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Page 1: I. Program Overview and Update

Q1 Department(s) Reviewed:

Center for Water Studies

Q2 Lead Author and Participants: Please list any person who participated in the preparation of this report.

Joseph D. Young

Q3 Dean/Manager:

Larry McLemore

Q4 Program Update: Please summarize the changes, additions, and achievements that have occurred in your program since your last program review was submitted. To access your 2019 program review, visit the Program Review webpage.

Since the Water & Wastewater Technology Program was awarded a 3 year, \$890,000 grant in October 2016 from the National Science Foundation (NSF), we have been focused on transitioning our existing program into the “Center for Water Studies”. Over the last 12 months, many of our goals have been successfully completed, as follows:

1. The demonstration water distribution system (Field Operations Skills Yard, or FOSY) has been completed.
2. The “L” building remodel has been completed.
3. The curriculum has been modified to reflect the new CWS (Center for Water Studies) nomenclature and to include the FOSY as a “hands-on” method of instruction. Certificates of Specialization were added to the program offerings. The curriculum changes were approved in November 2018.
4. New courses were developed, submitted, and approved for CWS 100 (career pathways), CWS 107 (water & wastewater industry safety), CWS 206 (advanced electrical and instrumentation), CWS 207(practical skills in water & wastewater systems), and CWS 210 (advanced water quality analysis).
5. The transition from the existing Water & Wastewater Technology Program into the new Center for Water Studies program has been completed.

Over the Spring '19 and Fall '19 semesters, the Field Operations Skills Yard (FOSY) has been integrated into many of the classes, utilized for demonstrations and class exercises as appropriate. The new classes (CWS 206, 207, & 210) will be rolling out in Spring '20 and will utilize the FOSY to an even greater extent. The FOSY adds the dimension of “hands-on” learning to the program’s offerings, and will better prepare students for their careers in the industry and will make them stronger candidates for employment in the water & wastewater industry.

Page 2: II. Assessment and Student Achievement

Q5 1. Do you have a course Student Learning Outcome (SLO) assessment plan on file with the Student Learning Outcome and Assessment Committee (SLOAC)? If you have not already done so, you can submit your program's assessment plan to SLO Coordinator, Tania Jabour, at tania.jabour@gcccd.edu. **Yes**

Q6 OPTIONAL: You may upload a copy of your SLO assessment plan for SLOAC here. If you have an Excel sheet, please convert to one of the supported files listed below before submission.

CWS SLO Assessment Plan Fall '14 through Spring '23.pdf (41.2KB)

Q7 2. Please provide an analysis of your Student Learning Outcomes (SLO) findings and what changes, if any, were made as a result.

All course SLO's in the WWTR program were last assessed in 2016-17. Of the 103 SLO's assessed across all courses in the WWTR program, the aggregate success rate was 89%. 92 SLO's were rated successful (>70%) with an aggregate success rate of 86%. 11 of the SLO's needed improvement (<70%) with an aggregate success rate of 61%.

SLO Assessment for the CWS courses are currently underway for Fall '19 and Spring '20. So far, 16 CWS courses have been assessed in Fall 19, with a success rate of 96%. The remaining 12 CWS courses are planned to be assessed in the coming Spring '20 semester. The results for the remaining assessments won't be known until the conclusion of the Spring '20 semester, around June '20.

The CWS instructors last discussed the SLO's that needed improvement at the Department meetings in the Spring of 2018. The results of the current round of assessments will be discussed at the CWS department meeting on January 21, 2020. So far, the CWS SLO's that need improvement are all related to mathematical calculations regarding water & wastewater treatment, pipe flow, flow velocity, pumping calculations, time and volume transfer relationships of moving water, and similar mathematical calculations. It has been shown in past assessments that the math component is generally the most challenging for the students to comprehend, and yet is critical to student success in passing State mandated certifications necessary for employment. The following recommendations were agreed upon by the program instructors:

1. Adjust lesson plans to focus more aggressively on the math components of the class.
2. Review homework assignments to assure that math is sufficiently included to give students more practice working problems.
3. Include frequent short quizzes to provide students more ongoing feedback on their math skills.
4. Develop and post additional practice math problems for those students who desire some extra work developing their math skills.
5. Promote the use of the tutoring center to students experiencing difficulty in performing mathematical computations.

