



COLLEGE OF ENGINEERING  
AND COMPUTER SCIENCE

**MS in Environmental Engineering**  
*Online Program*

**PROGRAM PERFORMANCE REVIEW**

**APRIL 2018**

**Department of Civil and Environmental Engineering**

**California State University, Fullerton**

## *Table of Contents*

I. DEPARTMENT/PROGRAM MISSION, GOALS AND ENVIRONMENT .....	<b>3</b>
II. DEPARTMENT/PROGRAM DESCRIPTION AND ANALYSIS.....	<b>5</b>
III. DOCUMENTATION OF STUDENT ACADEMIC ACHIEVEMENT AND ASSESSMENT OF STUDENT LEARNING OUTCOMES .....	<b>9</b>
IV. FACULTY .....	<b>14</b>
V. STUDENT SUPPORT AND ADVISING .....	<b>16</b>
VI. RESOURCES AND FACILITIES .....	<b>19</b>
VII. LONG-TERM PLANS .....	<b>20</b>
VIII. APPENDICES CONNECTED TO THE SELF-STUDY (REQUIRED DATA).....	<b>21</b>
APPENDIX I. UNDERGRADUATE DEGREE PROGRAMS .....	<b>22</b>
APPENDIX II. GRADUATE DEGREE PROGRAMS.....	<b>22</b>
<i>TABLE 5. Graduate Program Applications, Admissions, and Enrollments.....</i>	<i>22</i>
<i>TABLE 6-A. Graduate Program Enrollment in FTES .....</i>	<i>22</i>
<i>TABLE 6-B. Graduate Program Enrollment in Headcount.....</i>	<i>22</i>
<i>TABLE 7. Graduation Rates for Online Environmental Engineering (MS).....</i>	<i>23</i>
<i>TABLE 8. Master's Degrees Awarded.....</i>	<i>23</i>
APPENDIX III. FACULTY .....	<b>24</b>
<i>TABLE 9. Faculty Composition.....</i>	<i>24</i>
APPENDIX IV. RESOURCES.....	<b>25</b>
<i>TABLE 10. CEE Department Budget and Online Course Fee .....</i>	<i>25</i>
APPENDIX V. LONG-TERM PLANNING .....	<b>26</b>
APPENDIX VI. FACULTY CURRICULUM VITAE .....	<b>27</b>
APPENDIX VII. SAMPLE COURSE SYLLABUS.....	<b>72</b>
APPENDIX VIII. ASSESSMENT REPORTS RESULTS AND PROGRAM RANKING .....	<b>115</b>

## **I. Department/Program Mission, Goals and Environment**

### **A. Program mission and goals in relation to the university**

The Master of Science in Environmental Engineering (MSEnvE) is an online program hosted within the Civil and Environmental Engineering (CEE) department at California State University Fullerton (CSUF). Following the mission and goals of the university, the mission of this program is to educate and prepare future leaders in the environmental engineering field.

This degree program follows the Program Educational Objectives (PEOs) established by the CEE department, which are as follows:

Technical Skills: Graduates will be successful in multidisciplinary engineering practice and being well integrated into the workforce.

Professional Skills: Graduates will demonstrate professional skills necessary to be competent employees/leaders.

Professional Attitude: Graduates will have high ethical and professional standards toward advancement of the profession and society.

Consistent with the University's mission statement, the CEE department's PEO focus on preparing graduates for challenging professions with knowledge of modern engineering practice, ability to integrate into the local and global workforce, and with continued demonstration of professional skills. Also, the PEOs direct graduates to assume leadership roles and contribute to the economy of California and the nation, which is consistent with the University's mission of strengthening relations to communities and contributing productively to the society.

Furthermore, the department's PEOs promote enthusiasm for professional growth and career success as professional citizens, serving as a distinctive resource and catalyst for our surrounding regions.

The Student Learning Outcomes (SLOs) for the online MS in Environmental Engineering program to meet CEE Department PEOs are as follows:

1. Understanding basic principles and ability to conduct calculations related to environmental engineering
2. Understanding environmental regulations, engineering ethics, environmental impact report, and project management
3. Understanding contemporary pollution management issues and ability to conduct conceptual design of sustainable treatment processes
4. Ability to develop a research plan, write technical articles, and conduct oral presentation

As shown in Table I-1, attainment of the program SLOs is well-aligned with achieving the university graduate learning goals. Our program promotes student success by developing their skills and technical wisdom needed to succeed and professionally advance as an environmental engineer, as a result, fulfilling the University’s mission and goals.

**Table I-1: Program Learning Outcomes and University Learning Goals Alignment**

California State University, Fullerton Graduate Student Learning Goals (UPS 300.041)	Student Learning Outcomes (SLO)
Knowledge, skills, and professional dispositions including higher order competence in disciplinary perspectives and interdisciplinary points of view;	1,2,3,4
The ability to access, analyze, synthesize, and evaluate complex information from multiple sources and in new situations and settings;	2,3
Advanced communication skills;	4
The ability to work independently and in collaboration with others as artists, practitioners, researchers, and/or scholars;	2,3,4
The ability to apply appropriate methods and technologies to address problems that affect their communities;	1,2,3
Social responsibility within diverse communities and in interdependent global community.	1,2,3,4

**B. Changes in the trends since last program review**

This is our first program performance review.

**C. Future program priorities**

As our program matures we strive to build natural partnerships with professional industries and governmental organizations in the environmental engineering field. As the field of environmental engineering evolves, it is important for us to recognize changes and update our curriculum as needed.

**D. This program is not offered in a Special Session self-support mode.**

## **II. Department/Program Description and Analysis**

### **A. Curricular changes since last review**

This is first program performance review report for the online MSEnvE Program. Therefore, there are no changes to report since last review.

### **B. The structure of the degree program**

Applicants who have a bachelor's degree from a regionally accredited institution with a good academic standing and a minimum grade-point-average of 2.5 in the last 60 semester units are eligible to apply for the online MSEnvE Program. However, acceptance into the program depends on the pool of applicants each year. Students who meet the GPA requirement but do not have an undergraduate engineering degree are given conditional-admission with a set of deficiency courses. Those deficiency courses include mathematics through differential equations, one year of college-level physics, one year of college-level chemistry, undergraduate level fluid mechanics, and an undergraduate course in environmental engineering. All admitted students will be advanced to classified standing immediately after completing the deficiency courses and filing an adviser-approved study plan in the program.

The MSEnvE is a cohort-based online program. It currently consists of 27 units of required coursework and 3 units of a graduate capstone project (Table II.1), in addition to the necessary deficiency courses. A minimum GPA of 3.0 is required for graduation. EGCE 573 satisfies the graduate writing requirement as well.

**Table II.1: List of core, elective and capstone project classes**

Core Courses	Elective Courses	Capstone Research Project
EGCE 570 EGCE 571 EGCE 572 EGCE 573	EGCE 481 EGCE 482 EGCE 515 EGCE 546 EGCE 583	EGCE 597

All courses in the program are offered in either Fall, Spring or Summer sessions/semesters. The Fall and Spring semesters are 16-week long. Summer session is 10-week long and aligned with summer sessions offered by the university. By including summer session course offerings in the program, the entire program can be completed in approximately 20 months. Following is the curriculum map for the program:

#### **First Semester (Fall)**

EGCE 570 – Fate and Transport of Chemicals in the Environment (3 units)

EGCE 571 – Hydraulics and Hydrology for Environmental Engineers (3 units)

### **Second Semester (Spring)**

EGCE 515 – Solid Waste Management, System Design, and Sustainability (3 units)

EGCE 573 – Environmental Engineering Practices and Project Management (3 units)

### **Summer Session**

EGCE 481 – Remediation of Contaminated Soil and Groundwater (3 units)

EGCE 482 – Wastewater Treatment and Water Reclamation (3 units)

### **Third Semester (Fall)**

EGCE 572 – Water Supply, Treatment, and system Design (3 units)

EGCE 597 – Graduate Project (3 units)

### **Fourth Semester (Spring)**

EGCE 546 – Surface Water Pollution and Control (3 units)

EGCE 583 – Air Pollution Control Engineering (3 units)

Students are admitted in Fall semester only. Students complete the program by taking courses in four semesters and one summer session. Students in a cohort take two courses each semester and the summer session. The coursework in the first year solidifies the students' foundation in environmental engineering. The second year's coursework offers more specialized topics in environmental remediation and design. The capstone experience (EGCE 597) during their final year is through an applied project similar to what might be encountered in professional environmental engineering practice. On rare occasions, students who might have distress due to workload or family situation are allowed to take less than two courses per semester. However, they have to wait for a complete year to take the courses they missed as each course is only offered once a year and each course in the program, at present, is a required course.

## **C. Student demand for the program**

According to the US Department of Labor, Bureau of Labor Statistics, environmental engineers held about 52,640 jobs in 2017, mostly in engineering companies as well as local, state and federal governments. The mean annual wage was \$91,180 with highest 10% earnings of \$134,060 and higher. For reference, average annual salaries of all occupation and all engineers were \$37,040 and \$91,000, respectively. The projected change in employment from 2016 to 2026 is 8%. Although environmental engineers are in demand throughout the country, California, New York, Pennsylvania, Texas, and Massachusetts, are the top 5 highest demand states based on the employment level. In California, there were 8,180 employed environmental engineers in 2016. The average hourly wage and annual mean wage for environmental

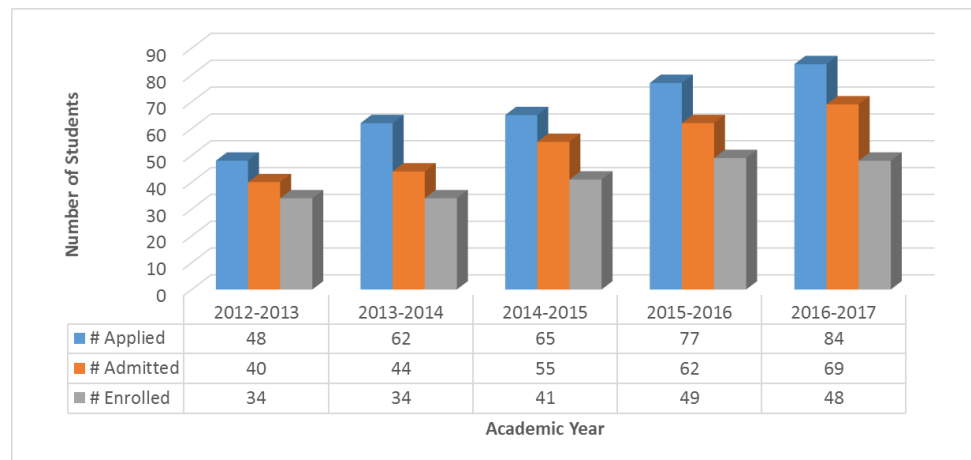
engineers in California in 2016 were \$49.86 and \$103,700, respectively. Considering the current excellent job prospects and geographic location of our institution, our online MS in environmental engineering is in high demand.

The online MS Program in Environmental Engineering has been offered since Fall 2012. The program focuses on integrating state-of-the-art practice in environmental engineering into its graduate curriculum. The contents of the graduate program are modified to focus on the employment trend and demand in different areas of environmental engineering. The program will take a leadership role in developing this online curriculum and in offering new courses to satisfy the intellectual desires of the students. The online graduate engineering programs at CSU Fullerton (software engineering and environmental engineering) are ranked 16<sup>th</sup> nationally by the US News and World Report (Appendix VIII). Impressively, the program was also ranked 3<sup>rd</sup> nationally for faculty credentials among online programs by US News and World Report. Due to its high ranking, online class offerings, high-quality academic environment, and high-ranking faculty credentials, the online MS in Environmental Engineering program is in high demand. The program received 48 applications in 2012-2013, whereas the number of eligible applications in 2016-2017 rose to 84. In the past six years the program has seen a total growth of 75% in the number applications received, with an average annual increase of eligible applicants by 15%. Current average acceptance rate in the program is about 80%. On average, approximately 78% of the students who got accepted officially enrolled into the program. Current departmental policy discourages graduate class sizes larger than 30, and this limitation triggers some restrictions on the enrollment capability of this program. However, for the program to maintain its high-quality educational offerings, the current enrollment of 50 students per cohort is considered ideal.

#### **D. Enrollment trends in the program**

As can be observed in Figure II.1, the program had 34 students enrolled in Fall 2012, which increased to 48 in Fall 2016. The overall enrollment growth in the past five years is 41.2%, which yields an annual enrollment growth of 8.2%. The program Full-time Equivalent Student (FTES) increased from 32.0 to 62.9 from Fall 2012 to Fall 2016, which shows an increase of 97%. Currently, the program does not have a target FTES. However, the growing demand may require the program to set its target FTES in future. There are at least five full-time faculty members consistently teaching courses in the program every year. At present, the number of faculty allocated to teach the courses offered by the program is sufficient. Moreover, as the program has an

annual enrollment of approximately 50 students, current enrollment trend is healthy to sustain the program goals.



**Figure II.1: Application, admission and enrollment trend in the online MS in Environmental Engineering program in past 5 years.**

Due to their high demand, all courses in the program have high student enrollment. As can be observed in Table II.2, the class sizes until Fall 2017 were larger than 50. The department made a policy of having class sizes less than 30 in graduate-level classes starting Spring 2018. The capstone design project is team-taught. Table II.2 shows enrollment in each course for past five years. Higher enrollment than the cohort in some of the courses is because some of these courses are cross-listed with MS in Civil Engineering program.

**Table II.2: Course-wise enrollment trend in the past 5 years**

Year	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
EGCE 481	54	53	102	92	56
EGCE 482	59	59	76	90	64
EGCE 515	58	53	79	120	103
EGCE 546		63	45	56	52
EGCE 570	76	47	62	64	64
EGCE 571	64	36	55	61	77
EGCE 572		64	51	61	55
EGCE 573	69	47	71	76	71
EGCE 583	-	55	45	51	45
EGCE 597	-	48	29	43	43



**E. Plan for curriculum changes**

Program will continue to review the curriculum each year and make appropriate changes in course contents, textbooks and computer software to better prepare the students for environmental engineering professional careers.

- F.** There are no special sessions self-support programs offered by the department/program.

**III. Documentation of Student Academic Achievement and Assessment of Student Learning Outcomes**

**A. Program assessment plan**

The program faculty members have been assessing the courses they were teaching for their course improvement and eventually for the program improvement, the an university-wide course and program level assessment for graduate programs was mandated in the 2015-2016 academic year only. Student Learning Outcome (SLO) of the programs in 2015-2016 were in line with the civil engineering graduate program, as specified below.

- a. An ability to utilize scientific inquiry and knowledge skills to design and solve and interpret complex engineering problems.
- b. An ability to design a specific system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability and to work as part of a team.
- c. An ability to communicate effectively
- d. Recognition of the need for, and an ability to engage in life-long learning and knowledge of contemporary issues.

However, due to the very different nature of course offerings, the faculty members in the MSEnvE program revised the SLOs, as presented below. The program also developed new assessment tools, specifically the performance indicators in the academic year 2016-2017 and assessed two of the four SLOs through its course offerings.

- (1) Understanding basic principles and ability to conduct calculations related to environmental engineering
- (2) Understanding environmental regulations, engineering ethics, environmental impact report, and project management
- (3) Understanding contemporary pollution management issues and ability to conduct conceptual design of sustainable treatment processes
- (4) Ability to develop a research plan, write technical articles, and conduct oral presentation

The online MSEnvE program regularly evaluates the student performance in all courses. All the lecture courses are assessed once in every two years, while EGCE 597 is assessed once per year. Table III.1 presents the assessment plan for each course in the program for the academic year 2016-2017 through 2019-2020.

## **B. Student learning outcomes (SLOs)**

Each Student Learning Outcome is met by one or more courses. The direct assessment approaches vary from course to course. Generally, they comprise of following:

- Homework assignment
- SLO assessment exam
- Project report
- Oral presentation

Table III.1 lists the performance indicator in relation to student learning outcomes assessed by each course in the program.

Successful attainment of each SLO is evaluated using the following rubrics:

**Table III.1 SLOs, Performance Indicators, and Assessment Schedule**

SLOs	Performance Indicators	Schedule											
		F16	S17	SS17	F17	S18	SS18	F18	S19	SS19	F19	S20	SS20
(1) Understanding basic principles and ability to conduct calculations related to environmental engineering	(1a) Understanding basic principles (chemistry, hydraulics, and/or hydrology) related to environmental engineering	570			571			570			571		
	(1b) Ability to conduct calculations on fate and transport of chemicals in the environment and/or hydraulics/hydrology related to environmental engineering	570			571			570			571		
(2) Understanding environmental regulations, engineering ethics, environmental impact report, and project management	(2a) Understanding environmental regulations, engineering ethics, and components of an environmental impact report					573						573	
	(2b) Ability to write technical articles related to environmental regulations/policies and impact statement					573						573	
	(2c) Understanding the components of project management					573						573	
(3) Understanding contemporary pollution management issues and ability to conduct conceptual design of sustainable treatment processes	(3a) Understanding contemporary environmental issues related to pollution management (air, water, wastewater, solid waste, stormwater runoff, and/or site contamination)		583	481	572	546	482		515	481	572	546	482
	(3b) Ability to conduct conceptual design of sustainable treatment processes (air, water, wastewater, solid waste, stormwater runoff, and/or site remediation)		583	481	572	546	482		515	481	572	546	482
(4) Ability to develop a research plan, write technical articles, and conduct oral presentation	(4a) Ability to conduct literature search and development of a research plan				597			597			597		
	(4b) Ability to write technical papers and conduct oral presentation				597			597			597		

- Level 1: No answers or portions of answers correct
- Level 2: 1/3 portion of answers is correct or with minor errors
- Level 3: 2/3 portion of answers is correct or with minor errors
- Level 4: Correct concept on all answers with only small errors
- Level 5: All answers are correct

SLO assessment exams are graded at a scale of 100 and assessed based on the average score obtained by all student participants. Overall score of higher than 70% in each SLO is considered as satisfactory to attain the SLO.

### **C. Assessment results and continuous improvement**

As mentioned earlier, SLO “a” was evaluated in the academic year 2015-2016. EGCE 515 was used to assess this SLO. A total of 114 students in the class were involved in the SLO assessment. The average score obtained by the students was 86.5%, which exceeded the score required for successful attainment of the SLO.

After the revision of SLOs in 2016-2017 and development of SLO assessment plan, SLOs “1” and “3” were assessed in 2016-2017. SLO “1” was assessed in EGCE 570, and SLO “3” was assessed in EGCE 583 and EGCE 481. According to the assessment results, SLO “1” was assessed in EGCE 570 through embedded exam questions. A total of 61 students participated the SLO assessment. An average score obtained by the students was 83% (84% and 82% in performance indicators “a” and “b”, respectively). As this score is higher than the threshold score of 70% for the successful attainment of the SLO, the SLO has been attained successfully. Likewise, 44 and 56 students were assessed through embedded exam questions in EGCE 583 and 481, respectively. An average score obtained by the students was 81% (81% in both performance indicators “a” and “b”). As this score is higher than the threshold score of 70%, the SLO has been attained successfully. The program will assess all SLOs in the academic year 2017-2018, as presented in Table III.1, to close the loop.

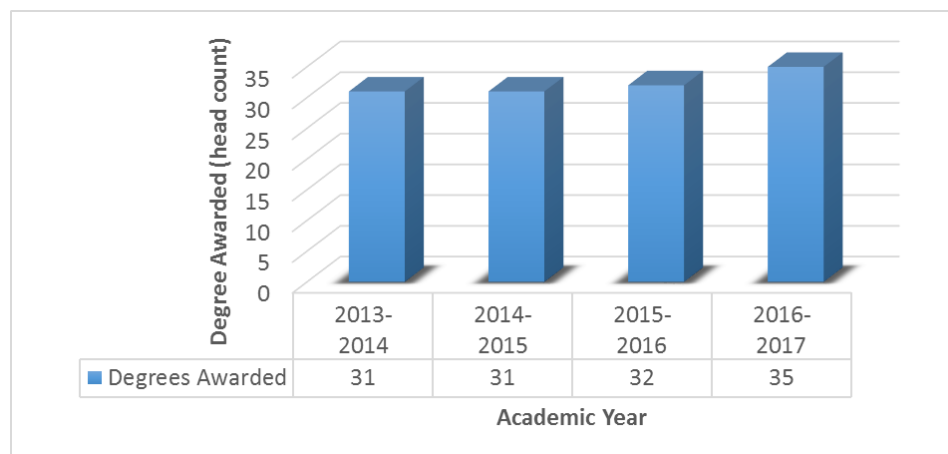
The Office of Assessment and Educational Effectiveness is an administrative division for evaluating campus-wide effort on assessment. Every year, each academic program is required to submit the assessment results through an online system “Compliance Assist”. Each program will receive feedback from the Office of Assessment and Educational Effectiveness regarding its assessment effort so that the programs can implement improvements in effective student learning outcomes. The online MS in Environmental Engineering program received excellent feedback from the Office of Assessment and Educational Effectiveness for its successful assessment results. Reports for academic years 2015-2016 and 2016-2017 are presented in the Appendix VIII.

In addition to the regular assessment of SLOs, faculty members teaching in the program self-evaluate instructional practices and proactively take actions in “closing the loop”. Faculty members use innovative instructional technologies, such as video conferencing to provide students a high-quality education. Faculty members also attended Quality Matters workshop to further enhance online instruction.

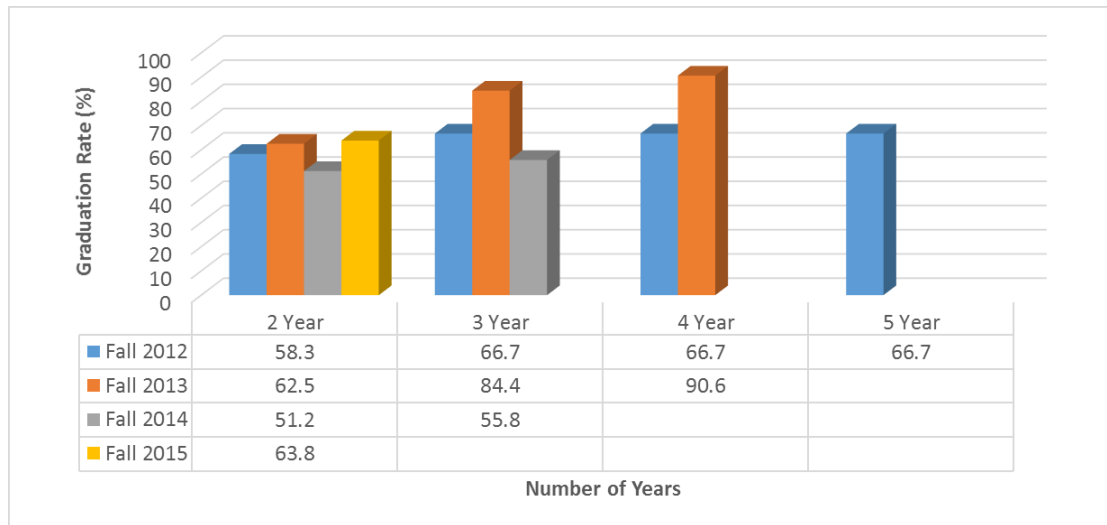
#### D. Quality indicators as evidence of effectiveness/success

Other quality indicators the program uses to evaluate its performance include surveys from alumni and current students, number of MSEnvE degrees awarded, 2-year and 3-year graduation rates, student-faculty collaborations on research, and graduate projects.

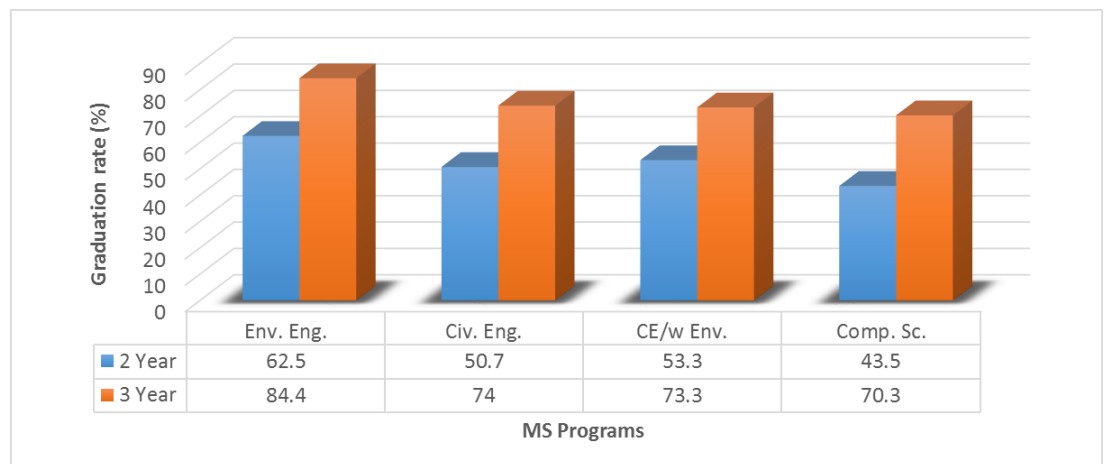
Presented in Figure III.1 is the data pertinent to degree awarded by the program. As can be observed in the figure, the program has consistently increased the number of graduate degrees awarded to the students, in line with the increase in student enrollment. Presented in Figure III.2 is the data that shows the annual trend in 2 to 5-year graduation rates. Except for the Fall 2014 cohort, the 2 and 3-year graduation rate has significantly increased. The student retention rate for the first cohort was only 67%. However, the program implemented various approaches to improve the student retention. As a result, student retention in other years has been significantly improved. For comparison purpose, 2 and 3-year graduation rates in other similar programs but offered in face-to-face mode, such as civil engineering, civil engineering with a concentration in environmental engineering, and computer science are presented in Table III.3. As can be observed in Table III.3, 2 and 3-year graduation rate for students in the online MS in Environmental Engineering is much higher than the other successful graduate programs in the College of Engineering and Computer Science.



**Figure III.1: Annual trend of graduate degrees awarded to the students enrolled into the program.**



**Figure III.2: 2, 3, 4 and 5- year graduation rates for the students enrolled into the program.**



**Figure III.3: 2 and 3-year graduation rates in other similar programs for comparison.**

**E. Student learning assessment for the program offered fully online**

This program is offered fully online and the program assessment methods and success indicators explained above apply to fully online offerings.

**IV. Faculty**

**A. Program Full-time Equivalent Faculty (FTEF)**

As the online MS in Environmental Engineering Program is housed under the Civil and Environmental Engineering Department, the program does not directly hire its faculty. However, the department assigns dedicated faculty members to teach in the program. The program coordinator, who gets six Weighted Teaching Units (WTU) release-time per semester, is in-charge of

analyzing applications pertinent to admission into the program, making admission decisions, advising students who are enrolled into the program, preparing their graduation plan (also called study plan), making graduation decisions, preparing expenditure plans for student and faculty development activities, and representing the program in the ECS Chair's Council as a council member. The program has one Administrative Support Coordinator (ASC) who devotes 25% of his/her time to the program's activities. Student assistants are hired as needed to help the program ASC and the program coordinator in recruitment and other day-to-day activities. The departmental and college budget analysts supports the program's budgetary aspects. The program currently has six full-time faculty members dedicated to program's academic activities, all of whom are tenured (3 members - all professors) or tenure-track (3 members - two assistant professors and one associate professor) faculty members. Total program FTEF is 6.0. Two of the tenure-track assistant professors are expected to get tenure and promotion to associate professor level in Fall 2018.

**B. Priorities for additional faculty hires**

All curriculum requirements of the program are met by full-time faculty members in the department. Considering the current scenario, department does not plan to hire additional faculty for this program at this time.

**C. Faculty teaching in the program**

All courses in the program are taught by full-time faculty members. Student assistants serve as graders who help faculty member in grading homework assignments. All faculty teaching in the program have terminal degrees. Moreover, half of the program faculty have professional engineering licenses. Credentials of program faculty are listed below.

**Kuo, Jeff, P.E.**

- **Education:** PhD, University of Southern California
- **Related experience:** worked for several major environmental engineering companies and Los Angeles County Sanitation Districts
- **Area of Expertise:** water/wastewater treatment, groundwater and soil remediation, greenhouse gases management, and air pollution control
- **Courses Taught in the Program:** EGCE 481, EGCE 482, EGCE 570, EGCE 583.

**Kurwadkar, Sudarshan, P.E.**

- **Education:** PhD, Missouri University of Science & Technology
- **Related experience:** worked for Missouri Department of Natural Resources for four years and briefly for a private consultancy firm.

- **Area of Expertise:** Physical and chemical processes in environmental engineering; fate and transport of emerging contaminants such as pharmaceuticals compounds and insecticides in the environment;
- **Courses Taught in the Program:** EGCE 481, EGCE 482, EGCE 546, EGCE 597.

**Mishra, Phoolendra**

- **Education:** PhD, University of Arizona
- **Related experience:** Post-Doctoral Research Associate, Los Alamos National Laboratory
- **Area of Expertise:** Modeling Flow and Transport in Subsurface; Well Hydraulics; Coupled Processes Modeling; Contaminant Source Identification; Parameter Estimation; Uncertainty Quantification
- **Courses Taught in the Program:** EGCE 571.

**Struckhoff, Garrett**

- **Education:** PhD, University of Iowa
- **Related experience:** Post-Doctoral Research Associate, Air Force Institute of Technology
- **Area of Expertise:** Phytoremediation; Bioremediation; Processes that allow wetlands to degrade anthropogenic contaminants
- **Courses Taught in the Program:** EGCE 546 EGCE 572, EGCE 573, and EGCE 597.

**Tiwari, Binod, P.E.**

- **Education:** PhD, Niigata University
- **Related experience:** Post-Doctoral Research Associate, Virginia Polytechnic Institute and State University; Consulting Geotechnical Engineer
- **Area of Expertise:** Geo-environmental Engineering, Geotechnical Earthquake Engineering, Slope Stability and Stabilization, Soil and Material Testing, and Applied GIS
- **Courses Taught in the Program:** EGCE 515.

D. There are no special sessions self-support programs offered by the department/program.

## ***V. Student Support and Advising***

### **A. Student advising**

The program coordinator advises all students in the program. The faculty members answer any specific questions related to the career opportunities in their areas of expertise. The program coordinator develops the study plan for each graduate student and communicates it to the Office of Graduate Studies. The program coordinator informs students about graduate school policies both



at the time of orientation and during the academic year. For students who are on academic probation, office of graduate studies conducts special workshops to walk them through on their options.

## **B. Students participation in research with faculty**

All students in the program are required to take a 3-unit graduate project (EGCE 597), which also satisfies the culminating experience towards graduation. Occasionally students are allowed to write a thesis in lieu of the project work. In such scenarios, students are allowed two semesters of EGCE-598 thesis work. Students work with assigned faculty mentors to conduct literature review and other research activities. Both students and faculty members receive 3 units of academic credit and teaching credit, respectively, for this. Students who want to carry their research further collaborate individually with faculty members for co-curricular research experience. Faculty and students in the program will receive support for conference travel if the faculty-student research results into a conference publication and presentation. Presented below are examples of faculty-student publications, conference presentations and theses since the beginning of the program.

1. Vanh Phonsiri, (2017). Occurrence and Detection of Variety of Human and Animal Pharmaceuticals in Engineered Wastewater System, M.S. Thesis 2017
2. Suliman Ibrahim, (2017). Experimental Studies on UV Facilitated Photodegradation of 2, 4 – Dinitrotoluene, M.S. Thesis 2017
3. Maria Nassiry Ousley, (2017). Abiotic Fate Mechanism: Hydrolysis Study on Selected Neonicotinoids, M.S. Thesis 2017
4. Jasmin Jamal (2016), Managed Aquifer Recharge Using Advanced Treated Recycled Water: Evaluation of Water Quality and Clogging Behavior in Recharge Basin, M.S. Thesis 2016
5. Kurwadkar, S., Phonsiri, V., Choi, S., Nguyen, C. (2018). Pharmaceuticals in engineered wastewater system - A potential concern for wastewater reuse and antibiotic resistance. *Journal of Environmental Chemical Engineering*, (under review manuscript # JECE-S-17-02924)
6. Kurwadkar, S., Struckhoff, G., Mishra, P., Modha, N., Murga, E., Amaral, B., Machado, G., Gomes, N. (2015). Modeling Fate and Transport of Emerging Micro-Pollutants in the Environment. In *Emerging Micro-Pollutants in the Environment: Occurrence, Fate, and Distribution*. American Chemical Society, Vol. 1198, pp. 97–112, ISBN13: 9780841230781e ISBN: 9780841230798. August 26, 2015. Copyright © 2015

7. Kurwadkar, S., Ibrahim, S., Lopez, S. (2017). Photo-degradation of 2, 4 - Dinitrotoluene using UV Radiation Source. World Environmental and Water Resources Congress, Sacramento, CA May 21 – 25, 2017
8. Kurwadkar, S. and Jamal J. (2017). Groundwater Recharge through Reclaimed Water: Evaluation of Clogging Behavior in Natural Basin. Annual Date Memorial Lecture, Indian Water Works Association, Nagpur, India, January 04, 2017
9. Ibrahim, S., Lopez, S. Experimental Studies on UV Facilitated Photo-degradation of 2, 4-Dinitrotoluene. 2017 CSUF Student Research Competition, February 23, 2017
10. Jamal, S. (2017). Managed Aquifer Recharge through Advanced Treated Recycled Water: Evaluation of Water Quality and Clogging Behavior in Recharge Basins. 2017 CSUF Student Research Competition, February 21, 2017
11. Ousley, M. (2017). Hydrolysis of Neonicotinoids. 2017 CSUF Student Research Competition, February 21, 2017
12. Kurwadkar, S. and Jamal J. (2017). Groundwater Recharge through Reclaimed Water: Evaluation of Clogging Behavior in Natural Basin. Annual Date Memorial Lecture, Indian Water Works Association, Nagpur, India, January 04, 2017.
13. Kurwadkar, S., Struckhoff, G., Pugh, K., & Singh, O. (2017). Uptake and translocation of sulfamethazine by alfalfa grown under hydroponic conditions. *Journal of Environmental Sciences*, 53, 217-223.
14. Struckhoff, G.C., Lopez, J., Gonzalo, J. (2017). Phytoremediation of 1,4-Dioxane by Basil (*Ocimum basilicum*) and Radish (*Raphanus sativus*). Under revision with *International Journal of Phytoremediation*.
15. Qin, K., Struckhoff, G.C., Agrawal, A., Shelley, M.L., Dong, H. (2014) Natural Attenuation Potential of Trichloroethene in Wetland Plant Roots: Role of Native Ammonium-Oxidizing Microorganisms. *Chemosphere* 119, 971-977. 1
16. Kuo, J.; Dow, J. (2017) “Biogas Production from anaerobic Digestion of Food Waste and Relevant Air Quality Implication”, *J. Air & Waste Management Association*, 67(9), 1000-1011.
17. Ajmera, B., Tiwari, B., *Koriala, J.*, and *Obaid, Z. T. A.* 2017. “Compaction Characteristics, Unconfined Compressive Strengths, and Coefficients of Permeability of Fine-Grained Soils Mixed with Crumb Rubber,” *Journal of Materials in Civil Engineering*, ASCE, 29 (9), 04017148 1-10.
18. Tiwari, B., and *Das, K.K.*, 2013. Influence of Cement Content and Curing Period on the Geotechnical Properties of Cement-Modified Soil,

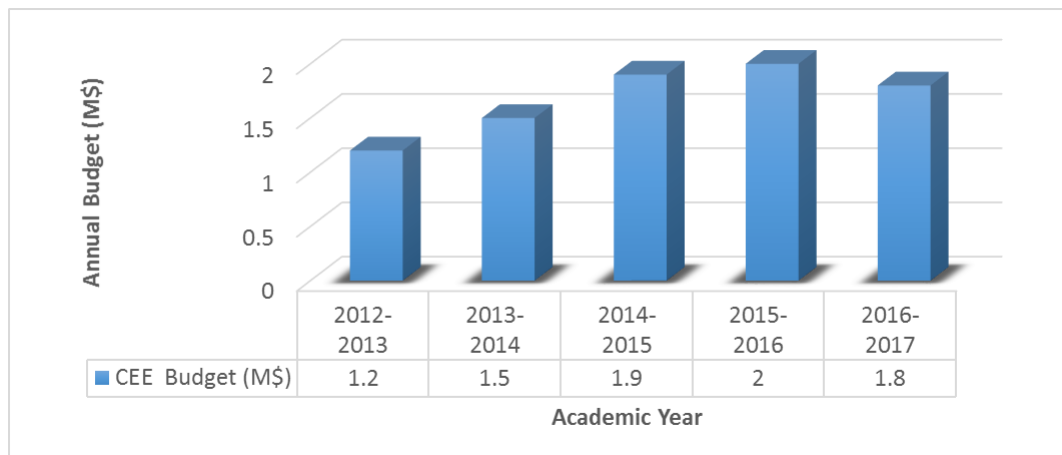
International Journal of Engineering Science and Management, 3 (2) 43 - 47.

19. Tiwari, B., *Principe, M., and Biabani, M.* 2014. Influence of activity and mineralogy in compaction and shear strength characteristics of clays, Geotechnical Special Publication, ASCE, 234, 1357-1366.
20. Tiwari, B., and *Upadhyaya, S.* 2014. Influence of Antecedent Rainfall on Stability of Slopes, Geotechnical Special Publication, ASCE, 234, 3243-3251.

## **VI. Resources and Facilities**

### **A. State support and non-state resources**

The State supports the online MSEnvE program. As it is housed within the CEE department, it does not receive a separate budget from the university. The budget allocated to run this program is included in the budget for the CEE department. This fund supports the overall operation of the department and any course-related activities. However, students pay an additional online course fee of \$99 per course, which helps meet the technology needs of the program. The annual budget trend for the CEE department in the past 5 years is presented in Figure VI.1. This includes regular operational funds for the entire department including the faculty teaching online MSEnvE program as well as the revenue generated from the regular online course fee. Presented in Figure VI.2 is the annual revenue generated through the additional online course fee, which is generally used for faculty and students’ professional development. As shown in figure VI.1, the budget allocated to the program is consistent throughout these 5 years.



**Figure VI.1: Annual budget of the Civil and Environmental Engineering Department in past 5 years.**

### **B. Special equipment used by the program**

Considering this program is being offered in a fully online format, high-quality video lectures created by our faculty members are core to our success. We purchased Microsoft Surface tablets for creating video lectures via Camtasia software. We also bought external hard drives, webcams and Wacom tablets that can be used by faculty and student assistants.

### **C. Library Resources**

Current resources provided by the university library meets the requirement of the program. Students can access the library services online and use online electronic journals related to environmental engineering and make use of interlibrary loan services. These resources have been adequate for the program.

## **VII. Long-term Plans**

Our long-term plan is to continue supporting the university and college in their mission and goals. We will continue to do so by ensuring the course contents up to date with the advances in the environmental engineering field. Fortunately, faculty members who teach in the program are active researchers and stay current with recent advances. More courses will be developed in the future to give an opportunity to students to select courses from a larger list of elective courses. Moreover, the program will work closely with the Office of Assessment and Educational Effectiveness at CSUF to develop and refine SLOs and implement a robust assessment plan to align the program goals with the mission and goals of the department, college, and the university as it evolves. Each program SLO will be assessed in every 2 years. However, if the program SLO assessment results show a need for improvement, SLO assessment will be implemented every year so that the assessment cycles can be closed for continuous improvement. The program faculty will be encouraged to attend professional development activities which will enhance the learning environment in the courses pertinent to the program. In the next six years, the program will assess the needs and area of improvement and implement necessary plans to recruit high-quality students, maintain its current growth, enhance retention and graduation rate, reduce probation and disqualification rates, and increase professional development opportunities for faculty members and students. In the long-run, the program needs a full-time administrative support staff and at least 25% technical support staff to run the program smoothly in addition to enhancing the recruitment and program development effort. As the current program significantly support the enrollment and FTES growth of the department and the college, allocation of additional funds will be needed for faculty development in addition to the current financial plan which includes a portion of the online course fee only.

