



SACRAMENTO  
STATE

# Course Change Proposal Form A



<b>Academic Group (College):</b> <b>Engineering and Computer Science</b>	<b>Academic Organization (Department):</b> <b>Civil Engineering</b>	<b>Date:</b> <b>September 19, 2007</b>
<b>Type of Course Proposal:</b> New <input checked="" type="checkbox"/> Change <input type="checkbox"/> Deletion <input type="checkbox"/>	<b>Department Chair:</b> <b>Ramzi Mahmood Ph.D., PE</b>	<b>Submitted by:</b> <b>Kurt Ohlinger Ph.D., PE</b>
<b>Does this course fulfill a requirement for single-subject or multiple subject credential students?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	<b>For Catalog Copy:</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <b>CCE:</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	<b>Semester Effective:</b> Fall <input type="checkbox"/> Spring <input checked="" type="checkbox"/> 200 <b>B</b>

**New course:**

<b>Subject Area (prefix) &amp; Catalog No. (course no.):</b> <b>CE 38B</b>	<b>Title:</b> <b>Operation of Wastewater Treatment Plants II</b>	<b>Units:</b> <b>6.0</b>
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**JUSTIFICATION:**

This course has been developed as a required component of the new Wastewater Treatment Plant Operation Specialist Certificate Program. The new certificate program is designed to provide students with the knowledge, skills, and abilities to competently operate wastewater treatment facilities.

**NEW COURSE DESCRIPTION:** (Not to exceed 80 words, and language should conform to catalog copy. See <http://www.csus.edu/acaf/univmanual/crspsl.htm> - Guidelines for Catalog Course Description)

This intermediate course is a continuation of Operation of Wastewater Treatment Plants I, and is designed to train operators in the safe and effective operation and maintenance of wastewater treatment plants. CE 38B emphasizes more complex treatment processes. This course also introduces operators to supervisory and management practices, including using good management practices, administering maintenance programs, record-keeping, uses of computers, and preparation and writing of reports.

**Note:**

**Prerequisite:** None  
**Enforced at Registration:** Yes  No

**Corequisite:** None  
**Enforced at Registration:** Yes  No

**CAN (California Articulation Number):**

**Graded:** Letter  Credit/No Credit  **Instructor Approval Required?** Yes  No

**Course Classification (e.g., lecture, lab, seminar, discussion):**  
**Lecture (Distance Education)** **Title for SIS+/CMS (not more than 30 characters)**  
**Oper Wastewater Trmt Plants II**

**Cross Listed?** Yes  No  **If yes, do they meet together and fulfill the same requirement, and what is the other course.**

**How Many Times Can This Course be Taken for Credit?** 1

**Can the course be taken for Credit more than once during the same term?** Yes  No

**FOR NEW COURSE PROPOSALS OR SUBSTANTIVE CHANGES ONLY:**

**Description of the Expected Learning Outcomes:** Describe outcomes using the following format: "Students will be able to: 1), 2), etc."  
See the example at <http://www.csus.edu/acaf/example.htm>

**Upon completion of this course, student will be able to:**

1. Demonstrate understanding of intermediate wastewater treatment and laboratory analysis processes.
2. Articulate the skills and knowledge necessary to operate and to administer operation of treatment processes at wastewater treatment plants to produce and deliver a clean, safe plant effluent suitable for reuse or for safe discharge to the environment. Unit processes include activated sludge biological treatment, anaerobic digestion, solids handling, and effluent discharge.
3. Demonstrate understanding of treatment plant administration including applying safe operation practices for working in and for supervising workers in a wastewater treatment facility, analysis and presentation of data, and recordkeeping and report writing.

**\*\*Attach a list of the required/recommended course readings and activities [Note: it is understood that these are updated and modified as needed by the instructor(s).] This attachment should be forwarded only to your Dean's office, not AcademicAffairs.**

**Assessment Strategies:** A description of the assessment strategies (e.g., portfolios, examinations, performances, pre and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above:

**Student assessment will be based on:**

1. Passing unit examinations for each training unit comprising the course.
2. Passing a comprehensive final exam covering all aspects of wastewater treatment plant operation covered during the course.

**For whom is this course being developed?**

Majors in the Dept  Majors of other Depts  Minors in the Dept  General Education  Other

Is this course required in a degree program (major, minor, graduate degree, certificate)? Yes  No

If yes, identify program(s): **Wastewater Treatment Plant Operation Specialist Certificate Program – Certificate of Academic Achievement**

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer facilities, faculty, etc.)? Yes  No

If yes, attach a description of resources needed and verify that resources are available.

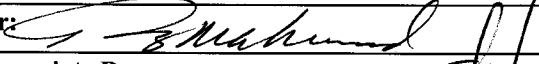
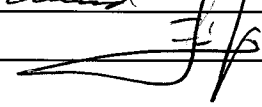
Indicate which department or programs will be affected by the proposed course (if any). \_\_\_\_\_

***The Department Chair's signature below indicates that affected programs have been sent a copy of this proposal form.***

**Approvals:** If proposed change, new course or deletion is approved, sign and date below. If not approved, forward without signing to the next reviewing authority, and attach an explanatory memorandum to the original copy.

**Signatures:**

**Date**

Department Chair: 	9/19/07
College Dean or Associate Dean: 	9/24/07
CPSP (for school personnel courses ONLY)	
Associate Vice President and Dean for Academic Programs	

**Distribution:** Academic Affairs (original), Department Chair and College Dean. Dean's office to send original after approval to Academic Affairs, at mail zip 6016. An electronic copy must also be sent

**Course Title: Operation of Wastewater Treatment Plants Volume II – CE 38B**  
6.0 Academic Credits

*Course Description*

This intermediate course is a continuation of Operation of Wastewater Treatment Plants I, and is designed to train operators in the safe and effective operation and maintenance of wastewater treatment plants. CE 38B emphasizes more complex treatment processes. This course also introduces operators to supervisory and management practices, including using good management practices, administering maintenance programs, record-keeping, uses of computers, and preparation and writing of reports.