When the remaining CWS course SLO's have been assessed this coming Spring '20, the full results of this latest round of assessments will be considered and discussed at the CWS department meeting ahead of the Fall '20 semester.

Q8 3. Does your department or discipline offer any degrees and/or certificates? **Yes**

Page 3: II. Assessment and Student Achievement

Q9 4. How are you currently assessing your PLOs?

SLO's for each course in the program are assessed, and the results of the assessments are transferred to the PLO's in accordance to the mapping of SLO's to the PLO's. The result is an aggregated success rate for each PLO in each program major, and an aggregate PLO success rate for each of the six majors in the program.

The answer to question #6 (below) is "Yes" and "No", and requires some explanation. The old WWTR PLO's were mapped to the old WWTR SLO's, and were assessed in 2014-15 and in 2016-17. All courses were renamed "CWS" beginning Spring '19, and some of the SLO's in some of the courses were altered at that time. The current CWS PLO's have not been mapped to CWS course SLO's because Trac-Dat has not been updated to reflect the new CWS course numbering and the new CWS SLO's. It is planned to remap CWS PLO's to CWS course SLO's when Trac-Dat has been updated in the future.

Q10 5. Are your PLOs in the catalog an accurate reflection of the department or discipline's current learning objectives? To access the College Catalog Associate Degree Programs and Certificates section, click here. **Yes**

Q11 6. Are the PLOs mapped onto the course SLOs? If you require assistance, please contact Madison Harding in the IESE Office at madison.harding@gcccd.edu **Yes**

Page 4: II. Assessment and Student Achievement

Q12 Referencing the last 5 years of data, discuss the changes in course success rate since the last program review (annual or comprehensive) report.

Over the last five years, the overall success rate for the CWS program ranged from a low of 77% (Fall '15) to a high of 86% (Spring '18). The average over the five years was 82%. The overall success rate since the last Annual Program Review is unchanged at 84%. (Please refer to the uploaded charts for the CWS Program)

Q13 Considering the college's 2024 goal of increasing course success rates to 77%, discuss how your department/discipline will help meet that goal.

The CWS program is already meeting the College's 77% success rate goal. Over the last five years, the lowest success rate recorded by the CWS program is 77%. The goal of every instructor in the CWS program is to focus their efforts on doing everything they can possibly do to assist students in succeeding in their courses, qualifying for State certification exams, and landing a job in the water or wastewater industry. We in the CWS program have been largely successful in our pursuit of this goal.

Q14 Please describe any equity gaps, in which specific groups (e.g., by gender and ethnicity) have success rates lower than that of the department or discipline overall.

The difference between Male and Female success rates is negligible. Over the last five years, Male success rates have averaged 82% and Female success rates averaged 83%. These success rates are well above the College goal of 77% rate of success.

Looking at ethnicity, American Indian/Alaskan Native, Asian, Filipino, Pacific Islander, White Non-Hispanic, and Unknown ethnicities average an overall success rate of 87% across the five years of data. African-American/Black Non-Hispanic, Hispanic/Latino, and Multiple ethnicities are averaging 74% overall success over the five years of data. The gap in average success between these two groupings is 13%. The gap between the African-American/Black Non-Hispanic, Hispanic/Latino, and Multiple ethnicities and the overall program average success rate of 82% is 8%.

Individually, the African-American/Black Non-Hispanic success rate is 71%, the Hispanic/Latino success rate is 77%, and the Multiple ethnicity success rate is 75%. The success rates for these three ethnic groups all lag behind the overall CWS program five year success rate of 82%. The success rates for African-American/Black Non-Hispanic and Multiple Races also lag behind the College goal of 77%. (Please refer to the uploaded charts for the CWS Program)

Q15 What department/discipline (or institutional) factors may be contributing to these lower success rates for these groups of students?