**VIII. Appendices Connected to the Self-Study (Required Data)**

1. Undergraduate Degree Programs
2. Graduate Degree Programs
3. Faculty
4. Resources
5. Long-term planning
6. *Curriculum Vitae* of faculty (which should include recent scholarly/creative activity and any research funding)
7. Course Syllabus
8. a. University Assessment Report; b. Online engineering graduate program ranking

**APPENDIX I. UNDERGRADUATE DEGREE PROGRAMS**

Tables 1 to 4 are not applicable to this program performance review.

**APPENDIX II. GRADUATE DEGREE PROGRAMS**

**TABLE 5. Graduate Program Applications, Admissions, and Enrollments**

<b>Academic Year</b>	<b># Applied</b>	<b># Admitted</b>	<b>% Admitted</b>	<b># Enrolled</b>	<b>% Enrolled</b>
2012-2013	48	40	83.3	34	85.0
2013-2014	62	44	71.0	34	77.3
2014-2015	65	55	84.6	41	78.8
2015-2016	77	62	80.5	49	79.0
2016-2017	84	69	82.1	48	69.6

**TABLE 6-A. Graduate Program Enrollment in FTES**

<b>Academic Year</b>	<b>Enrollment in FTES</b>
2012-2013	32.0
2013-2014	49.7
2014-2015	51.5
2015-2016	65.4
2016-2017	62.9

**TABLE 6-B. Graduate Program Enrollment in Headcount**

<b>Academic Year</b>	<b>Master's</b>	<b>Total</b>	<b>FTES per headcount</b>
2012-2013	48	48	0.5
2013-2014	82	82	0.5
2014-2015	85	85	0.4
2015-2016	95	95	0.5
2016-2017	100	100	0.5

**TABLE 7. Graduation Rates for Online Environmental Engineering (MS)**

First Enrolled in	Headcount	% Graduated			
		in 2 years	in 3 years	in 4 years	in 5 years persistence
Fall 2012	36	58.3	66.7	66.7	66.7
Fall 2013	32	62.5	84.4	90.6	NA
Fall 2014	43	51.2	55.8	NA	NA
Fall 2015	47	63.8	NA	NA	NA

**TABLE 8. Master's Degrees Awarded**

Academic Year	Degrees Awarded
2013-2014	31
2014-2015	31
2015-2016	32
2016-2017	35

**APPENDIX III. FACULTY**

**TABLE 9. Faculty Composition**

<b>Academic Year</b>	<b>Tenured</b>	<b>Tenure Track</b>	<b>Sabbatical at 0.5</b>	<b>FERP at 0.5</b>	<b>Lecturer</b>	<b>FTEF</b>	<b>AYFTES</b>
2012-2013	3	2	0	0	0	5	32.0
2013-2014	2	2	1	0	0	5	49.7
2014-2015	3	3	0	0	0	6	51.5
2015-2016	3	3	0	0	0	6	65.6
2016-2017	3	3	0	0	0	6	62.9



**APPENDIX IV. RESOURCES**

Table 10. Provide a table showing for the past five years all department resources and the extent to which each is from the state-supported budget or from other sources, such as self-support programs, research, contracts and/or grants, development, fund-raising, or any other sources or activities

**TABLE 10. CEE Department Budget**

<b>Academic Year</b>	<b>CEE Department Budget (M\$)</b>
2012-2013	1.2
2013-2014	1.5
2014-2015	1.9
2015-2016	2.0
2016-2017	1.8

**APPENDIX V. LONG-TERM PLANNING**

None

**APPENDIX VI. FACULTY CURRICULUM VITAE**

Including recent scholarly/creative active and research funding obtained.

**Jeff Kuo, Ph.D., P.E.**  
**Dept. of Civil & Environmental Engineering**  
**California State University**  
**Fullerton, CA 92834**  
(Tel: 657-278-3995, Fax: 657-278-3995, E-mail: [jkuo@fullerton.edu](mailto:jkuo@fullerton.edu))  
<http://faculty.fullerton.edu/jkuo>

**EDUCATION:** Ph.D. Environmental Engineering, Univ. of Southern California  
M.S. Petroleum Engineering, Univ. of Southern California  
M.S. Environmental Engineering, Univ. of Southern California  
M.S. Chemical Engineering, University of Wyoming  
B.S. Chemical Engineering, National Taiwan University

**REGISTRATION:** Professional Civil Engineer in California (C50965)  
Professional Chemical Engineer in California (CH 4487)  
Professional Mechanical Engineer in California (M 29853)

**SUMMARY:**

I have experiences in several engineering disciplines. My industrial experiences in environmental engineering include water and wastewater treatment, design and installation of air strippers, activated carbon adsorbers, flare/catalytic incinerator, bioremediation systems, and soil venting systems for wastewater treatment as well as groundwater/soil remediation; site assessment and fate analysis of toxics in the environment; RI/FS work for landfills and Superfund sites; design of flanged joints to meet the stringent fugitive emission requirements. Areas of researches in environmental engineering include dechlorination of halogenated aromatics by ultrasound, fines/bacteria migration through porous media, biodegradability of bitumen, surface properties of composite mineral oxides, kinetics of activated carbon adsorption, and wastewater filtration, nutrient removal, and disinfection. Recent research areas include methane emission testing for natural gas and crude oil industries, emission reductions of greenhouse gases, using nanoparticles for water/wastewater treatment, nutrient removal in wastewater treatment, membrane biological removal processes, disinfection of reclaimed water, landfill gas recovery and energy generation, and stormwater runoff treatment and management. I also patented a process for separation of heavy crude from tar sands by using ultrasound irradiation.

**WORK EXPERIENCE:**

**California State University, Fullerton (1991-present)**

Coordinator/MS in Environmental Engineering program (2012 to present)

Professor (2004 to present)/Dept. of Civil and Environmental Engineering

Head and Associate professor (2002 - 2003)/Dept. of Civil and Environmental Engineering

Associate professor (1999-2004)/Dept. of Civil & Environmental Engineering

Assistant professor (1995-1999) Dept. of Civil & Environmental Engineering

Lecturer (1991-1995) Dept. of Civil & Environmental Engineering

Courses taught include Statics; Mechanics of Materials; Introduction to Environmental Engineering; Public Transit and Operation Planning; Pharmaceutical Utilities, Safety, and Environment; Wastewater Treatment and Water Reclamation; Remediation of Contaminated Soil and Groundwater; Civil Engineer Professional Practices; Geo-Environmental Engineering; Air Pollution Control and Engineering; Coastal Pollution Engineering; Fate and Transport of Chemicals in the Environment.

**Graduate Institute of Environmental Engineering, National Taiwan University (2008-present)**

Worked as an adjunct professor and as a visiting professor (September 2009 to January 2010).

**Los Angeles County Sanitation Districts (1991-1995)**

Worked in the Wastewater Research Section as a research engineer. Projects included performance evaluation of several tertiary filtration systems, feasibility study of using ultraviolet radiation for wastewater disinfection, evaluation of gravity activated carbon filtration for water reuse, preparation of emission inventory plans and reports for wastewater reclamation plants.

**James M. Montgomery, Consulting Engineers, Inc. (1989-1991)**

Worked in the Applied Research Department as a supervising engineer and the section leader for wastewater and hazardous wastes. Responsibilities included project management, design, technical review, project execution, and supervision of staff engineers. Projects included feasibility studies on groundwater/soil remediation of a landfill site, of a state Superfund site and of two petroleum storage terminals; review of existing soil venting treatment systems of a major oil company and development of a guidance document; and derivation of state-wide emission factors for POTWs in compliance with Air Toxics regulations.

**Dames & Moore (1989-1989)**

Senior engineer/project manager responsible for project management, design of groundwater/soil remediation systems, preparation of RAPs and AB 2588 plans, and conducted RI/FS work for two State Superfund sites.

**Groundwater Technology, Inc. (1987-1989)**

At the Los Angeles branch office, I assumed several roles including District Engineering Manager, Assistant Chairman of the Senior Technical Advisory Team, and Regional Computer Modeling Coordinator. Responsible for project management, design of groundwater and soil remediation systems, design of wastewater treatment systems, site assessment, air and groundwater modeling, fate analysis, permit procurement, and supervision of staff engineers and technicians.

**University of Southern California (1983-1987)**

My research areas and duties as a graduate research assistant included the following:

1. Coordinator of a DOE-sponsored project "Bacterial Transport through Porous Media." Work performed included design and construction of a streaming potential measurement apparatus; investigation of bacterial and rock's surface properties and their effects on bacterial transport; and investigation of effects of surface tensions on fines and bacterial migration in porous media.
2. Research engineer of a project sponsored by Western Extraction Technology: "Using Low Radio Frequency to Extract Bitumen from Tar Sands."
3. Performed feasibility study on biodegradation of raw oil shale, bitumen, and kerogen by *Bacillus brevis*.
4. Conceived the concept, and conducted research on the dechlorination of chlorinated aromatics using ultrasonic irradiation and hydrogen peroxide.

**University of Wyoming (1981-1983)**

As a graduate research assistant, I conducted research for a DOE sponsored project: "Adsorption of Organics from Tar Sand Water by Activated Carbon in Packed Beds." Work performed included determination of adsorption isotherms; column studies of activated carbon adsorption at various flow rates, particle sizes, packing heights, and types of wastewater; and model-fitting of breakthrough curves to determine the adsorption mechanism and associated mass transfer coefficients.

**Su-Chiang Co., Taipei (1980-1981)**

Supervising engineer responsible for technical sales and service of water and wastewater treatment chemicals manufactured by Drew Chemical Corp., New Jersey. The industries serviced included petroleum refineries, paper and pulp industries, fertilizer plants, and electronics manufacturers.

**National Taiwan University (1978-1980)**

Full-time teaching assistant for chemical engineering courses, including unit operations, polymer chemistry, polymer chemistry laboratory, and engineering mathematics.

**Nan Ya Plastics Corp., Taipei (1977-1978)**

Process research engineer responsible for optimization of polyurethane leather production and for performing feasibility study on using ZnO as a stabilizer in PVC floor coverings.

**PUBLICATIONS:**

1. **Kuo, J.**; Dow, J. (2017) "Biogas Production from anaerobic Digestion of Food Waste and Relevant Air Quality Implication", *J. Air & Waste Management Association*, 67(9), 1000-1011. doi: 10.1080/10962247.2017.1316326.
2. **Kuo, J.** (2017) "Disinfection Processes", *Water Environ. Res.* 2016 Literature Review, pp. 1206-1244 (39). doi: 10.2175/106143017X15023776270278
3. Lee, Y.C.; Chen, Y.P.; Chen, M.J.; **Kuo, J.**; Lo, S.L. (2017), "Reductive Defluorination of Perfluorooctanoic Acid by Titanium (III) Citrate with Vitamin B<sub>12</sub> and Copper Nanoparticles", *J. Hazardous Materials*, 340: 336-343.
4. Chen, M.J.; Lo, S.L.; Lee, Y.C.; **Kuo, J.**; Wu, C.H. (2016), "Decomposition of Perfluorooctanoic Acid by Ultraviolet Light Irradiation with Pb-modified Titanium Dioxide", *J. Hazardous Materials*, 303: 111-118. doi:10.1016/j.jhazmat.2015.10.011
5. Munakata, N. and **Kuo, J.** (2016) "Disinfection Processes", *Water Environ. Res.* 2016 Literature Review, pp. 1192-1229. doi:10.2175/106143016X14696400494696
6. Chen, Y.C.; **Kuo, J.** (2016) "Potential of Greenhouse Gas Emissions from Sewage Sludge Management: a Case Study of Taiwan", *J. Cleaner Production*, 129, 196-201. doi: 10.1016/j.jclepro.2016.04.084
7. Lee, Y.C.; Chen, M.J.; Huang, C.P.; **Kuo, J.**; Lo, S.L. (2016) "Efficient Sonochemical Degradation of Perfluorooctanoic Acid Using Periodate", *Ultrason Sonochem*, 31, 499-505. doi:10.1016/j.ultsonch.2016.01.030
8. **Kuo, J.**; Hicks, T.C.; Drake, B.; Chan, T.F. (2015) "Estimation of Methane Emission for California Natural Gas Industry", *J. Air & Waste Management Association* 65(7), 844-55. doi: 10.1080/10962247.2015.1025924
9. Munakata, N. and **Kuo, J.** (2015) "Disinfection Processes", *Water Environ. Res.* 2015 Literature Review, pp. 1127-1146. doi: 10.2175/106143015X14338845155462
10. Lin, J.C.; Lo, S.L.; Hu, C.Y.; Lee, Y.C.; **Kuo, J.** (2015) "Enhanced Sonochemical Degradation of Perfluorooctanoic Acid by Sulfate Ions", *Ultrason Sonochem*, 22, pp.542-547.
11. Chou, Y.C.; Lo, S.L.; **Kuo, J.**; Yueh C.J. (2015) "Microwave-enhanced Persulfate Oxidation to Treat Mature Landfill Leachate", *J. Hazardous Materials*, 284:83-91.
12. Kuo, J. (2015) "Air Quality Issues Related to Using Biogas from Anaerobic Digestion of Food Waste", California Energy Commission, CEC-500-2015-037, March 2015, 73 pages.
13. **Kuo, J.** (2014) "*Practical Design Calculations for Groundwater and Soil Remediation* (2nd edition)", CRC Press.

14. Munakata, N. and **Kuo, J.** (2014) "Disinfection Processes", *Water Environ. Res.* 2014 Literature Review, pp. 1250-1273.
15. Huitric, S.-J.; Munakata, N.; Tang, C.-C.; Ackman, P.; **Kuo, J.**; Ackman, P.; Friess, P. (2014) " Sequential Chlorination for Recycled Water Disinfection: Advantages of Combining Free Chlorine and Chloramines", *Proc. WEFTEC.14 87<sup>th</sup> Annual Technical Exhibition and Conference*, pp. 6852-70.
16. Chen, Y.C.; Lo, S.L.; Li, N.H.; Lee, Y.C.; **Kuo, J.** (2013) "Sorption of Perfluoroalkyl Substance (PFASs) onto to Wetland Soils", *Desalination & Water Treatment*, 51(40-42), pp. 7469-7475.
17. Samra, T. and **Kuo, J.** (2013) Disinfection and Antimicrobial Process, *Water Environ. Res.* 2013 Literature Review, pp. 1262-1282.
18. Lee, Y.C.; Lo, S.L.; **Kuo, J.**; Huang C.P. (2013) "Promoted Degradation of Perfluorooctanic Acid by Persulfate When Adding Activated Carbon", *J. Hazardous Materials*, 261:463-9.
19. Chou, Y.C.; Lo, S.L.; **Kuo, J.**; Yueh, C.J. (2013) "A Study of Microwave Oxidation of Landfill Leachate – Contributions of Microwave-Specific Effects", *J. Hazardous Materials*, 246-247:79-86.
20. Chou, Y.C.; Lo, S.L.; **Kuo, J.**; Yueh, C.J. (2013) "Derivative Mechanisms of Organic Acids in Microwave Oxidation of Landfill Leachate", *J. Hazardous Materials*, 254-255:293-300.
21. Huitric, S.-J.; Tang, C.-C.; Ackman, P.; **Kuo, J.**; Munakata, N.; Friess, P.; Souza, K., Bernard, R. (2013) "Determining Free Chlorine Residual CT Values to Meet California Title 22 5-Log Virus Inactivation Requirements", *Proc. WEFTEC.13 86<sup>th</sup> Annual Technical Exhibition and Conference*, Chicago, IL, Oct. 5-9.
22. **Kuo, J.** (2012) "Estimation of Methane Emissions from the California Natural Gas System", California Energy Commission, CEC- 500-2014-072, February 2012 (129 pages).
23. **Kuo, J.** (2012) "Technological Options for Reducing Non-CO<sub>2</sub> Greenhouse Gases Emissions" in Handbook on Climate Change Mitigation (ed. by W.Y. Chen *et al.*), Springer Science, New York, NY.
24. **Kuo, J.** (2012) "Development and Implementation of Training Sessions on Operational Optimization of Landfills and Landfill Gas Systems in China ", U.S. Environmental Protection Agency, Cooperative Agreement: XA-83498901-0 (255 pages).
25. **Kuo, J.**; Chen, T.F. (2012) "Disinfection and Antimicrobial Process", *Water Environ. Res.* 2012 Literature Review, pp. 1286-1309(24).
26. Lee, Y.C.; Lo, S.L.; **Kuo, J.**; Hsieh, C. (2012) "Decomposition of Perfluorooctanoic Acid by Microwave-activated Persulfate: Effects of Temperature, pH, and Chloride Ions", *Front. Environ. Sci. Eng.*, v. 6(1), p. 17-25.
27. Lee, Y.C.; Lo, S.L.; **Kuo, J.**; Lin, Y. L. (2012) "Persulfate Oxidation of Perfluorooctanoic Acid under the Temperatures of 20-40 °C", *Chem. Eng. J.* v. 198-199, p. 27-32.
28. Lee, Y.C.; Lo, S.L.; **Kuo, J.**; Tsai C.C. (2012) "Beneficial Uses of Sludge from Water Purification Plants in Concrete Mix", *Environ. Eng. Sci.*, v. 29(4), p. 284-289.
29. Chen, Y. C.; Lo, S.L.; **Kuo, J.** (2011) "Effects of Titanate Nanotubes Synthesized by a Microwave Hydrothermal Method on Photocatalytic Decomposition of Perfluorooctanoic Acid", *Water Research*, v. 45(14), p. 4134-4140.
30. Tang, C.-C.; Munakata, N., Huitric, S.-J.; Garcia, A.; Thompson, S.; **Kuo, J.** (2011) "Combining UV and Chlorination for Recycled Water Disinfection", WateReuse Foundation, Contract No. WRF06-015 (199 pages), ISBN-13: 978-1-934183-34-2, ISBN: 1-934183-34-2.
31. **Kuo, J.**; Hicks, T. (2011) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 83(10), pp. 1333-1350.

32. Tsai, H.C.; Lo, S.L.; **Kuo, J.** (2011) "Using Pretreated Waste Oyster and Clam Shells and Microwave Hydrothermal Treatment to Recover Boron from Concentrated Wastewater", *Bioresource Technology*, v. 102(17), p. 7802-7806.
33. **Kuo, J.**; Hicks, T. (2011) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 83(10), pp. 1333-1350.
34. Munakata, N.; Huitric, S.J.; Tang, C.C.; **Kuo, J.**; Ackman, P.; Friess, P.L. (2011) "Evaluating Free Chlorine Disinfection of Viruses in Recycled Water: Effects of Free Chlorine CT, Dose, Residual, and Contact Time", *WEFTEC Disinfection 2011*, pp. 147-156.
35. Ling, M.; **Kuo, J.** (2011) "Application of Statistics in the Evaluation of Environmental Sampling Plan" in *Practical Applications of Environmental and Data Analysis* (ed. by Y. Rong), ILM Publications, UK.
36. Chen, Y.C.; Lo, S.L.; **Kuo, J.** (2010) "Pb(II) Adsorption Capacity and Behavior of Titanate Nanotubes Made by Microwave Hydrothermal Method", *Colloids & Surface A: Physicochem. Eng. Aspects*, 361, p. 126-131.
37. Huang, H.F.; Lo, S.L.; **Kuo, J.** (2010) "Review of PSR Framework and Development of a DPSIR Model to Assess Greenhouse Effect in Taiwan", *Environmental Monitoring and Assessment*, v. 177(1-4), p. 623-635.
38. **Kuo, J.** (2010) "Advance Methane Recovery and Use as a Clean Energy Source at Landfills in China", U.S. Environmental Protection Agency, Cooperative Agreement: XA-83444201-0.
39. Huitric, S.-J.; Tang, C.-C.; Munakata, N.; **Kuo, J.**; Ackman, P.; Friess, P.; Maguin, S.R. (2010) "Pilot-scale Demonstration of Virus Inactivation by the Sequential Chlorination Process", *Proc. WEFTEC.10 83<sup>rd</sup> Annual Technical Exhibition and Conference*, New Orleans, LA, Oct. 2-6.
40. Munakata, N.; Tang, C.-C.; **Kuo, J.**; Huitric, S.-J.; Ackman, P.; Garcia, A.; Thompson, S.; Friess, P.; Maguin, S.R. (2010) "Combining UV and Free Chlorine in Pilot-Scale Experiments: Disinfection Efficacy, Byproducts, and Trace Organic Constituents", *Proc. WateReuse Research Conference*, Tampa, FL, May 24-25.
41. Vu, D.; **Kuo, J.** (2010) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 82(10), pp. 1288-1310.
42. Maguin, S.R., Friess, P.L.; Huitric, S.-J.; Tang, C.-C.; **Kuo, J.**; Munakata, N. (2009) "Sequential Chlorination: A New Approach for Disinfection of Recycled Water", *Environmental Engineer: Applied Research and Practice*, 9(4), pp. 29-38.
43. Munakata, N.; Tang, C.-C.; Huitric, S.-J.; **Kuo, J.**; Garcia, A.; Ackman, P.; Friess, P.; Maguin, S.R. (2009) "Combining UV and Free Chlorine in Pilot-scale Experiments: Disinfection Efficiency, Byproducts, and Microconstituents", *Proc. WEFTEC.09 82<sup>nd</sup> Annual Technical Exhibition and Conference*, Orlando, FL, Oct. 10-14.
44. **Kuo, J.** (2009) "Technological Options for Reducing Non-CO<sub>2</sub> Greenhouse Gases Emissions", *Proc. The 15<sup>th</sup> International Joint Seminar on the Regional Deposition Processes in the Atmosphere (RDPA) and Climate Change in 2009*, October 12 – 14, Taipei, Taiwan.
45. **Kuo, J.**; Abustan, L. (2009) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 81(10), p. 1361-1375.
46. **Kuo, J.**; Kanada, M.; Vongphachanh, B.; Sluga, D.; Cook, D. (2009) "A Pilot-plant Study to Evaluate Microbial Inactivation Efficiency of Smart-Sponge®", *Proc. 3<sup>rd</sup> IWA-Aspire Conference*, Taipei, Taiwan, Oct. 18 – 22.
47. Munakata, N.; Tang, C.-C.; Huitric, S.-J.; Ackman, P.; **Kuo, J.**; Garcia, A.; Thompson, S.; Friess, P.; Maguin, S.R. (2009) "Comparing Free Chlorine and Chloramines in Combination with UV for the Disinfection of Wastewater Effluents and Reclaimed Water", *Proc. Disinfection 2009*, Atlanta, GA, Feb. 28 – March 3.



48. **Kuo, J.** (2008) "Clearinghouse of Technological Options for Reducing Anthropogenic Non-CO<sub>2</sub> Greenhouse Gases Emissions from All Sectors", State of California Air Resources Board, Contract No. CARB 05-328 (384 pages) <http://www.arb.ca.gov/cc/non-co2-clearinghouse/non-co2-clearinghouse.htm>.
49. **Kuo, J.** (2008) "Energy Recovery and Emission Reduction of Landfill as in China", United States Environmental Protection Agency, Contract No. XA-83362001 (191 pages).
50. Leong, L.; **Kuo, J.**; Tang, C.-C. (2008) "Disinfection of Wastewater Effluent – Comparison of Alternative Technologies", Water Environment Federation, Contract No. 04-HHE-4, Alexandria, VA (332 pages), ISBN-13: 978-1-84339-799-1, ISBN: 1-84339-799-4.
51. **Kuo, J.**; Nguyen, D. (2008) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 80(10), p. 1225-1240.
52. Mansell, B.; Huitric, S.-J.; Munakata, N.; **Kuo, J.**; Tang, C.-C.; Ackman, P.; Friess, P. L.; Selna, M. W. (2008) "Disinfection of Membrane Bioreactor Permeate Using Free Chlorine: Virus Inactivation and Disinfection Byproduct Formation", *Proc. WEFTEC.08 81<sup>st</sup> Annual Technical Exhibition and Conference*, Chicago, IL, Oct. 18-22.
53. Huitric, S.-J.; Munakata, N.; Tang, C.-C.; **Kuo, J.**; Ackman, P.; Thompson, S.; Friess, P.; Maguin, S.R. (2008) "Inactivation of Microbial Indicators by the Sequential Chlorination Process", *Proc. WEFTEC.08 81<sup>st</sup> Annual Technical Exhibition and Conference*, Chicago, IL, Oct. 18-22.
54. Munakata, N.; Tang, C.-C.; Huitric, S.-J.; **Kuo, J.**; Ackman, P.; Garcia, A.; Thompson, S.; Friess, P. (2008) "Combining UV and Chlorine for Disinfection of Wastewater Effluents and Reclaimed Water", *Proc. WEFTEC.08 81<sup>st</sup> Annual Technical Exhibition and Conference*, Chicago, IL, Oct. 18-22.
55. Tang, C.-C.; **Kuo, J.**; Weiss, J.S. (2007) "Maximum Nitrogen Removal in the Step-feed Activated Sludge Process", *Water Environ. Res.* V. 79 (4), p. 367-374.
56. **Kuo, J.**; Kanada, M. (2007) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 79(10), p. 1474-1495.
57. **Kuo, J.**; Tang, C.-C.; Huitric, S.-J. (2007) "Evaluation of Alternatives for Reclaimed Water Disinfection", *Proc. 11<sup>th</sup> Mainland Taiwan Environmental Protection Conference*, Harbin, China, June 8-12.
58. Ganesh, R.; Liu, B., Leong, L.Y.C.; **Kuo, J.**; Jain, M. (2007) "Removal of Organic and Inorganic Contaminants from Water Using Ferric Oxide Nanoparticles", *J. Nature Science & Sustainable Technology*, V. 1(4).
59. Huitric, S.-J.; Tang, C.-C.; **Kuo, J.**; Creel, M.; Snyder, D.; Ackman, P.; Horvath, R. (2007) "Sequential Chlorination for Reclaimed Water Disinfection", *Proc. WEFTEC.07 80<sup>th</sup> Annual Technical Exhibition and Conference*, San Diego, CA, Oct. 13-17, p. 2552-2564.
60. Mansell, B.; Huitric, S.-J.; Tang, C.-C.; Ackman, P.; Munakata, N.; **Kuo, J.**; Horvath, R. (2007) "Chlorination Disinfection Requirements for Membrane Bioreactor Permeate", *Proc. WEFTEC.07 80<sup>th</sup> Annual Technical Exhibition and Conference*, San Diego, CA, Oct. 13-17, p. 2518-2531.
61. Munakata, N.; **Kuo, J.**; Tang, C.-C.; Horvath, R.; L.Y.C. Leong (2007) "Results of a National Survey of POTWs Using UV Disinfection", *Proc. WEFTEC.07 80<sup>th</sup> Annual Technical Exhibition and Conference*, San Diego, CA, Oct. 13-17, p. 9030-9032.
62. Munakata, N.; Tang, C.-C.; Huitric, S.-J.; **Kuo, J.**; Ackman, P.; Thompson, S. (2007) "Alternatives for Disinfection of Reclaimed Water: Comparison of Disinfection Efficacy and Byproduct Formation", *Proc. 22<sup>nd</sup> Annual WateReuse Symposium*, Tampa, FL, Sep. 9-12.

63. Huitric, S.-J.; **Kuo, J.**; Creel, M.; Tang, C.-C.; Snyder, D.; Horvath, R. (2006) "Reclaimed Water Disinfection Alternatives to Avoid NDMA and THM Formation", *Proc. WEFTEC.06 79<sup>th</sup> Annual Technical Exhibition and Conference*, Dallas, TX, Oct. 21-25, p. 4397-4412.
64. Tang, C.-C.; **Kuo, J.**; Huitric, S.-J.; Jalali, Y.; Horvath, R.W.; Stahl, J.F. (2006) "UV Systems for Reclaimed Water Disinfection - From Equipment Validation to Operation", *Proc. WEFTEC.06 79<sup>th</sup> Annual Technical Exhibition and Conference*, Dallas, TX, Oct. 21-25, p. 2930-2943.
65. **Kuo, J.**; Chen, J. (2006) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 78(10), p. 1406-1428.
66. Tang, C.-C.; Huitric, S.-J.; **Kuo, J.**; Horvath, R.W.; Stahl, J.F. (2006) "Disinfection Alternatives to Avoid NDMA Formation", *Wastewater Professional*, V. 42(3), p. 14-23.
67. Mansell, B.; **Kuo, J.**; Tang, C.-C.; Huitric, S.-J.; Horvath, R.W.; Stahl, J.F. (2005) "Evaluation of Removals of NDMA, Hormones, Pharmaceuticals, and Personal Care Products in a Membrane Bioreactor", *Proc. WEFTEC.05 78<sup>th</sup> Annual Technical Exhibition and Conference*, Washington, D.C., Oct. 29-Nov. 2, p. 7411-7427.
68. Jalali, Y.; Huitric, S.-J.; **Kuo, J.**; Tang, C.-C.; Garcia, A.; Thompson, S.; Horvath, R.W.; Stahl, J.F. (2005) "A Large-scale UV Pilot-plant Study: Tertiary Effluent Disinfection and Effect on NDMA and Cyanide", *Proc. WEFTEC.05 78<sup>th</sup> Annual Technical Exhibition and Conference*, Washington, D.C., Oct. 29-Nov. 2, p. 1512-1530.
69. Huitric, S.-J.; **Kuo, J.**; Tang, C.-C.; Creel, M.; Horvath, R.W.; Stahl, J.F. (2005) "Fate of NDMA in Tertiary Water Reclamation Plants", *Proc. WEF Technology 2005 Sustainable Management of Water Quality Systems for the 21<sup>st</sup> Century*, San Francisco, CA, August 28-31.
70. Jalali, Y.; Huitric, S.-J.; **Kuo, J.**; Tang, C.-C.; Garcia, A.; Thompson, S.; Horvath, R.W.; Stahl, J.F. (2005) "A Large-scale UV Pilot-plant Study: Tertiary Effluent Disinfection and Effect on NDMA and Cyanide", *Proc. WEF Technology 2005 Sustainable Management of Water Quality Systems for the 21<sup>st</sup> Century*, San Francisco, CA, August 28-31.
71. **Kuo, J.**; Gallucci, J.L. (2005) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 77(6), p. 1425 -1463.
72. **Kuo, J.**; Chen, C.; Nellor, M. (2005) "Closure to Discussion of: A Standardized Collimated Beam Testing Protocol for Water/Wastewater Ultraviolet Disinfection", *ASCE J. Environ. Eng.* V. 131(5), 828-9.
73. Jalali, Y.; Huitric, S.-J.; **Kuo, J.**; Tang, C.-C.; Nellor, M. H.; Thompson, S.; Garcia, A.; Horvath, R. W.; Stahl, J.F. (2005) "Effect of Ultraviolet (UV) Disinfection on the Fate of NDMA and Cyanide", *Proc. WateReuse 2005 Conference*, California Section, San Diego, California, February 27- March 1.
74. Jalali, Y.; Huitric, S.; **Kuo, J.**; Tang, C.-C.; Thompson, S.; Nellor, M.H.; Horvath, R.W.; Stahl, J.F. (2005) "UV Pilot-Plant Disinfection of Tertiary Effluent and Effect on NDMA and Cyanide", *Proc. 20<sup>th</sup> Annual WateReuse Symposium*, Denver, CO.
75. **Kuo, J.**; Pham, P. (2004) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 76(5), p. 1238-1265.
76. Mansell, B.; **Kuo, J.**; Tang, C.; Thompson, S.; Jackson, J.; Garcia, A.; Gabrielian, E.; Horvath, R.; Stahl, J. (2004) "Comparison of Two Membrane Bioreactors and an Activated Sludge Plant with Dual-Media Filtration: Nutrient and Priority Pollutants Removals", *Proc. WEFTEC 2004 (in CD-Rom)*, Water Environment Federation, October 2-6, New Orleans, Louisiana.
77. Tang, C.; **Kuo, J.**; Weiss, J.; Rademacher, K.; Horvath, R.; Stahl, J. (2004) "Maximum Nitrogen Removal in the Step-feed Activated Sludge Process", *Proc. WEFTEC 2004 (in CD-Rom)*, Water Environment Federation, October 2-6, New Orleans, Louisiana.

78. Tang, C.; Prestia, P.; Kettle, R.; Chu, D.; Mansell, B.; **Kuo, J.**; Rademacher, K.; Horvath, R.; Stahl, J. (2004) "Start-up of a Nitrification/Denitrification Activated Sludge Process with a High ammonia Side-Stream: Challenges and Solutions", *Proc. WEFTEC 2004 (in CD-Rom)*, Water Environment Federation, October 2-6, New Orleans, Louisiana.
79. **Kuo, J.** (2004) "Discussion of: Odor and Volatile Organic Compound Treatment by Biotrickling Filters: Pilot-Scale Studies at Hyperion Treatment Plant", *Water Environ. Res.* V. 76(3), p. 280-1.
80. **Kuo, J.**; Korprasertsud, S.; Leong, L. (2004) "Disinfection Byproduct Precursor Removal Using Manganese-Oxide-Coated Media", *Proc. World Water & Environmental Resources Congress 2004, ASCE*, June 27-July 1, Salt Lake city, Utah.
81. **Kuo, J.**; Chen, C.; Nellor, M. (2003) "A Standardized Collimated Beam Testing Protocol for Water/Wastewater Ultraviolet Disinfection", *ASCE J. Environ. Eng.* V. 129(8), p. 774-9.
82. Thompson, S.S.; Jackson, J.L.; Suva-Castillo, M.; Yanko, W.A.; El Jack, Z.; **Kuo, J.F.**; Chen, C.; Williams, E.P. (2003) "Detection of Infectious Adenovirus in Tertiary Treated and UV Disinfected Wastewater During a UV Disinfection Pilot Study", *Water Environ. Res.* V. 75(2), p. 163-170.
83. **Kuo, J.**; Woo, B.L. (2003) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 75, No. 5 (in CD-Rom).
84. **Kuo, J.**; Stahl, J.; Burton, D.; El Jack, Z.; Horvath, R.; Tang, C. (2003) "Chloramination of N/DN Effluent - Meeting the Ammonia, Coliform And THM Limits ", *Proc. WEFTEC 2003 (in CD-Rom)*, Water Environment Federation, October 11-15, Los Angeles Convention Center, CA.
85. **Kuo, J.**; Paull, J. (2002) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 74, No. 5 (in CD-Rom).
86. **Kuo, J. F.**; Valderrama, E. (2001) "Disinfection and Antimicrobial Process", *Water Environ. Res.* V. 73, No. 5 (in CD-Rom).
87. Wang, M.; **Kuo, J.F.** (2000) "VOC Emissions from Landfills - A Systematic Analysis of Nine Landfills in Southern California", *Proc. Waste Tech 2000*, March 5-8, Orlando, FL.
88. Thompson, S.S.; Jackson, J.L.; Suva-Castillo, M.; Yanko, W.A.; El Jack, Z.; **Kuo, J.F.**; Chen, C.; Williams, E.P. (2000) "Detection of Infectious Adenovirus in Tertiary Treated and UV Disinfected Wastewater During a UV Disinfection Pilot Study", *Proc. WEFTEC 2000 (in CD-Rom)*, Water Environment Federation, October 12-16, Anaheim, CA.
89. El Jack, Z.; Chen, C.; **Kuo, J.F.**; Horvath, R.W.; Stahl, J.F. (2000) "UV Disinfection Pilot Testing at the Pomona Water Reclamation Plant", *Proc. CWEA 2000*, California Water Environment Federation, April, Sacramento, CA.
90. **Kuo, J.F.**; Patil, N. (2000) "Disinfection and Antimicrobial Processes", *Water Environ. Res.* V. 72, (in CD-Rom).
91. Chen, C.; El Jack, Z.; Horvath, W; Stahl, J.F.; **Kuo, J.F.** (2000) "Disinfection Using Low-Pressure High-Intensity UV Lamps for Water Reclamation", *Proc. Disinfection 2000: Disinfection of Wastes in the New Millennium (in CD-Rom)*, Water Environment Federation, March 15-18, New Orleans, LA.
92. **Kuo, J.F.**; Vitko, G. T. (1999) "Chapter 8 - Final Closure" in *Hazardous Waste Site Remediation Management*, ISBN 1-57278-145-9, Water Environment Federation, Alexandria, VA, p.175-191.
93. **Kuo, J.F.**; Yamashita, L. (1999) "Disinfection and Antimicrobial Processes", *Water Environ. Res.* V. 71(5), p. 685-692.
94. Chen, C.; El Jack, Z.; Horvath, W; Stahl, J.F.; **Kuo, J.F.** (1999) "Ultraviolet Disinfection of Tertiary Filter Effluent Using Low-Pressure High-Intensity Lamps", *Proc. 1999 Energy Efficiency Forum*, Water World and EPRI, August 29-31, San Diego, CA.
95. Vernon, K.; **Kuo, J.F.** (1999) "Ecological Risk Assessment: Seal Beach, California", *Proc. 1999 ASCE-CSCE Conference on Environmental Engineering*, July 25-28, Norfolk, Virginia.

96. **Kuo, J.F.** (1999) "Practical Design Calculations for Groundwater and Soil Remediation", ISBN 1-56670-238-0, CRC Press/Lewis Publisher, NY, NY.
97. Leong, L.Y.C.; **Kuo, J.F.** (1998) "Chloroform and Bromoform Formation from Synthetic Softening Resins", *Proc. 1998 Distribution System Symposium*, American Water Works Association, September 20-23, Austin, TX.
98. Chen, C.L.; **Kuo, J.F.**; Stahl, J.F. (1998) "The Role of Filtration for Wastewater Reuse", *Wastewater Reclamation and Reuse (ed. by T. Asano)*, ISBN 1-56676-620-6, Technomic Publishing, Lancaster, PA, p. 219-262.
99. **Kuo, J.F.**; Ramirez, C. (1998) "Disinfection and Antimicrobial Processes", *Water Environ. Res.* V. 70(4), p. 551-557.
100. **Kuo, J.F.**; Stahl, J.F.; Chen, C.L.; and Bohler, P.V. (1998) "Dual-Role of Activated Carbon Process for Water Reuse", *Water Environ. Res.* V. 70(2), p. 161-170.
101. **Kuo, J.F.**; Miskell, C. (1998) "Insights of the New PVRC Gasket Constants", *Proc. 1998 Technical Symposium of the Fluid Sealing Association - Global Sealing Challenges of the 21<sup>st</sup> Century*, April 26-28, Sheraton Music City, Nashville, TN.
102. **Kuo, J.F.**; Miskell, C. (1998) "Understanding the Link Between Gasket Tightness and Fugitive Emission Leak Definition", *Proc. National Manufacturing Week Conference '98 - Preparing Industry for the 21<sup>st</sup> Century*, March 16-19, McCormick Place, Chicago, IL.
103. **Kuo, J.F.**; J. Chen; Miskell, C. (1997) "Selection of Gasket Tightness to Meet Fugitive Emission Leak Definitions", *Proc. Emission Inventory: Planning for the Future*, Air & Waste Management Association, October 28-30, Research Triangle Park, NC.
104. Awad, J.; **Kuo, J.F.** (1997) "Control Guidelines for UV Disinfection Facilities" (1997), *Topics of Current Issues, WEFTEC' 97*, Water Environ. Fed. 70th Annual Conf., Chicago, IL, Oct. 18-22, 5, p.783-787.
105. **Kuo, J.F.**; Dodd, K.; Chen, C.; Horvath, R.; and Stahl, J.F. (1997) "Evaluation of Tertiary Filtration and Disinfection systems for Upgrading High-Purity Oxygen-Activated Sludge Plant Effluent", *Water Environ. Res.* V. 69(1), p. 34-43.
106. **Kuo, J.F.**; Mou, L. "Disinfection and Antimicrobial Processes" (1997), *Water Environ. Res.* V. 69(4), p. 526-534.
107. **Kuo, J.F.**; Chen, C. "Ultraviolet Disinfection for Water Reuses" (1997), *Proc. 1997 International Chinese Sustainable Development Conference*, Los Angeles, CA., July 4-5.
108. Ghazanshahi, S.; **Kuo, J.F.** (1997) "Shaping Engineering Education for High-Technology Industries", A Monograph of the Inter-Americas High-Technology Partnership Project, California State University at Fullerton and World Trade Center Association of Orange County.
109. Chen, J.; **Kuo, J.F.**; Miskell, C. (1996) "A Link Between Gasket Tightness and Fugitive Emission Leak Definition", *Proc. FSA 6th Annual Technical Symposium and Exhibit - Facing The Fluid Sealing Challenges of the 90's*, Houston, TX, October 6-8.
110. **Kuo, J.F.**; Smith, S. (1996) "Disinfection", *Water Environ. Res.* V. 67(2), p. 503-510.
111. Awad, H.; **Kuo, J.F.**; Awad, J. (1996) "Design Guidelines for UV Disinfection Facilities", *ASCE North American Water & Environmental Congress*, Anaheim, CA., June 22-28 (in CD-ROM format).
112. **Kuo, J.F.**; Chen, C. (1995) "Discussion of Treatment of Organically Contaminated Groundwaters in Municipal Activated Sludge Systems", *Water Environ. Res.* V. 67(2), p. 249-50.
113. **Kuo, J.F.**; Dodd, K.; Chen, C.; Horvath, R.; Stahl, J. (1995) "Evaluation of Tertiary Treatment Alternatives for Pure-oxygen Activated Sludge Effluent", *Topics of Current Interest*, Water Environ. Fed. 68th Conf., Miami Beach, Florida, Oct. 21-25, p. 119-130.

