Introduces students to the theory and practice of hydrologic analysis and design, to develop an analytical understanding of the basic phenomena of hydrology and to study a variety of practical quantitative methods and tools for solving hydrologic problems.

Entry Level Standards:

Students should have knowledge and experience working in the Windows operating system environment, including the use of the Microsoft Office software components. Students should also have the ability to use a standard keyboard and maintain a rate of 10 words per minute. Students should also have mathematics, writing, and verbal skills at the college level.

Prerequisites:

SURV2510, SURV 2210 or consent of CET coordinator

Textbook(s) and Other Course Materials:


I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Lab</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intro. water in our lives, stormwater management, significant figures.</td>
<td>Project assignment and discussion</td>
<td>CH 1</td>
</tr>
<tr>
<td>2</td>
<td>Properties of water, Hydrologic cycle, calculation of specific weight and specific gravity of various liquids</td>
<td>Available data resources</td>
<td>CH 2, 10</td>
</tr>
<tr>
<td>3</td>
<td>Fundamental Hydrostatics/ calculation of water pressure on different surfaces</td>
<td>Field Trip 1</td>
<td>CH 3</td>
</tr>
<tr>
<td>4</td>
<td>delineate drainage basin, estimate storm frequency</td>
<td>Determine watershed data and a site</td>
<td>CH 10</td>
</tr>
<tr>
<td>Week</td>
<td>Task Description</td>
<td>Task Details</td>
<td></td>
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<tr>
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<tr>
<td>5</td>
<td>Types of water flow, computation of discharge and velocity of water</td>
<td>Field work to obtain critical data</td>
<td>CH 4</td>
</tr>
<tr>
<td>6</td>
<td>Calculate flow from different devices (orifice, weir, gate and siphon)</td>
<td>Complete field work</td>
<td>CH 5</td>
</tr>
<tr>
<td>7</td>
<td>Cross-section area, hydraulic radius of a channel, normal depth in a channel</td>
<td>Map and data for the site</td>
<td>CH 6</td>
</tr>
<tr>
<td>8</td>
<td>Uniform flow in channels (normal depth in a channel, pipe, and etc), channel/pipe design charts</td>
<td>Continue to map and data for the site</td>
<td>CH 7</td>
</tr>
<tr>
<td>9</td>
<td>Computation of water surface profile, basic hydraulic jump</td>
<td>ArcHydro Demo</td>
<td>CH 8</td>
</tr>
<tr>
<td>10</td>
<td>types of flow pattern, inlet and outlet control, adequate culvert size</td>
<td>Site plan for proposed revisions</td>
<td>CH 9</td>
</tr>
<tr>
<td>11</td>
<td>Computation of peak runoff by different methods</td>
<td>Site plan</td>
<td>CH 11</td>
</tr>
<tr>
<td>12</td>
<td>Assess an existing culvert, new or replacement culvert design</td>
<td>Use of GIS and GPS for drainage inventory</td>
<td>CH 13</td>
</tr>
<tr>
<td>13</td>
<td>Storm water detention</td>
<td>Field Trip 2</td>
<td>CH 14</td>
</tr>
<tr>
<td>14</td>
<td>Basic detention design</td>
<td>Submit final project</td>
<td>CH 15</td>
</tr>
<tr>
<td>15</td>
<td>Final Exam Period</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**II. Engineering Technology General Outcomes (Educational objectives)**

I. Apply basic engineering theories and concepts creatively to analyze and solve technical problems

II. Utilize with a high degree of knowledge and skill equipment, instruments, software, and technical reference materials currently used in industry.

III. Communicate effectively using developed writing, speaking, and graphics skills.

IV. Assimilate and practice the concepts and principles of working in a team environment.

V. Obtain employment within the discipline or matriculate to a four year program in engineering or industrial technology.
III. Engineering Technology Concentration Competencies*

Students will:

A. Apply the knowledge, techniques, skills, and modern tools for the concentration of study to specifically defined engineering technology activities

B. Demonstrate the knowledge of mathematics, science, engineering and technology to engineering technology problems using developed practical knowledge

C. Conduct and report the results of standard tests and measurements, and conduct, analyze and interpret experiment or project results

D. Function effectively as a member of a technical team

E. Identify, analyze and solve specifically defined engineering technology-based problems

F. Employ written, oral and visual communication in a technical environment

• At the program level all 6 competencies apply to roman numerals I – V of the Engineering Technology General Outcomes (Educational objectives) listed above.

IV. Course Goals*:

The course will

1. Develop an understanding of the role of the hydrologic cycle. A & E

2. Introduce hydrologic analysis of watersheds, storm runoffs, flows in both open and closed channels. A, B & E

3. Develop the ability to determine time-of-concentrations, discharges, flow velocities, and flow depths for flows in open and closed channels. A, B & E

4. Develop the ability to compute peak discharges for overland flows as well as for flows in channels using a variety of methods. A, B & E

5. Introduce methods used to design public storm drainage systems as well as designing drainage systems for private property. A, B & E

*Capital letters after course goals reference the competencies of the Engineering Technology concentrations listed above.

V. Expected Student Learning Outcomes*:

Students will be able to:

a. Demonstrate techniques used to convert GIS data into a final cartographic product. A, B

b. Design a cartographic product. A, B

c. Create large format output. A, B

d. Use design principles in creating cartographic products. A, B

e. Demonstrate understanding of design principles in planning cartographic products. A, B
f. Demonstrate an understanding of cost, time and tools needed to create maps within budget.
A, B

*Numbers after Expected Student Learning Outcomes reference the course goals listed above.

VI. Evaluation:

A. Testing Procedures: 65-70% of grade

Three tests will be administered.

B. Laboratory Expectations: 35% of grade

Students will be assigned group and/or individual projects. The ability to work with others, the ability to make efficient use of equipment, and the level at which students perform will contribute to the grade.

C. Field Work:

N/A

D. Other Evaluation Methods:

N/A

E. Grading Scale:

90 - 100 A
80 - 89  B
70 - 79  C
60 - 69  D
Below 60 F

VII. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

B. Academic Dishonesty:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:
• Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
• Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services,
without proper documentation of the original source.

- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one’s own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

C. Accommodations for disabilities:

Students that need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by sending email to disabilityservices@pstcc.edu, or visiting Goins 127, 132, 134, 135, 131. More information is available at http://www.pstcc.edu/sswd/.

D. Other Policies:

**Safety and Equipment Abuse:**
Repeated safety violations will result in a reduction of final grade, at the instructor's discretion. Flagrant violations which result in equipment damage or personal injury could result in automatic failure of the course.