I don't believe there are any department or institutional factors affecting these lower success rates that directly relate to our particular discipline of water & wastewater technology. However, much of our CWS curriculum is based in mathematical calculations and students must be reasonably proficient in these skills to successfully pass the State Water Resources Control Board (SWRCB) certification examinations that are required to be employed in the majority of the water & wastewater jobs they are seeking. It is more likely that success in the program has more to do with the individual students' educational history and their past success in certain mathematical disciplines. Instructors typically spend a good deal of class time drilling on the necessary math skills, and the fact is that some students come to the program better equipped to deal with the math element than others. Does this explain the apparent gaps? Hard to say.....

Q16 What specific steps will the department of discipline take to address these equity gaps in the 2020/21 academic year?

It has always been understood by the program instructors that the math component is generally the most difficult for any student to comprehend (regardless of ethnicity). This skill is critical not only to student success in the CWS program, but also to the students' success in passing State mandated certifications necessary for employment. The following recommendations were agreed upon by the program instructors in fall '19 to promote better student success across the board:

- Adjust lesson plans to focus more aggressively on the math components of the class.
 - Review homework assignments to assure that math is sufficiently included to give students more practice working problems.
 - Include frequent short quizzes to provide students more ongoing feedback on their math skills.
 - Develop and post additional practice math problems for those students who desire some extra work developing their math skills.
 - Promote the use of the tutoring center to students experiencing difficulty in performing mathematical computations.
-

Q17 How do these steps inform the long-term department or discipline goals that you are setting in this annual program review?

The long-term department goal is to maintain our historically favorable success rates, and to raise the success rates where they lag behind either the Overall CWS Program rate or the College 2024 Goal. Improving the water math comprehension level across all ethnicities and genders will accomplish these goals.

Q18 In what way does your department/discipline work across instruction and student services to advance the college's student success & equity goals?

Over the last two semesters, instructors in the CWS program have been making much better use of Tutoring Center to assist students that are struggling in the mathematical elements of their courses. Many students are responding well to these recommendations, and we have seen improvement in these students performance regarding the math elements of our course offerings. Also, as appropriate, referring certain students to Counseling and Veterans Services has been helpful in guiding students who need some assistance dealing with the college regimen. The CWS American Water Works Association (AWWA) Student Chapter is another track that has helped many students in terms of advancing their career paths and succeeding in finding careers in the water & wastewater industry.

Q19 OPTIONAL: If you would like to attach any charts or additional documentation (aside from the program review report prepared by the IESE Office), please upload it using the button below.

CWS Chart Doc.pdf (369.6KB)

Q20 Do you offer distance education (online) courses? **No**

Page 6: II. Assessment and Student Achievement

Q21 Are there differences in success rates for distance education (online) versus in-person sections? **Respondent skipped this question**

Q22 If there are differences in success rates for distance education (online) versus in-person sections, what will the discipline or department do to address these disparities? **Respondent skipped this question**

Q23 What mechanisms are in place to ensure regular and effective contact within online courses across the discipline or department? **Respondent skipped this question**

Page 7: III. Previous Goals: Update (If Applicable)

Q24 Would you like to provide an update for your previous program review goal(s)? **Yes**

Page 8: III. Previous Goals: Update (If Applicable) continued

Q25 Previous Goal 1:

Through our NSF grant, California Water Works 1 (CWW-1), develop a comprehensive outreach and recruitment program that targets women, under-represented minorities, and transitioning military personnel and veterans looking for a second career. This project has been substantially completed under CWW-1. A future grant, CWW-2, will build on the progress made under previous goal 1

Q26 Which College Strategic Goal does this department goal most directly support? **Guided Student Pathways**

Q27 Please describe how this goal advances the college strategic goal identified above.

The recruiting effort includes advising potential students from start to completion, with assigned points of contact at each stage to help students persist, progress, and complete their chosen area of study and transition into a water or wastewater career.