*Course Outline*

- I. Activated Sludge (Conventional Activated Sludge Plants)
  - A. The Activated Sludge Process
  - B. Aeration Systems
  - C. Safety
  - D. Checking Out a New Plant
  - E. Process Start-Up Procedures
  - F. Routine Operational Control
  - G. Abnormal Operation (Operational Problems)
  - H. Equipment Shutdown, Abnormal Operation, and Maintenance
  - I. Modifications of the Activated Sludge Process
  - J. Sequencing Batch Reactors (SBRs)
  - K. Microbiology for Activated Sludge
  
- II. Sludge Digestion and Solids Handling
  - A. Need for Sludge Digestion
  - B. Components in the Anaerobic Sludge Digestion Process
  - C. Operation of Anaerobic Digesters
  - D. Anaerobic Digestion Controls and Test Interpretation
  - E. Operational Strategy
  - F. Digester Cleaning
  - G. Aerobic Sludge Digestion
  - H. Digested Sludge Handling
  - I. Sludge Disposal
  - J. Review of Plans and Specifications
  
- III. Effluent Disposal
  - A. Importance of Effluent Disposal
  - B. Effluent Disposal by Surface Discharge
  - C. Operating Procedures
  - D. Receiving Water Monitoring

- E. Sampling and Analysis
  - F. Safety
  - G. Maintenance
  - H. Review of Plans and Specifications
  - I. Other Types of Receiving Waters
- IV. Plant Safety
- A. Why Safety?
  - B. Types of Hazards
  - C. Specific Hazards
  - D. Safety in the Laboratory
  - E. Fire Prevention
  - F. Water Supplies
  - G. Safety Equipment and Information
  - H. "Tailgate" Safety Meetings
  - I. How to Develop Safety Training Programs
  - J. Hazard Communication (Worker Right-To-Know Laws)
  - K. Safety Summary
- V. Maintenance
- A. Treatment Plant Maintenance – General Program
  - B. Mechanical Equipment
  - C. Beware of Electricity
  - D. Electrical Equipment Maintenance
  - E. Motors
  - F. Records
  - G. Additional Reading
  - H. Mechanical Maintenance
  - I. Unplugging Pipes, Pumps, and Valves
  - J. Flow Measurements – Meters and Maintenance
  - K. Review of Plans and Specifications
- VI. Laboratory Procedures and Chemistry
- A. Importance of Laboratory Procedures
  - B. Basic Laboratory Words, Equipment, and Techniques
  - C. Safety and Hygiene in the Laboratory
  - D. Sampling
  - E. Laboratory Procedures for Plant Control
  - F. Laboratory Procedures for NPDES Monitoring
- VII. Applications of Computers for Plant O & M
- A. Computers in a Treatment Plant?
  - B. How Can I Use a Computer?
  - C. How Do You Get a Computer?
  - D. Time Savings

- E. Cautions
- F. Scada Systems
- G. Conclusions

- VIII. Analysis and Presentation of Data
  - A. Need for Analyzing and Presenting Data
  - B. Causes of Variations in Results
  - C. Manometer and Gage Reading
  - D. Chart Reading
  - E. Average or Arithmetic Mean
  - F. Range of Values
  - G. Median and Mode
  - H. Geometric Mean
  - I. Moving Averages
  - J. Graphs and Charts
  - K. Variance and Standard Deviation
  - L. Metric Calculations
- IX. Records and Report Writing
  - A. Need for Records and Report Writing
  - B. Records
  - C. Report Writing
  - D. Typical Monthly Report
  - E. Emergency Planning
  - F. Additional Reading
- X. Treatment Plant Administration
  - A. Need for Utility Management
  - B. Functions of a Manager
  - C. Planning
  - D. Organizing
  - E. Staffing
  - F. Communication
  - G. Conducting Meetings
  - H. Public Relations
  - I. Financial Management
  - J. Operations and Maintenance
  - K. Emergency Response
  - L. Safety Program
  - M. Record Keeping
  - N. Security Measures
  - O. Acknowledgments
  - P. Additional Reading

*Required Text*

*Operation of Wastewater Treatment Plants, Volume II, 6<sup>th</sup> Ed.* (2003), Prepared by the CSU Sacramento Office of Water Programs.

*Recommended Reference*

*Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> Ed.* (1998), Prepared by the American Public Health Association, American Water Works Association, and Water Environment Federation.

*Expected Learning Knowledge, Behavior, and Attitude Outcomes and Competencies*

1. Demonstrate understanding of intermediate wastewater treatment and laboratory analysis processes.
2. Articulate the skills and knowledge necessary to operate and to administer operation of treatment processes at wastewater treatment plants to produce and deliver a clean, safe plant effluent suitable for reuse or for safe discharge to the environment. Unit processes include activated sludge biological treatment, anaerobic digestion, solids handling, and effluent discharge.
3. Demonstrate understanding of treatment plant administration including applying safe operation practices for working in and for supervising workers in a wastewater treatment facility, analysis and presentation of data, and recordkeeping and report writing.

*Assessment Strategies and Evidence of Competency*

1. Pass unit examinations for each training unit comprising the course.
2. Pass a comprehensive final exam covering all aspects of wastewater treatment plant operation covered during the course.