114. **Kuo, J.F.**; Chen, C.; Stahl, J.; Horvath, R. (1994) "Evaluation of Four Different Tertiary Filtration Plants for Turbidity Control", *Water Environ. Res.* V. 66(7), p.879-86.
115. **Kuo, J.F.**; Hashman, T. (1994) "Discussion of Estimation of the Removal of Organic Priority Pollutants by the Powdered Activated Carbon Treatment Process", *Water Environ. Res.* V. 66(1), p. 89-91.
116. Chen, C.; Nur, R.; Stahl, J.; Horvath, R.; **Kuo, J.F.** (1993) "UV Inactivation of Bacteria and Viruses in Tertiary Effluent", *Proc. Effluent Disinfection Systems*, Water Environ. Fed. Specialty Conf., Whippany, New Jersey, May. 23-25, p. 61-72.
117. **Kuo, J. F.** (1993) "Discussion of Model for Predicting PCE Desorption from Contaminated Soils", *Water Environ. Res.* V. 65(1), p. 85-87.
118. **Kuo, J.F.**; Chen, C.; Stahl, J.; Horvath, R. (1993) "Evaluation of Four Different Tertiary Filtration Plants for Turbidity Control", *Proc. Liq. Treatment Symposia*, Water Environ. Fed. 65th Conf., New Orleans, Sep. 20-24, p. 429-440.
119. Leong, L.; Regan, M.; **Kuo, J.F.**; Wong, E. (1992) "An Overview of the Pooled Emission Estimation Program for POTWs", *Environmental Progress*, V. 11(4), p. 278-287.
120. Sadeghi, K.M.; Sadeghi, M.A.; **Kuo, J. F.**; Jang, L.K.; Lin, J.R.; Yen, T.F. (1992) "A New Process for Tar Sand Recovery", *Chem. Eng. Comm.* Vol. 117, p. 191-203.
121. **Kuo, J. F.**; Yang, P. (1991) "A Three-Dimensional Soil Venting Model and Its Applications", ACS Symposium Series No. 468, *Emerging Technologies for Hazardous Waste Treatment II* (ed. by D.W. Tedder & F. G. Pohland), p. 382-400.
122. Leong, L.; **Kuo, J. F.**; Regan, M.; Wong, E. (1991) "A Pooled Emission Estimation Program for Wastewater Treatment Facilities", Paper No. 91-105.13, Air & Waste Management 84th Annual Meeting, Vancouver, BC, June 16-21.
123. "Treatment of Carbonaceous Materials," U.S. Patent No. 5, 017,281 issued on May 21, 1991; Canadian Patent No. 1,283,879 issued on May 7, 1991.
124. "A Two-Dimensional Model for Estimating Radius of Influence of a Soil Venting Process" (1990), *Proc. Hazmacon 90*, Anaheim, CA, April 17-19.
125. "Sonication Method and Reagent for Treatment of Carbonaceous Materials," U.S. Patent No. 4,891,131 issued on January 2, 1990.
126. "Geology Related to Microbial Enhanced Oil Recovery" (1990) in *Microbial Enhanced Oil Recovery: Principal and Practice* (ed. by T. F. Yen), p. 29-39, CRC Press, Boca Raton, FL.
127. "Chemistry in Microbial Enhanced Oil Recovery" (1990) in *Microbial Enhanced Oil Recovery: Principal and Practice* (ed. by T. F. Yen), p. 41-56, CRC Press, Boca Raton, FL.
128. "Fluid Mechanics in Microbial Enhanced Oil Recovery" (1990) in *Microbial Enhanced Oil Recovery: Principal and Practice* (ed. by T. F. Yen), p. 73-84, CRC Press, Boca Raton, FL.
129. "Bioengineering Approaches for Microbial Enhanced Oil Recovery" (1990) in *Microbial Enhanced Oil Recovery: Principal and Practice* (ed. by T. F. Yen), p. 111-8, CRC Press, Boca Raton, FL.
130. "Chemical Engineering Problems of Enhanced Oil Recovery" (1990) in *Microbial Enhanced Oil Recovery: Principal and Practice* (ed. by T. F. Yen), p. 119-33, CRC Press, Boca Raton, FL.
131. "A New Tar Sand Recovery Process: Recovery Methods and Characterization of Products" (1990), *Energy Sources*, 12(2), p. 147-60.
132. "Discussions of Monograph for Air Stripping of VOC from Water" (1988), *J. Environ. Eng. ASCE*, V. 114, No. 5, p. 1248-50.
133. "A Closed-Loop Air Stripping System for Groundwater Remediation" (1988), *Proc. Hazmacon 88* p. 694-701, Anaheim, CA, April 5-7.

134. "Electrokinetic Behavior of a Porous Composite Oxide Matrix" (1988), *J. Colloid & Interface Sci.* V. 126, No. 2, p. 537-46.
135. "Treatment of Carbonaceous Materials", U.S. Patent No. 4,765,885 issued on August 23, 1988.
136. "Surface Tension Effects on Bacterial Transport through Porous Media" (1988) in *Interfacial Phenomena in Biotechnology and Materials Processing* (ed. by Y.A. Attia, B.M. Moudgill, and Chander), p. 17-26, Elsevier Science Publishers, Amsterdam.
137. "Some Aspects in Predicting the Point of Zero Charge of a Composite Oxide System" (1988), *J. Colloid & Interface Sci.* V. 121, No. 1, p. 220-5.
138. "Note on Hydrocarbon: 2. Naphthenic Hydrocarbons" (1987), *Energy Sources* V. 9, p. 125-32.
139. "Interfacial Electrochemical Properties of Composite Oxides in Aqueous Solution" (1987), Ph.D. Dissertation, University of Southern California.
140. "Further Investigation of the Surface Charge Properties of Oxide Surface in Oil Bearing Sand and Sandstones" (1987), *J. Colloid & Interface Sci.* V. 121, No. 1, p. 220-5.
141. "Enhancement of Bitumen Separation from Tar Sand by Radicals in Ultrasonic Irradiation" (1986), *Appl. Phy. Comm.* V. 6(2), p. 205-12.
142. "Streaming Potential measurements on Mixed Oxide Systems" (1986), *Proc. ACS 21st IECEC* V. 3, p. 251-6, San Diego, CA, August 25-29.
143. "A New Extraction Technology for Tar Sand Production" (1985), *Proc. 3rd International Conf. On Heavy Crude and Tar Sands*, p. 739-47, Long Beach, CA.
144. Kuo, J.F., Pedram, E.O., Hines, A.L., McTernan, W.F. (1984) "Kinetics of Adsorption of Organics from Water Produced from a Steamflood Experiment in a Utah Tar Sand", AIChE 1984 National Meeting, 63E, May 20-23, Anaheim, CA.
145. Kuo, J.F. (1983) "Kinetics of Adsorption of Organics from Tar Sand Water by Activated Carbon", M.S. Thesis, University of Wyoming.

#### **MEMBERSHIP/PROFESSIONAL ORGANIZATIONS**

1. Water Environment Federation (WEF)
2. Technical Advisory Committee (Civil Engineering), Board for Professional Engineers and Surveyors, State of California (2000-2004)
3. Air Quality Impacts Committee/WEF (1996-2000)
4. Literature Review Committee/WEF (1996-present)
5. Task Force on Hazardous Waste Site Remediation Management/WEF (1997-1999)
6. Gasket Committee/American Standard and Testing Materials (1996-1998)

#### **AWARDS**

1. Carol Barnes Excellence in Outstanding Teaching Award, CSUF (2009 - 2010)
2. CSUF Outstanding Faculty/Scholar (2010)
3. Distinguished Faculty, College of Engineering and Computer Science, CSUF (2006)
4. Professor of the Year (2006 –2007), ASCE Chapter, CSUF
5. Professor of the Year (2003-04) of the MESA Engineering Program, CSUF
6. CSUF Outstanding Faculty/Scholar (2007)
7. CSUF Outstanding Faculty/Service (2006)
8. CSUF Outstanding Teacher/Scholar (2005)
9. CSUF Outstanding Teacher/Scholar (2002)

10. CSUF Outstanding Teacher/Scholar (2001)

#### **RECENT EXTERNALLY-FUNDED RESEARCH PROJECTS**

1. *Air Quality Issues Related to Using Biogas from Anaerobic Digestion of Food Waste* – California Energy Commission (Principal Investigator), 2012 – 2015, \$164,201.
2. *Estimation of Methane Emissions from the California Natural Gas System* – California Energy Commission (Principal Investigator), 2009 – 2012, \$600,000.
3. *Development and Implementation of Training Sessions on Operational Optimization of Landfills and Landfill Gas Systems in China* – U.S. Environmental Protection Agency (Principal Investigator), 2011 – 2012, \$100,000.
4. *Mercury Removal by Nanoparticles* – Kennedy/Jenks Consultant (Principal Investigator), 2011 – 2012, \$8,000.
5. *Methane Emissions from the California Crude Oil Operations* – California Air Resources Board (Principal Investigator), 2009 – 2010, \$50,000.
6. *Advance Methane Recovery and Use as a Clean Energy Source at Landfills in China* – U.S. Environmental Protection Agency (Principal Investigator), 2009 – 2010, \$98,500.
7. *Clearinghouse of Technological Options for Reducing Non-CO<sub>2</sub> Greenhouse Gas* - California Air Resources Board (Principal Investigator), 2006 – 2008, \$50,000.
8. *Energy Recovery and Emission Reduction of Landfill Gas in China* – U.S. Environmental Protection Agency (Principal Investigator), 2007 – 2008, \$95,000.
9. *Removal of Pathogens from Stormwater Runoff Using Smart-Sponge<sup>®</sup> Media* – AbTech Pacific (Principal Investigator)
10. *Evaluation of Disinfection Technologies for Wastewater Treatment* - Water Environment Research Foundation (Co-Principal Investigator)
11. *Removal of Organics in Water by Using Nanoparticles* - Kennedy/Jenks Consultants
12. *Removal of Heavy Metals in Water by Using Nanoparticles* - Kennedy/Jenks Consultants
13. *Reduce THM Formation Potentials by Using Metal Oxides* - Castaic Lake Water Agency

**SUDARSHAN KURWADKAR, Ph.D., P.E., BCEE**

Department of Civil and Environmental Engineering

800 N. State College Blvd. Fullerton, CA 92831

Email: [skurwadkar@fullerton.edu](mailto:skurwadkar@fullerton.edu)

Phone: 657-278-2457; Fax: 657-278-3916

Website: <http://www.ecs.fullerton.edu/~skurwad/>

---

**EDUCATION**

Ph.D. (Civil Engineering with Environmental Engineering emphasis), *Missouri University of Science & Technology, Rolla (Formerly University of Missouri – Rolla)*, 2005: **GPA-3.8**

Doctoral Dissertation Committee: Dr. Craig Adams (*Advisor*), Dr. Glenn Morrison, Dr. Mike Meyers, Dr. Cesar Mendoza, Dr. Joel Burken, Dr. Jeffrey Cawlfeld

Dissertation: *Transport of Selected Sulfonamides and other Antimicrobials in Three Loamy Soils*

MS (Rock Mechanics), *Indian Institute of Technology, New Delhi, 1997*

MS (Construction and Management), *Government College of Engineering, Pune, 1996*

BS (Civil Engineering), *Government College of Engineering, Amravati 1994*

**ACADEMIC POSITIONS**

Associate Professor, Department of Civil and Environmental Engineering, California State University, Fullerton, CA (2017- Present)

Research focus: Fate and transport of emerging contaminants. I am particularly interested in studying the persistence and mobility of pharmaceuticals, explosives and neonicotinoid class of insecticides in the aqueous and terrestrial environment. My research includes persistence of organic pollutants under abiotic degradation mechanisms, sub-surface mobility, and mathematical modeling.

Assistant Professor, Department of Civil and Environmental Engineering, California State University, Fullerton, CA (2014- 2017)

Taught various environmental engineering courses at undergraduate and graduate level. Developed environmental engineering laboratory with a focus on advanced analytical instruments such as High-Performance Liquid Chromatography and reactor based modeling. Developed stand-alone water quality experimental modules with both field and laboratory capabilities. Supervised graduate thesis and doctoral dissertation.

Assistant Professor, Department of Engineering and Physics, Tarleton State University, Stephenville, TX (2009-2014)

Taught general engineering, civil and environmental engineering classes at the undergraduate level. Organized various field trips for an on-site demonstration of real-world examples in the field of environmental engineering. Prepared ABET accreditation report for the environmental engineering program. Served on the Engineering Program Oversight Committee. Conducted research on water quality issues in the Bosque River Watershed and screening and prioritization of impaired watershed. Ranking and prioritizing of the watershed regarding restoration.



Lecturer, Directorate of Training and Technical Education (1998-2001)

Taught courses in public health engineering and environmental engineering

### **NON-ACADEMIC POSITIONS**

Environmental Engineer, Division of Environmental Quality, Missouri Department of Natural Resources, Jefferson City, MO (2006-2009)

Reviewed and commented on the technical and regulatory adequacy of hazardous waste facility's corrective action and remediation work plans for several high and medium priority sites in the State of Missouri. Provided technical and regulatory oversight to stakeholders and assisted them in meeting their Resource Conservation and Recovery Act corrective action obligation promptly. Assisted stakeholders in preparing hazardous waste facility permit, corrective action order such as a statement of basis and other agreements to ensure that they meet their corrective action requirements. Performed risk assessment to determine if there exists an unacceptable level of risk due to contamination at the hazardous waste treatment, storage, and disposal facilities. Evaluated groundwater-monitoring reports, established contaminant trends, and optimized sampling protocol. Assisted facilities in performing a subsurface investigation and provided appropriate guidance to design and develop the sampling protocol.

Environmental Engineer, MARRS Services, Inc., Santa Fe Springs, CA (2005-2006)

Analyzed laboratory data and prepared quarterly groundwater monitoring report for NMRC. The prepared standard operating procedure, for groundwater sampling for Naval Marine Reserve Center (NMRC) Los Angeles, CA. Developed a conceptual framework for drafting Project Closeout report for the U.S. Army Corps of Engineers (USACE) for the Formerly Used Defense Sites by verifying past remedial/clean up works performed by the independent consultant. Reviewed existing site investigations and developed a conceptual stormwater pollution mitigation plan for California Transportation for the Areas of Special Biological Significance

### **PROFESSIONAL REGISTRATION**

Professional Engineer (Civil Engineering), State of Texas (License No. PE. 104432)

Board Certified Environmental Engineer, AAEE (Certificate No. 09-10006)

Certified Hazardous Material Manager (License No. 13691-Expired)

### **HONORS AND AWARDS**

- Global Academic Initiative Network, Ministry of Human Resources and Development, Govt. of India, Fellowship 2016, \$12,000
- Summer Faculty Fellowship – Air Force Institute of Technology, Air Force Office of Sponsored Research, 2015, \$25,000
- Junior Faculty Research Strategy Group Award, Texas A&M University System, 2013
- Texas A&M University System Teaching Excellence Award, 2011-2012
- ASEE Early Career Award, American Society of Engineering Education, 2011-2012
- ASCE-ExCEED Fellowship, American Society of Civil Engineers, 2011-2012
- Fresh Face of Sigma Xi, Sigma Xi Scientific Research Committee, 2010-2011
- Listed in the Who's who in Environmental Engineering, American Academy of Environmental Engineers
- John and Susan Mathes Doctoral Fellowship, Missouri University of Science and Technology
- First Prize: Research Paper World Water Environmental Res. Congress, Anchorage, AK

- Missouri Groundwater Association Scholarship, MGA Conference Columbia, MO
- Chi-Epsilon Scholarship for academic excellence

### **PROFESSIONAL RECOGNITION**

- Invited by Sigma Xi (The Scientific Research Honor Society) to serve as a judge for the 2017 Intel International Science and Engineering Fair, May 14-19, 2017 Los Angeles, California
- Invited to serve as a judge for the 2017 California State Science Fair
- Invited to write an Editorial for the Bulletin of Environmental Contamination and Toxicology (Springer Publication)
- Presided American Chemical Society Symposium on Fate and Transport of Perfluorinated Compounds, San Diego, March 13-17, 2016
- Associate Editor, Water Environment Research
- Organizer, Symposium, “Emerging Micro-Pollutants in the Environment” at the 247<sup>th</sup> ACS National Meeting, Dallas, TX March 16-20, 2014
- Chair, Groundwater Quality Section, Water Environment Research Journal, 2013 - 2017.
- Chair, Student and Young Professional Member Technical Paper Competition and Poster Competition, 2014 World Environmental and Water Resources Congress, Portland, OR, June 01 – 05, 2014
- Invited to serve on the International Advisory Committee of the conference “Nano-science and Nanotechnology: Lessons from Nature and Emerging Technologies” July 25-26, 2013.”
- Vice-Chair, Conference Activities Committee, Student and New Professional Activities Council, Environmental & Water Resources Institute, American Society of Civil Engineers 2012 - 2015
- Chair, Student and Young Professional Member Poster Session, 2013 World Environmental and Water Resources Congress, Cincinnati, OH, May 19-23, 2013
- Invited to write a research review paper on Reconnaissance of Groundwater Quality for Water Environment Research Journal 2013
- Chair, Student and Young Professional Member Poster Session, 2012 World Environmental and Water Resources Congress, Albuquerque, NM, May 20-24, 2012
- Early Career Grant Award, American Society of Engineering Education for the best paper published in the 119<sup>th</sup> Proceedings of the ASEE conference and exposition 2012
- Invited to teach a summer course at the Mahidol University, Thailand, 2011
- Chair and moderator a conference session at the 4th International Perspective on Water and Environment Conference, Singapore, 2011
- Named Fresh Face of Sigma Xi by the Scientific Research Society, 2011
- Reviewer of several prestigious journals in the field of environmental engineering

### **PROFESSIONAL DEVELOPMENT ACTIVITIES**

- Making Academic Change Happen Workshop, Rose-Hulman Institute of Technology, May 31 – June 02, 2017
- Water Resources and Policy Initiative Annual Conference, San Jose, CA, April 05-07, 2017
- Hazardous Waste Operations and Emergency Response, (HAZWOPER) 40-Hour, Environmental Response Training Program, USEPA, October 17 – 21, 2016
- Quality Matters: Peer Reviewer Course, September 28, 2016
- Teaching Online Program - Workshop 1; September 26 – October 13, 2016

- Accessibility Awareness Workshop, September 20, 2016
- Developing Effective Practices that Serve Hispanic Students: Mini-Conference, September 16, 2016
- Open Educational Resources Workshop, August 31, 2016
- Webinar: Aiming for Integrity: How Well Do Students Understand Plagiarism? Turnitin, August 31, 2016
- Faculty Ambassador of Affordable Learning Solutions
- Water Resources and Policy Initiative Annual Conference, Long Beach, April 28-29, 2016
- Chemistry Ambassadors video project at the 251st ACS National Meeting in San Diego. March 13-17, 2016
- CSUF Faculty/Graduate Student Mentoring program, 2016-2017
- Presided American Chemical Society Symposium on Fate and Transport of Perfluorinated Compounds, San Diego, March 13-17, 2016
- Research Festival Day, California State University – Fullerton, March 01, 2016
- American Society of Civil Engineers – Orange County Mentorship Program, 2015-2016
- NSF Day at Pasadena City College, January 22, 2016
- Alliance of Hispanic Serving Institution Educators (AHSIE) Grantsmanship Institute, November 05 – 07, 2015
- Quality Matters: Independent Applying the QM Rubric (APPQMR): (Statewide Systems), October 23, 2015
- Completed three-day workshop on Environmental Remediation Technologies conducted by USEPA, Atlanta, GA, April 21 -23, 2015
- Attended half-day seminar on New Advances in Environmental Applications of Ion Chromatography and Column Selection and Suppression Theory organized by Thermo Fisher – Dionex, March 26, 2015
- Attended two-day workshop on Quality Education for Minorities (QEM) Network, NSF Faculty Early Career Development (CAREER) Program Proposal Workshop, March 6-7, 2015, Baltimore, MD
- Attended FDC seminar on, “Evaluating and Responding to SOQ,” March 09, 2015
- Attended FDC seminar on, “Documenting Faculty Success through RTP Process (NFD participants only), September 15 and November 03, 2014
- Attended FDC workshop on, “New Faculty Scholarly & Creative Activities Support,” May 12, 2015

## **SCHOLARLY AND CREATIVE ACTIVITIES**

### **RESEARCH STREAMS**

- Removal of Carbamazepine from Wastewater
- Monitoring of pharmaceuticals and personal care products in engineered wastewater system: Removal across treatment train
- Degradation of 2, 4 – Dinitrotoluene under ambient environmental conditions with fixed and dispersed catalysts
- Neonicotinoid insecticides, occurrence, persistence, and stability
- Fate and transport of emerging micro-pollutants in the environment
- Campus as a Living Lab: Water quality assessment through an integrated approach to learning enhancement of undergraduate curriculum.

**THESIS COMPLETED** (\*Role: *Committee member, Non-CSUF*)

Vanh Phonsiri, (2017). Occurrence and Detection of Variety of Human and Animal Pharmaceuticals in Engineered Wastewater System, M.S. Thesis 2017

Suliman Ibrahim, (2017). Experimental Studies on UV Facilitated Photo-degradation of 2, 4 – Dinitrotoluene, M.S. Thesis 2017

Maria Nassiry Ousley, (2017). Abiotic Fate Mechanism: Hydrolysis Study on Selected Neonicotinoids, M.S. Thesis 2017

\*Morgan Russell. (2017). Using Ultra-Violet Light Emitting Diodes and Photocatalysis to Destroy Organic Pollutants in Water. M.S. Thesis. Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio

\*Kailas Malwade. (2017). Microwave-Swing Adsorption for the Capture and Recovery of Hazardous Air Pollutants Using Engineered Carbon-Based Adsorbents. Ph.D. Dissertation. Texas A&M University, Kingsville, TX

Jasmin Jamal (2016), Managed Aquifer Recharge Using Advanced Treated Recycled Water: Evaluation of Water Quality and Clogging Behavior in Recharge Basin, M.S. Thesis 2016

**PUBLICATIONS<sup>1\*</sup>**

\*Russell, M. M.; Kempisty, D. M.; **Kurwadkar, S.**; Kanel, S. R.; Brittle, S. W.; Sizemore, I.; Yaal, L. (2018). Destruction of aqueous phase organic pollutants using ultraviolet light emitting diodes and photocatalysis. *Water, Air, & Soil Pollution* (Accepted, manuscript#WATE-D-17-01855)

\***Kurwadkar, S.**, Phonsiri, V., Choi, S., Nguyen, C. (2018). Pharmaceuticals in engineered wastewater system - A potential concern for wastewater reuse and antibiotic resistance. *Journal of Environmental Chemical Engineering*, (under review manuscript # JECE-S-17-02924)

\***Kurwadkar, S.** (2017). Groundwater Pollution and Vulnerability Assessment – An Annual Review. *Water Environment Research*, Vol. 89(10), 1561-1579

\***Kurwadkar, S.**, Singh, I. K., Soni, S. (2017). Pesticide Exposure and Emerging Ecotoxicological Challenge to Non-Target Species. *Ecotoxicology* (Accepted)

\***Kurwadkar, S.**, Beran, L., Marsh, J., Lambert, B., Hibbler, K., Johnson, J., Lambert, D. (2017). Recovery Potential Evaluation for Restoration & Prioritization of Selected Impaired Segments in the Trinity River Basin. *J. of Water Resources Planning and Management* (Under review: *Journal of American Water Resources Association*)

\***Kurwadkar, S.**, Pugh, K., Singh, O. V. (2017). Uptake and translocation of sulfamethazine by alfalfa grown under hydroponic conditions. *Journal Environmental Sciences*, 53, 217-223

---

\*<sup>1</sup> Peer reviewed publications with California State University Affiliation.

\***Kurwadkar, S.**, Evans, A. (2016). Neonicotinoids: Systemic Insecticides and Systematic Failure, *Bulletin of Environmental Contamination and Toxicology*, 97(6), 745-748

\***Kurwadkar, S.**, Evans, A., DeWinne, D., White, P., Mitchell, F. (2016). Modeling Photo-degradation Kinetics of Three Systemic Neonicotinoids – Dinotefuran, Imidacloprid and Thiamethoxam in Aqueous and Soil Environment. *Environ. Toxicol. Chem.*, 35(7), 1718–1726

\*Malwade, K. Lataye, D., Mhaisalkar, V., **Kurwadkar, S.**, Ramirez. D. (2016). Adsorption of Hexavalent Chromium onto Activated Carbon Derived from Leucaena Leucocephala Waste Sawdust: Kinetics, Equilibrium, and Thermodynamics. *International Journal of Environmental Science and Technology*, 13, 2107-2116

\***Kurwadkar, S.**, Hoang T., Kanel, S., Harper, W., Struckhoff, G. (2016). Application of Carbon Nanotubes for Removal of Pharmaceuticals and Endocrine Disrupting Compounds in Engineered Water Treatment System (under preparation)

Kanel, S., Kempisty, D., Patterson, C., Varma, R., Choi, H., **Kurwadkar, S.** Arsenic Contamination in Groundwater: Geochemistry, Occurrence and Treatment Technologies: A Review (under preparation)

\***Kurwadkar, S.**, Wheat, R., Mitchell, F. (2014). Evaluation of Leaching Potential of Three Systemic Neonicotinoid Insecticides in Vineyard Soil. *Journal of Contaminant Hydrology*, 170, 86-94

\***Kurwadkar, S.** (2014). Emerging Trends in Groundwater Pollution and Quality. *Water Environment Research*, 86 (10), 1677-1691

\***Kurwadkar, S.**, Pugh, K., Gupta, A., Ingole, S., (2014). Nanoparticles in the Environment: Occurrence, Distribution, and Risks. *Journal of Hazardous, Toxic and Radioactive Waste*. 19(3), 04014039

**Kurwadkar, S.** (2014). Enhanced Learning Experiences through Effective Use of Simulation and Visualization Technologies for Demonstration of Environmental System Modeling. *Proceedings of the 2014 ASEE Gulf-Southwest Conference Organized by Tulane University, New Orleans, Louisiana* Copyright © 2014, American Society for Engineering Education

**Kurwadkar, S.**, Venkataraman, K. (2013). Reconnaissance of Groundwater Quality. *Water Environment Research*, 85 (9), 1700-1714

**Kurwadkar, S.**, Sicking V., Lambert, B., McFarland, A. (2013). Preliminary Studies on Occurrence of Monensin Antibiotic in Bosque River Watershed. *J. of Environmental Sciences*, 25(2), 268-273

**Kurwadkar, S.**, DeWinne, D., Wheat, R., Mitchell, F. (2013). Time-Dependent Sorption Behavior of Dinotefuran, Imidacloprid, and Thiamethoxam. *Journal of Environmental Science and Health, Part – B*, 48, 237-242

Ralegaonkar, R., **Kurwadkar, S.**, Mandavgane, S. (2013). Utilization of Recycled Paper Mill Residue and Rice Husk Ash in Production of Light Weight Bricks. Archives of Civil and Mechanical Engineering, 13 (2), 269-275

**Kurwadkar, S.**, Marble, D., Edwards, J. (2012). Summer Merit Camp & Environmental Communication Week: Targeted Approaches to Environmental Engineering Education. Proc. of the 119<sup>th</sup> ASEE Annual Conference & Exposition, San Antonio, TX, June 10-13, 2012.

**Kurwadkar, S.**, Marble, D. (2012). Undergraduate Environmental Engineering Research Experiences in a Predominantly Undergraduate Teaching Institute. Proceedings of the 119<sup>th</sup> ASEE Annual Conference and Exposition, San Antonio, TX, June 10-13, 2012.

**Kurwadkar, S.**, Adams, C., Meyer, M., Kolpin, D. (2011). Comparative Mobility of Sulfonamides and Bromide Tracer in Three Soils. J. Environmental Management, 92, 1874-1881.

**Kurwadkar, S.**, Lambert, B., McFarland, A. (2010). Studies on Occurrence and Detection of Monensin Antibiotic in Surface Water Samples. Proceedings of the 4<sup>th</sup> International Perspective on Sustainable Environmental and Water Resources Management, National University of Singapore, Singapore, January 4-6, 2011

**Kurwadkar, S.**, Adams, C., Meyer, M., Kolpin, D. (2007). Effects of Sorbate Speciation on Sorption of Selected Sulfonamides in Three Loamy Soils. J. of Agricultural & Food Chemistry, 55, 1370-1376

**Kurwadkar, S.**, Adams, C., Meyer, M., Kolpin, D. (2005). Modeling Transport of Sulfathiazole in Three Loamy Soils. Proceedings of the 78<sup>th</sup> Annual Technical Exhibition & Conference of Water Environment Federation, Washington, D. C., Oct. 29- Nov. 2, 2005

**Kurwadkar, S.** (2005). Emerging Micro-pollutants in the Environment: Sorption and Mobility of Sulfonamide Antibiotics – A Potential Threat to Groundwater Contamination. Proceedings of the World Water Environmental Congress, Impacts of Global Climate Change, 2005, 173, 3.

Adams, C., Qiang, Z., Barnes, E., **Kurwadkar, S.**, Meyer, M. (2003). Occurrence and Control of Sulfonamides and Macrolide Antibiotics in Full-scale Drinking Water Treatment Plants. Proceedings of the 3<sup>rd</sup> International Conference on Pharmaceuticals and Endocrine Disrupting Chemicals in Water, Minneapolis, MN, March 19-21, 2003, 248-252

## **BOOKS**

**Kurwadkar, S., Mandal, P.** Dioxin – Environmental Fate and Health/Ecological Consequences. Taylor and Francis, CRC Press/Balkema, Leiden, The Netherlands (Under consideration)

**Kurwadkar, S.**, Zhang, X., Ramirez, D., Mitchell, F. Emerging Micro-Pollutants in the Environment: Occurrence, Fate, and Distribution. ACS Symposium Series; American Chemical Society: Washington, DC, 2015.

### **BOOK CHAPTERS** (\*Peer reviewed publications with California State University Affiliation.)

\***Kurwadkar, S.**, Struckhoff, G., Mishra, P., Modha, N., Murga, E., Amaral, B., Machado, G., Gomes, N. (2015). Modeling Fate and Transport of Emerging Micro-Pollutants in the Environment. In *Emerging Micro-Pollutants in the Environment: Occurrence, Fate, and Distribution*. American Chemical Society, Vol. 1198, pp. 97–112, ISBN13: 9780841230781e ISBN: 9780841230798. August 26, 2015. Copyright © 2015

\*Gupta, A., Gupta, R., **Kurwadkar, S.** (2015). Liposome-Encapsulated Antimicrobial Peptides: Potential Infectious Diseases Therapy. In S. Soni, A. Salhotra, & M. Suar (Eds.) *Handbook of Research on Diverse Applications of Nanotechnology in Biomedicine, Chemistry, and Engineering* (pp. 301-332). Hershey, PA: Engineering Science Reference. doi:10.4018/978-1-4666-6363-3.ch014

### **CONFERENCE PRESENTATIONS**

**Kurwadkar, S.** (2017). Environmental Fate and Transport of Selected Neonicotinoids. World Environmental and Water Resources Congress, Sacramento, CA May 21 – 25, 2017

**Kurwadkar, S.**, Ibrahim, S., Lopez, S. (2017). Photo-degradation of 2, 4 - Dinitrotoluene using UV Radiation Source. World Environmental and Water Resources Congress, Sacramento, CA May 21 – 25, 2017

Russell, M., Kanel, S., Kempisty, D., **Kurwadkar, S.**, Sizemore, I., Brittle, S. Low-cost, low power technology to destroy organic pollutants in water: an ultra-violet light emitting diodes and photocatalysis. World Environmental and Water Resources Congress, Sacramento, CA May 21 – 25, 2017

**Kurwadkar, S.**, Wheat, R., Mitchell, F. (2014) Modeling Photo-degradation Kinetics of Three Systemic Neonicotinoid Insecticides in Aqueous and Soil Environment. 247<sup>th</sup> American Chemical Society's National Meeting and Exposition, March 16 – 20, 2014, Dallas, TX  
Malwade, K., Tabor, J., Ramirez, D.,

**Kurwadkar, S.** (2014). Comparative Study of the Aqueous-phase Adsorption of Sulfamethazine onto Commercially Available and Laboratory Developed Activated Carbon” 247<sup>th</sup> American Chemical Society's National Meeting and Exposition, March 16 – 20, 2014, Dallas, TX

**Kurwadkar, S.** (2014). Enhanced learning experiences through the effective use of simulation and visualization technologies for a demonstration of environmental system modeling. Proceedings of the 2014 ASEE Gulf-Southwest Conference Organized by Tulane University, New Orleans, Louisiana Copyright © 2014, American Society for Engineering Education

**Kurwadkar, S.**, Wheat, R., Mitchell, F. (2014). Evaluation of leaching potential of three systemic neonicotinoid insecticides in vineyard soil. 2014 World Environmental & Water Resources Congress, June 01 – 05, Portland, OR

**Kurwadkar, S.**, DeWinne, D., Mitchell, F. (2013). Photo-degradation Kinetics of Dinotefuran, Imidacloprid, and Thiamethoxam in Aqueous and Terrestrial Environment. Presented at the Sigma Xi SW Region Research Conference, University of Texas – Dallas, January 11-13, 2013

**Kurwadkar, S.,** Marble D. (2012). Undergraduate Environmental Engineering Research Experiences in a Predominantly Undergraduate Teaching Institute. Presented at the 119th ASEE Annual Conf. and Exposition, San Antonio, TX, June 10-13, 2012.

**Kurwadkar, S.,** Marble D., Edwards, J. (2012). Summer Merit Camp and Environmental Communication Week: Targeted Approaches to Environmental Engineering Education. Presented at the 119th ASEE Annual Conference and Exposition, San Antonio, TX, June 10-13, 2012.

**Kurwadkar, S.** (2011). Sorption Kinetics of Sulfonamide Antimicrobials. Presented at the Fundamental for Life: Soil, Crop, & Environmental Sciences Conference 2011 ASA-CSSA-SSSA International Annual Meetings, Canadian Society of Soil Science, San Antonio, Texas, USA (October 17, 2011).

**Kurwadkar, S.** Lambert, B., McFarland, A. (2011). Studies on Occurrence and Detection of Monensin Antibiotics in Surface Water Samples. Presented at the 4th International Perspective on Water and Environment, National University of Singapore, Singapore, January 4-6, 2011

**Kurwadkar, S.** (2010). Real World Experiences in Environmental Engineering: Been There, Seen and Done That! Presented at the 7th Annual Excellence in Teaching Conference, Quality Enhancement Plan, Tarleton State University. April 09, 2010.

**Kurwadkar, S.** (2009). Occurrence and Fate of Pharmaceuticals in the Environment. Presented at the Missouri Waste Control Coalition Environmental Conf., Lake of the Ozark, MO, June 21-23, 2009

**Kurwadkar, S.** (2005). Modeling transport of Sulfathiazole in Three Loamy Soils. Presented at the 78th Annual Technical Exhibition and Conference of Water Environment Federation, Washington DC, Oct-29- Nov.2, 2005.

**Kurwadkar, S.** (2005). Emerging Micro-pollutants in the Environment: Sorption and Mobility of Sulfonamide Antibiotics – A Potential Threat to Groundwater Contamination. Presented at the World Water Environmental Resources Congress, Anchorage, Alaska, May 15 -19, 2005

**Kurwadkar, S.** (2004). Transport of Veterinary Antibiotics in Three Sandy-loam and Clay-loam Soils. Presented at the Missouri Groundwater Conference, Columbia, MO, March 04, 2004

**Kurwadkar, S.** (2004). Transport of Sulfonamides and Macrolides in Loamy Soil Systems. Presented at the 9<sup>th</sup> Mid-American Environmental Engineering Conference, Edwardsville, Illinois. September 17-18, 2004

Adams, C., **Kurwadkar, S.,** Kolpin, D., Meyer, M. (2004). Modeling Transport of Sulfonamides, Tetracyclines, Macrolides, and Carbadox Soils. Presented at the Science to Secure Food and the Environment Conference ASA-CSSA-SSSA International Annual Meetings with the Canadian Society of Soil Science, Seattle, Washington, USA (Nov 2, 2004).



Qiang, Z., Adams, C., **Kurwadkar, S.** (2003). Control of Antibiotics in Water Treatment Plants. Presented at the Missouri American Water Works Association and Water Environment Federation, Osage Beach, MO, USA (March 25, 2003).

Adams, C., Qiang, Z., Barnes, E., **Kurwadkar, S.**, Meyer, M. (2003). Occurrence and Control of Sulfonamides and Macrolide Antibiotics in Full-Scale Drinking Water Treatment Plants. Presented at the 3rd International Conf. on Pharmaceuticals and Endocrine Disrupting Compounds in Water, Minneapolis, MN, USA (March 21, 2003).

### **INVITED TALKS**

**Kurwadkar, S.** (2017). Emerging Contaminant of Concern – Human Health and Ecological Consequences. Fourth Annual American Academy of Environmental Engineers and Scientists Conference, University of California, Irvine, May 18, 2017

**Kurwadkar, S.** and Jamal J. (2017). Groundwater Recharge through Reclaimed Water: Evaluation of Clogging Behavior in Natural Basin. Annual Date Memorial Lecture, Indian Water Works Association, Nagpur, India, January 04, 2017.