Q28 Goal Status **Completed**

Page 9: III. Previous Goals: Update (If Applicable) continued

Q29 Please describe the results or explain the reason for deletion/completion of the goal:

Work under our previous NSF grant, CWW-1, has been substantially completed. Our future grant, CWW-2, will build upon the progress made in previous goal 1.

Q30 Do you have another goal to update? **Yes**

Page 10: III. Previous Goals: Update (If Applicable) continued

Q31 Please describe action steps for the year: **Respondent skipped this question**

Q32 How will this goal be evaluated? **Respondent skipped this question**

Q33 Do you have another goal to update? **Yes**

Page 11: III. Previous Goals: Update (If Applicable) continued

Q34 Previous Goal 2:

Provide K-12 students and teachers with learning opportunities in water and wastewater technology to promote STEM proficiency. This project has been substantially completed under CWW-1. A future grant, CWW-2, will build upon the progress made in previous goal 2.

Q35 Which College Strategic Goal does this department goal most directly support? **Guided Student Pathways**

Q36 Please describe how this goal advances the college strategic goal identified above.

This project included advising potential students from start to completion, with assigned points of contact at each stage to help students persist, progress, and complete their chosen area of study and transition into a water or wastewater career. This goal was substantially completed under CWW-1. Our future grant, CWW-2, will build upon this effort.

Q37 Goal Status **Completed**

Page 12: III. Previous Goals: Update (If Applicable) continued

Q38 Please describe the results or explain the reason for deletion/completion of the goal:

Work under our previous NSF grant, CWW-1, has been substantially completed. Our future grant, CWW-2, will build upon the progress made in previous goal 1.

Q39 Do you have another goal to update? **Yes**

Page 13: III. Previous Goals: Update (If Applicable) continued

Q40 Please describe action steps for the year: **Respondent skipped this question**

Q41 How will this goal be evaluated? **Respondent skipped this question**

Q42 Do you have another goal to update? **No**

Page 14: III. Previous Goals: Update (If Applicable) continued

Q43 Previous Goal 3:

Develop a Bachelor Degree Program with emphasis in Water & Wastewater Utility Management jointly with a local college.

Q44 Which College Strategic Goal does this department goal most directly support? **Guided Student Pathways**

Q45 Please describe how this goal advances the college strategic goal identified above.

This goal will create a path for students detailing the scope and sequence of courses required to complete their technical credential in the CWS program and transition to a baccalaureate degree program that will enable them to compete for management positions in the water & wastewater industry.

Q46 Goal Status **In Progress-will carry this goal forward into next year**

Page 15: III. Previous Goals: Update (If Applicable) continued

Q47 Please describe the results or explain the reason for deletion/completion of the goal: **Respondent skipped this question**

Q48 Do you have another goal to update? **Respondent skipped this question**

Page 16: III. Previous Goals: Update (If Applicable) continued

Q49 Please describe action steps for the year:

We have successfully engaged National University to develop and provide a four-year baccalaureate program in Public Administration with an emphasis on water & wastewater issues and disciplines that is woven through our existing CWS program offerings. Action steps for the coming year include finalizing the MOU between Cuyamaca College and National University, finalizing the specific electives that will be focused on public water utility issues and disciplines, recruiting instructors to deliver the courses, and rolling out the first cohort into the program, most likely in the Spring of '21.

Q50 How will this goal be evaluated?

Successfully recruiting CWS students and current water industry professionals into the program will measure it's success.

Q51 Do you have another goal to update?

Yes

Page 17: III. Previous Goals: Update (If Applicable) continued

Q52 Previous Goal 4:

Hire an additional full-time wastewater instructor to facilitate management of the expanded "Center for Water Studies" Program.

Q53 Which College Strategic Goal does this department goal most directly support?

Guided Student Pathways

Q54 Please describe how this goal advances the college strategic goal identified above.

