

Technical College of the Lowcountry  
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## **CET 218 HYDRAULICS**

### **Course Description**

This course includes the fundamentals of flow, control, disposal of water, and flow through open and closed conduits, orifices, and weirs.

3 Cr (3 lec/pres, 0 lab, 0 other)

### **Course Focus**

The course covers the fundamentals of fluid mechanics, hydrostatics, hydrodynamics, and the flow of water in hydraulic systems. Fundamental hydrology and stormwater design are also discussed.

### **Text and References**

Gribben, John E., 2007, **Introduction to Hydraulics and Hydrology with Applications for Stormwater Management**, 3rd Ed., Cengage  
Published: 2007  
ISBN 978-1-4180-3295-1

### **Course Goals**

The following list of course goals will be addressed in the course. These goals are directly related to the performance objectives.

1. understand the properties of fluids
2. calculate hydrostatic pressure on a horizontal surface
3. compute hydrostatic pressure on a vertical surface
4. calculate buoyant forces
5. recognize types of water flow
6. draw hydraulic grade line for a simple system
7. estimate friction loss in a hydraulic system
8. draw energy grade line for a simple system
9. compute discharge of water flow in a simple hydraulic system
10. compute velocity of water in a simple hydraulic system
11. understand measurement of flow and velocity in simple hydraulic systems
12. calculate orifice flow
13. compute flow over a weir
14. calculate flow under a gate
15. compute slope of a channel
16. calculate area of flow in a channel
17. compute wetted perimeter and hydraulic radius of open channel flow
18. identify normal depth in an open channel
19. compute critical depth of a an open channel
20. use Manning's equation

21. use channel and pipe charts properly
22. identify flow control type in culverts
23. choose culvert size for a given discharge
24. address inlet efficiency options
25. describe hydrologic cycle
26. delineate drainage basins
27. estimate time of concentration for a drainage basin
28. estimate storm frequency for a given rainfall intensity
29. examine runoff hydrographs
30. use the rational method to compute peak runoff and volume
31. use the modified rational method to compute peak runoff and volume
32. review the NRCS method to compute runoff
33. layout a storm sewer system
34. interpret a storm sewer profile
35. delineate incremental drainage areas in a standard storm sewer design
36. compute pipe sizes in a storm sewer design
37. design rip rap outfall protection
38. analyze layout for new culverts
39. design culvert replacements
40. compute impoundment volume
41. compute impoundment outflow using orifice and weir
42. compute reservoir routing
43. explain regional and on-site detention
44. design a basic detention basin

### Student Contributions

The student is expected to be prepared for class and to be in class on time. Test materials are weighed heavily in favor of lecture materials. The student will complete all assignments. The student is required to observe and practice all lab safety rules. All cell phones and pagers must be silenced during class.

### Course Evaluation

The grade scale is as follows:	90 – 100 =	A
	80 – 89 =	B
	70 – 79 =	C
	60 – 69 =	D
	Below 60 =	F

Course grades will be determined from the following weighting scheme:

Attendance/Notebook Review/Homework completion	20%
Quizzes	60%
Final	20%

### Course Schedule

The class meets for 1 lecture/lab for 2.75 hours per week.

### **ADA Statement**

The Technical College of the Lowcountry provides access, equal opportunity and reasonable accommodation in its services, programs, activities, education and employment for individuals with disabilities. To request disability accommodation, contact the counselor for students with disabilities at (843) 525-8228 during the first ten business days of the academic term.

### **Academic Misconduct**

There is no tolerance at TCL for academic dishonesty and misconduct. The College expects all students to conduct themselves with dignity and to maintain high standards of responsible citizenship.

It is the student's responsibility to address any questions regarding what might constitute academic misconduct to the course instructor for further clarification.

The College adheres to the Student Code for the South Carolina Technical College System. Copies of the Student Code and Grievance Procedure are provided in the *TCL Student Handbook*, the Division Office, and the Learning Resources Center.

### **Attendance**

The College's statement of policy indicates that students must attend ninety percent of total class hours or they will be in violation of the attendance policy.

- Students not physically attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
- Students taking an online/internet class must sign in **and** communicate with the instructor within the first ten calendar days from the start of the semester to indicate attendance in the class. Students not attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
- Reinstatement requires the signature of the division dean.

In the event it becomes necessary for a student to withdraw from the course ***OR if a student stops attending class, it is the student's responsibility to initiate and complete the necessary paperwork.*** Withdrawing from class may have consequences associated with financial aid and time to completion.

When a student exceeds the allowed absences; the student is in violation of the attendance policy. The instructor **MUST** withdraw the student with a grade of "W", "WP", or "WF" depending on the date the student exceeded the allowed absences and the student's progress up to the last date of attendance *or* under extenuating circumstances and at the discretion of the faculty member teaching the class, allow the student to continue in the class and make-up the work. This exception must be documented at the time the allowed absences are exceeded.

Absences are counted from the first day of class. There are no "excused" absences. All absences are counted, regardless of the reason for the absence.

- A student must take the final exam or be excused from the final exam in order to earn a non-withdrawal grade.

A copy of TCL's **STATEMENT OF POLICY NUMBER: 3-1-307 CLASS ATTENDANCE (WITHDRAWAL)** is on file in the Division Office and in the Learning Resources Center.

### **Hazardous Weather**

In case weather conditions are so severe that operation of the College may clearly pose a hardship on students and staff traveling to the College, notification of closing will be made through the following radio and television stations: WYKZ 98.7, WGCO 98.3, WGZO 103.1, WFXH 106.1, WWVV 106.9, WLOW 107.9, WGZR 104.9, WFXH 1130 AM, WLVH 101.1, WSOK 1230 AM, WAEV 97.3, WTOC TV, WTGS TV, WJWJ TV, and WSAV TV. Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. [www.tcl.edu/textalert.asp](http://www.tcl.edu/textalert.asp)

**Emergency Text Message Alert**

Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. Participants receive immediate notification of emergency events and weather cancelations via text messaging on their cell phones. Participants can also opt in to receive non-emergency news and announcements. Go to [www.tcl.edu](http://www.tcl.edu). On the homepage, click on “emergency TextAlert at TCL” and fill out the form or go to [www.tcl.edu/textalert.asp](http://www.tcl.edu/textalert.asp)