**Kurwadkar, S.** (2016). ... Tell me more about the Birds and Bees. Nature Lunch Seminar Series, Department of Biological Sciences, California State University – Fullerton, March 10, 2016

**Kurwadkar, S.** (2015). Neonicotinoids in the Environment- To Bee or Not To Bee! Honors Program, Welcome Back Event, California State University – Fullerton, September 10, 2015

**Kurwadkar S.** (2015). Recovery Potential Evaluation for Restoration and Prioritization of Impaired Watersheds. Indian Water Works Association, India, January 09, 2015

**Kurwadkar, S.** (2013). Mobility and Persistence of Three Systemic Neonicotinoid Insecticides in Aqueous and Soil Environment. CREST-RESSACA and Institute for Sustainable Energy and Environment, Texas A&M University, Kingsville, November 08, 2013

**Kurwadkar, S.** (2011). Human Health and Environmental Implication of Occurrence of Pharmaceuticals in the Environment. Environmental Communication Week, Tarleton State University, April 19, 2011

**Kurwadkar, S.** (2009). Implications of First-Order Rate Constants for Monitored Natural Attenuation. Presented at the Division of Environmental Quality, Missouri Department of Natural Resources, and Jefferson City, Missouri. January 22, 2009

**Kurwadkar, S.** (2008). Contaminated Sites – Issues Related to Stockpiling. Presented at the Missouri Department of Natural Resources, Division of Environmental Quality, Jefferson City, Missouri, July 16, 2008

**Kurwadkar, S.** (2007). Emerging Micro-pollutants in the Environment: Selected Studies on Sorption and Mobility of Sulfonamides in Aquatic and Terrestrial Environment. Presented at the

Department of Civil Engineering, Govt. College of Engineering, Gadgenagar, Amravati, India, May 14, 2007

**Kurwadkar, S.** (2007). Risk-Based Approach to Cleanup Decision – Understanding Human Health and Ecological Risk Assessment. Presented at the Missouri University of Science and Technology, November 09, 2007

**Kurwadkar, S.** (2006). Got Antibiotics! Presented at the Missouri Department of Natural Resources, Division of Environmental Quality, Jefferson City, Missouri, August 14, 2006

**STUDENT PRESENTATIONS** (\* Students at California State University – Fullerton)

\*Ibrahim, S., Lopez, S. Experimental Studies on UV Facilitated Photo-degradation of 2, 4-Dinitrotoluene. 2017 CSUF Student Research Competition, February 23, 2017

\*Jamal, S. (2017). Managed Aquifer Recharge through Advanced Treated Recycled Water: Evaluation of Water Quality and Clogging Behavior in Recharge Basins. 2017 CSUF Student Research Competition, February 21, 2017

\*Ousley, M. (2017). Hydrolysis of Neonicotinoids. 2017 CSUF Student Research Competition, February 21, 2017

\*Shakir, M., and **Kurwadkar, S.** (2016). Experimental Studies on Hydrolysis Rate of Selected Neonicotinoid Insecticides. International Symposium on Engineering Research (ISER), Sao Paulo, Brazil. November 19-26, 2016

\*Lopez, S., Becerra, R., **Kurwadkar, S.** (2016). Experimental Studies on UV facilitated Photo-degradation of 2, 4 – Dinitrotoluene. International Symposium on Engineering Research (ISER), Sao Paulo, Brazil. November 19-26, 2016

\*Mai, H., Mau, L., **Kurwadkar, S.** (2015). Aqueous Photodegradation of 2, 4 – Dinitrotoluene. Presented at the 23rd Annual Southern California Conference on Undergraduate Research, Harvey Mudd College, November 21, 2015

\*Modha, N. Natalia-Teixeira, G., Evans, A., **Kurwadkar, S.** (2015). Modeling Hydrolysis of Selected Neonicotinoid Insecticides. Presented at the 2015 American Society of Agricultural and Biological Engineers Annual International Meeting, New Orleans, July 26 – 29, 2015

\*Eloi-do-Amaral, B., Machado-Dias, G., **Kurwadkar, S.** (2015). Ionization of Sulfonamide Antimicrobials and its Effect on Sorption and Mobility under Simulated Conditions. Presented at the 29th Annual CSUF & CSU Student Research Competition. Fullerton, February 25 - 27, 2015

Pugh, K., **Kurwadkar, S.**, Murphy, M., Mitchell, F. (2014). Uptake of Sulfamethazine by Plants Grown Under Hydroponic Conditions. 2014 World Environmental & Water Resources Congress, June 01 – 05, Portland, OR

Tabor, J., Malawade, K., Ramirez, D., **Kurwadkar, S.** (2013). Speciation of Sulfamethazine and its Effect on Sorption and Mobility under Simulated Conditions. Texas A&M University System 11th Annual Student Research Symposium, Texas A&M Kingsville, Kingsville, TX, November 08, 2013

Malwade, K., Tabor, J., Ramirez, D., **Kurwadkar, S.** (2013). A Comparative Study of Aqueous-Phase Adsorption of Sulfamethazine onto Powdered Activated Carbons. Texas A&M University System 11th Annual Student Research Symposium, Texas A&M Kingsville, TX, November 08, 2013

Pugh, K., **Kurwadkar, S.** Mitchell, F. (2013). Hydrolysis of Dinotefuran, Imidacloprid, and Thiamethoxam. 2013 Student Water Conference, Stillwater, OK, April 04 – 05, 2013 (Student received \$500 NSF grant for his presentation).

Harrivel, M., Brady, J. **Kurwadkar, S.** Mitchell, F. (2012). Predatory Protozoa in Land Management Units. 10th Annual Texas A&M University System Student Research Symposium, Texas A&M College Galveston, TX, November 11, 2012

Wheat, R., **Kurwadkar, S.**, Mitchell, F. (2011). The mobility of Selected Neonicotinoids in Vineyard Soils. 9th Annual Texas A&M University System Student Research Symposium, Texas A&M College Station, TX, November 11, 2011

DeWinne D., **Kurwadkar, S.**, Mitchell, F. (2011). Photolysis of Selected Neonicotinoids in Aqueous Solution. 9th Annual Texas A&M University System Student Research Symposium, Texas A&M College Station, TX, November 11, 2011

DeWinne D., **Kurwadkar, S.**, Mitchell, F. McGahan, D. (2011). Sorption Kinetics of Dinotefuran, Imidacloprid, and Thiamethoxam. Society of Environmental Toxicologist and Chemistry, Denton, TX, May 19-22, 2011

Sicking, V., **Kurwadkar, S.** Lambert, B., McFarland, A. (2010). The occurrence of Monensin Antibiotics in Bosque Watershed Region, Society of Environmental Toxicologist and Chemistry, Junction, TX April 30-02, 2010.

### **COURSES TAUGHT**

ENVE – 300 Fluid Mechanics

ENVE – 301 Environmental System Modeling

ENVE – 310 Water Resources Engineering

ENVE – 402 Air Pollution Control

ENVE – 320 Groundwater Hydrology

ENGR – 221 Principles of Engineering – I

EGCE – 441 Environmental Engineering

EGCE – 481 Remediation of Contaminated Soil and Groundwater

EGCE – 482 Wastewater Treatment and Water Reclamation

EGCE – 497 Senior Project

EGCE – 546 Surface Water Pollution and Control

EGCE – 597 Graduate Project

HYDR – 110 Introduction to Hydrology

### **SERVICE**

#### *University Committees*

Auxiliary Services Corp., Faculty Director, Term Ends Spring 2019

Academic Standards Committee, Term Ends Spring 2018

International Education Committee, Term Ends Spring 2018

#### *Department Committees*

Library Committee

Research Committee

ASCE Co-Advisor

CEE Undergraduate Advisor

Student Recruitment Committee

### **PAST SERVICE**

Engineering Program Oversight Committee, 2009 – Current

Committee for Office of Student Research and Creative Activities, 2012 – Current

International Education Advisory Council, Tarleton State University, 2012 – Current

University Library Committee, 2013 – Current

Water Conservation Committee, Commission of the City of Stephenville, 2011 – Current

Search Committee Chair, Civil Engineering Faculty Search Committee

Search Committee for Director of Office of Diversity and Inclusion

Search Committee for Environmental Engineering Faculty

Co-advisor for Engineering Club, Tarleton State University

Co-advisor for French Club, Tarleton State University

### **PROFESSIONAL ASSOCIATIONS**

#### *Professional Membership*

American Academy of Environmental Engineers (Current)

American Society of Civil Engineers (Current)

Environmental Water Research Institute (Current)

American Chemical Society (Current)

Association of Environmental Engineers and Science Professors (Current)

American Society for Engineering Education (Expired)

Academy of Certified Hazardous Materials Managers (Expired)

Water Environment Federation - Secretary- UMR chapter (2002-2004)

National Groundwater Association (2005-2010)

#### *Honor Society Membership*

Sigma Xi, Scientific Research Committee

Chi-Epsilon, National Civil Engineering Honor Society

Omicron Delta Kappa, National Leadership Honor Society

Blue Key, National Service Honor Society

Alpha Chi, National Honor Scholarship Society

### **SERVICE TO PROFESSIONAL ASSOCIATIONS**

#### *Reviewer*

Environmental Pollution

Environmental Science and Technology

Ecotoxicology and Environmental Safety

Water Environment Research

Journal of Environmental Monitoring

Vadose Zone

Journal of Hazardous, Toxic, and Radioactive Waste Mgmt.

Journal of Environmental Management

Journal of Agriculture and Food Chemistry

Quality Considerations for Munitions Response Project, ITRC, UXO Team

Board of Regents Support Fund R&D (RCS & ITRS) Program, Louisiana

Natural Sciences and Engineering Research Council of Canada

### **GRANTS** (\*Grants received/submitted while at California State University – Fullerton).

#### ***Funded grants***

\* Co-Principal Investigator: National Science Foundation Major Research Instrument (NSF-MRI): “Acquisition of an ultra-performance liquid chromatography-mass spectrometer (UPLC-MS) for multidisciplinary research,” **\$368,212**

\*Faculty Lead, “Campus as Living Lab Grant, California State University System, Chancellor’s office,” **\$36,000**, awarded on May 19, 2016

\*Principal Investigator “Engage in the STEM, NSF Mini-grant.” **\$10,200** (4 mini-grants @ \$2050 each), Principal Investigator, awarded on May 30, 2016

\*Principal Investigator: Air Force Office of Sponsored Research, Summer Faculty Fellowship Grant, **\$25,000**

\*Principal Investigator: “Engage in the STEM, NSF Mini-grant.” **\$6,150** (3 mini-grants @ \$2050 each), Principal Investigator, awarded on May 30, 2015

#### **Grants Submitted and Under Consideration**

\*Principal Investigator: “Risk and Vulnerability Assessment of Groundwater and Non-target Species to Neonicotinoids under California IPM System,” **\$500,000**. Submitted on September 30, (Co-PI Dr. Bwalya Malama, Cal Poly, San Luis Obispo)

\*Principal Investigator: “Development of Novel Low Cost and Highly Sensitive Multiple River Water Quality Monitoring Sensor.” **\$1,088,740**. The Department of Science and Technology, Govt. of India, Intel® and the Indo-U.S. Science and Technology Forum (IUSSTF) (Under consideration)

\*Principal Investigator: “Enhanced Photocatalytic Degradation of Munitions and Explosives used in Department of Defense Facilities,” California State University – Fullerton. **\$5150**. Submitted on September 18, 2017

**Funded grants (Another institute)**

Principal Investigator: “Evaluation of Removal of Low-Level Antibiotics from Drinking Water using Laboratory Developed and Commercially Available Activated Carbon,” Office of Faculty Research, Organized Research Grant. **\$ 17,352.73**, 2013-2014.

Collaborator: “Demonstrating the Efficacy of an Insect Growth Regulator (IGR) to Potentiate Infection of *Solenopsis Invicta* Colonies by the Protozoan Parasite *Kneallhazia* (*Thelohania*) *Solenopsae*,” Texas Invasive Ant Research and Management Seed Grant Program. **\$104,000**, 2013-2014 (PI: Dr. Forrest Mitchell).

Principal Investigator: “Environmental Analysis of Third Generation Neonicotinoids using High-Performance Liquid Chromatography.” Waters Academic Grant Program, Waters Inc.; **\$12,000**, 2012-2013.

Principal Investigator: Research Infrastructure Development Grant, Office of Student Research and Creative Activities, Tarleton State University, **\$10,000**, 2013-2013

Principal Investigator: Research Infrastructure Development Grant, Office of Student Research and Creative Activities, Tarleton State University, **\$25,000**, 2012-2013

Principal Investigator: Research Infrastructure Development Grant, Dean, College of Science and Technology, Tarleton State University, **\$20,306**, 2012-2013

Principal Investigator: Uptake of Sulfonamides and Macrolides Antimicrobials by Plants Grown Under Hydroponic Conditions, University Research Committee (URC) Organized Research Grant, **\$10,533.33**, 2012-2013

Principal Investigator: Texas Pierce’s Disease Research and Education Program, USDA - APHIS (Co-Principal Investigator: Dr. Forrest Mitchell), **\$6000**, 2011-2012

Principal Investigator: Water Quality Analysis through Microbiological Genotyping and Source Tracking University Research Committee (URC) Organized Research Grant, (Co-Principal Investigator: Dr. Forrest Mitchell), **\$16,120.83**, 2011-2012

Project Director (Environmental Engineering Track): REAL WORLD Summer Merit Program Residential Camp, Texas Workforce Commission, (Project Directors: Dr. Daniel Marble (Nuclear Engineering Track); Dr. Mircea Agapie (Computer Sci. Track), **\$90,000**, 2011-2011

Principal Investigator: “Sorption Kinetics of Neonicotinoid Insecticides,” Office of Student Research and Creative Activities, Tarleton State University, **\$6,500**, 2011-2011

Principal Investigator: Leaching Behavior of Neonicotinoids Insecticides in Vineyard, Office of Student Research and Creative Activities, Tarleton State University, **\$4,000**, 2011-2011

Principal Investigator: Photo-degradation of Selected Neonicotinoids Insecticides in Aqueous and Terrestrial Environment, Office of Student Research and Creative Activities, Tarleton State University, **\$4,000**, 2011-2011

Principal Investigator: Applied Learning Experience, Real World Experiences Applied to Learning (REAL), **\$1,500**, 2011-2011

Faculty Development Grant, **\$1400**, 2011-2011

Principal Investigator: Pierces' Disease Control: Environmental Fate of Neonicotinoids University Research Committee (URC) Organized Research Grant, **\$9,766.50**, 2010-2011

Principal Investigator: Laboratory Evaluation of the Efficacy of Calcium Peroxide-Enhanced Bioremediation of Crude Oil (Co-Principal Investigator: Mr. Mark Murphy), FMC Corporation Research Grant, **\$5000**, 2010-2011

Principal Investigator: Texas Pierce's Disease Research and Education Program (Co-Principal Investigator: Dr. Forrest Mitchell), **\$4118**, 2010-2011

Principal Investigator: Environmental Occurrence of Various Antibiotics in the Bosque Watershed Region, Organized Research Grant, (Co-Principal Investigators: Dr. Barry Lambert and Dr. Anne McFarland), **\$18,183**, 2009-2010

Project Director (Environmental Engineering Track): REAL WORLD Summer Merit Program Residential Camp, Texas Workforce Commission, (Project Directors: Dr. Daniel Marble (Nuclear Engineering Track); Dr. Mircea Agapie (Computer Sci. Track), **\$79,000**, 2010-2010

**Grants (not funded)**

\* Experimental Studies on Environmental Persistence and Risk Assessment of Selected Neonicotinoid Insecticides, Research, Scholarship, and Creative Activity grant, September 16, 2016

\*Real-Time Noise Monitoring and Analysis for Abatement of Noise Pollution, United Engineering Education. \$163,913 (Co-PI Dr. Kenneth Faller)

\*Rapid Detection of Pesticide Residues on Fruit and Vegetables was received. 2016-17, NineSigma, Inc., \$150,000 (Co-PI Dr. Kenneth Faller)

\*Spring 2016 CSU Online Faculty Learning Community (FLC) on Critical Thinking through Online/Blended Discussion, February 05, 2016

\*Promising Course Redesign Faculty proposal, Environmental Engineering, Chancellor's office, California University System, 2016

\*Co-PI Self-Sustainable Management of Urban Stormwater Runoff through Public-Private Partnerships for Santa Ana Gardens Channel, Submitted to the USEPA (Funding Opportunity #PA-OW-IO-15-01), November 20, 2015. Not funded

\*Research, Scholarship, and Creative Activity (RCSA) Incentive Grant. Photocatalytic degradation of 2, 4 – DNT. November 18, 2015



# Phoolendra Mishra

**Assistant Professor**  
**Civil & Environmental Engineering**  
**California State University, Fullerton C A 92831**

**Phone:** (657) 278-8808  
**Email:** pkmishra@fullerton.edu  
**Fax:** (657) 278-3916

## EDUCATIONAL BACKGROUND

---

Ph.D.	University of Arizona, Tucson AZ	Hydrology	Dec 2010
Master's Thesis	Technical University of Aachen, Germany	Hydrology	Feb 2003
Master of Technology	Indian Institute of Technology Kanpur, India	Civil Engineering	July 2003
Bachelor of Technology	G B Pant University, Pant Nagar, India	Civil Engineering	July 2001

## PROFESSIONAL EXPERIENCE

---

<i>Assistant Professor</i> , Civil & Environmental Engineering California State University, Fullerton, California	Aug 2012 – current
<i>Postdoctoral Research Associate</i> , Earth and Environmental Sciences Los Alamos National Laboratory, Los Alamos, NM	Oct 2010 – Aug 2012
<i>Graduate Research Assistant</i> , Hydrology and Water Resources University of Arizona, Tucson AZ	Aug 2006 – Oct 2010
<i>Lecturer</i> at Civil Engineering Department Jaypee University, Solan India	Aug 2004 – Aug 2006
<i>Assistant Engineer</i> Consulting Engineering Services Private Limited , India	Aug 2003 - Aug 2004

## SELECTED PUBLICATIONS

---

### Relevant Publications

1. Dylan Harp, Phillip Stauffer, **Phoolendra Mishra**, Daniel Levitt, Bruce Robinson (2014). “Thermal Modeling of High-Level Nuclear Waste Disposal in a Salt Repository”, *Nuclear Technology*, Vol 187 pp 294–307.
2. **Phoolendra Mishra** and Kristopher Kuhlman (2013). Unconfined Aquifer Flow Theory: From Dupuit to Present, Book chapter, Recent Advances in Hydrogeology, *Springer*.
3. **Mishra Phoolendra**, Vessilinov V. Velimir, Gupta V. Hoshin (2013). “On simulation and analysis of variable-rate pumping tests”, *Groundwater*, doi: 10.1111/j.1745-6584.2012.00961. x.
4. **Mishra Phoolendra**, Vessilinov V. Velimir, Neuman P. Shlomo (2012). “Radial flow to a partially penetrating well with a storage in an anisotropic confined aquifer”, *Journal of Hydrology*, 448-449, pp 255-259.
5. **Mishra Phoolendra**, Vessilinov V. Velimir and Kuhlman L. Kristopher (2012). “Saturated-unsaturated flow in a compressible leaky unconfined aquifer”, *Advances in Water Resources*, 42, pp 62-70.
6. **Mishra Phoolendra** and Neuman P. Shlomo (2011). “Saturated-unsaturated flow to a well with storage in a compressible unconfined aquifer”, *Water Resources Research*, Vol 47, W05553, doi: 10.1029/2010WR01077.

### Other Significant Publications

7. **Phoolendra Mishra** and Kristopher Kuhlman (2013). Recent Advances in Hydrogeology, *Springer*.
8. **Mishra Phoolendra** and Neuman P. Shlomo (2010), “Improved forward and inverse analyses of saturated-unsaturated flow toward a well in a compressible unconfined aquifer”, *Water Resources Research*, 46, W07508, doi:10.1029/2009WR008899.
9. **Phoolendra Mishra** (2010). Advanced Analytical Solutions for Aquifer Pumping Tests- Analysis and Evaluation, *Verlag Dr. Muller Publishing House*, Germany (ISBN: 978-3-639-31417-5).

10. **Mishra Phoolendra** and Neuman P. Shlomo, (2009). “Pumping Tests Determination of Unsaturated Aquifer Properties”, *Jornaes de Investigation en la Zona no Saturada del Suelo*, Barcelona, Spain.
11. Kuhlman L. Kristopher, Hinnell C. Andrew, **Mishra Phoolendra**, Yeh TC Jim, (2008) “Basin-scale transmissivity and storativity estimation using hydraulic tomography”, *Groundwater*, Vol 46 (5).

Selected Conference Papers and Presentations

12. **Mishra Phoolendra** and Neuman P. Shlomo (2011). “Pumping test characterization of deep vadose zone properties”, *Annual Waste Management (WM) conference proceedings*, Phoenix, AZ.
13. **Mishra Phoolendra**, Painter L. Scott, Zyvoloski A. George, (2012). Coupled processes model for partially frozen soils, *Flow and Transport in Porous Medium*, American Society of Mechanical Engineers, Houston, Texas invited.
14. **Mishra Phoolendra**, Zyvoloski A. George, Pawar Rajesh, (2012). Analysis of coupled thermal-hydrologic-mechanical model for Springerville CO2 reservoir, *11th Annual Carbon Capture and Sequestration Conference*, Pittsburgh, Pennsylvania.
15. **Mishra Phoolendra**, Vessilinov V. Velimir, Miller Terry, Harp Dylan, (2011). A 3-D regional groundwater flow model to evaluate aquifer parameters using long term water level monitoring data, *American Geophysical Union Fall Meeting*, 2011.
16. **Mishra Phoolendra** and Neuman P. Shlomo, (2010). Saturated-unsaturated flow to partially penetrating well with storage in a compressible unconfined aquifer, *American Geophysical Union Fall Meeting*, 2010.

## GRANTS

---

<i>Water Resources and Policy Incentive</i> grant, Project title : “Groundwater contaminant source identification” Funded by Office of Chancellor, California State University.	\$4,971 3 WTU’s Spring 2013
<i>Junior Intramural Grant</i> Program 2013-14, Project title : “Experimental Setup to Understand Groundwater Flow System” Funded by California State University Fullerton	\$2000 + 3 WTU’s Fall 2013

## ACADEMIC DISTINCTIONS AND AWARDS

---

- **Teaching Award**, California State University Fullerton, for *Exceptional Teaching Effectiveness*, March, 2014.
- **Hargis award** by Hargis Associates for best student poster presentation at University of Arizona 20<sup>th</sup> Annual *El Dia Del Agua* showcase 2010.
- GEOSYNTEC, INC. **Best Student Research Paper** Award National Competition 2010 from Geosyntec Consultants Inc. USA,
- **John and Margaret Hershberger Doctoral fellow** in Subsurface Hydrology-Hydrogeology from Hydrology and Water Resources Department of University of Arizona (January 2009),
- **Eugene S Simpson fellow** in groundwater from Hydrology and Water Resources Department of University of Arizona (January 2008),
- **Deutscher Akademischer Austausch Dienst (DAAD)fellowship** from the German government for pursuing my Masters thesis work at the Technical University Rstheinisch Westf’alsche Technische Hochschule (RWTH) Aachen, Germany for one academic year (May2002 February 2003),

## PRASADA RAO, Ph.D.

Professor  
Civil and Environmental Engineering Department  
California State University  
Fullerton, CA 92834  
(657) 278 3016, fax (657) 278 3916  
mprasadarao@fullerton.edu

---

### EMPLOYMENT

08/16-Present Professor, Department of Civil and Environmental Engineering, CSU, Fullerton, CA  
07/08-07/16 Associate Professor, Department of Civil and Environmental Engineering, CSU, Fullerton, CA  
07/09-08/12 Chair & Associate Professor, Department of Civil and Environmental Engineering, CSU, Fullerton, CA  
08/02–06/08 Assistant Professor, Department of Civil and Environmental Engineering, CSU, Fullerton, CA  
11/00-07/02 Research Associate, Civil and Environmental Engineering Department, Duke University, Durham, NC  
01/97-10/00 Research Associate, Department of Civil and Environmental Engineering, University of Kentucky, Lexington, KY

### FUNDED GRANTS

Title	PI	Co-PI	Funding Agency	Project Duration	Total Amount (\$)
ARID Hydrology Manual Update	Y		San Bernardino County	10/15-09/17	50,000
Assessing Recent High Volume Rainfall Events in San Bernardino County	Y		San Bernardino County	01/11-04/11	20,395
Contamination threats to water systems: Interception and Mitigation Tools	Y		EPA	5/05 - 4/08	193,700
Design of next generation sprinkler head for curved landscapes	Y		US Dept of Interior	10/03-6/05	66,000
Parallel TABS-MDS model for simulating large scale transport processes, <i>Phase II</i>	Y		DoD - NAVO PET	11/01-12/02	170,665
A hydrodynamic model for operational modeling of tidal estuaries		Y	Office of Naval Research	06/01-05/04	602,000
Parallel TABS-MDS model for simulating large scale transport processes, <i>Phase I</i>	Y		DoD – NAVO PET	05/01-10/01	143,673

### PUBLICATIONS

1. A Case Study in Addressing Water Infrastructure Resiliency and Sustainability, T.V.Hromadka and Prasada Rao, Accepted for Publication by *National Academy of Engineering, The Bridge* (Fall 2018)
2. Numerical Modeling of rapidly varying flows using HEC-RAS and WSPG Models, Prasada Rao and T. V. Hromadka II, *Springer Plus*, DOI 10.1186/s40064-016-2199-0, 2016.

3. Assessment of Computer Modeling Accuracy in Floodplain Hydraulics, Rao, P., Hromadka II, T.V., Huxley, C., Souders, D., Jordan, N., Yen, C.C., Bristow, E., Biering, C., Horton, S., Espinosa, B., *International Journal of Modelling and Simulation*, 37:2, 88-95, 2016.
4. What Rainfall Return Frequency, T. V. Hromadka II, M. Phillips, Prasada Rao, B. Espinosa, R. Perez, M. Barton, *Atmospheric and Climate Sciences*, 3:385-396, 2013.
5. Rainfall Infiltration Return Frequency Estimates, T. V. Hromadka II, M. Phillips, Prasada Rao, B. Espinosa, T. Hromadka III, *Atmospheric and Climate Sciences*, 3:595-609, 2013.
6. Venu Kandiah and Prasada Rao, Identifying and understanding the infrastructure interdependencies in water systems, *West Indian Journal of Engineering*, 30:36-49, 2008.
7. Prasada Rao, Numerical modeling of open channel flows with moving fronts using a variable boundary formulation, *Applied Mathematics and Computation*, 182:1, 369-382, 2006.
8. Prasada Rao and Miguel Medina, Enhanced TABS-MDS model for simulating large scale free surface flows, *Environmental Modeling and Software*, 21:98-106, 2006.
9. Prasada Rao and Miguel Medina, A multiple domain algorithm for modeling two dimensional transient contaminant transport flows, *Applied Mathematics and Computation*, 174:117-133, 2005.
10. Luis Castaneda and Prasada Rao, Comparison of methods for estimating reference evapotranspiration in southern California, *Journal of Environmental Hydrology*, 13:1-10, 2005.
11. Prasada Rao and Miguel Medina, A multiple domain algorithm for modeling one dimensional transient contaminant transport flows, *Applied Mathematics and Computation*, 167: 1-15, 2005.
12. Cevza Kazezyilmaz-Alhan, Miguel A. Medina and Prasada Rao, On numerical modeling of open channel flows, *Applied Mathematics and Computation*, 166:724-740, 2005.
13. Prasada Rao, Numerical Modeling of Open Channel Flows using a Multiple Grid ENO Scheme, *Applied Mathematics and Computation*, 161:599-610, 2005.
14. Prasada Rao, A Parallel RMA2 model for simulating large scale free surface flows, *Environmental Modeling and Software*, 20(1):47-53, 2004.
15. Prasada Rao, A Parallel Hydrodynamic Model for Shallow Water Equations, *Applied Mathematics and Computation*, 150:291-302, 2004.
16. Prasada Rao, "A moving domain boundary formulation for modeling two dimensional open channel transient flows", *Applied Mathematics and Computation*, 154:769-781, 2004.
17. Venu Kandiah and Prasada Rao, Water Infrastructure Interdependencies: A Complex Adaptive System, *Journal of Environmental Hydrology*, 12(1), 2004.
18. Prasada Rao, Two dimensional multiple grid algorithm for modeling transient open channel flows, *Advances in Water Resources*, 26(6): 685-690, 2003.
19. Prasada Rao and Miguel A. Medina, Evaluation of V and W multiple grid cycles for modeling one and two-dimensional transient free surface flows, *Applied Mathematics and Computation* 138: 151-167, 2003.
20. Prasada Rao and Miguel A. Medina, An improved radiating boundary equation for free surface flows, *Applied Mathematics and Computation*, 132: 73-86, 2002.
21. Prasada Rao and Scott Yost, Simulation of two dimensional shallow water flows using a high resolute scheme, *International Journal of Computational Fluid Dynamics* (in press)
22. Prasada Rao, Contribution of Boussinesq pressure and bottom roughness terms for open channel flows with shocks, *Applied Mathematics and Computation*, 133: 581-590, 2002.
23. Scott Yost and Prasada Rao, A multiple grid approach for open channel flows with strong shocks, *Applied Mathematics and Computation*, 124, 381-395, 2001.
24. Prasada Rao and B.S. Pani, Simulation of free surface flows using a Runge-Kutta technique, *Applied Mathematics and Computation*, 114:27-38, 2000.
25. Scott Yost, Prasada Rao and Russell Brown, Absorbing boundary technique for open channel flows, *International Journal for Numerical Methods in Fluids*, 33:641-656, 2000.
26. Scott Yost and Prasada Rao, A moving boundary algorithm for one-dimensional free surface flows, *Advances in Water Resources*, 23:373-382, 2000.

27. Scott Yost and Prasada Rao, A multiple grid approach for simulating transient flows, *Advances in Water Resources*, 23:645-651, 2000.
28. Scott Yost and Prasada Rao, A non linear filter for one and two dimensional open channels with shocks, *Advances in Water Resources*, 24,187-193, 2000.
29. Scott Yost, and Prasada Rao, Flux corrected transport technique for open channel flow, *International Journal for Numerical Methods in Fluids*, 29:951-973, 1999.
30. S.A. Yost and Prasada Rao, Non-oscillatory scheme for open channel flows, *Advances in Water Resources*, 22: 133-143, 1998.
31. Prasada Rao and B.S. Pani, Technical note on Simulation of Hydraulic jump with grid adaptation, *Jl. Hydraulic Research*, IAHR, 35(2): 285-286, 1997.

#### **INVITED PRESENTATIONS**

Assessing Arid Area Extreme Precipitation Using Doppler Radar and Rain Gages, Southwest Extreme Precipitation Symposium, Scripps Institute, San Diego, March 2018.

#### **BOOK EDITOR**

1. Topics in Climate Modeling, ISBN 978-953-51-2661-4, Edited by Theodore Hromadka and Prasada Rao, 164 pages, Publisher: InTech, 2016.
2. Flood Risk Manahement, , ISBN 978-953-51-3664-4, Edited by Theodore Hromadka and Prasada Rao, 316 pages, Publisher: InTech, 2017.

#### **TECHNICAL REPORTS**

Doppler radar and Precipitation depth correlation for the Arid region of San Bernardino County, T.V.Hromadka, Prasada Rao, Rene Perez and Doug McInvale, submitted to Water Resources Division, County of San Bernardino, March 2018.

## Garrett C. Struckhoff, Ph.D., EIT

Department of Civil and Environmental Engineering  
California State University, Fullerton  
gstruckhoff@fullerton.edu  
800 N. State College Blvd.  
Fullerton, CA 92831  
(657) 278-8079

---

### EDUCATION

- Dec. 2009      **University of Iowa**, Ph.D., Civil & Environmental Engineering, Thesis Advisor: Gene F. Parkin, Thesis: *Plant-Assisted Bioremediation of Perchlorate and the Effect of Plants on Redox Conditions and Biodiversity in Low and High Organic Carbon Soil*
- Dec. 2003      **Missouri University of Science and Technology**, M.S., Civil Engineering with Environmental Engineering Emphasis, Thesis Advisor: Joel G. Burken, Thesis: *Vapor Phase Uptake and Translocation of Volatile Organic Compounds*
- May 2002      **Missouri University of Science and Technology**, B.S., Civil Engineering, Rolla, MO, Graduated *summa cum laude*

### PROFESSIONAL EXPERIENCE

- 2012-present      Assistant Professor, Civil and Environmental Engineering, California State University, Fullerton
- Taught Surveying, Surveying Lab, Environmental Lab, Environmental Engineering, and Introduction to Engineering
  - Developed and taught online graduate courses (Water Treatment, Environmental Law, Surface Water Pollution, Graduate Project)
  - Researched contaminant uptake into plants, solar panel efficiency on greenroofs, and algal biofuels derived from brewery waste
  - Taught high school students in summer session as a lecturer for Johns Hopkins Univ.
- 2009-2012      NRC Postdoctoral Research Associate, Air Force Inst. of Technology, Dayton, OH
- Studied TCE cometabolism by methane and ammonia oxidizers
  - Used tested techniques to enrich root-associated microbes
  - Mentored graduate students to strengthen research skills and habits
- 2006-2007      Intern, Ecolotree Inc., North Liberty, IA
- Designed, installed, and maintained phytoremediation tree plots
  - Represented small consulting firm to clients
  - Wrote white papers directed towards regulatory agencies
- 2003-2009      Graduate Teaching Assistant, University of Iowa, Iowa City, IA
- Taught software help sessions for Excel, MS Word, and MATLAB
  - Held regular office hours to help students with questions arising from homework and pre-examination review.
- 2003 - 2009      Graduate Research Assistant, University of Iowa, Iowa City, IA
- Characterized perchlorate degradation in planted and bioaugmented soil reactors
  - Determined change in bacterial *cll* gene diversity due to plant presence
  - Electrolytically generated perchlorate from chloride to create radiolabeled tracer
  - Wrote proposals and progress reports to funding agencies

## PATENTS

Shelley, M., Agrawal, A., Qin, K., **Struckhoff, G.**, Enfield, C., Waldron, J., & Powell, C. (2014). Upward flow constructed wetland for treatment of water contaminated with chlorinated aliphatics. *U.S. Patent No. 8,894,849*. Washington, DC: U.S. Patent and Trademark Office.

## BOOK CHAPTERS (Peer Reviewed)

Kurwadkar, S., **Struckhoff, G.C.**, Mishra, P., Modha, N., Murga, E., Amaral, B., Machado, G., Gomes, N. (2015) Modeling Fate and Transport of Emerging Micro-Pollutants in the Environment. Emerging Micro-Pollutants in the Environment: Occurrence, Fate, and Distribution. 97-112

## PUBLICATIONS

### Peer Reviewed

1. **Struckhoff, G.C.**, Lopez, J., Gonzalo, J. (2017). Phytoremediation of 1,4-Dioxane by Basil (*Ocimum basilicum*) and Radish (*Raphanus sativus*). Under revision with *International Journal of Phytoremediation*.
2. Kurwadkar, S., **Struckhoff, G.**, Pugh, K., & Singh, O. (2017). Uptake and translocation of sulfamethazine by alfalfa grown under hydroponic conditions. *Journal of Environmental Sciences*, 53, 217-223.
3. Qin, K., **Struckhoff, G.C.**, Agrawal, A., Shelley, M.L., Dong, H. (2014) Natural Attenuation Potential of Trichloroethene in Wetland Plant Roots: Role of Native Ammonium-Oxidizing Microorganisms. *Chemosphere* 119, 971-977.
4. **Struckhoff, G. C.**, Livermore, J. A., & Parkin, G. F. (2013), Diversity of The Chlorite Dismutase Gene in Low and High Organic Carbon Rhizosphere Soil Colonized by Perchlorate-Reducing Bacteria. *International Journal of Phytoremediation*, 15(9), 830-843.
5. Shrout, J.D., **Struckhoff, G.C.**, Parkin, G.F., Schnoor, J.L. (2006), Stimulation and Molecular Characterization of Bacterial Perchlorate Degradation by Plant-Produced Electron Donors. *Environ. Sci. Technol.* 40(1), 310-317.
6. Burken, J.G., Ma, X.M., **Struckhoff, G.C.**, Gilbertson, A.W. (2005), Volatile Organic Compound Fate in Phytoremediation Applications: Natural and Engineered Systems. *Z. Naturforsch.* 60c(3/4), 208-215.
7. **Struckhoff, G.C.**, Burken, J.G. (2005), Vapor-Phase Exchange of Perchloroethene between Soil and Plants. *Environ. Sci. Technol.* 39(6), 1563 -1568.
8. **Struckhoff, G.C.**, Burken, J.G., Schumacher, J.G. (2004), Effect of Soil PCE on Uptake and Loss by Plants In: Proceedings of the 4<sup>th</sup> International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Battelle Press, Columbus, OH.

### Non-Peer Reviewed

1. Gonzalo, J., Lopez, J., **Struckhoff, G.C.** Phytoremediation of 1,4-Dioxane by *Ocimum basilicum* and *Raphanus sativus*. (2014) Proceedings of the 9<sup>th</sup> International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Battelle Press, Columbus, OH.
2. Schumacher, J.G., **Struckhoff, G.C.**, Burken, J.G. (2004), *Assessment of Subsurface Chlorinated Solvent Contamination Using Tree Cores*. USGS Scientific Investigations Report 2004-5049, 35pp.

## SELECTED PRESENTATIONS

### Platform

1. **Struckhoff, G.C.**, Gonzalo, J. “Wireless Data Collection System to Assess Solar Panel Efficiency on Greenroofs.” *14<sup>th</sup> International Phytotechnologies Conference*, Montreal, QC, Canada, September 25 – 29, **2017**.
2. Schkoda, S., Cecena, S., **Struckhoff, G.C.** “Inhibitory Effects of Hops (*Humulus lupulus*) on Algal Growth.” *Southern California Conferences for Undergraduate Research*, Claremont, CA, November 21, **2015**.
3. **Struckhoff, G.C.**, Gonzalo, J., Lopez, J. “Phytoremediation of 1,4-Dioxane with Sweet Basil and Common Radish.” *12<sup>th</sup> International Phytotechnologies Conference*, Manhattan, KS, September 27 – 30, **2015**.
4. Schkoda, S., **Struckhoff, G.C.** “Evaluating the Effectiveness of *Chlorella vulgaris* in Treatment of Brewery Effluent.” *Southern California Conferences for Undergraduate Research*, Fullerton, CA, November 22, **2014**.
5. **Struckhoff, G.C.** “Phytoremediation of 1,4-Dioxane with Sweet Basil and Radish,” *9<sup>th</sup> International Conference on Remediation of Chlorinated and Recalcitrant Compounds*, Monterey, CA, May 19-22, **2014**.
6. Lopez, J., Gonzalo, J., **Struckhoff, G.C.** “Phytoremediation of 1,4-dioxane with sweet basil,” *Southern California Conferences for Undergraduate Research*, Whittier, CA, November 23, **2013**.
7. **Struckhoff, G.C.**, Qin, K., Gigandet, K., Agrawal, A. “Aerobic cometabolism of a suite of chlorinated hydrocarbons in flow-through wetland-plant mesocosms.” *10<sup>th</sup> International Phytotechnologies Conference*, Syracuse, NY, October 1 – 4, **2013**.
8. Agrawal, C. Powell, K. Qin, M. Smith, **G. Struckhoff**, and M. Shelley Biodegradation of Chlorinated Hydrocarbons in Plant Roots: Role of Aerobic-Anaerobic Interface in Shallow Wetland Environments. *246<sup>th</sup> ACS National Meeting*, Indianapolis, IN, Sept 8–12, **2013**.
9. Smith, M.M., Qin, K., **Struckhoff, G.C.**, Shelley, M.L., Agrawal, A. Biodegradation of Emerging Contaminants In Shallow Wetland Environments by Aerobic Cometabolism. Presentation at *Second International Bioremediation and Sustainable Environmental Technologies Symposium*, Jacksonville, FL, June 10-13, **2013**.
10. Qin, K., Agrawal, A., **Struckhoff, G.C.**, Shelley, M.L. Aerobic Degradation of Chlorinated Hydrocarbons by Ammonia and Nitrite Oxidizers Associated with Wetland Plant Roots. Presentation at *Second International Bioremediation and Sustainable Environmental Technologies Symposium*, Jacksonville, FL, June 10-13, **2013**.
11. **Struckhoff, G.C.**, Agrawal, A., Shelley, M.L. Cometabolism of cis-DCE and TCE Driven by Wetland Plant Root Products and Root-Associated Microorganisms. *8<sup>th</sup> Intl. Phytotechnologies Conference*, Portland, OR, Sept. 13-16, 2011.
12. **Struckhoff, G.C.**, Agrawal, A., Shelley, M.L. Stimulation of cis-DCE and TCE cometabolism by Wetland Plant Root Products and Associated Microorganisms. *Battelle Bioremediation and Sustainable Environmental Technologies Symposium*, Reno, NV, June 27-30, 2011.
13. **Struckhoff, G.C.**, Parkin, G.F., Livermore, J.L. Performance and Microbial Diversity during Phytoremediation of Perchlorate in High and Low Organic Matter Soil. *Sixth International Phytotechnologies Conference*, St. Louis, MO, Dec. 2-4, 2009
14. **Struckhoff, G.C.**, Parkin, G.F. Plant-Influenced Variation of ORP in Soil and the Effect on Perchlorate Bioremediation. *Sixth International Conference on Remediation of Chlorinated and Recalcitrant Compounds*, Monterey, CA. May 19-22, 2008
15. **Struckhoff, G.C.**, Burken, J.G., Schumacher, J.G. Vadose Zone PCE: An Important Source and Fate in Planted Systems; *Third International Phytotechnologies Conference*, Atlanta, GA, April 20-22, 2005.