The new position will be held by an instructor with extensive wastewater experience and strong connections to the wastewater industry. This instructor will be better equipped to mentor students who are focused on a wastewater career, provide advising from start to completion, provide appropriate contacts within the industry to assist in their employment search, and provide resources to help students persist, progress, and complete the CWS program and find employment and a career in their chosen field.

Q55 Goal Status

Completed

Page 18: III. Previous Goals: Update (If Applicable) continued

Q56 Please describe the results or explain the reason for deletion/completion of the goal:

The approval of our second full-time instructor was made in late December 2019. Development of a job description and establishing an interview panel is underway.

Q57 Do you have another goal to update?

No

Page 19: III. Previous Goals: Update (If Applicable) continued

Q58 Please describe action steps for the year:

Respondent skipped this question

Q59 How will this goal be evaluated?

Respondent skipped this question

Q60 Do you have another goal to update?

Respondent skipped this question

Page 20: III. Previous Goals: Update (If Applicable) continued

Q61 Previous Goal 5: **Respondent skipped this question**

Q62 Which College Strategic Goal does this department goal most directly support? **Respondent skipped this question**

Q63 Please describe how this goal advances the college strategic goal identified above. **Respondent skipped this question**

Q64 Goal Status **Respondent skipped this question**

Page 21: Copy of page: III. Previous Goals: Update (If Applicable) continued

Q65 Please describe the results or explain the reason for deletion/completion of the goal: **Respondent skipped this question**

Page 22: Copy of page: III. Previous Goals: Update (If Applicable) continued

Q66 Please describe action steps for the year: **Respondent skipped this question**

Q67 How will this goal be evaluated? **Respondent skipped this question**

Page 23: IV. New Goals (If Applicable)

Q68 Would you like to propose any new goal(s)? **Yes**

Page 24: IV. New Goals (If Applicable) continued

Q69 New Goal 1:

Create new STEM pathways in the CWS water & wastewater technology program by developing a four year baccalaureate degree program in water & wastewater management and administration

Q70 Which College Strategic Goal does this department goal most directly support? **Guided Student Pathways**

Q71 Please describe how this goal advances the college strategic goal(s) identified above.

Create additional pathways detailing the scope and sequence of courses required to complete a credential and transition to a water & wastewater baccalaureate degree program and ultimately water and wastewater industry employment.

Q72 Please indicate how this goal was informed by SLO (student learning outcome) assessment results, PLO (program learning outcome) assessment results, student achievement data, or other data:

Based on Water Research Foundation and AWWA estimates, California's 3,000 potable water treatment and delivery systems, and more than 2,500 wastewater treatment plants and wastewater facilities, will be looking for as many as 20,000 new employees to replace retiring workers over the coming decade. Locally, as many as 40% of the present water & wastewater industry professionals will be eligible to retire in four years. This goal is focused on increasing the number of qualified workers to help fill this employment gap.

Q73 Action steps for this year:

The new CWW-II grant will build upon the existing certificate program. CWS will create a four-year degree pathway for management and administration of water and wastewater facilities. CWW-II will use the above-ground laboratory resources for advanced-level courses. Students and incumbent workers recruited for the four-year degree pathway will be those completing the certificate programs.

Q74 How will this goal be evaluated?

The first cohort into the baccalaureate degree program is expected by Spring 2021. It will be a number of years before the success of this goal can be fully evaluated.

Q75 Do you have another new goal?

Yes

Page 25: IV. New Goals (If Applicable) continued

Q76 New Goal 2:

Improve workforce development as follows:

- 1) Recruit transitioning military members, women and other underrepresented populations for entry into the water & wastewater industry through nontraditional pathways
 - 2) Create an apprenticeship program for transitioning active duty military members and veterans
 - 3) Create a resource guide toolkit for recruiting minority and underrepresented students into STEM.
-

Q77 Which College Strategic Goal does this department goal most directly support?

Guided Student Pathways

Q78 Please describe how this goal advances the college strategic goal(s) identified above.

