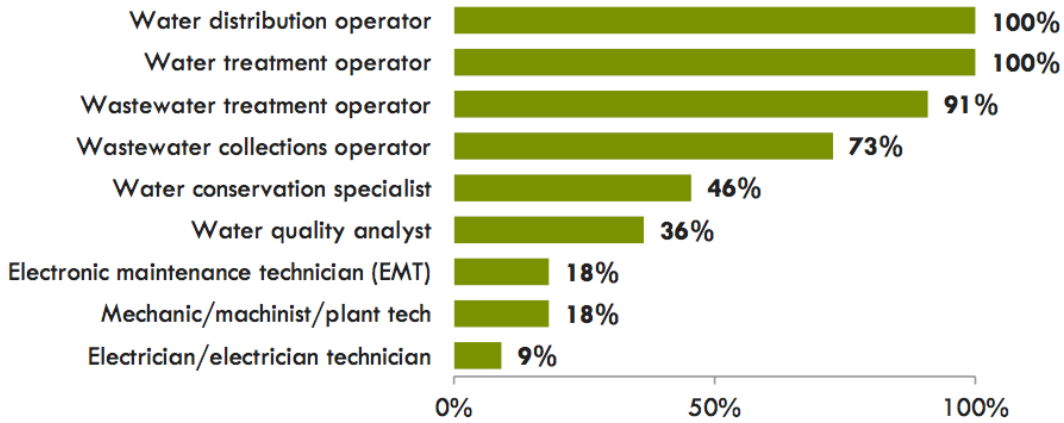
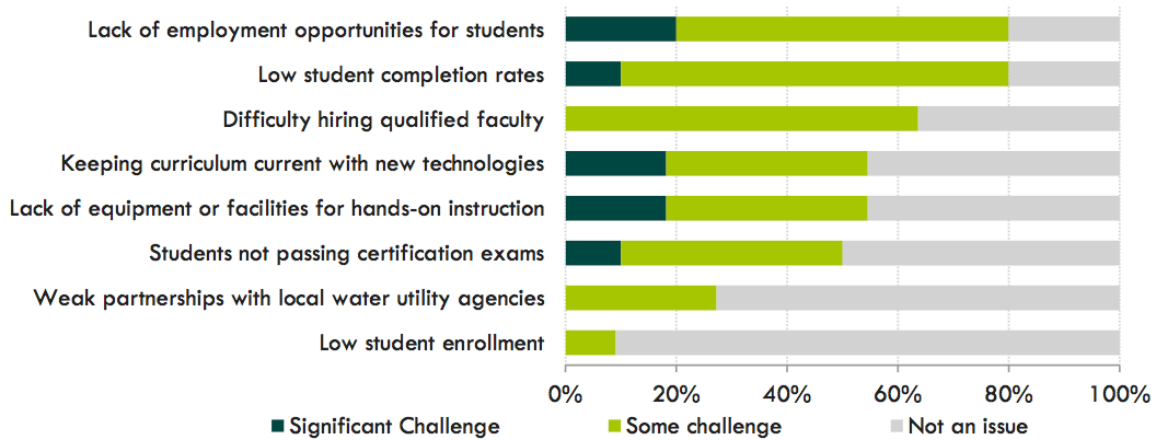


Figure 15 – Program Challenges



Water Science Program Review 2012 – 2013

Recommendations to Community Colleges:

The findings of this study point to a need for creative solutions between college and industry partners to meet budget challenges and employer demand for qualified workforce. Here are some of the possible approaches that community colleges in Southern California may take:

- **Exploring not-for-credit mechanisms of offering water and wastewater training at colleges that already have facilities and curricula developed.** This would allow more students to take classes in the environment of budget cuts and provide opportunities for partnerships with employers to address their needs for incumbent worker training in a timely manner.
- **Building partnerships between Water Technology programs and Electrical, Mechanical and Industrial Technology departments to develop pathways for support occupations in water industries,** such as mechanics, industrial maintenance technicians, electrical technicians, machinist, etc. Such partnerships within different departments of a college would help address a need for electronic maintenance technicians and other trades with necessary skills and knowledge to work in water and/or wastewater agencies.
- **Expanding existing programs with new courses and/or creating certificate options in water conservation and water quality analysis.** As more employers are expected to add jobs for water conservation specialists and water quality analysts, skills and knowledge in these areas could give graduates of water technology programs a competitive edge on the job market and an opportunity to move up on a career ladder.
- **Strengthening and increasing the number of employer-college partnerships for job placement and internship opportunities.** Employer and college interests align. As employers are looking to prepare qualified workforce to replace retired workers, colleges could be their key partners in training new generations of water and wastewater professionals. However, new graduates of water programs often face obstacles to employment. Internship is one of the vehicles in facilitating the entrance into the workforce. Community colleges should proactively pursue partnerships with many employers within their service areas with the purpose of creating internship opportunities for their students. The partnerships that Cuyamaca College has formed with employers for internships could be considered best practice and may be replicated by other colleges. Also, the COE can provide a list of water/wastewater employers in a college service area within Southern California that expressed an interest to be contacted by a community college.
- **Working more closely with K-12 and 4-year educational systems to create articulated agreements and facilitate the movement along the water/wastewater career pathway.** Aligning community college offerings with those of secondary and university institutions would provide an opportunity for students to enter water and wastewater careers earlier and also advance to higher paying positions. Partnerships with K-12 system could help raise awareness of the high school students about water and wastewater career options, which seems to be a challenge (according to various studies). Partnerships with 4-year universities and employers could yield a chance for more experienced workers to obtain higher level degrees and move up along the career ladder, while leaving a space community college graduates to enter the labor force in this industry.