## Poster

1. **Struckhoff, G.C.**, Ayad, M., Borrayo, A., Garcia, E., Saucedo, G., Schkoda, S., Smith, G. “Algal Conversion of Brewery Waste to Biofuel.” *12<sup>th</sup> International Phytotechnologies Conference*, Manhattan, KS, September 27 – 30, **2015**.
2. Lopez, L., Mercado, C., Cook, D., **Struckhoff, G.C.** “Rhizoremediation of 1,4-dioxane by Hybrid Populus trees and Amycolata sp. CB1190.” *Southern California Conferences for Undergraduate Research*, Fullerton, CA, November 22, **2014**.
3. Gigandet, K., **Struckhoff, G.C.**, Qin, K., Agrawal, A., Shelley, M.L. Bench-scale degradation of chlorinated compounds in the root zone of wetland plant *Scripus atrovirens*. *Annual Meeting of Geological Society of America*, Charlotte, NC, November 4-6, **2012**.
4. **Struckhoff, G.C.**, Taylor, A., Agrawal, A., Shelley, M.L. Wetland Plant Root Products Stimulate Cometabolic Degradation of Chlorinated Hydrocarbons. *241<sup>st</sup> ACS National Meeting and Exposition*, Anaheim, CA. March 27-31, 2011.
5. **Struckhoff, G.C.**, Parkin, G.F. Plant-Influenced Variation of Oxidation-Reduction Potential in Soil Systems and the Effect on Perchlorate Bioremediation. *Fourth International Phytotechnologies Conference*, Denver, CO. Sep. 24-26, 2007. (Best Student Poster Award, Honorable Mention)

## MASTERS THESES MENTORED

Salamanca, J. (2016). *Evaluation of runoff quality from an extensive green roof system*. California State University, Fullerton.

## PROFICIENCIES & SKILLS

- Algal Biofuels
- Environmental molecular biology
- Gas and ion chromatography
- Solar Panel / Greenroof Interactions
- Hydroponic and soil-based plant propagation
- Plant-microbe-contaminant interactions

## RESEARCH INTERESTS

- Application of molecular biology to environmental engineering
- Sustainable remediation technologies
- Eco-friendly alternative energy sources
- Phytoremediation
- Quality of life in the developing world

## SCHOLARLY HONORS AND AWARDS

- Sept. 2007 Best Poster Award, Honorable Mention: *The Fourth International Phytotechnologies Conference*
- July 2005 Fellow, Center for Biocatalysis and Bioprocessing (CBB), University of Iowa
- May 2004 Best Student Paper Award, Winner: *Fourth International Conference on Remediation of Chlorinated and Recalcitrant Compounds*, Battelle Memorial Institute
- April 2003 Honorable Mention, NSF Graduate Research Fellowship
- August 2000 Member of Chi Epsilon
- April 2000 Member of Tau Beta Pi, chapter president, chapter adviser

## PROPOSALS AND GRANTS

In Progress	Industry grant to fund greenroof expansion	Approx. \$20,000
Oct 2015	EPA Urban Water Small Grant	\$59,000, declined
Apr 2014	CSUF Intramural Grant	<b>\$2,466, awarded</b>
Aug. 2013	CSU Campus as a Living Lab Program	\$12,000, declined
May 2013	CSUF Fund My Research Series	<b>\$750, awarded</b>
March 2013	DOE Grant for SSFL Soil Study	\$240,000, declined
Jan. 2013	U.S. DHS Summer Research Opportunity	\$14,000, declined
Sept. 2012	WRPI Program from CSU Chancellor	<b>3 WTU Assigned Time</b>

## TEACHING ACCOMPLISHMENTS

Summer '13, '14, '15, '16  
Engineering Innovations

Represented CSUF in a summer program introducing high school students to engineering in a 16-week-equivalent class taught at a college level. The program is headquartered at Johns Hopkins University.

## SERVICE ACTIVITIES

- Member of University Writing Proficiency Committee 2017 – Present
- Department Search Committee Member 2016 – Present
- Member of ECS Curriculum Committee 2016 – Present
- Member of ECS Safety Committee 2015 – Present
- Inaugural Chair of University Writing Proficiency Committee 2015 – 2017
- Chair of two Department committees 2014 – 2016
- University Bicycling Committee Member 2013 – Present
- Advisor for Chi Epsilon, the Civil Engineering Honor Society 2013 – Present
- Advisor for the CSUF Society of Environmental Engineers 2013 – Present
- Member of three or more Department committees 2013 – Present

## Curriculum Vita

**Binod Tiwari, Professor; Civil and Environmental Engineering Department**  
[btiwari@fullerton.edu](mailto:btiwari@fullerton.edu)/ (657)278-3968

### Educational Background

Niigata University	Environmental Mgmt Science/ Geotechnical Engineering	PhD/2003
Niigata University	Geo- and Biosphere Science/ Geotechnical Engineering	MSc/2000
Tribhuvan University	Civil Engineering	BSc/1992

### Academic Appointments

Professor	California St. University, Fullerton	2015 – present
Associate Professor	California St. University, Fullerton	2012 – 2015
Assistant Professor	California St. University, Fullerton	2006 – 2012
Visiting Associate Professor	Kobe University, Japan	2013 – 2014
Lecturer	Johns Hopkins University	2008 – present
Post-doctoral Research Associate	Virginia Tech	2003-2006

### Administrative Appointments

Interim Program Coordinator, MS Environmental Engineering Program, CSU Fullerton, 2017-present  
Acting Chair, Civil & Environmental Engineering Department, CSU Fullerton, 2013

### Professional Services

Vice President, International Consortium on Landslides; Board Member, Southern California Conference on Undergraduate Research; Chair, Engineering Division, Council for Undergraduate Research; Co-Lead, Post-earthquake Reconnaissance Visit Team, 2015 Gorkha Earthquake, Nepal, Geotechnical Extreme Event Reconnaissance, Funded by NSF; Member, Post-earthquake Reconnaissance Visit Team, 2011 Tohoku Earthquake Japan, American Society of Civil Engineers; Award Committee Chair, Geo-Institute Technical Committee on Slopes, Embankment, and Dams, American Society of Civil Engineers; Geo-challenge Director, Geo-Institute Student Participation Committee, American Society of Civil Engineers; Past Chair, ASCE Geo-Institute Los Angeles Chapter; Executive Editor, ICL Journal Landslides; Associate Editor, ASCE Journal of Geotechnical and Geo-environmental Engineering; Associate Editor-in-chief, International Journal of Geo-environmental Disasters; Editor, International Journal of Geotechnical Engineering; Fellow and Advisory Board member, American Society of Nepalese Engineers; Honorary fellow, International Consortium on Landslides; Scientific Committee Member, LARAM.

### Selected Publications in Past 5 years (*names in italics are CSUF Students*)

#### ***Book and Manuals***

1. Tiwari, B. and Kuo, J. “Geotechnical Engineering for Environmental; Engineers”, CRC Press

(scheduled, August 2018).

2. Sassa, K., Tiwari, B., Liu, K.F., McSaveney, M., Strom, A., and Setiawan, H. (2018) “Landslide Dynamics: ISDR-ICL Landslide Interactive Teaching Tools”, Springer Nature.
3. Tiwari, B. (2017) “Slope Stabilization and Landslide Prevention”, Half Moon Education Pub.
4. Tiwari, B. (2017) “Retaining Wall Design and Slope Stabilization Techniques”, Half Moon Pub.
5. Mikos, M., Tiwari, B., Yin, Y., Sassa, K. (2017). “Advancing Culture of Living with Landslides”, Springer Nature.

### ***Journal Publications***

1. Tiwari, B., Pradel, D., Ajmera, B., Yamashiro, B., and Diwakar, K. 2018. “Landslide Movement at Lokanthali during the 2015 Earthquake in Gorkha, Nepal,” Journal of Geotechnical and Geoenvironmental Engineering, 144(3), 05018001 1-12.
2. Ajmera, B., Tiwari, B., Koriala, J., and Obaid, Z. T. A. 2017. “Compaction Characteristics, Unconfined Compressive Strengths, and Coefficients of Permeability of Fine-Grained Soils Mixed with Crumb Rubber,” Journal of Materials in Civil Engineering, ASCE, 29 (9), 04017148 1-10.
3. Tiwari, B., Ajmera, B., and Dhital, S. 2017. “Characteristics of Moderate to Large Scale Landslides Triggered by the Mw8 Gorkha Earthquake and Its Aftershocks,” Landslides, Springer Nature, 14 (4), 1297-1318.
4. Tiwari, B., Ajmera, B., and Villegas, D. 2017. “Dynamic Properties of Lightweight Cellular Concrete for Geotechnical Applications,” Journal of Materials in Civil Engineering, ASCE 30 (2), 04017271 1-10. (*Highlighted as the Most Read Article*).
5. Ajmera, B., Brandon, T., and Tiwari, B. (2017) Influence of Index Properties on Shape of Cyclic Strength Curve for Clay-Silt Mixtures, Soil Dynamics and Earthquake Engineering, Elsevier, 102, 46-55.
6. Tiwari, B., Ajmera, B., Maw, R., Cole, R., Villegas, D., and Palmerson, P. 2017. “Mechanical Properties of Lightweight Cellular Concrete for Geotechnical Applications,” Journal of Materials in Civil Engineering, ASCE, 29 (7), 06017007 1-7. (*Highlighted as the Most Read Article*).
7. Swarat, S., Oliver, P., Tran, L., Childers, G., Tiwari, B., and Babcock, J. 2017. How Disciplinary Differences Shape Student Learning Outcome Assessment: A Case Study, AERA Open, 3(1), 1–12.
8. Xue, K., Ajmera, B., Tiwari, B., and Hu, Y. 2016. Effect of Long Duration Rainstorm on Stability of Red-clay Slopes, International Journal of Geo-environmental Disasters, Springer, 3:12, 1-13.
9. Kawakatsu, T., Kawai, K., Tiwari, B., and Izuka, A. 2015. PORE AIR BEHAVIOR WITHIN A SLOPING EARTH STRUCTURE. Journal of Japan Society of Civil Engineers, 71 (2), 171-180.
10. Moss, R., Thompson, E. M., Kieffer, D. S., Tiwari, B., Hashash, Y. M. A., Acharya, I., Adhikari, B., Asimaki, D., Clahan, K. B., Collins, B. D., Dahal, S., Jibson, R. W., Khadka, D., Macdonald, A., Madugo, C. L. M., Mason, H. B., Pehlivan, M., Rayamajhi, D., Uprety, S. 2015. Geotechnical Effects of the 2015 Magnitude 7.8 Gorkha, Nepal Earthquake and Aftershocks, Seismological Research Letters, Seismological Society of America, 86, 1514-1523.
11. Tiwari, B. and Ajmera, B. 2014. Reduction in Fully Softened Shear Strength of Natural Clays with NaCl Leaching and Its Effect on Slope Stability, Journal of Geotechnical and Geoenvironmental

Engineering, ASCE, 04014086-1-10 (*Runner up for the nomination of the ASCE Thomas Middlebrooks Award*).

12. Tiwari, B. and *Al-Adhadh, A. R.* 2014. Influence of Relative Density on Static Soil–Structure Frictional Resistance of Dry and Saturated Sand, *Geotechnical and Geological Engineering*, Springer, 32 (2), 411-427.
13. Tiwari, B. and *Ajmera, B.* 2013. Effects of Saline Fluid on Compressibility of Clay Minerals, *Environmental Geotechnics*, ICE Publishing, 1 (2), 108-120.
14. Pradel, D., Wartman, J. and Tiwari, B. 2013. Impact of Anthropogenic Changes in Liquefaction along Tone River During the 2011 Tohoku Earthquake, *Natural Hazards Review*, ASCE, 15 (1), 13-26.
15. Wartman, J., Dunham, L., Tiwari, B. and Pradel, D. 2013. Landslides in Eastern Honshu Induced by the 2011 Tōhoku Earthquake, *Bulletin of the Seismological Society of America*, 103 (2B), 1503-1521).
16. Tiwari, B., and *Das, K.K.*, 2013. Influence of Cement Content and Curing Period on the Geotechnical Properties of Cement-Modified Soil, *International Journal of Engineering Science and Management*, 3 (2) 43 - 47.
17. Tiwari, B., Kawai, K., *Caballero, S.*, and *Viradeth, P.* 2013. How rainfall and earthquake trigger shallow slides – experimental and numerical studies on laboratory prepared slopes, *International Journal of Landslide and Environment*, 1 (1), 109-110.
18. Tiwari, B. and *Ajmera, B.* 2012. New Correlation Equations for Compression Index of Remolded Clays, *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, 138, 6, 757-762.

#### ***Journal and ASCE Special Publications***

1. Tiwari, B., *Ajmera, B.*, *Yamashiro, B.*, and *Phan, Q.* 2018. “Effect of Overburden Pressure, Mineralogical Composition, and Plasticity on Post-Cyclic Shear Strength Degradation”, *Geotechnical Special Publication* (In press).
2. Tiwari, B., *Ajmera, B.*, *Khalid, M.*, *Donyanavard, S.*, and *Chavez, R.* 2018. “Influence of Slope Density on the Stability and Deformation of Clayey Slopes”, *Geotechnical Special Publication* (In press).
3. Tiwari, B., Pradel, D., and *Ajmera, B.* 2018. “Equations to calculate the undrained shear strength of lacustrine soil deposit with Swedish Cone Sounding”, *Geotechnical Special Publication* (In press).
4. *Ajmera, B.*, Tiwari, B., and *Al-Behadili, M.* 2018. “Effect of Normalization on Developing SHANSEP Based Undrained Shear Strengths of Fine-Grained Soils”, *Geotechnical Special Publication* (In press).
5. Tiwari, B., *Ajmera, B.*, and *Villegas, D.* 2018. “Cyclically Induced Deformations in Lightweight Cellular Concrete Backfilled Retaining Structures”, *Geotechnical Special Publication* (In press).
6. *Ajmera, B.*, Tiwari, B., and *Nassrudin, L.* 2018. “Effect of Plasticity and Effective Normal Stress on Coefficient of Consolidation and Hydraulic Conductivity of Fine-Grained Soils with Different Pore Fluid Chemistries”, *Geotechnical Special Publication* (In press).
7. *Ajmera, B.*, Tiwari, B., and *Ostrova, F.* 2018. “Influence of Salinity of Pore Fluid on the

- Undrained Shear Strength of Clays”, Geotechnical Special Publication (In press).
8. Tiwari, B., Ajmera, B., and Villegas, D. 2017. “Dynamic Characteristics of Lightweight Cellular Concrete,” Geotechnical Special Publication 280, ASCE, 827-833.
  9. Tiwari, B., Ajmera, B., and *Dhital, S.* 2017. “Geological, Topographical and Seismological Control on the Co-Seismic Landslides Triggered by the 2015 Gorkha Earthquake, Geotechnical Special Publication 278, ASCE, 234-243.
  10. Ajmera, B., Tiwari, B., and *Pandey, P.* 2017. “Use of Pore Pressure Response to Determine Shear Strength Degradation from Cyclic Loading,” Geotechnical Special Publication 281, ASCE, 19-26.
  11. Ajmera, B., and Tiwari, B. 2017. “Damping and Shear Moduli of Laboratory Prepared Mineral Mixtures,” Geotechnical Special Publication 281, ASCE, 10-18.
  12. *Khanal, P.*, Tiwari, B., Ajmera, B., *Mann, M.*, and *Al Quraishi, M.* 2017. “Parametric Study on the Influence of Replacement Ratio on Seismic Amplification in Soft Clay Sites Modified with Deep Soil Mixing Panels,” Geotechnical Special Publication 281, ASCE, 27-36.
  13. Tiwari, B. and Pradel, D. 2017. “Ground Deformation at Lokanthali, Kathmandu due to Mw 7.8 2015 Gorkha Earthquake,” Geotechnical Special Publication 2017, ASCE, 278, 333-342.
  14. Tiwari, B. and *Caballero, S.*, 2015. Experimental Model of Rainfall Induced Slope Failure in Compacted Clays, Geotechnical Special Publication, ASCE, 256, 1217-1226.
  15. Tiwari, B. 2014. Involving Students in Geotechnical Research from Their Early Career, Geotechnical Special Publication, ASCE, 234, 3939-3948.
  16. Tiwari, B., *Principe, M.*, and *Biabani, M.* 2014. Influence of activity and mineralogy in compaction and shear strength characteristics of clays, Geotechnical Special Publication, ASCE, 234, 1357-1366.
  17. Tiwari, B., *Fanaiyan, S.*, *Hastings, R.* and *Olgun, G.* 2014. Reduction in Seismic Ground Shaking With The Use of Soil-Cement Panels, Geotechnical Special Publication, ASCE, 234, 1186-1195).
  18. Tiwari, B., and *Upadhyaya, S.* 2014. Influence of Antecedent Rainfall on Stability of Slopes, Geotechnical Special Publication, ASCE, 234, 3243-3251.
  19. Tiwari, B., *Ajmera, B.*, *Moubayed, S.*, *Lemmon, A.*, *Styler, K.*, and *Martinez, J. G.* 2014. Improving Geotechnical Behavior of Clayey Soils with Shredded Rubber Tires-Preliminary Study, Geotechnical Special Publication, ASCE, 234, 3734-3743.
  20. Tiwari, B., and *Al-Adhadh, A. R.* 2014. Influence of void ratio on static soil-structure frictional resistance of dry and saturated sand, Geotechnical Special Publication, ASCE, 234, 1503-1510).
  21. Pradel, D., Wartman, J. and Tiwari, B. 2013. Failure of the Fujinuma Dams during the 2011 Great East Japan Earthquake, Geotechnical Special Publication, ASCE, 231 (1), 1566-1580.
  22. Tiwari, B., Wartman, J. and Pradel, D. 2013. Slope Stability Issues After Mw9.0 Tohoku Earthquake, Geotechnical Special Publication, ASCE, 231 (1), 1594-1601.
  23. Tiwari, B., and *Duarte, S.* 2013. Performance of Slope Stabilization Works Stabilized with Drainage and Buttress, Geotechnical Special Publication, ASCE, 231 (1), 1697-1700.
  24. Tiwari, B., *Lewis, A.*, and *Ferrar, E.* 2013. Experimental Simulation of Rainfall and Seismic Effects to Trigger Slope Failures, Geotechnical Special Publication, ASCE, 231 (1), 448-451.
  25. Tiwari, B., and *Lewis, A.* 2012. Experimental Modeling of Rainfall and Seismic Activities as

- Landslide Triggers, Geotechnical Special Publication, ASCE, 225, 471-478.
26. Tiwari, B., and Douglas, R. 2012. Application of GIS Tools for Three-Dimensional Slope Stability Analysis of Preexisting Landslides, Geotechnical Special Publication, ASCE, 225, 479-488.
  27. Ajmera, B., and Tiwari, B. 2012. Consolidation Characteristics of Soft Clays with Saline Water as a Pore Fluid, Geotechnical Special Publication, ASCE, 225, 1223-1232.
  28. Tiwari, B., Ajmera, B., Moubayed, S., Lemmon, A., and Styler, K. 2012. Soil Modification with Shredded Rubber Tires, Geotechnical Special Publication, ASCE, 225, 3701-3708.
  29. Ajmera, B., Tiwari, B., and Shrestha, D. 2012. Effect of Mineral Composition and Shearing Rates on the Undrained Shear Strength of Expansive Clays, Geotechnical Special Publication, ASCE, 225, 1185-1194.
  30. Paykov, O., Tiwari, B., Correa, A., and Ruiz, S. 2012. Appraisal of the irreversible effect of organic compounds on geotechnical properties of clays, Geotechnical Special Publication, ASCE, 225, 1233-1242.

### **Major Grants (in past 5 years)**

Internal Grants – 2017: Incentive “Study on Post-earthquake Rainfall Induced Landslides Framework”, \$15,000; 2016: Senior: “Contribution of Geological and Topographical Setting on Post-earthquake Rainfall Induced Landslides”, \$5,000; 2014: *Junior*: “Study on Combined Effect of Earthquake and Rainfall to Trigger Landslides”, \$8,718; 2012: *Incentive*: “Use of recycled Materials in Civil Engineering Application”, \$ 10,000.

External Grants – 2017: *NSF through RPI* “Mixed Reality and Mobile Gaming for 21st Century Engineering Education”, 15,000; 2015: *Partners of the Americas Foundation*, 100,000 *Strong in the Americas, Competition #91*, “CSUF-UNESP Sorocaba: Bilateral Exchange for Engineering Students”, \$110,700; 2015: *Cell-Crete Corporation*, “Study on applicability of Cell-Crete material as an appropriate backfill material for MSE wall” (PI), \$46,000; 2013: *Bechtel Undergraduate Science Grant*, “Collaborative Engagement across Science and Engineering”, \$20,000 (in collaboration with several faculty from the college of Natural Science and Mathematics); 2012: *National Science Foundation, USA: NEES-SG: Reduction of Seismic Shaking Intensity on Soft Soil Sites Using Stiff Ground Reinforcement*; (In collaboration with Virginia Tech and University of California Davis), \$926,000;

### **Professional Awards (in past 5 years)**

Outstanding Professor, 2017, CSU Fullerton; Associate Editor of the Year, J. of Geotech. & Geoenviron. Eng., 2017; Carol Barnes Teaching Excellence Award, 2016, CSU Fullerton; University Nominee, CSU Wang Family Excellence Award, 2015, 2016 and 2017; Outstanding Leadership Award, 2015, American Soc. of Civ. Engrs, GI Los Angeles Chapter; Outstanding Professor of the Year, CSUF CE Student Organizations (2013); Outstanding Faculty/Scholar, CSUF (2013, 2012, 2011); Distinguished Faculty of the Year, CSUF Alumni Association (2012); Outstanding Academic Advisor, CSUF Academic Advisement Center (2012).

**APPENDIX VII. SAMPLE COURSE SYLLABUS**



## CE 481 - Remediation of Contaminated Soil and Groundwater (Summer 2017)

Jeff Kuo, Ph.D., P.E.

<i>1</i>	<i>Date</i>	<i>Topic</i>
<i>1</i>	<i>5/29/17</i>	Overview of Solid Waste Management & Treatment (Chapter 1) Waste management and treatment Environmental ethics Environmental Legislation (Chapter 2) RCRA, CERCLA, and others (HSWA, CAA, etc.) Characterization of Vadose Zone (Chapters 4 & 15; EPA: p.59-71) Review of the concepts Soil gas survey
<i>2</i>	<i>6/5/17</i>	Determine Extent of Contamination Mass concentration relationships Practical engineering calculations for RI activities Sampling of Soil & Groundwater (Chapters 4& 15; EPA: p.123-154) Soil borings and vadose zone sampling Groundwater monitoring wells and sampling
<i>3</i>	<i>6/12/17</i>	Characterization of Groundwater Movement (Chap. 4 & 15; EPA: p.39-58) Darcy's velocity, seepage velocity, permeameters Aquifer tests Fate & Transport of Contaminants (Chapter 4) Contaminant release Mass of contaminants present in different phases Fate and transport of contaminants
<i>4</i>	<i>6/19/17</i>	Migration velocity of the dissolved plume in groundwater Diffusivity and dispersion Retardation factor Travel velocity of dissolved plume Physicochemical Processes in Subsurface (Chapter 3; EPA: p.155-192) Organic contaminants Gas-phase transport Inorganic contaminants Organic-inorganic interactions
<i>5</i>	<i>6/26/17</i>	Aquifer Restoration (EPA: p.243-259) Product removal Pump-and-treat remediation, groundwater extraction Review for the Midterm
<i>6</i>	<i>7/3/17</i>	Physicochemical Treatment Processes I - Soil Venting (Chap. 9; EPA: p.215-29) Radius of influence System design Physicochemical Treatment Processes II - Soil Washing (EPA: p.236-241) Principles and types of solvents System design

	<i>7/8/17</i>	<b>Midterm Examination (9:30 - 11:20)</b>
<b>7</b>	<i>7/10/17</i>	Physicochemical Treatment Processes III - Air Stripping (Chapter 9) Air stripping and steam stripping System design Physicochemical Treatment Processes IV - Chemical Treatment (Chap. 9; EPA: p.193-4) Dechlorination Free radical reactions, advanced oxidation process
<b>8</b>	<i>7/17/17</i>	Physicochemical Treatment V - Stabilization/Solidification (Chap. 11; EPA: p.232-6) Process descriptions Leaching mechanisms Biological Treatment Processes (Chapter 10; EPA: p229-232, p. 248-258) Soil bioremediation system design (biopiles, bioventing) Groundwater bioremediation design (air sparging, etc.)
<b>9</b>	<i>7/24/17</i>	Thermal Treatment Processes (Chapter 12) Heat transfer Reactor and process types Treatment of VOC-laden Air (Chapter 12) Selection of treatment methods System design Waste Minimization and Resource Recovery (Chapter 7) Waste minimization applications Management approaches
<b>10</b>	<i>7/31/17</i>	Risk Assessment & Management (Chapter 14) Risk assessment Risk management Facility Development and Operation (chapter 8) Site audit Closure plan and Post closure Remedial Alternative Analysis (Chapter 17) Development of alternatives Analysis of alternatives Brownfield Management Reactive Barrier Natural Attenuation
	<i>8/5/17</i>	<b>Final Exam (9:30 - 11:20)</b>

## CE 482 - WASTEWATER TREATMENT AND WATER RECLAMATION (Summer 2017)

Jeff Kuo, PhD, PE

	<u>Date</u>	<u>Topic</u>
1.	05/29/17	<i>Wastewater Engineering: An Overview</i> Wastewater & sludge treatment Wastewater reclamation & effluent disposal <i>Wastewater Characteristics I</i> Wastewater constituents and sampling Definitions and measurements of physical characteristics Inorganic non-metallic and metallic constituents
2.	06/05/17	<i>Wastewater Characteristics II</i> Definitions and measurements of organic chemical characteristics Biological characteristics Toxicity testing
3.	06/12/17	<i>Analysis and Selection of Flow Rates and Mass Loadings</i> Selection of design flow rate and mass loading  <i>Introduction to Process Analysis and Selection</i> Mass balance concept Reactor types and flow regimes Elements of conceptual process design
4.	06/19/17	<i>Physical Unit Operations I</i> Screening Flow equalization Mixing and flocculation Gravity separation theory <i>Physical Unit Operations II</i> Primary sedimentation and high rate clarification Flotation Aeration, oxygen transfer and VOC removal
5.	06/26/17	<i>Chemical Unit Processes</i> Chemical coagulation Precipitation Chemical oxidation <i>Review for the Midterm</i>
6.	07/03/17	<i>Biological Unit Processes I - Fundamentals</i> Microbial metabolism Kinetics of biological growth Cell growth and substrate utilization <i>Biological Unit Processes I - Suspended Growth</i> Activated sludge process
	07/08/17	<b>Midterm (13:00 - 14:50)</b>

7. 07/10/17 *Biological Unit Processes I - Suspended Growth*  
 Design calculations  
*Biological Unit Processes II - Attached Growth and Others*  
 Trickling filters  
 Rotary biological contactors  
 Anaerobic wastewater treatment  
 Low-tech solutions
8. 07/17/17 *Biological Unit Processes III - O&M and Nutrient Removals*  
 Process analysis  
 Process Control  
 Operational problems  
 Biological nutrient removal  
*Sludge Treatment*  
 Sludge sources, characterization, and quantities  
 Preliminary operations  
 Conditioning and dewatering
9. 07/24/17 *Sludge Treatment*  
 Stabilization  
 Sludge digestion  
 Composting  
 Incineration and land disposal  
*Disinfection Processes*  
 Disinfection theory  
 Chlorination/chloramination  
 Dechlorination  
 Ozonation and UV disinfection
10. 07/31/17 *Advanced Wastewater Treatment*  
 Depth filtration  
 Membrane processes  
 Adsorption  
 Ion exchange  
 Air stripping  
 Advanced oxidation process  
*Wastewater Reclamation & Reuse*  
 Issues  
 Wastewater reclamation technologies
- 08/05/17 *Final Exam (13:00-14:50)*

**California State University, Fullerton**  
**College of Engineering and Computer Science**  
**Department of Civil and Environmental Engineering**

**EGCE 515-51 Solid Waste Management, System Design, and Sustainability**  
SCH 21775  
**Spring Semester 2018**

<b>Instructor:</b>	Binod Tiwari, Ph.D., P.E.	<b>Class Meeting:</b>	<b>online</b>
<b>Office:</b>	E-419	<b>Class Room:</b>	<b>online</b>
<b>Phone:</b>	(657) 278- 3968	<b>Units:</b>	<b>3</b>
<b>Fax:</b>	(657) 278- 3916		
<b>Email:</b>	<a href="mailto:btiwari@fullerton.edu">btiwari@fullerton.edu</a>		

**Prerequisite** EGCE 436 or equivalent or enrolled in MS Environmental Engineering  
Students registered for this course should have completed the prerequisite course. During the semester, the department will verify the prerequisite requirements. If any student has completed the prerequisite course at another school, please submit appropriate documents to the department secretary. Otherwise, their name will be deleted from the class list at any time during the semester.

**Required textbook**

- "Design, Operation, and Closure of Municipal Solid Waste Landfill" by EPA (1994)
- "Guide to Technical Resources for the Design of Land Disposal Facilities" by EPA (1988)
- "Design and Construction of RCRA/CERCLA Final Covers" by EPA (1991)
- "State of Practices for Bioreactor Landfills" by EPA (2001)
- "Requirements for Hazardous Waste Landfill Design, Construction, and Closure" by EPA (1989)
- "Geo-environmental Engineering" by Hari D. Sharma and Krishna R. Reddy, John Wiley, 2004

**Reference Materials**

- "*Geotechnical Aspects of Landfill Design and Construction*" by Qian et al., Prentice Hall (2002)
- "*Design, Construction, and Monitoring of Landfill*" by Bagchi, John Wiley & Sons, (1994)
- "*Geotechnology of Waste Management*" by Oweis & Khera, PWS Publishing (1998)
- "*Waste Containment Systems, Waste Stabilization, and Landfills*" by Sharma & Lewis, Wiley (1994)

**Office Hours**

**Monday** **16:00 – 17:00**

**Course Description**

Industrial waste treatment and disposal, waste minimization, process selection, control, green technologies and resource recovery. Design of liners, gas and leachate collection and removal systems in landfills.

**Course Learning Objectives**

This course covers industrial waste treatment and disposal, waste minimization, process selection, control, green technologies, and resource recovery. Design of liners, gas and leachate collection and removal systems in landfills. Students will learn:

- solid waste characterization and relevant regulations
- solid waste management (resources recovery, waste minimization, sustainability)
- design of clay liners
- design of flexible membrane liners
- design of gas collection and removal systems
- design of landfill final cover
- issues related to landfill operation and management

### **Program Educational Objectives**

The educational objectives of the program are as follows:

- A) Technical Growth: Graduates will be successful in modern engineering practice, integrate into the local and global work force, and contribute to the economy of California and nation.

### **Assessment of Student's Learning**

The effect of this course on student's learning ability will be assessed according to the following criteria:

- (3a) Understanding contemporary environmental issues related to pollution management (solid waste).
- (3b) Ability to conduct conceptual design of sustainable treatment processes (solid waste).

### **Required Technical Competencies and Equipment**

All course materials will be distributed using the CSUF TITANium system available at <http://TITANium.fullerton.edu>. Students will additionally be expected to submit assignments and participate in class discussion periods using TITANium. In order to use TITANium and their student portal, students will need access to a computer and an Internet connection capable of handling large file downloads and a data transmission rate for real-time discussions and viewing web-cast materials. Submission of hand-written problem sets will require the use of a scanner.

### **Planned Assignments**

Thirteen problem sets will be assigned throughout the semester, approximately one every week. The problem sets may include selected problems from the text as well as longer analyses devised by the instructor. Assignments must be submitted electronically through TITANium by midnight of the day they are due. Unless specifically indicated by the instructor, assignments should be submitted in a pdf format. Calculations or diagrams completed by hand should be scanned and submitted as a pdf file.

The TITANium features will be used to ensure the security and authenticity of student work. Students will also be assigned participation in discussion boards and chat rooms through TITANium. A small team project will also be assigned and a team presentation is required. The project report should be in pdf format as well.

### **On-Line Participation**

Student on-line participation will be graded based on the number and content of postings in discussion sessions. Additionally, the frequency of accessing assigned web pages will be taken into account. Student activities within TITANium will be tracked by the instructor and recorded as

a log of on-line activity, including access of assigned readings, problem sets, lecture notes, and on-line presentations.

### Examinations

The mid-term and final examinations should be taken either on-campus or at the approved test centers. The final examination will be comprehensive.

### On-line Availability of Instructor

The instructor will monitor course emails at during the specified office hours. During real-time course assignments such as chat rooms, the instructor will answer immediately. Alternatively, the instructor may be reached by phone.

### Grading Policy

Assignments will be evaluated and assigned a grade to provide students with feedback on the quality of their efforts. Assignments will be distributed throughout the semester as roughly indicated by the Course Schedule. The final grade for the course will be calculated as follows:

- Web access of lectures/materials 5%
- Participation in on-line discussions 5%
- Mini-project report and presentation 20% (*Due: May 12, 2018, 5 pm PST*)
- Homework 20% (*Due: check syllabus*)
- Mid-term examination 20% (*March 17, 2018 10:00-11:30 am*)
- Final examination 30% (*May 12, 2018 9:30 – 11:20 am*)

### Letter Grades

- |                               |                |                              |
|-------------------------------|----------------|------------------------------|
| • A <sup>+</sup> (> 97%)      | A (93 – 96.9%) | A <sup>-</sup> (90 – 92.9 %) |
| • B <sup>+</sup> (87 – 89.9%) | B (83 – 86.9%) | B <sup>-</sup> (80 – 82.9 %) |
| • C <sup>+</sup> (77 – 79.9%) | C (73 – 76.9%) | C <sup>-</sup> (70 – 72.9 %) |
| • D <sup>+</sup> (67 – 69.9%) | D (63 – 66.9%) | D <sup>-</sup> (60 – 62.9%)  |
| • F (< 60%)                   |                |                              |

### On-campus Meeting Requirements

None

### Technical Support

In case of technical problems, students may contact the CSUF Help Desk at 657-278-7722.

### Disability Statement

Students having a disability or special need for which they are or may be requesting an accommodation are requested to inform the instructor and contact the Disabled Student Services Office, located in University Hall 101, as early as possible in the term. For more information, the Disabled Student Services Office can be reached by calling (657) 278-3117 or visiting their website at [www.fullerton.edu/disabledservices/](http://www.fullerton.edu/disabledservices/). Confidentiality will be protected.

### Academic Integrity Statement

As stated in the CSUF Catalog "Plagiarism" is defined as the act of taking the specific substance of another and offering it as one's own without giving credit to the source. When sources are used,

acknowledgment of the original author or source must be made following standard scholarly practice." It is expected that all work submitted for this course, as well as any other at Cal State Fullerton, will be the student's own unless properly attributed to another author. All work should be original for this class and specific to the assignment. Unless an assignment is specifically designated a team project, all assignments are expected to be completed individually. For any questions, students can contact the instructor.

Students who violate university standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the university. Since dishonesty in any form harms students, and the university, policies on academic integrity are strictly enforced. We expect that students will familiarize themselves with the academic integrity guidelines in the current *Catalog* and *Student Handbook*.

### **Appropriate On-Line Behavior**

In all of their on-line interactions with the course instructor and their student colleagues, students in this course are expected to exhibit appropriate on-line behavior. Such guidelines have been famously compiled as "netiquette" by Virginia Shea (<http://www.albion.com/netiquette>). In summary:

- Do not write something on-line that would be considered rude or offensive in person;
- Abide by civil and criminal laws (paying for shareware; eschewing piracy);
- Make sure that the content you post is appropriate to the tone and purpose of the domain;
- Respect others' time and bandwidth by being succinct and taking care not to post accidentally;
- Use formal language that is appropriate to a classroom setting;
- Share what you know with others when it is helpful;
- Do not perpetuate extended "flaming";
- Respect the privacy of others;
- Do not abuse your expert knowledge;
- Be forgiving of others' mistakes.

You are encouraged to read more about netiquette at <http://www.albion.com/netiquette>

### **Drop Policy**

The Spring 2018 Schedule contains the University Regulations and Deadlines for dropping this course. Students should note that the department stamp and/or department chair's signature is also required in addition to instructor's signature to drop the course.