This goal will create a pathway for transitioning military members, women and other underrepresented populations detailing the scope and sequence of courses required to complete their technical credential in the CWS program and prepare them to compete for positions in the water & wastewater industry.

Q79 Please indicate how this goal was informed by SLO (student learning outcome) assessment results, PLO (program learning outcome) assessment results, student achievement data, or other data:

Based on Water Research Foundation and AWWA estimates, California's 3,000 potable water treatment and delivery systems, and more than 2,500 wastewater treatment plants and wastewater facilities, will be looking for as many as 20,000 new employees to replace retiring workers over the coming decade. Locally, as many as 40% of the present water & wastewater industry professionals will be eligible to retire in four years. This goal is focused on increasing the number of qualified workers to help fill this employment gap.

Q80 Action steps for this year:

- 1) CWS will work with key industry partners like AWWA, CWEA, ACWA, regional water and wastewater agencies, Zero8hundred, Operation Reboot and other groups to develop the apprenticeship program for transitioning military members
- 2) CWS will adapt the Women in Water symposium format for use with transitioning members of the military
- 3) CWS will expand the Women in Water symposia, targeting additional outreach to women and high-school age students to recruit high-school age girls into water and wastewater career pathways.
- 4) CWS will develop and disseminate a toolkit with market information and an industry survey to identify the trends and new skills required to assist nontraditional populations pursue careers in the water and wastewater industry

Q81 How will this goal be evaluated?

Analyzing student data and demographics in future years will provide evidence of the success of this goal.

Q82 Do you have another new goal?

No

Page 26: IV. New Goals (If Applicable) continued

Q83 New Goal 3:

Respondent skipped this question

Q84 Which College Strategic Goal does this department goal most directly support?

Respondent skipped this question

Q85 Please describe how this goal advances the college strategic goal(s) identified above.

Respondent skipped this question

Q86 Please indicate how this goal was informed by SLO (student learning outcome) assessment results, PLO (program learning outcome) assessment results, student achievement data, or other data:

Respondent skipped this question

Q87 Action steps for this year:

Respondent skipped this question

Q88 How will this goal be evaluated?

Respondent skipped this question

Q89 Do you have another new goal? **Respondent skipped this question**

Page 27: IV. New Goals (If Applicable) continued

Q90 New Goal 4: **Respondent skipped this question**

Q91 Which College Strategic Goal does this department goal most directly support? **Respondent skipped this question**

Q92 Please describe how this goal advances the college strategic goal(s) identified above. **Respondent skipped this question**

Q93 Please indicate how this goal was informed by SLO (student learning outcome) assessment results, PLO (program learning outcome) assessment results, student achievement data, or other data: **Respondent skipped this question**

Q94 Action steps for this year: **Respondent skipped this question**

Q95 How will this goal be evaluated? **Respondent skipped this question**

Page 28: V. Resources Needed to Fully Achieve Goal(s)

Q96 Is the program requesting resources this year to achieve this program goal(s)? (Faculty Resource Needs, Classified Staff Resource Needs, Technology Resource Needs, Supplies/Equipment Resource Needs, Facilities Resource Needs or Other Resource Needs) **No**

Page 29: VI. Faculty Resource Needs

Q97 Are you requesting one or more Faculty Positions to achieve this program goal(s)? **Respondent skipped this question**

Page 31: VIII. Classified Staff Resource Needs

Q98 Are you requesting one or more Classified Positions to achieve this goal? **Respondent skipped this question**

Page 33: X. Technology Resource Needs

Q99 Are you requesting technology resources to achieve this goal? **Respondent skipped this question**

Page 35: XIV. Supplies/Equipment Resource Needs

Q100 Are you requesting supplies and/or equipment resources to achieve this goal? **Respondent skipped this question**

Page 37: XVI. Facilities Resource Needs

Q101 Are you requesting facilities resources to achieve this goal(s)? **Respondent skipped this question**

Page 39: Final Check

Q102 Are you ready to submit your program review?If you would like to go back and review a section, select a section a click "Next." **I am ready to submit my program review**