## Detailed Class Schedule

Week	Day	Topic/s	Due Date
1	January 20	Course Introduction	
		Review of Pre-requisite Materials	
2	January 27	Introduction to Landfill and Landfill Technology	
		<ul style="list-style-type: none"> <li>• <i>Introduction and overview of landfill components</i></li> <li>• <i>Regulations and minimum technology guidance</i></li> <li>• <i>Site Selection</i></li> <li>• <i>A case story of landfill phases - design, construction, operation, and closure</i></li> </ul>	
3	February 3	Liner Design: Clay Liner I	Home Work # 1
		<ul style="list-style-type: none"> <li>• <i>Soil classification, phase diagrams, index properties</i></li> <li>• <i>Basic properties of clay</i></li> <li>• <i>Darcy's law and hydraulic conductivity</i></li> <li>• <i>Measurements of hydraulic conductivity</i></li> </ul>	
4	February 10	Liner Design: Clay Liner II	Home Work # 2
		<ul style="list-style-type: none"> <li>• <i>Factors affecting hydraulic conductivity</i></li> <li>• <i>Compaction</i></li> </ul>	
5	February 17	Contaminants' travel through clay liner	Home Work # 3
		Geosynthetic clay liner	
6	February 24	Liner Design: Flexible Membrane Liner I	Home Work # 4
		<ul style="list-style-type: none"> <li>• <i>Geomembrane materials</i></li> <li>• <i>Behaviors of geomembrane materials</i></li> <li>• <i>Design of access ramps</i></li> </ul>	
7	March 3	Liner Design: Flexible Membrane Liner II	Home Work # 5
		<ul style="list-style-type: none"> <li>• <i>Design of runout and anchor trenches</i></li> <li>• <i>Leakage through FMLs</i></li> </ul>	
8	March 10	Liquid Management I - Leachate Generation	
		<ul style="list-style-type: none"> <li>• <i>Leachate quality</i></li> <li>• <i>Rate of leachate generation</i></li> <li>• <i>Leachate Treatment</i></li> </ul>	Home Work # 6
9	March 17	Liquid Management II - Leachate Collection and Removal	
		<ul style="list-style-type: none"> <li>• <i>Geonet design for leachate drainage</i></li> <li>• <i>Design of leachate collection pipes and drainage materials</i></li> <li>• <i>Response time</i></li> <li>• <i>HELP model</i></li> </ul>	Home Work # 7
		<b>Mid-term Exam 10:00 – 11:30</b>	
10	March 24	Design of Gas Collection and Removal System	Home Work # 8
		<ul style="list-style-type: none"> <li>• <i>Gas composition and generation</i></li> </ul>	

		<ul style="list-style-type: none"> <li>• <i>Gas migration rate</i></li> <li>• <i>Design of gas collection system</i></li> </ul>	
12	<b>March 26-April 1</b>	<b>Spring Recess</b>	<b>No Class</b>
13	April 7	Design of Final Cover	
		<ul style="list-style-type: none"> <li>• <i>Components of final cover system</i></li> <li>• <i>Alternative landfill cover</i></li> <li>• <i>Soil erosion control</i></li> <li>• <i>Run-on/run-off control</i></li> </ul>	Home Work # 9
13	April 14	Landfill Settlement	Home Work # 10
		<ul style="list-style-type: none"> <li>• <i>Mechanisms of solid waste settlement</i></li> <li>• <i>Estimate of landfill settlement</i></li> <li>• <i>Effect of settlement on landfill capacity</i></li> </ul>	
14	April 21	Landfill Construction I - Clay Liner	Home Work # 11
		Landfill Construction II - Flexible Membrane Liners	
15	April 28	Bioreactor Landfills	Home Work # 12
		<ul style="list-style-type: none"> <li>• <i>Types of bioreactor landfills</i></li> <li>• <i>Bioreactor landfill issues and concerns</i></li> <li>• <i>Status of bioreactor landfills</i></li> </ul>	
16	May 5	Other Relevant Topics	
		<ul style="list-style-type: none"> <li>• <i>Liner compatibility with wastes</i></li> <li>• <i>Performance monitoring</i></li> <li>• <i>Long-term considerations</i></li> <li>• <i>Leak response action plan</i></li> </ul>	Home Work # 13 Mini project
		<b>Review for Final Exam</b>	
	<b>May 12 2018 09:30-11:20</b>	<b>Final Exam</b>	

## Emergency Procedures Notice to Students

The safety of all students attending California State University Fullerton is of paramount importance. During an emergency it is necessary for students to have a basic understanding of their personnel responsibilities and the University's emergency response procedures. In the event of an emergency please adhere to the following guidelines

### Before an emergency occurs-

1. Know the safe evacuation routes for your specific building and floor.
2. Know the evacuation assembly areas for your building.

### When an emergency occurs-

1. Keep calm and do not run or panic. Your best chance of emerging from an emergency is with a clear head.
2. Evacuation is not always the safest course of action. If directed to evacuate, take all of your belongings and proceed safely to the nearest evacuation route.
3. Do not leave the area, remember that faculty and other staff members need to be able to account for your whereabouts.
4. Do not re-enter building until informed it is safe by a building marshal or other campus authority.
5. If directed to evacuate the campus please follow the evacuation routes established by either parking or police officers.

### After an emergency occurs-

1. If an emergency disrupts normal campus operations or causes the University to close for a prolonged period of time (more than three days), students are expected to complete the course assignments listed on the syllabus as soon as it is reasonably possible to do so.
2. Students can determine the University's operational status by checking the University's web site at <http://www.fullerton.edu>, calling the University's hotline number at 657-278-0911, or tuning into area radio and television stations. Students should assume that classes will be held unless they hear or read an official closure announcement.

#### EMERGENCY CALLS

##### DIAL 9-1-1

All campus phones and cell phones on campus reach the  
University Police Department

Non-emergency line: (657) 278-2515

24-hour recorded emergency information line: (657) 278-0911  
(657) 278-4444

**CALIFORNIA STATE UNIVERSITY, FULLERTON  
ENGINEERING AND COMPUTER SCIENCE  
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**

**EGCE 546: Surface Water Pollution**

**Instructor:** Sudarshan Kurwadkar

**Office:** E-307

**Phone:** (657) 278-2457

**Email:** skurwadkar@fullerton.edu

**Office Hours:** 1:00 PM – 3:00 PM Tuesday and Thursday

**Skype:** sudarshan.kurwadkar

**Course Description**

Prerequisites: EGCE 436 or enrollment in MS environmental engineering program.

Sources, quality, and quantity of stormwater runoff, best management practices (BMPs), system design of structural BMPs, green technologies, design for wastewater discharge into rivers, lakes, and oceans. One or more sections may be offered in an online format.

**Course Objective and Learning Goals**

This course covers sources, quality and quantity of stormwater runoff pollutants, and Best Management Practices systems that are used to decrease surface water pollution. Students will experience an overview of appropriate disposal and treatment processes. Student goals include:

- An understanding of the various ways in which surface water can become contaminated;
- Familiarity with BMPs used to reduce surface water impairment; and
- Understanding of the process of disposal of water into lakes, rivers, estuaries, and the ocean.

**Student Learning Outcomes**

- An ability to utilize scientific inquiry and knowledge skills to design and solve and interpret complex engineering problems.
- An ability to design a specific system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability and to work as part of a team.
- An ability to communicate effectively.
- Recognition of the need for, and an ability to engage in life-long learning and knowledge of contemporary issues.

**Textbooks**

1. "Design Handbook for Low Impact Development Best Management Practices," Riverside County Flood Control and Water Conservation District (2011)
2. "Low Impact Development Manual for Southern California," SCSMC / SWRCB (2010)
3. "Stormwater Best Management Practice Design Guide," EPA/600/R-04/121 (2004)
4. "Stormwater Best Management Practices – New Development and Redevelopment" by California Stormwater Quality Association (2003).
5. "Stormwater Best Management Practices – Construction" by CSQA (2003).
6. "Storm Water Quality Handbook – Project Planning and Design Guide" by Caltran (2002)
7. "Urban Runoff Pollution Prevention and Control Planning," EPA/625/R-93/004 (1993)
8. "Urban Drainage Design Manual - Hydraulic Engineering Circular No. 22", U.S. Dept. of Transportation (1996)
9. "Constructed Wetland Treatment of Municipal Wastewaters," EPA/625/R-99/010 (1999)
10. "Remediation of Contaminated Sediments," EPA/625/6-91/028 (1991)
11. "Wastewater Engineering (Chapter 17)" by Metcalf and Eddy, Inc. McGraw-Hill (1991)

## References

- 1."Stormwater Management" by M. Wanielista & Y. Yousef, John Wiley & Sons (1993)
- 2."Stream, Lake, Estuary, and Ocean Pollution (2nd ed.)" by N.L. Nemerow, VNR (1991)
- 3."Ocean Environmental Management" by, E.G. Frankel (1995)

## Response Time

The instructor will monitor course emails at least twice a week during the specified office hours. Every effort will be made to respond to emails within 48 hours (except weekends). The instructor will also be available on Skype during office hours or by appointment. Skype availability may not always be immediate, depending upon the presence of other students in the office. During real-time course assignments such as chat rooms, the instructor will answer immediately. Alternatively, the instructor may be reached by phone.

## Course Communication

All course announcements and individual email are sent through Titanium, which only uses CSUF email accounts. Therefore, you MUST check your CSUF email on a regular basis (several times a week) for the duration of the course.

## Course Schedule

WEEK	Date	TOPICS COVERED
1	20-Jan	Introduction to the Course and Watershed Basics
2	27-Jan	Introduction to Urban Stormwater Runoff
3	3-Feb	Hydrograph and Event Loading
4	10-Feb	Introduction to Best Management Practices (BMP)
5	17-Feb	Structural BMP - Design I
6	24-Feb	Structural BMP - Design II
7	3-Mar	Structural BMP - Design III
8	10-Mar	Structural BMP - Design III
	<b>17-Mar</b>	<b>Mid-Term Exam at 12:00 to 1:50 PM; Room E201</b>
9	24-Mar	Surface Water Pollution-Effluent Disposal Part I
	31-Mar	<b>Spring Break, March 26th – April 1st</b>
10	7-Apr	Surface Water Pollution-Effluent Disposal Part II
11	14-Apr	Disposal into Rivers
12	21-Apr	Disposal into Rivers -CBOD and NBOD
13	28-Apr	Disposal into Rivers
14	5-May	Final Review
	<b>12-May</b>	<b>Final Exam: 12:00 to 1:50 PM; ROOM E201</b>

## Required Technical Competencies and Equipment

All course materials will be distributed using the CSUF TITANIUM system. Students will additionally be expected to submit assignments and participate in class discussion periods using TITANIUM. To use TITANIUM and student portal, students will need access to a computer, an Internet connection capable of handling large file downloads, and a data transmission rate for

real-time discussions and viewing web-cast materials. Submission of hand-written problem sets will require the use of a scanner. The details of minimum technical specifications, internet connection/access, and computer skills and competencies are shown below:

### **1. Minimum Technical Specifications**

To fully participate in this course, you will need to have and successfully operate a computer system that meets the following minimum technical specifications:

#### **Computer Requirements**

**Operating System:** Windows XP or higher, Macintosh OS X

**Processor:** 1.0 GHz or higher preferred. **Memory:** 1 GB of RAM or higher.

**Plug-ins:** Adobe Reader, Flash Player, Quicktime, Java, Windows Media Player

**Browser:** Chrome or Firefox (Safari for Mac)

**Software:** Microsoft Office 2003 or Open Office, PowerPoint 2010 Viewer

**E-mail Account:** Must be able to send/receive attachments.

**2. Internet Connection/Access:** Students are required to have a reliable connection to the Internet. The speed and reliability of your connection can and will directly influence your online learning experience and your ability to complete exams, online exercises, and assignments. A Cable, DSL, or other high-speed network is highly recommended.

### **3. Computer Skills and Competencies**

Students who enroll in online courses and/or programs must have the requisite knowledge to use the computer, navigate the internet, and use TITANium. It is not the instructor's responsibility to teach students how to use the computer, navigate the internet, send and/or receive emails or how to use the TITANium system.

#### **Online Participation**

Student online participation will be graded based on the number and content of postings in discussion sessions. A minimum of five meaningful blog postings throughout the semester will be required for full participation credit. Your number of login attempts into the course material is also indicative of the fact that you are accessing the material regularly and keeping track of the material. A number of login attempts will be taken into account to award the points towards class participation.

#### **Planned Assignments**

There will be homework assignments throughout the semester. Homework assignments will be calculation/design type problems relevant to class discussion. Assignments must be submitted electronically through TITANium by midnight of the day they are due. Unless specifically indicated by the instructor, assignments should be submitted in a standard readable format (PDF preferred). Assignments must also be submitted in a single file. Calculations or diagrams completed by hand may be scanned and submitted as a PDF, jpeg, or png. Ensure that scanned documents are readable, particularly if using the greenish engineering paper. Missed assignments will be rewarded zero points. Excused late assignments will be accepted, provided the student has communicated with the instructor ahead of time. Late homework will receive penalty ranging from 10 to 50 % depending on how late the submission is.

In the event of technical problems, students may submit hard copies of assignments by hand delivering or faxing their work to the Civil and Environmental Engineering office in E-100 (657-

278-3016). Assignments must be labeled with the course number and instructor's name. Students who submit or fax assignments to the office must notify the instructor ahead of time.

### **Examinations**

Examinations will be offered on-campus on a Saturday for those near enough to drive in. Those students who do not live nearby to drive, they will have to arrange to take the exams at an approved testing center. The final examination will be comprehensive. Anyone missing a scheduled examination must notify the instructor or the department office in advance except for *bona fide* emergencies. A written letter must follow absence from a medical doctor or another appropriate official. For excused absences, no make-up examinations will be given, and the score of the other examination may be just extended, at the discretion of the instructor. Unexcused absences will count as a zero score obtained. Cheating and use of unfair means during the examination will result in automatic 'F' grade in the class.

### **Grading Policy**

Assignments will be evaluated and assigned a grade to provide you with feedback on the quality of your efforts. Assignments will be distributed throughout the semester as roughly indicated by the Course Schedule. The final grade for the course will be calculated as follows:

▪ Web access of lectures/materials	5%
▪ Participation in online discussions	5%
▪ Homework sets	15%
▪ Midterm examination	35%
▪ Final examination	40%

The "+/-" grading will be used, and final grades will be computed according to the following scale:

#### **Tentative Letter Grade**

Note that this is *tentative* grading guideline.

A+ (4.0): 97 – 100	C+ (2.3): 77 – 79	F (0.0): 0 – 59
A (4.0): 93 – 96	C (2.0): 73 – 76	
A- (3.7): 90 – 92	C- (1.7): 70 – 72	
B+ (3.3): 87 – 89	D+ (1.3): 67 – 69	
B (3.0): 83 – 86	D (1.0): 63 – 66	
B- (2.7): 80 – 82	D- (0.7): 60 – 62	

### **On-campus Meeting Requirements**

There is no mandatory meeting requirement. However, the option exists for those students within driving distance to take the Midterm and Final exams on campus. Those students who do not attempt the exams on campus will be required to take it at the approved testing centers and at their own expense.

### **Technical Support**

In case of technical problems, students may contact the CSUF Help Desk at 657-278-7722.

### **Students with Special Needs**

Please inform the instructor during the first week of classes about any disability or special needs that you may have that may require specific arrangements related to attending class sessions, carrying out class assignments, or writing papers or examinations. According to California State University policy, students with disabilities must document their disabilities at the Disability Support Services (DSS) Office in order to be accommodated in their courses. Additional

information can be found at the DSS website, by calling 657-278-3112 or email [dsservices@fullerton.edu](mailto:dsservices@fullerton.edu)

### **Academic Dishonesty Policy**

Academic dishonesty includes such things cheating, inventing false information or citations, plagiarism, and helping someone else commit an act of academic dishonesty. It usually involves an attempt by students to show possession of a level of knowledge or skill, which they, in fact, do not possess. Cheating is defined as the act of obtaining or attempting to obtain credit for work by the use of any dishonest, deceptive, fraudulent, or unauthorized means. Plagiarism is defined as the act of taking the work of another and offering it as one's own without giving credit to that source. Instructors who believe that an act of academic dishonesty has occurred (1) are obligated to discuss the matter with the student(s) involved; (2) should possess reasonable evidence such as documents or personal observation; and (3) may take whatever action (subject to student appeal) they deem appropriate, ranging from an oral reprimand to an F in the course. Additional information on this policy is available from University Policy Statement 300.02 [http://www.fullerton.edu/senate/publications\\_policies\\_resolutions/ups/UPS%20300/UPS%20300.021.pdf](http://www.fullerton.edu/senate/publications_policies_resolutions/ups/UPS%20300/UPS%20300.021.pdf)

It is expected that all work submitted for this course, as well as any other at Cal State Fullerton, will be your own unless properly attributed to another author. All work should be original for this class and specific to the assignment. Unless an assignment is specifically designated a team project, all assignments are expected to be completed individually. If you have any questions, please contact the instructor.

Students who violate university standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the university. Since dishonesty in any form harms you, other students, and the university, policies on academic integrity are strictly enforced. Safeguards, such as verification the identity of students during online participation and the exams shall be taken at a proctored place, will be taken to ensure the authenticity of student work.

### **Appropriate Online Behavior**

In all of their online interactions with the course instructor and their student colleagues, students in this course are expected to exhibit appropriate online behavior. Such guidelines have been famously compiled as “netiquette” by Virginia Shea (<http://www.albion.com/netiquette>). In summary:

- Do not write something online that would be considered rude or offensive in person;
- Abide by civil and criminal laws (paying for shareware; eschewing piracy);
- Make sure that the content you post is appropriate to the tone and purpose of the domain;
- Respect others' time and bandwidth by being succinct and taking care not to post accidentally;
- Use formal language that is appropriate to a classroom setting;
- Share what you know with others when it is helpful;
- Do not perpetuate extended “flaming”;
- Respect the privacy of others;
- Do not abuse your expert knowledge;
- Be forgiving of others' mistakes.

You are encouraged to read more about netiquette at <http://www.albion.com/netiquette>



### **Emergency Preparedness**

To be able to respond effectively in an emergency, be sure to note (a) fire alarm pull station locations, (b) evacuation map including the class's outside meeting area, (c) emergency procedures for fire, medical emergency, hazardous materials release, earthquake and dangerous situations, and (d) location of nearest emergency phone. Any person with special needs is encouraged to speak with the instructor privately. All campus personnel are required to participate in all campus-wide drills. More emergency preparedness information can be found at the [Classroom Preparedness website](#).

<http://prepare.fullerton.edu/campuspreparedness/ClassroomPreparedness.php>

The emergency procedures (c above) that you need to follow in our class are detailed in the classroom guide at the end of this syllabus.

If an emergency disrupts normal campus operations or causes the University to close for a prolonged period (more than three days), students are expected to complete the course assignments listed on the syllabus as soon as it is reasonably possible to do so.

### **Library Support**

The Library offers various resources and services to assist students receiving online instruction. Students can download a PDF copy here

[http://www.library.fullerton.edu/resources/pdf\\_word/guidelines-online-instruction-30aug12.pdf](http://www.library.fullerton.edu/resources/pdf_word/guidelines-online-instruction-30aug12.pdf)

Library guidelines can be accessed through the web link:

<http://www.library.fullerton.edu/about/guidelines/online-instruction-guidelines.php>

### **Final Exams Schedule**

Student can access the final examination schedule by visiting the web link

<http://records.fullerton.edu/registration/finalexaminations.php>

### **University Learning Center**

The goal of the University Learning Center is to provide all CSUF students with academic support in an inviting and contemporary environment. The staff of the University Learning Center will assist students with their academic assignments, general study skills, and computer user needs. The ULC staff work with all students from diverse backgrounds in most undergraduate general education courses including those in science and math; humanities and social sciences; as well as other subjects. They offer one-to-one peer tutoring, online writing review, and many more services. More information can be found on the [University Learning Center website](#).

### **Writing Center**

The Writing Center offers 30-minute; one-on-one peer tutoring sessions and workshops, aimed at assisting with all written assignments and student writing concerns. Writing Center services are available to students from all disciplines. Registration and appointment schedules are available at the [Writing Center Appointment Scheduling System](#). Walk-in appointments are also available on a first come, first served basis, to students who have registered online. More information can be found at the [Writing Center webpage](#). The Writing Center is located on the first floor of the [Pollak Library](#) their phone number is (657) 278-3650.

## EGCE 570 Fate and Transport of Chemicals in the Environment (Fall 2016)

- |     | <u>Date</u> | <u>Topic</u>   |
|-----|-------------|--|
| 1.  | 08/20/16    | <i>Course Overview</i><br><i>Chemistry for Environmental Engineers I</i><br>Matter and measurements<br>Atoms, molecules, and ions<br>Stoichiometry: calculations with chemical formula and equations |
| 2.  | 08/27/16    | <i>Chemistry for Environmental Engineers II</i><br>Aqueous reactions and solution stoichiometry<br>Thermochemistry   |
| 3.  | 09/03/16    | <i>Chemistry for Environmental Engineers III</i><br>Periodic properties of the elements<br>Concepts of chemical bonding<br>Gases   |
| 4.  | 09/10/16    | <i>Chemistry for Environmental Engineers IV</i><br>Intermolecular forces, liquids, and solids<br>Modern materials<br>Properties of solutions   |
| 5.  | 09/17/16    | <i>Chemistry for Environmental Engineers V</i><br>Properties of solutions (continued)<br>Chemical kinetics   |
| 6.  | 09/24/16    | <i>Chemistry for Environmental Engineers VI</i><br>Chemical equilibrium<br>Acids and bases   |
| 7.  | 10/01/16    | <i>Chemistry for Environmental Engineers VII</i><br>Additional aspects of aqueous equilibrium<br>Chemistry for the environment   |
| 8.  | 10/08/16    | <i>Chemistry for Environmental Engineers VIII</i><br>Chemical thermodynamics<br>Electrochemistry<br>Nuclear chemistry<br>Chemistry of nonmetals  |
| 9.  | 10/15/16    | <b>Midterm (13:00 - 14:50)</b>   |
| 10. | 10/22/16    | <i>Chemistry for Environmental Engineers IX</i><br>Metals and metallurgy<br>Chemistry of coordination compounds<br>Organic chemistry   |

## EGCE 570 Fate and Transport of Chemicals in the Environment (Fall 2016)

- |     | <u>Date</u> | <u>Topic</u>   |
|-----|-------------|--|
| 11. | 10/29/16    | <i>Water and Wastewater Quality Parameters</i><br>Physical characteristics<br>Chemical characteristics<br>Biological characteristics   |
| 12. | 11/05/16    | <i>Mass and Energy Balance, Reactors, and Heat Transfer</i><br>Mass and flow balances<br>Reactors and configuration<br>Mass loading<br>Hydraulic loading<br>Energy balance and heat transfer   |
| 13. | 11/12/16    | Mass of Contaminants Present in Different Phases<br>Mass-concentration relationship<br>Liquid-vapor equilibrium  |
| 14. | 11/19/16    | Mass of Contaminants Present in Different Phases (Continued)<br>Solid-liquid equilibrium<br>Partition of contaminants in different phases<br><i>Physical and Chemical Processes in the Subsurface</i><br>Advection-dispersion equation |
| 15. | 11/26/16    | <b>No Class (Thanksgiving Week)</b>  |
| 16. | 12/03/16    | <i>Physical and Chemical Processes in the Subsurface (continued)</i><br>Physical, chemical, and biological processes in the subsurface<br><i>Review</i>  |
| 17. | 12/10/16    | <b>Final Exam (13:00-14:50)</b>  |

Department of Civil and Environmental Engineering  
California State University, Fullerton

SYLLABUS

EGCE 571: Fall – 2017

Hydraulics and Hydrology for Environmental Engineers

---

**Instructor:** Phoolendra Mishra, ✉: [pkmishra@fullerton.edu](mailto:pkmishra@fullerton.edu), ☎: (657) 278-8808

**Office Hours:** Tu (3-5 pm), Th (11:30 am - 12:30 pm), Room E-319, Engineering building

**Recommended Book:** Water Resources Engineering by *Larry W. Mays*, 2<sup>nd</sup> Edition, John Wiley & Sons, Inc., (2010). Online e-textbook can be purchased at :

<https://www.vitalsource.com/products/water-resources-engineering-larry-w-mays-v9780470574164>.

**Reference Books:** Following are selected books that may be used as reference for this course.

- Mechanics of Fluids by *Potter, Wiggert and Ramadan*, 4<sup>th</sup> Edition, Delmar Cengage Learning.
- Introduction to Hydrology by *Viessman Lewis*, 5<sup>th</sup> Edition, Prentice Hall.

**Calculator Policy:** In this course students are allowed to use only National Council of Examiners for Engineering and Surveying (NCEES) approved calculators. For list of approved calculators, please refer to:

<http://ncees.org/exams/calculator-policy/>

Students find [TI 36X Pro](#) or [Casio FX-115 ES Plus](#) to be best suited for this course. Graphing calculators are not allowed. This requirement will be strictly enforced in all exams and in-class tests.

**Course Objectives:** Water is important and unique component of our earth and its environment. This course introduces various topics and methods related to water resources engineering. Theoretical, practical and computational approaches in hydraulics and hydrology will be introduced throughout the semester by lectures, homeworks and exams.

**Learning Outcomes:**

- Develop basic understanding of water as resource
- Understand the basic principles governing the flow of water in closed conduits and open channels
- Be able to apply mass conservation, energy conservation and momentum conservation principles
- Be able to distinguish different components of the hydrologic cycle mathematically and discuss scientifically how the various components interact
- Acquire skills in various methods of hydrologic analysis, including unit hydrograph, flow routing, statistical methods and frequency analysis.

**Grading:** A final [grade](#) will be awarded based on student's performance in class. Following grading criterion will be used in determining the final grade of the course:

**A<sup>+</sup>** [97 – 100]; **A** [93 – 97]; **A<sup>-</sup>** [90 – 93]; **B<sup>+</sup>** [87 – 90]; **B** [83 – 87]; **B<sup>-</sup>** [80 – 83]; **C<sup>+</sup>** [77 – 80]; **C** [73 – 77]; **C<sup>-</sup>** [70 – 73]; **D<sup>+</sup>** [67 – 70]; **D** [60 – 67]; **F** [0 – 60).

The final score will be computed using the following weights:

Class participation .....	10%
Midterm Exam .....	45%
Final Exam .....	45%

**Class Participation:** Class participation is integral component of this online course.

- Every student must participate on our course blog (<http://egce571.blogspot.com>).
- There will be weekly homework throughout the semester. Homework problems must be worked on 8.5" x 11" paper. Homework must be submitted electronically at Titanium. Late submission of homeworks or homework submission via email will not be accepted.
- Please regularly check Titanium course portal for other graded class participation activities.

**Grading Policy:** Please note following regarding general policy on grading homework quizzes and exams.

- Partial credit (if given) is solely on the discretion of the instructor and is not subject to appeal decision of the instructor is final
- Work which, while possibly correct but can not be followed will be considered incorrect
- It is responsibility of student to check that the grades on Titanium match their Homework/exams grades. If there is mismatch student must inform the instructor within **2 days** from the date grades have been posted

**Academic Honesty:** As a California State University, Fullerton student, you have agreed to abide by the University's academic honesty policy stated in [UPS 300.021](#). All academic work must meet the University standards. For additional information please refer to [Academic Integrity Resources](#). Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation.

**Course Outline:** Following is **tentative\*** outline of the course.

Week starting	Topics	Suggested Readings
August, 19 .....	W1: Introduction, Units & dimension, fluid density ..	Chapter 1 & 2, 3.1.1
August, 26 .....	W2: Properties of fluid, pressure, velocity & discharge .....	3.1, 3.1.2-3.1.8
September, 02 .....	W3: Application of mass, energy and momentum conservation .....	3.2-3.5
September, 09 .....	W4: Hydraulics of pressurized pipe flow, pumps & reservoir systems	4.1-4.3
September, 16 .....	W5: Pipe networks and water distribution systems .....	4.4, 4.5.1-4.5.3
September, 23 .....	W6: Hydraulics of open channel flow .....	5.1.1-5.1.4, 5.2
September, 30 .....	W7: Hydraulic jump, discharge measurement .....	5.5, 5.6.1-5.6.3
October, 07 .....	W8: Review session .....	
October, 14 .....	W9: <b>Midterm Exam</b> .....	
October, 21 .....	W10: Hydrologic cycle, water budget .....	7.1.1-7.1.5
October, 28 .....	W11: Precipitation, evaporation, infiltration .....	7.2-7.4
November, 04 .....	W12: Drainage basin, storm hydrograph .....	8.1, 8.2.1-8.2.3
November, 11 .....	W13: Rainfall-Runoff analysis, Unit hydrograph .....	8.3-8.8
November, 18 .....	W14: Reservoir routing .....	Chapter 9
November, 25 .....	W15: Fall Recess .....	
December, 02 .....	W16: Channel Routing .....	Chapter 9
December, 09 .....	W17: <b>Final Exam</b> .....	

\*Changes can be made by the instructor during the semester

**CALIFORNIA STATE UNIVERSITY, FULLERTON  
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**

**EGCE 572: Water Treatment & Design**

**Instructor:** Garrett Struckhoff

**Office:** E-306

**Phone:** (657) 278-8079

**Email:** gstruckhoff@fullerton.edu

**Office Hours:** Mon 10:00 – 12:00 PM

**Skype:** DrStruckhoff

Wed 11:30 – 12:30 PM

---

**Course Objective and Learning Goals**

This course covers theories, development, design, and operation of potable water treatment systems. Students will experience an overview of applicable chemical, separation, and disinfection processes. The course will finish up with a survey of current topics in potable water treatment. Learning goals include:

- an understanding of the various ways in which water quality is determined;
- familiarity with chemical processes used to treat drinking water;
- understanding of the separation techniques used to isolate water from contaminants; and
- knowledge of the process used to develop a treatment train for surface water sources.

**Required Text:**

MWH's Water Treatment: Principles and Design, 3<sup>rd</sup> Edition, 2012

John C. Crittenden, R. Rhodes Trussell, David W. Hand, Kerry J. Howe, George Tchobanoglous  
ISBN: 978-0470405390

**Supplemental Reading**

Water Quality & Treatment: A Handbook on Drinking Water, 5<sup>th</sup> Edition, 2010

American Water Works Association, James Edzwald, Editor  
ISBN: 978-0071630115

**Required Technical Competencies and Equipment**

All course materials will be distributed using the CSUF TITANIUM system. Students are expected to submit assignments and participate in class discussion periods using TITANIUM. In order to use TITANIUM and their student portal, students will need access to a computer and an Internet connection capable of handling large file downloads and a data transmission rate for real-time discussions and viewing web-cast materials. Submission of hand-written problem sets will require the use of a scanner. The details of minimum technical specifications, internet connection/access, and computer skills and competencies are shown below:

**1. Minimum Technical Specifications**

To fully participate in this course, you will need to have and successfully operate a computer system that meets the following minimum technical specifications:

### **Computer Requirements**

**Operating System:** Windows 7 or higher, Macintosh OS X

**Processor:** 2.0 GHz or higher preferred. **Memory:** 3 GB of RAM or higher.

**Applications:** Adobe Reader, Flash Player, Quicktime, Java, Windows Media Player

**Browser:** Chrome or Firefox (Safari for Mac)

**Software:** Microsoft Office 2007 or Open Office, PowerPoint 2010 Viewer

**E-mail Account:** Must be able to send/receive attachments.

**2. Internet Connection/Access:** Students are required to have a dependable connection to the Internet. The speed and reliability of your connection can and will directly influence your online learning experience and your ability to successfully complete exams, on-line exercises, and assignments. A Cable, DSL, or other high speed network is highly recommended.

### **3. Computer Skills and Competencies**

Students who enroll in online courses and/or programs must have the requisite knowledge to use the computer, navigate the internet, and use TITANium. It is not the instructor's responsibility to teach students how to use the computer, navigate the internet, send and/or receive emails or how to use the TITANium system.

### **Software for Students**

Did you know you can get FREE and low-cost software for being an active CSUF student? Software downloads and request forms can be found on the [CSUF Student Software website](#).

### **On-Line Participation**

Student on-line participation will be graded based on the number and content of postings in discussion sessions. A minimum of 5 meaningful blog postings throughout the semester will be required for full participation credit.

### **On-line Availability of Instructor**

The instructor will monitor course emails at least twice a week during the specified office hours. Every effort will be made to respond to emails within 24 hours during the week, but this is not guaranteed. Instructor will also be available on Skype during office hours or by appointment. Skype availability may not always be immediate, depending upon the presence of other students in the office. During real-time course assignments such as chat rooms, the instructor will answer immediately. Alternatively, the instructor may be reached by phone.

### **Planned Assignments**

Throughout the semester there will be biweekly homework assignments. Homework assignments will generally be calculation/design type problems relevant to class discussion. Assignments must be submitted electronically through TITANium by midnight of the day they are due. Unless specifically indicated by the instructor, assignments should be submitted in a standard readable format (PDF preferred). Calculations or diagrams completed by hand may be scanned and submitted as a PDF, jpeg, or png. Ensure that scanned documents are readable, particularly if using the greenish engineering paper.

In the event of technical problems, students may submit hard copies of assignments by hand delivering or faxing their work to the Civil and Environmental Engineering office in E-100 (657-278-3016). Assignments must be clearly labeled with the course number and instructor's name. Students who submit or fax assignments to the office must notify the instructor first.

### Examinations

Examinations will be offered on-campus on a Saturday for those near enough to drive in. Those students not near enough to drive in will need to make arrangements to take the exams at an approved testing center. The final examination will be comprehensive. Anyone missing a scheduled examination must notify the instructor or the department office in advance except for *bona fide* emergencies. An absence must be followed by a written letter from a medical doctor or other appropriate official. For excused absences, no make-up examinations will be given and the score of the other examination may be just extended, at the discretion of the instructor. Unexcused absences count as if a zero score has been obtained.

### Grading Policy

Assignments will be evaluated and assigned a grade to provide you with feedback on the quality of your efforts. Assignments will be distributed throughout the semester as roughly indicated by the Course Schedule. The final grade for the course will be calculated as follows:

- |  |     |
|--|-----|
| ▪ Participation in on-line discussions | 5%  |
| ▪ Homework/Quizzes                     | 20% |
| ▪ Midterm examination                  | 25% |
| ▪ Design Project                       | 25% |
| ▪ Final examination                    | 25% |

The “+/-“ grading will be used and final grades will be computed according to the following scale:

97 – 100% = A+	93 – 97% = A	90 – 93 % = A-
87 – 90 % = B+	83 – 87 % = B	80 – 83 % = B-
77 – 80 % = C+	73 – 77 % = C	70 – 73 % = C-
67 – 70 % = D+	63 – 67 % = D	60 – 63 % = D-
< 60% = F		

### On-campus Meeting Requirements

There is no required meeting requirement. However, the option exists for those students within driving distance to take the Midterm and Final exams on campus. Those that do not take the exams on campus will be required to take them at approved testing centers and at the students’ expense.

### Technical Support

In case of technical problems, students may contact the CSUF Help Desk at 657-278-7722.

### Disability Statement

If you have a disability or special need for which you are or may be requesting an accommodation, please inform the instructor and contact the Disability Support Services Office, located in University Hall 101, as early as possible in the term. For more information, the Disability Support Services Office can be reached by calling (657) 278-3117 or visiting their website at [www.fullerton.edu/DSS/](http://www.fullerton.edu/DSS/). Confidentiality will be protected.



### **Academic Integrity Statement**

As stated in the CSUF Catalog "**Plagiarism** is defined as the act of taking the specific substance of another and offering it as one's own without giving credit to the source. When sources are used, acknowledgment of the original author or source must be made following standard scholarly practice." It is expected that all work submitted for this course, as well as any other at Cal State Fullerton, will be your own unless properly attributed to another author. All work should be original for this class and specific to the assignment. Unless an assignment is specifically designated a team project, all assignments are expected to be completed individually. If you have any questions, please contact the instructor.

Students who violate university standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the university. Since dishonesty in any form harms you, other students, and the university, policies on academic integrity are strictly

enforced. We expect that you will familiarize yourself with the academic integrity guidelines in the current *Catalog* and *Student Handbook*.

Safeguards will be taken to ensure the authenticity of student work. Examples include: verification of the identity of students during on-line participation, off-campus exams taken at a proctored facility, and verification of student identity at exams.

### **Appropriate On-Line Behavior**

In all of their on-line interactions with the course instructor and their student colleagues, students in this course are expected to exhibit appropriate on-line behavior. Such guidelines have been famously compiled as "netiquette" by Virginia Shea (<http://www.albion.com/netiquette>). In summary:

- Do not write something on-line that would be considered rude or offensive in person;
- Abide by civil and criminal laws (paying for shareware; eschewing piracy);
- Make sure that the content you post is appropriate to the tone and purpose of the domain;
- Respect others' time and bandwidth by being succinct and taking care not to post accidentally;
- Use formal language that is appropriate to a classroom setting;
- Share what you know with others when it is helpful;
- Do not perpetuate extended "flaming";
- Respect the privacy of others;
- Do not abuse your expert knowledge;
- Be forgiving of others' mistakes.

### **Emergency Procedures Policy**

In the event of an emergency, please know the safe evacuation routes for your specific building and floor, as well as the evacuation assembly areas for your building. Students can determine the university's operational status by checking the university's web site at <http://www.fullerton.edu>, calling the university's hotline number at 657-519-0911, or tuning in to area radio and television stations. Students should assume that classes will be held unless they hear or read an official closure announcement. In the event of an emergency, please call 911. The campus non-emergency line is 657-278-2515, and the 24-hour recorded emergency information line is 657-519-0911. Additional information on university emergency procedures can be found at <http://prepare.fullerton.edu/campuspreparedness/>.

## Course Schedule

WEEK	Date	TOPICS COVERED	ASSIGNMENTS
1	Aug 19	Introduction to Water Quality	
2	Aug 26	Chemical and Physical Water Quality	
3	Sep 2	Microbiological Water Quality	
4	Sep 9	Water Treatment Regulations	HW 1 due
5	Sep 16	Introduction to Water Treatment	
6	Sep 23	Coagulation, Flocculation, Sedimentation – Part I	HW 2 due
7	Sep 30	Coagulation, Flocculation, Sedimentation – Part II	
8	Oct 7	Filtration – Part I	HW 3 due
<b>9</b>	<b>Oct 14</b>	<b>Mid-Term (Lectures 1 – 7) 9:30 – 11:20 AM</b>	
10	Oct 21	Filtration – Part II	
11	Oct 28	Chemical Oxidation	HW 4 due
12	Nov 4	Disinfection and DPB analysis	
13	Nov 11	Activated Carbon Adsorption and Membrane Processes	HW 5 due
14	Nov 18	Synthesis of Treatment Trains	
	<b>Nov 25</b>	<b>Fall Recess</b>	
15	Dec 2	Current Topics of Water Treatment	HW 6 due
	<b>Dec 9</b>	<b>Final Exam 9:30 – 11:20 AM</b>	

**CALIFORNIA STATE UNIVERSITY, FULLERTON**  
**DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**

**EGCE 573: ENVIRONMENTAL ENGINEERING PRACTICES AND PROJECT  
MANAGEMENT**

**Instructor:** Garrett Struckhoff

**Phone:** (657) 278-8079

**Office Hours:** 10:00 – 11:30 am, Tuesday and Thursday

**Office:** E-306

**Email:** gstruckhoff@fullerton.edu

**Skype:** DrStruckhoff

---

**Course Objective and Learning Goals**

This course combines topics of environmental regulation and assessment with elements of engineering project management. Students will experience an overview to environmental regulation including the Safe Drinking Water Act, the Clean Air Act, the Resource Conservation and Recovery Act, Superfund (CERCLA), and others. The engineering requirements of many of these regulations are environmental assessments including Environmental Impact Statements, Superfund RI/FS's, and RCRA RFA/RFIs. The course then presents more general principles and techniques of engineering project management. Student goals include:

- familiarity with federal and state laws and regulations governing environmental discharges to air, water, and land as well as handling of solid and hazardous waste;
- familiarity with the components and creation of Environmental Impact Statements and other environmental assessments;
- familiarity with the principles and calculations of basic engineering economics; and
- understanding of the management of engineering projects including planning, project initiation, cost estimation, budgeting, scheduling, project coordination, and project termination.

**Recommended Texts**

Environmental Law Handbook

By: Daniel M. Steinway, Kevin A. Ewing, David R. Case, Karen J. Nardi, William F. Brownell  
ISBN-13: 978-1605907253

Environmental Impact Assessment: A Guide to Best Professional Practices

By: Charles H. Eccleston

ISBN-13: 978-1439828731

Project Management for Environmental, Construction and Manufacturing Engineers

By: Nolberto Munier

ISBN-13: 978-9400744752

**Supplemental Reading**

Bass, R., Herson, A., and Bogdan, K. (2001). *The NEPA Book*. Solano Press Books, Point Area, CA.

Cropper, M. and Oates, W. (1992). Environmental Economics: A Survey. *Journal of Economic Literature*, 30(1992), 657-740.

## **Required Technical Competencies and Equipment**

All course materials will be distributed using the CSUF TITANium system. Students will additionally be expected to submit assignments using TITANium. In order to use TITANium and their student portal, students will need access to a computer and an Internet connection capable of handling large file downloads and a data transmission rate for viewing web-cast materials. Submission of hand-written problem sets will require the use of a scanner. The details of minimum technical specifications, internet connection/access, and computer skills and competencies are shown below:

### **1. Minimum Technical Specifications**

To fully participate in this course, you will need to have and successfully operate a computer system that meets the following minimum technical specifications:

#### **Computer Requirements**

**Operating System:** Windows 7 or higher, Macintosh OS X

**Processor:** 2.0 GHz or higher preferred.

**Memory:** 2 GB of RAM or higher.

**Plug-ins:** Adobe Reader, Flash Player, Quicktime, Java

**Browser:** Chrome or Firefox (Safari for Mac)

**Network Connection:** Cable, DSL, or other high speed network highly recommended.

**Monitor:** 15" monitor with 800 x 600 resolution capability or higher.

**Software:** Microsoft Office 2010 or Open Office, PowerPoint 2010 Viewer

**2. Internet Connection/Access:** Students are required to have a dependable connection to the Internet. The speed and reliability of your connection can and will directly influence your online learning experience.

### **3. Computer Skills and Competencies**

Students who enroll in online courses and/or programs must have the requisite knowledge to use the computer, navigate the internet, and use TITANium. It is not the instructor's responsibility to teach students how to use the computer, navigate the internet, send and/or receive emails or how to use the TITANium system.

## **Response Time**

I will strive to respond to email questions and phone calls within 48 hours. Include the course number and section in the email heading. If I have not responded after a few days, please resend the email. Due to the online nature of the program I receive a large number of emails and a few do slip through the cracks. I will check email regularly on most weekends, but there is the possibility of no internet access on my part.

## **Course Communication**

All course announcements and individual email are sent through TITANium, which only uses CSUF email accounts. Therefore, you **MUST** check your CSUF email on a regular basis (several times a week) for the duration of the course.

## **On-line Availability of Instructor**

The instructor will monitor course emails at least twice a week during the specified office hours. Instructor will also be available on Skype during office hours or by appointment. Skype availability may not always be immediate, depending upon the presence of other students in the office. The instructor may also be reached by office phone, which historically has worked best.

## Planned Assignments

Throughout the semester there will be five homework assignments and a larger term paper due at the end of the semester. Assignments will be graded with an emphasis on writing skills and timely feedback will be given to students to allow them to improve writing throughout the semester. Assignments must be submitted electronically through TITANium in a standard readable format (PDF preferred, Microsoft Word accepted). Calculations or diagrams completed by hand may be scanned and submitted as a PDF.

TITANium and TurnItIn features will be used to ensure the security and authenticity of student work. Students will also be assigned participation in discussion boards through TITANium.

In the event of technical problems, students may submit hard copies of assignments by hand-delivering or faxing their work to the Civil and Environmental Engineering office in E-100 (657-278-3016). Assignments must be clearly labeled with the course number and instructor's name.

## Term Paper

A 2,500 word research paper on the topic of your choice will be due in the last week of class. You are free to choose any topic for your research so long as it falls within the range of the materials covered in the course. A portion of the research paper grade will be derived from peer evaluations, and you will be expected to evaluate two of your peers.

## On-campus Meeting Requirements

There is no meeting requirement. However, the option exists for those students within driving distance to take the Midterm and Final exams on campus.

## Examinations

Examinations will be offered on-campus on a Saturday for those near enough to drive in. Those students not near enough to drive in will need to make arrangements to take the exams at an approved testing center. Anyone missing a scheduled examination must notify the instructor or the department office in advance except for *bona fide* emergencies. It must be followed by a written letter from a medical doctor or other appropriate official. For excused absences, no make-up examinations will be given and average scores in other examination may be extended, at the discretion of the instructor. Unexcused absences count as a zero score.

## Grading Policy

Assignments will be evaluated and assigned a grade to provide you with feedback on the quality of your efforts. Assignments will be distributed throughout the semester as indicated by the Course Schedule. The final grade for the course will be calculated as follows:

- |  |     |
|--|-----|
| ▪ Participation in on-line discussions | 5%  |
| ▪ Homework sets                        | 15% |
| ▪ Term paper                           | 20% |
| ▪ Midterm examination                  | 30% |
| ▪ Final examination                    | 30% |

The “+/-“ grading system will be used and final grades will be computed according to the following scale:

97 – 100% = A+; 93 – 97% = A; 90 – 93 % = A-; 87 – 90 % = B+; 83 – 87 % = B; 80 – 83 % = B-; 77 – 80 % = C+; 73 – 77 % = C; 70 – 73 % = C-; 67 – 70 % = D+; 63 – 67 % = D;  
< 63% = F

**Writing Center**

The Writing Center offers 30-minute, one-on-one peer tutoring sessions and workshops, aimed at providing assistance for all written assignments and student writing concerns. Writing Center services are available to students from all disciplines. Registration and appointment schedules are available at the [Writing Center Appointment Scheduling System](#). Walk-in appointments are also available on a first come, first served basis, to students who have registered online. More information can be found at the [Writing Center webpage](#). The Writing Center is located on the first floor of the [Pollak Library](#) their phone number is (657) 278-3650.

**On-Line Participation**

Student on-line participation will be graded based on the number and content of postings in discussion sessions. Full credit requires 5 posts to the course blog.

**Technical Support**

In case of technical problems, students may contact the CSUF Help Desk at 657-278-7722.

**Software for Students**

Did you know you can get FREE and low-cost software for being an active CSUF students? Software downloads and request forms can be found on the [CSUF Student Software website](#).

**Disability Statement**

If you have a disability or special need for which you are or may be requesting an accommodation, please inform the instructor within the first week of classes and contact the Disability Support Services Office, located in University Hall 101, as early as possible in the term. For more information, the Disabled Student Services Office can be reached by calling (657) 278-3112 or visiting their website at [www.fullerton.edu/DSS](http://www.fullerton.edu/DSS). Confidentiality will be protected.

**Academic Integrity Statement**

As stated in the CSUF Catalog "**Plagiarism** is defined as the act of taking the specific substance of another and offering it as one's own without giving credit to the source. When sources are used, acknowledgment of the original author or source must be made following standard scholarly practice." It is expected that all work submitted for this course, as well as any other at Cal State Fullerton, will be your own unless properly attributed to another author. All work should be original for this class and specific to the assignment. Unless an assignment is specifically designated a team project, all assignments are expected to be completed individually. If you have any questions, please contact the instructor.

Students who violate university standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the university. Since dishonesty in any form harms you, other students, and the university, policies on academic integrity are strictly enforced. We expect that you will familiarize yourself with the academic integrity guidelines in the current *Catalog* and *Student Handbook*.

Safeguards, such as verification of the identity of students during on-line participation and the exams taken at a proctored place, will be taken to ensure the authenticity of student work.

### **Appropriate On-Line Behavior**

In all of their on-line interactions with the course instructor and their student colleagues, students in this course are expected to exhibit appropriate on-line behavior. Such guidelines have been famously compiled as “netiquette” by Virginia Shea (<http://www.albion.com/netiquette>). In summary:

- Do not write something on-line that would be considered rude or offensive in person;
- Abide by civil and criminal laws (paying for shareware; eschewing piracy);
- Make sure that the content you post is appropriate to the tone and purpose of the domain;
- Respect others’ time and bandwidth by being succinct and taking care not to post accidentally;
- Use formal language that is appropriate to a classroom setting;
- Share what you know with others when it is helpful;
- Do not perpetuate extended “flaming”;
- Respect the privacy of others;
- Do not abuse your expert knowledge;
- Be forgiving of others’ mistakes.

### **Emergency Procedures Policy**

During an emergency it is necessary for students to have a basic understanding of their personal responsibilities and the university’s emergency response procedures. In the event of an emergency, please know the safe evacuation routes for your specific building and floor, as well as the evacuation assembly areas for your building. Students can determine the university’s operational status by checking the university’s web site, calling the university’s hotline number at (657) 519-0911, or tuning in to area radio and television stations. Students should assume that classes will be held unless they hear or read an official closure announcement. In the event of an emergency, please call 911. The campus non-emergency line is (657) 278-2515, and the 24-hour recorded emergency information line is (657) 519-0911. Additional information on university emergency procedures can be found at <http://prepare.fullerton.edu/campuspreparedness/>

## Course Schedule

WEEK	Date	TOPICS COVERED	ASSIGNMENTS
1	Jan 20	Environmental laws and regulations; National Environmental Protection Act; the regulatory process	
2	Jan 27	Federal environmental regulation: Safe Drinking Water Act; Clean Water Act	
3	Feb 3	Federal environmental regulation: Solid Waste Disposal Act/Resource Conservation and Recovery Act; definitions and types of waste; Subtitle C and D; Land Disposal Restrictions; hazardous waste facilities; Corrective action; RFA;RFI	HW 1 due 2/5
4	Feb 10	Federal environmental regulation: CERCLA/SARA (Superfund); Hazard Ranking System; National Priorities List; RIFS; ROD ;RA/RD	
5	Feb 17	Federal environmental regulation: Clean Air Act; Brownfields	HW 2 due 2/19
6	Feb 24	California Environmental Quality Act	
7	Mar 3	Overview of Environmental Case Law	Term Paper Proposal Due 3/5
8	Mar 10	Environmental Impact Assessment: types of assessments; steps of the process	HW 3 due 3/12
9	Mar 17	<b>Midterm Exam (Covering first 7 weeks)</b>	<b>March 17<sup>th</sup> @ 12:00 PM</b>
10	Mar 24	Assessing the physical environment; Prediction and assessment of impacts; risk assessment	
	Mar 31	<b>Spring Break, March 26<sup>th</sup> – April 1<sup>st</sup></b>	
11	April 7	Evaluation of alternatives and public participation; management of environmental impact statements; cost benefit analysis	
12	Apr 14	Engineering economics I - present value; interest rates; annual worth	HW 4 due 4/16
13	Apr 21	Engineering economics II - opportunity cost; return on investment; marginal analysis	
14	Apr 28	Introduction to Project Management	HW 5 due 4/30
15	May 5	Cost Estimation, Cost Control, Project Layout	Term Paper Due 5/7
		<b>FINAL EXAM: Saturday, May 12<sup>th</sup> @ 12:00 PM</b>	



## EG-CE 583 AIR POLLUTION CONTROL ENGINEERING (Spring 2018)

Jeff Kuo, PhD, PE

- | <u>Date</u> | <u>Topic</u>  |
|-------------|---|
| 1. 01/20/18 | <i>Introduction to Air Pollution Control (p. 1-12)</i><br>Introduction<br>Emissions, transport, receptors<br>Units and standards<br><i>Air Pollution Effects (p. 13 - 39)</i><br>Effects on human, property, and visibility                             |
| 2. 01/27/18 | <i>Air Pollution Effects (p. 13 - 39)</i><br>Sources of air pollutions<br><i>Air Pollution Control Laws and Regulations (p. 63 - 82)</i><br>Laws and regulations<br>Control philosophies  |
| 3. 02/03/18 | <i>Air Pollution Measurements and Emission Estimates (p.63-82)</i><br>Sampling, flow rate determination, analytical method<br>Emission factors<br><i>Meteorology for Air Pollution Control Engineers (p.83-118)</i><br>Horizontal atmospheric motion    |
| 4. 02/10/18 | <i>Meteorology for Air Pollution Control Engineers (p.83-118)</i><br>Vertical motion in the atmosphere<br>Winds<br>Temperature inversions, fumigations, and stagnations<br><i>Air Pollutant Concentration Models (p. 119 - 159)</i><br>Fixed box models |
| 5. 02/17/18 | <i>Air Pollutant Concentration Models (p. 119 - 159)</i><br>Diffusion models<br>Pollutant creation and decay in atmosphere  |
| 6. 02/24/18 | <i>General Ideas in Air Pollution Control (p. 160 - 208)</i><br>Alternatives<br>Design of air pollution control system and equipment<br>Combustion  |
| 7. 03/03/18 | <i>General Ideas in Air Pollution Control (p. 160 - 208)</i><br>Combustion<br>Flow rates, pressure drops, efficiencies, etc.<br><i>The Nature of Particulate Pollutants (p. 209 - 248)</i><br>Primary and secondary particles                           |
| 8. 03/10/18 | <i>The Nature of Particulate Pollutants (p. 209 - 248)</i><br>Settling velocity<br>Particle size distribution function<br>Behavior of particles in atmosphere   |

## EG-CE 583 AIR POLLUTION CONTROL ENGINEERING (Spring 2018)

Jeff Kuo, PhD, PE

- |     | <u>Date</u> | <u>Topic</u>   |
|-----|-------------|--|
| 9.  | 03/17/18    | <b>Midterm (12:00 - 13:50)</b>   |
| 10. | 03/24/18    | Control of Primary Particulates (p. 249-328)<br>Wall collection devices<br>Dividing collection device  |
| 11. | 03/31/18    | <b>No Class (Spring recess)</b>  |
| 12. | 04/07/18    | Control of VOCs (p. 329-394)<br>Basics<br>Control by prevention  |
| 13. | 04/14/18    | <i>Control of VOCs (p. 329-394)</i><br>Control by concentration and recovery<br>Control by oxidation   |
| 14. | 04/21/18    | <i>Control of Sulfur Oxides (p. 395-438)</i><br>Basics<br>Removal technologies   |
| 15. | 04/28/18    | <i>Control of Nitrogen Oxides (p. 439-470)</i><br>Basics<br>Removal technologies<br><i>The Motor Vehicle Problems (p. 471-510)</i><br>Problems and solutions |
| 16. | 05/05/18    | <i>Air Pollutants, Global Climate, and Other Topics (p. 511-557)</i><br>Global warming, ozone depletion, acid rain<br>HAPs, indoor air pollution             |
| 17. | 05/12/18    | <b>Final Exam (12:00-13:50)</b>  |

**CALIFORNIA STATE UNIVERSITY, FULLERTON  
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**

**EGCE 597: Graduate Project**

**Co-Instructor:** Garrett Struckhoff, PhD                      **Office:** E-306                      **Phone:** (657) 278-8079  
**Email:** gstruckhoff@fullerton.edu                      **Skype:** DrStruckhoff  
**Office Hours:** Tues 9:30-11:30am, Wed 11:30 – 12:30pm

**Co-Instructor:** Sudarshan Kurwadkar, PE, PhD                      **Office:** E-307                      **Phone:** (657) 278-2457  
**Email:** skurwadkar@fullerton.edu                      **Skype:** sudarshan.kurwadkar  
**Office Hours:** Mon, Wed 10:00 – 12:00 PM

**Course Objective and Learning Goals**

The goal of this course is that the students will have exposure to a systematic approach to performing research. They will experience learning through lecture-style teaching as well as through their own researches. They will be taught topics that include:

- (1) How to identify a proper research design and research plan
- (2) How to avoid plagiarism, use proper citations, and choose ideal sources
- (3) Conducting individual and team research
- (4) How to conduct a literature search,
- (5) How to critique technical articles,
- (6) Learning the essentials of preparing technical reports/memorandum (as well as presentations), and finally
- (7) Learning approaches to analyze experimental data,

**Required Technical Competencies and Equipment**

All course materials will be distributed using email and the CSUF TITANium system. Students will additionally be expected to submit assignments and participate in class discussion periods using TITANium and the course blog. In order to use TITANium and their student portal, students will need access to a computer and an Internet connection capable of handling large file downloads and data transmission rate high enough for real-time discussions and viewing of web-cast materials. Submission of hand-written problem sets will require the use of a scanner. The details of minimum technical specifications, internet connection/access, and computer skills and competencies are shown below:

**1. Minimum Technical Specifications**

You must have (access to) a computer system that meets the following minimum specifications:

**Computer Requirements**

- Operating System:** Windows 7 or higher, Macintosh OS X
- Processor:** 2.0 GHz or higher preferred.
- Memory:** 3 GB of RAM or higher.
- Plug-ins:** Adobe Reader, Flash Player, Quicktime, Java, Windows Media Player
- Browser:** Chrome or Firefox (Safari for Mac)
- Network Connection:** Cable, DSL, or other high speed network highly recommended.
- Monitor:** 15” monitor with 800 x 600 resolution capability or higher.
- Software:** Microsoft Office 2007 or Open Office, PowerPoint 2010 Viewer
- E-mail Account:** Must be able to send/receive attachments.

**2. Internet Connection/Access:** Students are required to have a dependable connection to the Internet. The speed and reliability of your connection can and will directly influence your online learning experience and your ability to successfully complete exams, on-line exercises, and assignments.

### **3. Computer Skills and Competencies**

Students who enroll in online courses and/or programs must have the requisite knowledge to use a computer, navigate the internet, and use TITANium. It is not the instructor's responsibility to teach students how to use a computer, navigate the internet, send and/or receive emails or how to use the TITANium system.

#### **Software for Students**

Did you know you can get FREE and low-cost software for being an active CSUF student? Software downloads and request forms can be found on the [CSUF Student Software website](#).

#### **On-Line Participation**

Student on-line participation will be graded based on the number and content of postings in discussion sessions and blog threads. A minimum of 5 meaningful postings will be required for full credit. Additionally, the frequency of accessing assigned web pages will be taken into account. Student activities within TITANium will be tracked by the instructor and recorded as a log of on-line activity, including access of assigned readings, problem sets, lecture notes, and on-line presentations.

#### **On-line Availability of Instructor**

The instructor will monitor course emails at least twice a week during the specified office hours. Every effort will be made to respond to emails within 24 hours during the week, but this is not guaranteed. Instructor will also be available on Skype during office hours or by appointment. Skype availability may not always be immediate, depending upon the presence of other students in the office. During real-time course assignments such as chat rooms, the instructor will answer immediately. Alternatively, the instructor may be reached by phone.

#### **Planned Assignments**

Throughout the semester there will be written homework assignments and a larger term paper/portfolio due at the end of the semester. Assignments will be graded with an emphasis on writing and research skills and timely feedback will be given to the students to allow them to improve writing throughout the semester. Assignments must be submitted electronically through TITANium by midnight of the day they are due. Unless specifically indicated by the instructor, assignments should be submitted in a standard readable format (Microsoft Word preferred, PDF accepted). Calculations or diagrams completed by hand may be scanned and submitted as a PDF, jpeg, or png.

TITANium and TurnItIn features will be used to ensure the security and authenticity of student work. Students will also be assigned participation in discussion boards and chat rooms through TITANium.

In the event of technical problems, students may submit hard copies of assignments by hand delivering or faxing their work to the Civil and Environmental Engineering office in E-100 (657-278-3916). Assignments must be clearly labeled with the course number and instructor's name. Students who submit or fax assignments to the office must notify the instructor first.

#### **Oral Presentations**

An oral defense of research conducted during the semester will be held on-campus the Saturday of Finals week. Those students not near enough to drive in will need to make arrangements to present via video file or webcam.

#### **On-campus Meeting Requirements**

There is no required meeting requirement. However, the option exists for those students within driving distance to present the oral defense on campus.

#### **Technical Support**

In case of technical problems, students may contact the CSUF Help Desk at 657-278-7722.

### Grading Policy

Assignments will be evaluated and assigned a grade to provide you with feedback on the quality of your efforts. Assignments will be distributed throughout the semester as roughly indicated by the Course Schedule. The final grade for the course will be calculated as follows:

- Participation in on-line discussions            5%
- Homework submissions                            20%
- Term paper    50%
- Oral Defense                                        25%

The “+/-“ grading will be used and final grades will be computed according to the following scale:

97 – 100% = A+	93 – 96% = A	90 – 92 % = A-
87 – 89 % = B+	83 – 86 % = B	80 – 82 % = B-
77 – 79 % = C+	73 – 76 % = C	70 – 72 % = C-
67 – 69 % = D+	63 – 66 % = D	60 – 62 % = D-
< 59% = F		

### Disability Statement

If you have a disability or special need for which you are or may be requesting an accommodation, please inform the instructor and contact the Disability Support Services Office, located in University Hall 101, as early as possible in the term. For more information, the Disability Support Services Office can be reached by calling (657) 278-3112 or visiting their website at <http://www.fullerton.edu/DSS/>. Confidentiality will be protected.

### Academic Integrity Statement

As stated in the CSUF Catalog "**Plagiarism** is defined as the act of taking the specific substance of another and offering it as one's own without giving credit to the source. When sources are used, acknowledgment of the original author or source must be made following standard scholarly practice." It is expected that all work submitted for this course, as well as any other at Cal State Fullerton, will be your own unless properly attributed to another author. All work should be original for this class and specific to the assignment. Unless an assignment is specifically designated a team project, all assignments are expected to be completed individually. If you have any questions, please contact the instructor.

Students who violate university standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the university. Since dishonesty in any form harms you, other students, and the university, policies on academic integrity are strictly enforced. We expect that you will familiarize yourself with the academic integrity guidelines in the current *Catalog* and *Student Handbook*.

Safeguards, such as verification the identity of students during on-line participation and the exams shall be taken at a proctored place, will be taken to ensure the authenticity of student work.

### Appropriate On-Line Behavior

In all of their on-line interactions with the course instructor and their student colleagues, students in this course are expected to exhibit appropriate on-line behavior. Such guidelines have been famously compiled as “netiquette” by Virginia Shea (<http://www.albion.com/netiquette>). In summary:

- Do not write something on-line that would be considered rude or offensive in person;
- Abide by civil and criminal laws (paying for shareware; eschewing piracy);
- Make sure that the content you post is appropriate to the tone and purpose of the domain;
- Respect others' time and bandwidth by being succinct and taking care not to post accidentally;
- Use formal language that is appropriate to a classroom setting;
- Share what you know with others when it is helpful;

- Do not perpetuate extended “flaming”;
- Respect the privacy of others;
- Do not abuse your expert knowledge;
- Be forgiving of others’ mistakes.

### Emergency Procedures Policy

During an emergency it is necessary for students to have a basic understanding of their personal responsibilities and the university’s emergency response procedures. In the event of an emergency, please know the safe evacuation routes for your specific building and floor, as well as the evacuation assembly areas for your building. Students can determine the university’s operational status by checking the university’s web site at <http://www.fullerton.edu>, calling the university’s hotline number at 657-519-0911, or tuning in to area radio and television stations. Students should assume that classes will be held unless they hear or read an official closure announcement. In the event of an emergency, please call 911. The campus non-emergency line is 657-278-2515, and the 24-hour recorded emergency information line is 657-519-0911. Additional information on university emergency procedures can be found at <http://prepare.fullerton.edu/campuspreparedness/>.

### Course Schedule

Week	Date	Topics Covered	Assignments Due
1	Aug 19	Course Introduction, Project Proposals, and Research Plans	
2	Aug 26		
3	Sep 2	Plagiarism, Proper Citations, Reliable Sources	Project Proposal
4	Sep 9		
5	Sep 16	Conducting individual and team research	
6	Sep 23		Progress Report #1
7	Sep 30	Conducting a literature review	
8	Oct 7		
9	Oct 14	Critiquing Technical Articles	Progress Report #2
10	Oct 21		Article Critique
11	Oct 28	Essentials of preparing technical reports	
12	Nov 4		Progress Report #3
13	Nov 11	Data Analysis	
14	Nov 18	**Work on defense and paper**	Analysis Assignment
	<b>Nov 25</b>	<b>Fall Recess</b>	
15	Dec 2	**Work on defense and paper**	Term Paper Due
	<b>Dec 9</b>	<b>Oral Defense</b>	

**CALIFORNIA STATE UNIVERSITY, FULLERTON  
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**

**EGCE 597: Graduate Project**

**Co-Instructor:** Garrett Struckhoff, PhD                      **Office:** E-306                      **Phone:** (657) 278-8079  
**Email:** gstruckhoff@fullerton.edu                      **Skype:** DrStruckhoff  
**Office Hours:** Mon 10:00 – 12:00pm, Wed 11:30 – 12:30pm

**Co-Instructor:** Sudarshan Kurwadkar, PE, PhD                      **Office:** E-307                      **Phone:** (657) 278-2457  
**Email:** skurwadkar@fullerton.edu                      **Skype:** sudarshan.kurwadkar  
**Office Hours:** Mon, Wed 10:00 – 12:00 PM

**Course Objective and Learning Goals**

The goal of this course is that the students will have exposure to a systematic approach to performing research. They will experience learning through lecture-style teaching as well as through their own researches. They will be taught topics that include:

- (1) How to identify a proper research design and research plan
- (2) How to avoid plagiarism, use proper citations, and choose ideal sources
- (3) Conducting individual and team research
- (4) How to conduct a literature search,
- (5) How to critique technical articles,
- (6) Learning the essentials of preparing technical reports/memorandum (as well as presentations), and finally
- (7) Learning approaches to analyze experimental data,

**Required Technical Competencies and Equipment**

All course materials will be distributed using email and the CSUF TITANium system. Students will additionally be expected to submit assignments and participate in class discussion periods using TITANium and the course blog. In order to use TITANium and their student portal, students will need access to a computer and an Internet connection capable of handling large file downloads and data transmission rate high enough for real-time discussions and viewing of web-cast materials. Submission of hand-written problem sets will require the use of a scanner. The details of minimum technical specifications, internet connection/access, and computer skills and competencies are shown below:

**1. Minimum Technical Specifications**

You must have (access to) a computer system that meets the following minimum specifications:

**Computer Requirements**

- Operating System:** Windows 7 or higher, Macintosh OS X
- Processor:** 2.0 GHz or higher preferred.
- Memory:** 3 GB of RAM or higher.
- Plug-ins:** Adobe Reader, Flash Player, Quicktime, Java, Windows Media Player
- Browser:** Chrome or Firefox (Safari for Mac)
- Network Connection:** Cable, DSL, or other high speed network highly recommended.
- Monitor:** 15” monitor with 800 x 600 resolution capability or higher.
- Software:** Microsoft Office 2007 or Open Office, PowerPoint 2010 Viewer
- E-mail Account:** Must be able to send/receive attachments.

**2. Internet Connection/Access:** Students are required to have a dependable connection to the Internet. The speed and reliability of your connection can and will directly influence your online learning experience and your ability to successfully complete exams, on-line exercises, and assignments.

### **3. Computer Skills and Competencies**

Students who enroll in online courses and/or programs must have the requisite knowledge to use a computer, navigate the internet, and use TITANium. It is not the instructor's responsibility to teach students how to use a computer, navigate the internet, send and/or receive emails or how to use the TITANium system.

#### **Software for Students**

Did you know you can get FREE and low-cost software for being an active CSUF student? Software downloads and request forms can be found on the [CSUF Student Software website](#).

#### **On-Line Participation**

Student on-line participation will be graded based on the number and content of postings in discussion sessions and blog threads. A minimum of 5 meaningful postings will be required for full credit. Additionally, the frequency of accessing assigned web pages will be taken into account. Student activities within TITANium will be tracked by the instructor and recorded as a log of on-line activity, including access of assigned readings, problem sets, lecture notes, and on-line presentations.

#### **On-line Availability of Instructor**

The instructor will monitor course emails at least twice a week during the specified office hours. Every effort will be made to respond to emails within 24 hours during the week, but this is not guaranteed. Instructor will also be available on Skype during office hours or by appointment. Skype availability may not always be immediate, depending upon the presence of other students in the office. During real-time course assignments such as chat rooms, the instructor will answer immediately. Alternatively, the instructor may be reached by phone.

#### **Planned Assignments**

Throughout the semester there will be written homework assignments and a larger term paper/portfolio due at the end of the semester. Assignments will be graded with an emphasis on writing and research skills and timely feedback will be given to the students to allow them to improve writing throughout the semester. Assignments must be submitted electronically through TITANium by midnight of the day they are due. Unless specifically indicated by the instructor, assignments should be submitted in a standard readable format (Microsoft Word preferred, PDF accepted). Calculations or diagrams completed by hand may be scanned and submitted as a PDF, jpeg, or png.

TITANium and TurnItIn features will be used to ensure the security and authenticity of student work. Students will also be assigned participation in discussion boards and chat rooms through TITANium.

In the event of technical problems, students may submit hard copies of assignments by hand delivering or faxing their work to the Civil and Environmental Engineering office in E-100 (657-278-3916). Assignments must be clearly labeled with the course number and instructor's name. Students who submit or fax assignments to the office must notify the instructor first.

#### **Oral Presentations**

An oral defense of research conducted during the semester will be held on-campus the Saturday of Finals week. Those students not near enough to drive in will need to make arrangements to present via video file or webcam.

#### **On-campus Meeting Requirements**

There is no required meeting requirement. However, the option exists for those students within driving distance to present the oral defense on campus.

#### **Technical Support**

In case of technical problems, students may contact the CSUF Help Desk at 657-278-7722.



### Grading Policy

Assignments will be evaluated and assigned a grade to provide you with feedback on the quality of your efforts. Assignments will be distributed throughout the semester as roughly indicated by the Course Schedule. The final grade for the course will be calculated as follows:

- Participation in on-line discussions            5%
- Homework submissions                            20%
- Term paper    50%
- Oral Defense                                        25%

The “+/-“ grading will be used and final grades will be computed according to the following scale:

97 – 100% = A+	93 – 96% = A	90 – 92 % = A-
87 – 89 % = B+	83 – 86 % = B	80 – 82 % = B-
77 – 79 % = C+	73 – 76 % = C	70 – 72 % = C-
67 – 69 % = D+	63 – 66 % = D	60 – 62 % = D-
< 59% = F		

### Disability Statement

If you have a disability or special need for which you are or may be requesting an accommodation, please inform the instructor and contact the Disability Support Services Office, located in University Hall 101, as early as possible in the term. For more information, the Disability Support Services Office can be reached by calling (657) 278-3112 or visiting their website at <http://www.fullerton.edu/DSS/>. Confidentiality will be protected.

### Academic Integrity Statement

As stated in the CSUF Catalog "**Plagiarism** is defined as the act of taking the specific substance of another and offering it as one's own without giving credit to the source. When sources are used, acknowledgment of the original author or source must be made following standard scholarly practice." It is expected that all work submitted for this course, as well as any other at Cal State Fullerton, will be your own unless properly attributed to another author. All work should be original for this class and specific to the assignment. Unless an assignment is specifically designated a team project, all assignments are expected to be completed individually. If you have any questions, please contact the instructor.

Students who violate university standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the university. Since dishonesty in any form harms you, other students, and the university, policies on academic integrity are strictly enforced. We expect that you will familiarize yourself with the academic integrity guidelines in the current *Catalog* and *Student Handbook*.

Safeguards, such as verification the identity of students during on-line participation and the exams shall be taken at a proctored place, will be taken to ensure the authenticity of student work.

### Appropriate On-Line Behavior

In all of their on-line interactions with the course instructor and their student colleagues, students in this course are expected to exhibit appropriate on-line behavior. Such guidelines have been famously compiled as “netiquette” by Virginia Shea (<http://www.albion.com/netiquette>). In summary:

- Do not write something on-line that would be considered rude or offensive in person;
- Abide by civil and criminal laws (paying for shareware; eschewing piracy);
- Make sure that the content you post is appropriate to the tone and purpose of the domain;
- Respect others' time and bandwidth by being succinct and taking care not to post accidentally;
- Use formal language that is appropriate to a classroom setting;
- Share what you know with others when it is helpful;

- Do not perpetuate extended “flaming”;
- Respect the privacy of others;
- Do not abuse your expert knowledge;
- Be forgiving of others’ mistakes.

### Emergency Procedures Policy

During an emergency it is necessary for students to have a basic understanding of their personal responsibilities and the university’s emergency response procedures. In the event of an emergency, please know the safe evacuation routes for your specific building and floor, as well as the evacuation assembly areas for your building. Students can determine the university’s operational status by checking the university’s web site at <http://www.fullerton.edu>, calling the university’s hotline number at 657-519-0911, or tuning in to area radio and television stations. Students should assume that classes will be held unless they hear or read an official closure announcement. In the event of an emergency, please call 911. The campus non-emergency line is 657-278-2515, and the 24-hour recorded emergency information line is 657-519-0911. Additional information on university emergency procedures can be found at <http://prepare.fullerton.edu/campuspreparedness/>.

### Course Schedule

Week	Date	Topics Covered	Assignments Due
1	Aug 19	Course Introduction, Project Proposals, and Research Plans	
2	Aug 26		
3	Sep 2	Plagiarism, Proper Citations, Reliable Sources	Project Proposal
4	Sep 9		
5	Sep 16	Conducting individual and team research	
6	Sep 23		Progress Report #1
7	Sep 30	Conducting a literature review	
8	Oct 7		
9	Oct 14	Critiquing Technical Articles	Progress Report #2
10	Oct 21		Article Critique
11	Oct 28	Essentials of preparing technical reports	
12	Nov 4		Progress Report #3
13	Nov 11	Data Analysis	
14	Nov 18	**Work on defense and paper**	Analysis Assignment
	<b>Nov 25</b>	<b>Fall Recess</b>	
15	Dec 2	**Work on defense and paper**	Term Paper Due
	<b>Dec 9</b>	<b>Oral Defense</b>	

**APPENDIX VIII. ASSESSMENT REPORTS RESULTS AND PROGRAM RANKING**

# US News Ranking for online Graduate Engineering Programs

HIGHER EDUCATION / ONLINE COLLEGES / GRADUATE ENGINEERING...

f t r e MORE



## Best Online Graduate Engineering Programs

These are the best online master's in engineering degree programs, based on factors such as academic reputation among peer institutions, faculty credentials and admissions selectivity.

[Read the Best Online Programs Methodology](#)

### School Name

### Location



### Program Rankings



Best Online Programs for Veterans

### Tuition (per credit)



\$0 - \$2,000+

State for in-state tuition: [none](#)

### Enrollment









93 schools









SORT BY:









[CARD](#) | [TABLE](#)










**Graduate Engineering** x [Clear All](#)

Name/Rank	Tuition per credit	Enrollment	Compare
<b>Columbia University (Fu Foundation)</b> New York, NY #1 in Engineering Programs	\$1,936	305	<input type="checkbox"/>
<b>University of California--Los Angeles (Samueli)</b> Los Angeles, CA #2 in Engineering Programs (tie)	\$1,000 out-of-state	474	<input type="checkbox"/>
<b>University of Southern California (Viterbi)</b> Los Angeles, CA #2 in Engineering Programs (tie)	\$1,937	995	<input type="checkbox"/>
<b>Pennsylvania State University--World Campus</b> Malvern, PA #4 in Engineering Programs	\$930 out-of-state	833	<input type="checkbox"/>
<b>Purdue University--West Lafayette</b> West Lafayette, IN #5 in Engineering Programs (tie)	\$1,258 out-of-state	761	<input type="checkbox"/>
<b>University of Michigan--Ann Arbor</b> Ann Arbor, MI #5 in Engineering Programs (tie)	\$1,671 out-of-state	419	<input type="checkbox"/>









<b>University of Wisconsin--Madison</b> Madison, WI  #7 in Engineering Programs	\$1,600 out-of-state	201	<input type="checkbox"/>
<b>Texas A&amp;M University--College Station (Look)</b> College Station, TX  #8 in Engineering Programs	\$570 out-of-state	539	<input type="checkbox"/>
<b>North Carolina State University</b> Raleigh, NC  #9 in Engineering Programs	\$1,132 out-of-state	625	<input type="checkbox"/>
<b>Cornell University</b> Ithaca, NY  #10 in Engineering Programs	\$2,192	127	<input type="checkbox"/>
<b>Arizona State University (Fulton)</b> Tempe, AZ  #11 in Engineering Programs	\$914 out-of-state	402	<input type="checkbox"/>
<b>University of Virginia</b> Charlottesville, VA  #12 in Engineering Programs	\$1,101 out-of-state	46	<input type="checkbox"/>
<b>New York University</b> Brooklyn, NY  #13 in Engineering Programs (tie)	\$1,720	111	<input type="checkbox"/>
<b>University of Illinois--Urbana-Champaign</b> Urbana, IL  #13 in Engineering Programs (tie)	\$1,034 out-of-state	320	<input type="checkbox"/>









<b>Auburn University</b> Auburn, AL  #15 in Engineering Programs	\$949 out-of-state	138	<input type="checkbox"/>
<b>California State University-- Fullerton</b> Fullerton, CA  #16 in Engineering Programs (tie)	\$728 out-of-state	211	<input type="checkbox"/>
<b>Louisiana State University-- Baton Rouge</b> Baton Rouge, LA  #16 in Engineering Programs (tie)	\$784 out-of-state	74	<input type="checkbox"/>
<b>Texas Tech University (Whitacre)</b> Lubbock, TX  #16 in Engineering Programs (tie)	\$330 out-of-state	138	<input type="checkbox"/>
<b>Johns Hopkins University (Whiting)</b> Elkridge, MD  #19 in Engineering Programs	\$1,352	2,853	<input type="checkbox"/>
<b>Virginia Tech</b> Blacksburg, VA  #20 in Engineering Programs	\$1,551 out-of-state	91	<input type="checkbox"/>
<b>University of Florida</b> Gainesville, FL  #21 in Engineering Programs (tie)	\$690 out-of-state	388	<input type="checkbox"/>
<b>University of South Florida</b> Tampa, FL  #21 in Engineering Programs (tie)	\$913 out-of-state	151	<input type="checkbox"/>









<b>Missouri University of Science &amp; Technology</b> Rolla, MO  #23 in Engineering Programs (tie)	\$1,200 out-of-state	876	<input type="checkbox"/>
<b>Ohio State University</b> Columbus, OH  #23 in Engineering Programs (tie)	\$723 out-of-state	82	<input type="checkbox"/>
<b>Stevens Institute of Technology (Schaefer)</b> Hoboken, NJ  #23 in Engineering Programs (tie)	\$1,554	408	<input type="checkbox"/>
<b>George Washington University</b> Washington, DC, DC  #26 in Engineering Programs (tie)	\$860	467	<input type="checkbox"/>
<b>Oregon State University</b> Corvallis, OR  #26 in Engineering Programs (tie)	\$503 out-of-state	80	<input type="checkbox"/>
<b>University of North Carolina--Charlotte (Lee)</b> Charlotte, NC  #26 in Engineering Programs (tie)	\$960 out-of-state	62	<input type="checkbox"/>
<b>Colorado State University</b> Fort Collins, CO  #29 in Engineering Programs (tie)	\$985 out-of-state	240	<input type="checkbox"/>
<b>Drexel University</b> Philadelphia, PA  #29 in Engineering Programs (tie)	\$1,228	324	<input type="checkbox"/>









<b>University of Nebraska--Lincoln</b> Lincoln, NE  #29 in Engineering Programs (tie)	\$630 out-of-state	55	<input type="checkbox"/>
<b>Washington State University</b> Pullman, WA  #29 in Engineering Programs (tie)	\$1,375 out-of-state	103	<input type="checkbox"/>
<b>Kansas State University</b> Manhattan, KS  #33 in Engineering Programs (tie)	\$838 out-of-state	149	<input type="checkbox"/>
<b>University of Arizona</b> Tucson, AZ  #33 in Engineering Programs (tie)	\$995 out-of-state	252	<input type="checkbox"/>
<b>University of Maryland--College Park (Clark)</b> College Park, MD  #33 in Engineering Programs (tie)	\$1,153 out-of-state	396	<input type="checkbox"/>
<b>Ohio University (Russ)</b> Athens, OH  #36 in Engineering Programs	\$633 out-of-state	309	<input type="checkbox"/>
<b>California Polytechnic State University--San Luis Obispo</b> San Luis Obispo, CA  #37 in Engineering Programs (tie)	\$550 out-of-state	57	<input type="checkbox"/>
<b>Oklahoma State University</b> Stillwater, OK  #37 in Engineering Programs (tie)	\$849 out-of-state	307	<input type="checkbox"/>
<b>University of Illinois--Chicago</b> Chicago, IL  #37 in Engineering Programs (tie)	\$830 out-of-state	60	<input type="checkbox"/>



















<b>Duke University (Pratt)</b> Durham, NC  #40 in Engineering Programs (tie)	\$2,187	70	<input type="checkbox"/>
<b>The University of Texas Health Science Center at Houston</b> Houston, TX  #40 in Engineering Programs (tie)	\$761 out-of-state	231	<input type="checkbox"/>
<b>Old Dominion University</b> Norfolk, VA  #42 in Engineering Programs (tie)	\$1,249 out-of-state	272	<input type="checkbox"/>
<b>University of Tennessee-- Knoxville</b> Knoxville, TN, TN  #42 in Engineering Programs (tie)	\$1,637 out-of-state	141	<input type="checkbox"/>
<b>Worcester Polytechnic Institute</b> Worcester, MA  #42 in Engineering Programs (tie)	\$1,421	327	<input type="checkbox"/>
<b>University of Arkansas-- Fayetteville</b> Fayetteville, AR  #45 in Engineering Programs	\$289 out-of-state	174	<input type="checkbox"/>
<b>Lehigh University (Rossin)</b> Bethlehem, PA  #46 in Engineering Programs (tie)	\$1,460	114	<input type="checkbox"/>
<b>Villanova University</b> Villanova, PA  #46 in Engineering Programs (tie)	\$1,350	429	<input type="checkbox"/>




<b>University of Tennessee-- Chattanooga</b> Chattanooga, TN  #48 in Engineering Programs	\$895 out-of-state	37	<input type="checkbox"/>
<b>Mississippi State University (Bagley)</b> Mississippi State, MS  #49 in Engineering Programs (tie)	\$456 out-of-state	149	<input type="checkbox"/>
<b>University of Colorado--Boulder</b> Boulder, CO  #49 in Engineering Programs (tie)	\$1,350 out-of-state	465	<input type="checkbox"/>
<b>Florida International University</b> Miami, FL  #51 in Engineering Programs (tie)	\$833 out-of-state	113	<input type="checkbox"/>
<b>University of Alabama</b> Tuscaloosa, AL  #51 in Engineering Programs (tie)	\$375 out-of-state	39	<input type="checkbox"/>
<b>University of Alabama-- Birmingham</b> Birmingham, AL  #51 in Engineering Programs (tie)	\$995 out-of-state	352	<input type="checkbox"/>
<b>University of California-- Riverside (Bourns)</b> Riverside, CA  #51 in Engineering Programs (tie)	\$833 out-of-state	129	<input type="checkbox"/>
<b>University of Dayton</b> Dayton, OH  #51 in Engineering Programs (tie)	\$899	159	<input type="checkbox"/>

<b>University of Cincinnati</b> Cincinnati, OH  #56 in Engineering Programs	\$525 out-of-state	60	<input type="checkbox"/>
<b>George Mason University (Volgenau)</b> Fairfax, VA  #57 in Engineering Programs (tie)	\$1,524 out-of-state	27	<input type="checkbox"/>
<b>Lawrence Technological University</b> Southfield, MI  #57 in Engineering Programs (tie)	\$960	62	<input type="checkbox"/>
<b>University of South Carolina</b> Columbia, SC  #57 in Engineering Programs (tie)	\$1,182 out-of-state	142	<input type="checkbox"/>
<b>Michigan Technological University</b> Houghton, MI  #60 in Engineering Programs (tie)	\$1,078 out-of-state	45	<input type="checkbox"/>
<b>Rochester Institute of Technology (Gleason)</b> Rochester, NY  #60 in Engineering Programs (tie)	\$1,035	96	<input type="checkbox"/>
<b>New Jersey Institute of Technology</b> Newark, NJ  #62 in Engineering Programs (tie)	\$1,248 out-of-state	333	<input type="checkbox"/>
<b>Syracuse University</b> Syracuse, NY  #62 in Engineering Programs (tie)	\$1,500	102	<input type="checkbox"/>

<b>Clemson University</b> Clemson, SC  #64 in Engineering Programs (tie)	\$895 out-of-state	94	<input type="checkbox"/>
<b>New York Institute of Technology</b> Old Westbury, NY  #64 in Engineering Programs (tie)	\$1,250	139	<input type="checkbox"/>
<b>University of Louisville</b> Louisville, KY  #64 in Engineering Programs (tie)	\$714 out-of-state	137	<input type="checkbox"/>
<b>Colorado Technical University</b> Colorado Springs, CO  #67 in Engineering Programs (tie)	\$585	23	<input type="checkbox"/>
<b>Wright State University</b> Dayton, OH  #67 in Engineering Programs (tie)	\$1,091 out-of-state	109	<input type="checkbox"/>
<b>Binghamton University--SUNY (Watson)</b> Binghamton, NY  #69-#90 in Engineering Programs	\$925 out-of-state	N/A	<input type="checkbox"/>
<b>Gonzaga University</b> Spokane, WA  #69-#90 in Engineering Programs	\$970	36	<input type="checkbox"/>
<b>Kennesaw State University</b> 1100 South Marietta Parkway, Room Q-330, Mail Drop 9074, Marietta, GA  #69-#90 in Engineering Programs	\$383 out-of-state	84	<input type="checkbox"/>

<p><b>New Mexico State University</b> Las Cruces, NM</p> <p> #69-#90 in Engineering Programs</p>	<p>\$851 out-of-state</p>	<p>N/A</p>	<input type="checkbox"/>
<p><b>Oakland University</b> Rochester, MI</p> <p> #69-#90 in Engineering Programs</p>	<p>\$1,027 out-of-state</p>	<p>81</p>	<input type="checkbox"/>
<p><b>Rowan University</b> Glassboro, NJ</p> <p> #69-#90 in Engineering Programs</p>	<p>\$800 out-of-state</p>	<p>50</p>	<input type="checkbox"/>
<p><b>Southern Methodist University</b> Dallas, TX</p> <p> #69-#90 in Engineering Programs</p>	<p>\$1,350</p>	<p>220</p>	<input type="checkbox"/>
<p><b>Texas A&amp;M University-- Kingsville (Dotterweich)</b> Kingsville, TX</p> <p> #69-#90 in Engineering Programs</p>	<p>\$595 out-of-state</p>	<p>33</p>	<input type="checkbox"/>
<p><b>University of Alabama-- Huntsville</b> Huntsville, AL</p> <p> #69-#90 in Engineering Programs</p>	<p>N/A</p>	<p>67</p>	<input type="checkbox"/>
<p><b>University of Bridgeport</b> Bridgeport, CT</p> <p> #69-#90 in Engineering Programs</p>	<p>\$875</p>	<p>77</p>	<input type="checkbox"/>
<p><b>University of Colorado-- Colorado Springs</b> Colorado Springs, CO</p> <p> #69-#90 in Engineering Programs</p>	<p>\$834 out-of-state</p>	<p>89</p>	<input type="checkbox"/>

<b>University of Maine</b> Orono, ME  #69-#90 in Engineering Programs	\$536 out-of-state	25	<input type="checkbox"/>
<b>University of Massachusetts--Lowell (Francis)</b> Lowell, MA  #69-#90 in Engineering Programs	\$575 out-of-state	33	<input type="checkbox"/>
<b>University of Michigan--Dearborn</b> Dearborn, MI  #69-#90 in Engineering Programs	\$1,041 out-of-state	230	<input type="checkbox"/>
<b>University of Minnesota--Twin Cities</b> Minneapolis, MN  #69-#90 in Engineering Programs	\$1,494 out-of-state	N/A	<input type="checkbox"/>
<b>University of North Dakota</b> Grand Forks, ND  #69-#90 in Engineering Programs	\$918 out-of-state	12	<input type="checkbox"/>
<b>University of Oklahoma</b> Norman, OK  #69-#90 in Engineering Programs	\$824 out-of-state	N/A	<input type="checkbox"/>
<b>University of Toledo</b> Toledo, OH  #69-#90 in Engineering Programs	\$560 out-of-state	40	<input type="checkbox"/>
<b>University of Wisconsin--Platteville</b> Platteville, WI  #69-#90 in Engineering Programs	\$650 out-of-state	277	<input type="checkbox"/>

<b>University of Wisconsin--Stout</b> Menomonie, WI  #69-#90 in Engineering Programs	\$581 out-of-state	49	<input type="checkbox"/>
<b>Western New England University</b> Springfield, MA  #69-#90 in Engineering Programs	\$1,101	76	<input type="checkbox"/>
<b>Youngstown State University</b> Youngstown, OH  #69-#90 in Engineering Programs	\$681	22	<input type="checkbox"/>
<b>Louisiana Tech University</b> Ruston, LA Unranked	\$727 out-of-state	1	<input type="checkbox"/>
<b>Temple University</b> Philadelphia, PA Unranked	\$1,373 out-of-state	1	<input type="checkbox"/>
<b>University of New Mexico</b> Albuquerque, NM Unranked	\$363 out-of-state	5	<input type="checkbox"/>

Source: <https://www.usnews.com/education/online-education/engineering/search?mode=table&program=engineering>

## Rankings





California State University--Fullerton is ranked No. 16 in [Best Online Graduate Engineering Programs](#). Schools are ranked according to their performance across a set of widely accepted indicators of excellence. Read more about [how we rank schools](#).

 #16 (tie) in [Best Online Graduate Engineering Programs](#)

[See all Online Program rankings »](#)

## Best Online Programs Ranking Indicators

See how this program stacks up against others, based on factors used in the U.S. News methodology.

Student Engagement rank	5
Student Engagement score 	90
Faculty Credentials and Training rank	3
Faculty Credentials and Training score 	94
Student Services and Technology rank	36
Student Services and Technology score 	68
Admissions Selectivity rank	43
Admissions Selectivity score 	57
Peer assessment score (out of 5)	2.4

Other rankings at this school: [Colleges](#), [Grad Schools](#)



## Feedback 2015-2016 Assessment Report

**Department/Program:** MS Environmental Engineering

**Unit Number:** 112-001-X

**Review Team:** Su Swarat, Binod Tiwari, Carter Rakovski

### Step 1: Assessable Outcome

	Review Criteria	Simple Feedback	Comments
1.1	Are the outcomes viable?	Yes	Very similar to ABET SLOs for the BS program, but with advanced level of sophistication.
1.2	Are the outcomes learner/customer centered?	Yes	
1.3	Are the outcomes specific, clear, and concise?	Partially	SLO-02: Is it unclear whether the ability to design and the ability to work as part of a team can be assessed together? If so, please reword to make it clear.
1.4	Are the outcomes measurable?	Yes	

### Step 2: Identify Methods & Measures

	Review Criteria	Simple Feedback	Comments
2.1	Are the outcomes assessed with Embedded Measures?	Yes	
2.2	Are the outcomes assessed with Direct Measures?	Yes	
2.3	Are the outcomes assessed with Indirect Measures?	No	
2.4	Do the measures appear to be valid and reliable?	Yes	Remove "course grades" under "Instrument(s) used" since homework and SLO assessment exams are used.

### Step 3: Criteria for Success

	Review Criteria	Simple Feedback	Comments
3.1	Does every method/measure have a predetermined criterion for success?	Yes	
3.2	Are the criteria for success appropriate?	Yes	It is unclear though why the exam graded out of 100 needs to be converted to a 5pt scale. For a graduate student, is a grade/score of 70% sufficient? Is it appropriate for the criteria to be the same for undergrads and grads?

### Step 4 (2015-2016): Data Collection and Analysis

	Review Criteria	Simple Feedback	Comments
4.1	Is there sufficient description of the data collection?	Yes	Great to provide details about the assessment question.
4.2	Is there sufficient description of the data analysis procedures and results?	Yes	Elaborate how the rubric ("levels of attainment") correlates to the exam grade (out of 5).
4.3	Are the sample populations and sample sizes appropriate?	Yes	Great sample size
4.4	(If used) Is the rubric calibrated?	No	No indication of rubric calibration.

### Step 5 (2015-2016): Improvement Actions

	Review Criteria	Simple Feedback	Comments
5.1	Are there any plans to use assessment results for improvements?	Yes	
5.2	Are there any actual improvements made based on the assessment results?	No	
5.3	Are there any plans to assess the impact of the improvement actions?	Yes	Implied per ABET requirement.

#### 6. General Comments

- 6.1 The report demonstrated great effort in starting assessment for the MS program - it assessed all 4 SLOs in one year! The SLOs are similar to the BS program, but with advanced level of sophistication. In the measures and/or criteria of success, please be sure to hold the expectation at a level of sophistication appropriate for a graduate program. The program primarily used direct measure, and thus is recommended to consider indirect measures (similar to the BS program). The detailed description of the assessment questions used is great, and so is the large sample size. More details regarding data collection and analysis procedures would helpful, as indicated in the individual comments above. Thank you for your effort. We look forward to seeing more progress next year.

\* Outcomes retrieved from Compliance Assist 12/12/2016

## Feedback 2016-2017 Assessment Report

**Department/Program:** MS Environmental Engineering

**Unit Number:** 112-001-X

**Review Team:** Su Swarat, Binod Tiwari, Carter Rakovski

### Step 1: Assessable Outcome

	Review Criteria	Simple Feedback	Comments
1.1	Are the outcomes viable?	Yes	
1.2	Are the outcomes learner/customer centered?	Yes	
1.3	Are the outcomes specific, clear, and concise?	No	Each SLO seems to have multiple outcomes in it. Need to unpack them if different outcomes are assessed separately.
1.4	Are the outcomes measurable?	Yes	

### Step 2: Identify Methods & Measures

	Review Criteria	Simple Feedback	Comments
2.1	Are the outcomes assessed with Embedded Measures?	Yes	
2.2	Are the outcomes assessed with Direct Measures?	Yes	
2.3	Are the outcomes assessed with Indirect Measures?	No	Recommend to add indirect measures.
2.4	Do the measures appear to be valid and reliable?	Yes	

### Step 3: Criteria for Success

	Review Criteria	Simple Feedback	Comments
3.1	Does every method/measure have a predetermined criterion for success?	Yes	
3.2	Are the criteria for success appropriate?	Yes	

### Step 4 (2016-2017): Data Collection and Analysis

	Review Criteria	Simple Feedback	Comments
4.1	Is there sufficient description of the data collection (e.g. student population, sample size, etc.)?	Yes	Great details.
4.2	Is there sufficient description of the data analysis procedures and results?	Partially	Unclear how the exam scores, course grades and the assignment work together. Did you use all or only the assignment?
4.3	(If used) Is the rubric calibrated?	N/A	The grading "rubric" is not a real rubric, but a scoring guide.

### Step 5 (2016-2017): Improvement Actions

	Review Criteria	Simple Feedback	Comments
5.1	Are there any planned or implemented improvement actions based on the assessment results?	Yes	

### Recommended Next Steps

Excellent assessment practice: Keep up the good work!

**General Comments**

Thank you for submitting the report! The report demonstrated excellent effort in assessment, particularly given this is an MS program. Great details regarding assessment plan, instrument and data are much appreciated. The SLOs need to be unpacked, however, since each one seems to have multiple outcomes embedded in it. Please feel free to contact us for assistance. We look forward to seeing your progress next year.

*\* Outcomes retrieved from Compliance Assist 12/11/2017*



# Alumni Experience Survey

Invite others to add a comment



Alumni Experience Survey

QUESTION SUMMARIES

DATA TRENDS

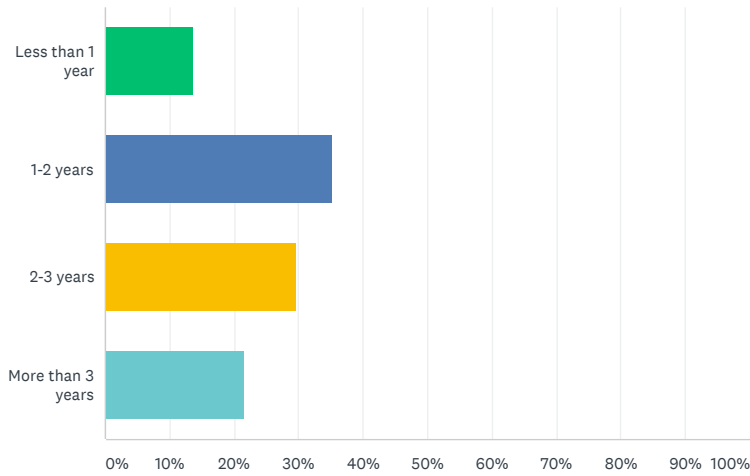
INDIVIDUAL RESPONSES

Q1



## How long has passed since you graduated from the MS Environmental Engineering Program?

Answered: 37 Skipped: 0



ANSWER CHOICES

RESPONSES

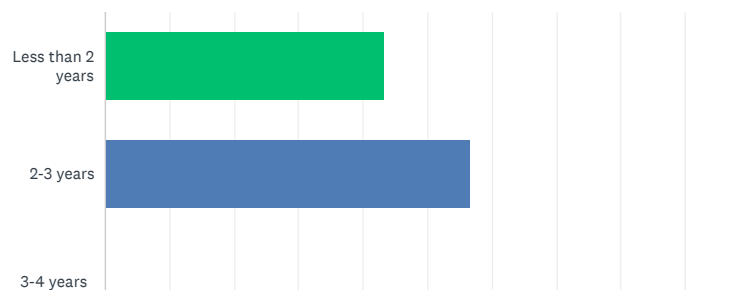
Less than 1 year	13.51%	5
1-2 years	35.14%	13
2-3 years	29.73%	11
More than 3 years	21.62%	8
<b>TOTAL</b>		<b>37</b>

Q2



## How long did it take to finish the MS Environmental Engineering Program?

Answered: 37 Skipped: 0



Share Link

<https://www.surveymonkey.com/re/>

COPY

SHARE SETTINGS

Share

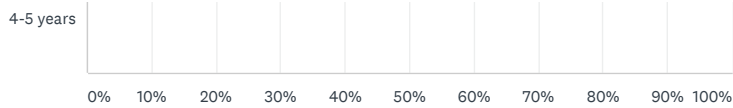
Tweet

Share

Share



37 responses



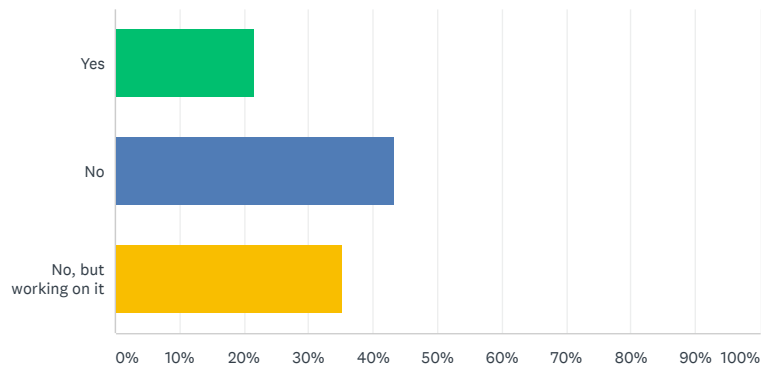
ANSWER CHOICES	RESPONSES	
Less than 2 years	43.24%	16
2-3 years	56.76%	21
3-4 years	0.00%	0
4-5 years	0.00%	0
<b>TOTAL</b>		<b>37</b>

Q3



Do you possess a Professional Engineer (PE) license?

Answered: 37 Skipped: 0



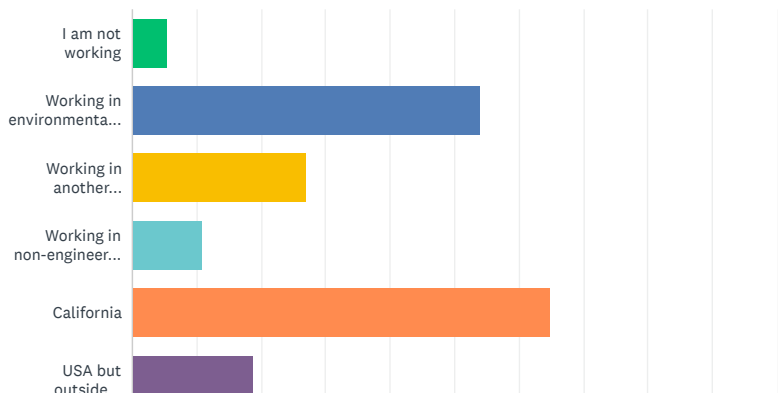
ANSWER CHOICES	RESPONSES	
Yes	21.62%	8
No	43.24%	16
No, but working on it	35.14%	13
<b>TOTAL</b>		<b>37</b>

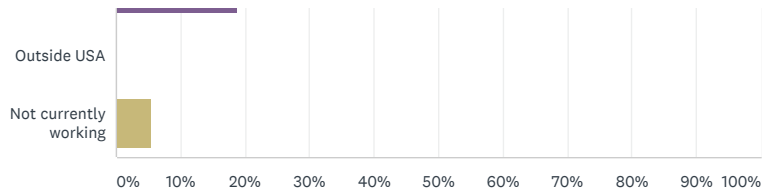
Q4



What is your current employment status and where do you currently work? (Check all that apply.)

Answered: 37 Skipped: 0





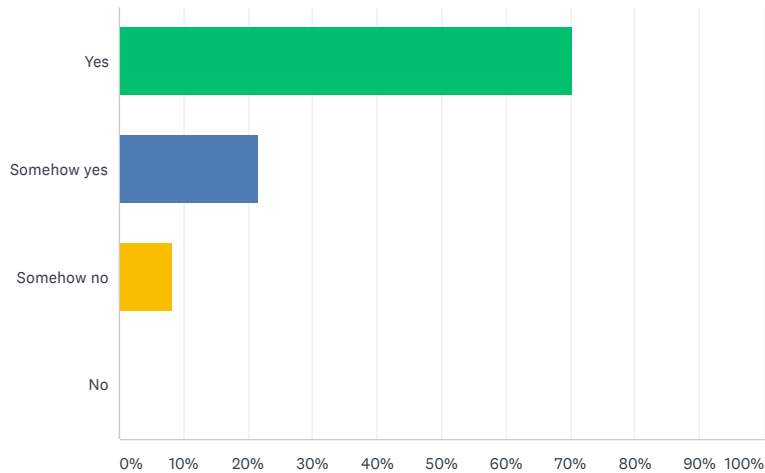
ANSWER CHOICES	RESPONSES	
I am not working	5.41%	2
Working in environmental engineering field	54.05%	20
Working in another engineering field	27.03%	10
Working in non-engineering field	10.81%	4
California	64.86%	24
USA but outside California	18.92%	7
Outside USA	0.00%	0
Not currently working	5.41%	2
<b>Total Respondents: 37</b>		

Q5



Through the courses you have taken in the program, do you feel that you have a clear understanding of basic principles and the ability to conduct calculations related to environmental engineering?

Answered: 37 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	70.27%	26
Somehow yes	21.62%	8
Somehow no	8.11%	3
No	0.00%	0
<b>TOTAL</b>		<b>37</b>

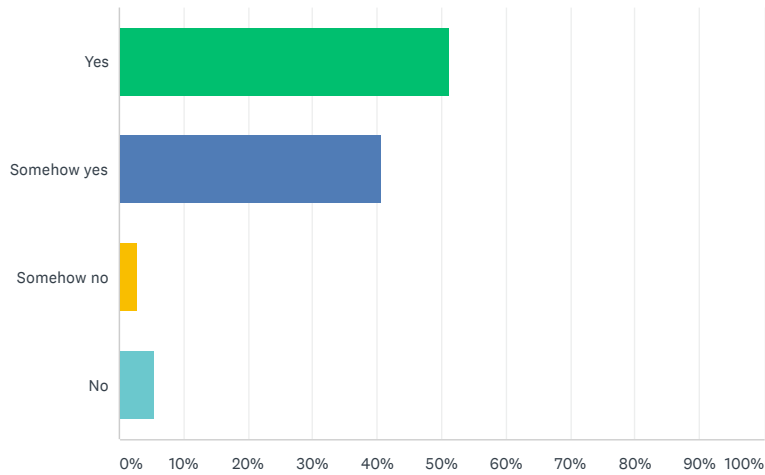
Q6



Through the courses you have taken in the program, do

you feel that you have a clear understanding of environmental regulations, engineering ethics, environmental impact report, and project management?

Answered: 37 Skipped: 0



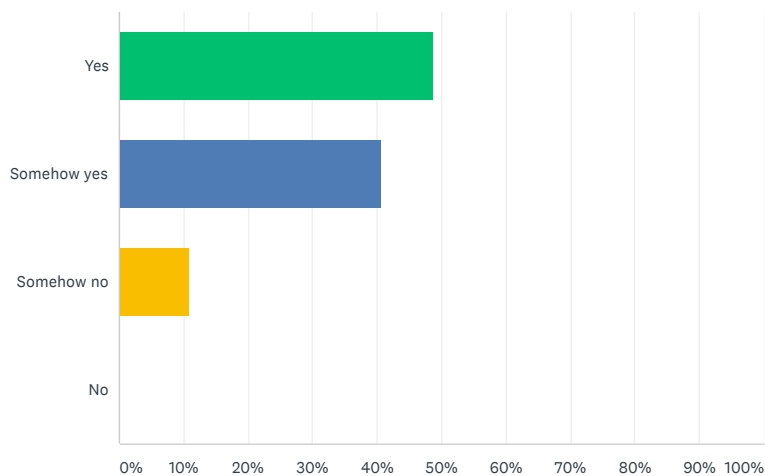
ANSWER CHOICES	RESPONSES	
Yes	51.35%	19
Somehow yes	40.54%	15
Somehow no	2.70%	1
No	5.41%	2
<b>TOTAL</b>		<b>37</b>

Q7



Through the courses you have taken in the program, do you feel that you have a clear understanding of contemporary pollution management issues and the ability to conduct conceptual design of sustainable treatment processes?

Answered: 37 Skipped: 0



ANSWER CHOICES

136

RESPONSES



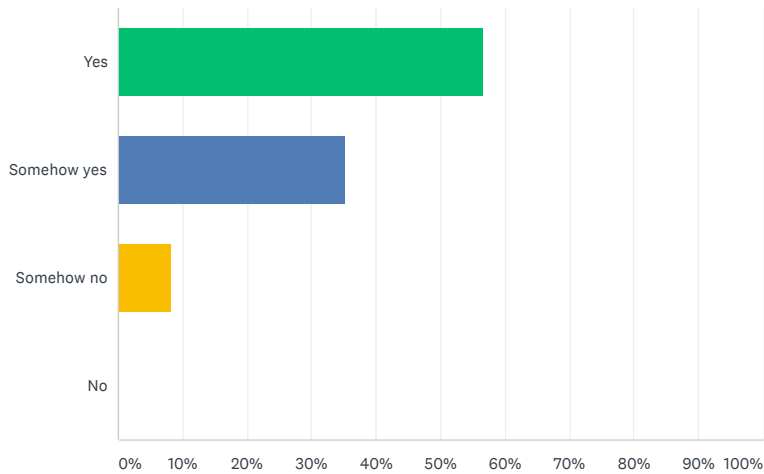
Yes	48.65%	18
Somehow yes	40.54%	15
Somehow no	10.81%	4
No	0.00%	0
<b>TOTAL</b>		<b>37</b>

Q8



Through the courses you have taken in the program, do you feel that you have an ability to develop a research plan, write technical articles, and conduct oral presentations?

Answered: 37 Skipped: 0



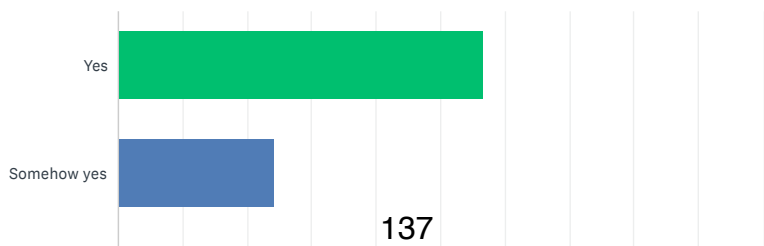
ANSWER CHOICES	RESPONSES	
Yes	56.76%	21
Somehow yes	35.14%	13
Somehow no	8.11%	3
No	0.00%	0
<b>TOTAL</b>		<b>37</b>

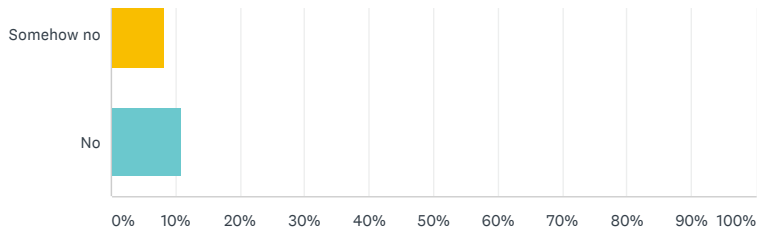
Q9



Do you agree that the online MS in environmental engineering program that you graduated from at CSUF was helpful to enhance your technical capability and success in getting an engineering job?

Answered: 37 Skipped: 0





ANSWER CHOICES	RESPONSES	
Yes	56.76%	21
Somehow yes	24.32%	9
Somehow no	8.11%	3
No	10.81%	4
<b>TOTAL</b>		<b>37</b>

**Q10**



Please provide your suggestions to improve the quality of the program.

Answered: 22 Skipped: 15

-Topics need to be taught in depth. more material needs to be added and more research papers needs to be required from students. Homework should be harder and cover all kind of problems.

4/21/2018 4:08 AM

Offer specialized electives

4/20/2018 9:51 PM

More practical lessons on EPA and CA regulatory reporting SCAQMD Title V, EPA TRI, SWPPP this could be a capstone taught by industry professionals.

4/20/2018 2:29 AM

I feel the program was well coordinated and the level of rigor was appropriate. It landed me my current environmental specialist job at a nuclear power plant and gave me the necessary skills for air, surface, and groundwater permitting and compliance work.

4/19/2018 6:25 PM

I would suggest having students/faculty congregate at least once a month to connect, go over assignments, share information and knowledge. Although the format of the program is online, this will help to establish and

Powered by  SurveyMonkey

Check out our [sample surveys](#) and [create your own now!](#)



# Current Student Experience Survey

Hide comments



Current Student Experience Survey

QUESTION SUMMARIES

DATA TRENDS

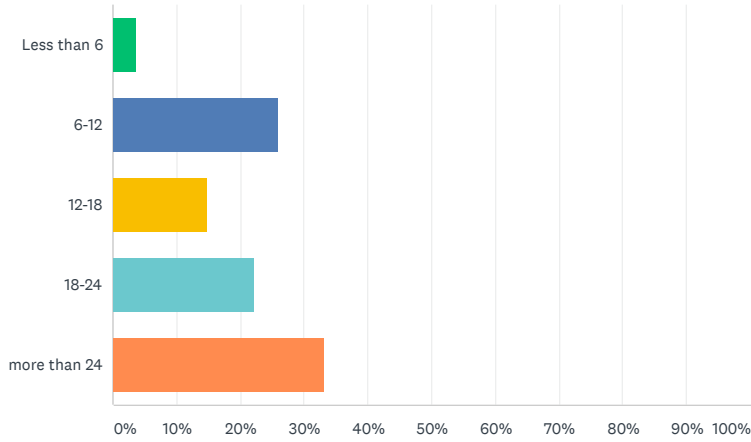
INDIVIDUAL RESPONSES

Q1



## How many units have you completed so far?

Answered: 27 Skipped: 0



ANSWER CHOICES

RESPONSES

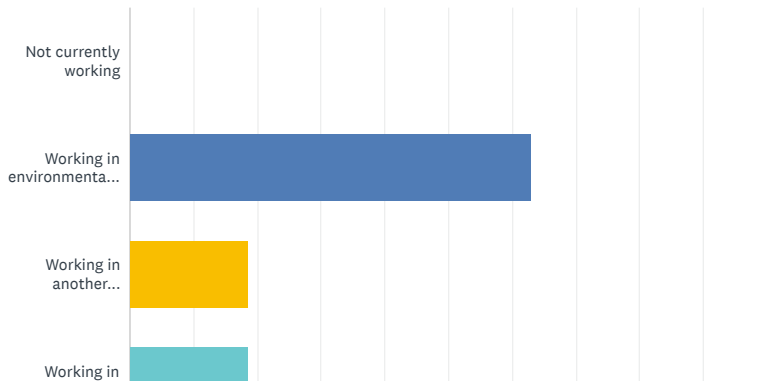
Less than 6	3.70%	1
6-12	25.93%	7
12-18	14.81%	4
18-24	22.22%	6
more than 24	33.33%	9
<b>TOTAL</b>		<b>27</b>

Q2



## What is your current employment status?

Answered: 27 Skipped: 0



Share Link

<https://www.surveymonkey.com/re:>

COPY

Share

Tweet

G+ Share

Share



27 responses

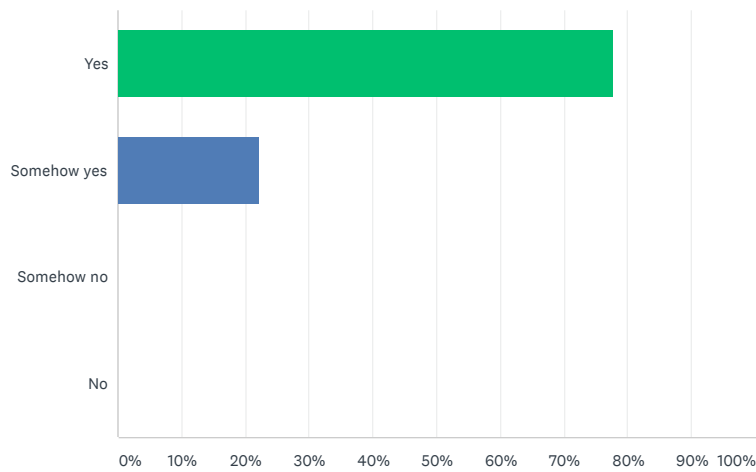
ANSWER CHOICES	RESPONSES	
Not currently working	0.00%	0
Working in environmental engineering field	62.96%	17
Working in another engineering field	18.52%	5
Working in non-engineering field	18.52%	5
<b>TOTAL</b>		<b>27</b>

Q3



Through the current courses you are taking, do you feel that you have a clear understanding of basic principles and the ability to conduct calculations related to environmental engineering?

Answered: 27 Skipped: 0



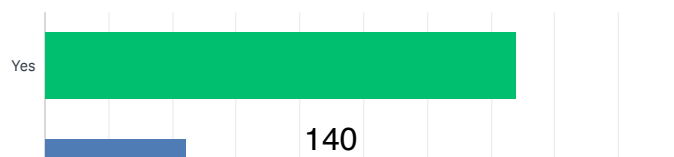
ANSWER CHOICES	RESPONSES	
Yes	77.78%	21
Somehow yes	22.22%	6
Somehow no	0.00%	0
No	0.00%	0
<b>TOTAL</b>		<b>27</b>

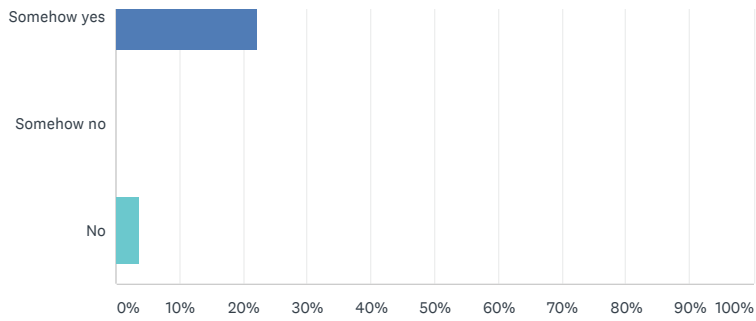
Q4



Through the current courses you are taking, do you feel that you have a clear understanding of environmental regulations, engineering ethics, environmental impact report, and project management?

Answered: 27 Skipped: 0





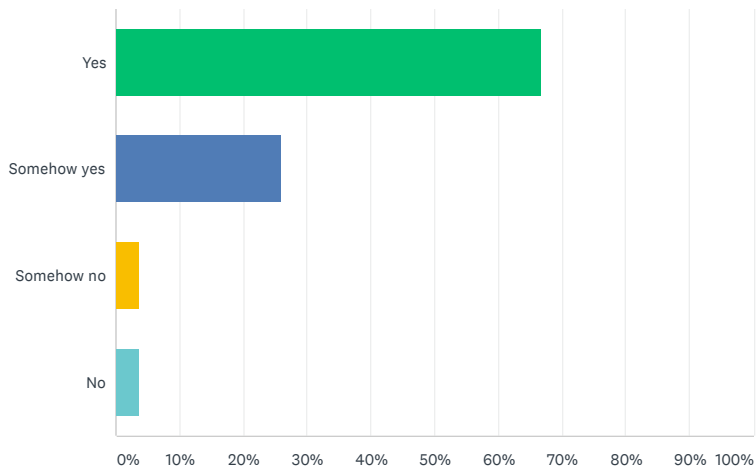
ANSWER CHOICES	RESPONSES	
Yes	74.07%	20
Somehow yes	22.22%	6
Somehow no	0.00%	0
No	3.70%	1
<b>TOTAL</b>		<b>27</b>

Q5



Through the current courses you are taking, do you feel that you have a clear understanding of contemporary pollution management issues and the ability to conduct conceptual design of sustainable treatment processes?

Answered: 27 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	66.67%	18
Somehow yes	25.93%	7
Somehow no	3.70%	1
No	3.70%	1
<b>TOTAL</b>		<b>27</b>

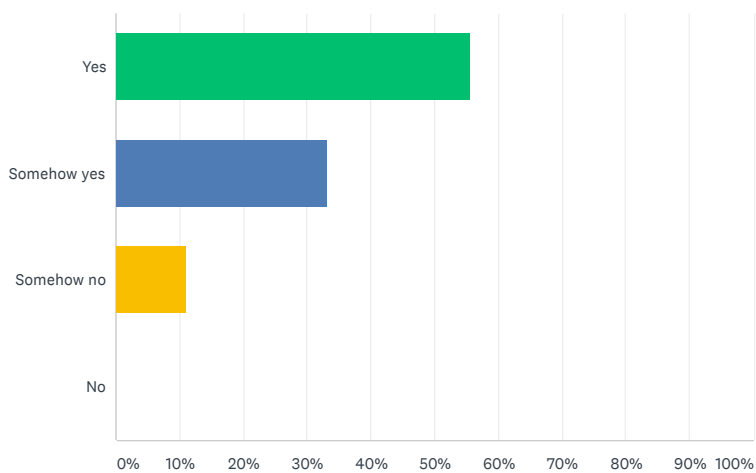
Q6



Through the current courses you are taking, do you feel that you have the ability to develop a research plan, write

## technical articles, and conduct oral presentations?

Answered: 27 Skipped: 0

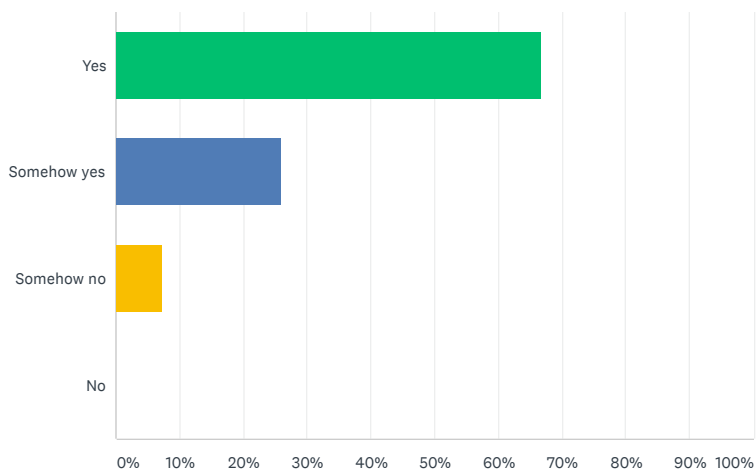


ANSWER CHOICES	RESPONSES	
Yes	55.56%	15
Somehow yes	33.33%	9
Somehow no	11.11%	3
No	0.00%	0
<b>TOTAL</b>		<b>27</b>

## Q7

Are you feeling comfortable with the current on-line mode of instructions in the classes you are taking?

Answered: 27 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	66.67%	18
Somehow yes	25.93%	7
Somehow no	7.41%	2
No	0.00%	0
<b>TOTAL</b>		<b>27</b>

Powered by  SurveyMonkey

Check out our [sample surveys](#) and [create your own now!](#)