Course Description and Prerequisites
This is an advanced course of Water Resources Engineering in formation of three credit online lecture. The course covers topics of general fluid mechanics regarding internal and external incompressible viscous flow including pipe flow and boundary layer, water distributions and control, watershed hydrologic analysis, stormwater drainage systems using river analysis system.

Prerequisites: “C” or better grade in CIVE 4335 Water Resources Engineering

Learning Objectives/Outcomes for the Course
Course Outcomes & Assessment: H - Homework; Q – Quiz; T – Test; F – Field trip; and P – Class project
1. Understand the fundamental concepts of Fluid Mechanics and Hydraulics [H, Q, T]
2. Understand the fundamentals of internal and external incompressible viscous flow [H, Q, T]
3. Demonstrate knowledge of watershed hydrology analysis [H, Q, T]
4. Ability to apply hydrologic analysis numerical model in given watershed [H, Q, P]
5. Understand municipal water distribution systems [H, Q, T]
6. Understand open channel flow hydraulics and its driving force [H, Q, T]
7. Demonstrate knowledge of the Rio Grande Valley stormwater drainage system [H, Q, P]
8. Ability to apply open channel analysis numerical model in given waterways [H, Q, P]

Learning Objectives for Core Curriculum Requirements
Texas Higher Education Coordinating Board (THECB) Outcomes associated with Civil Engineering Department

Student Outcomes
• Critical Thinking Skills - an ability to identify, formulate, and solve engineering problems;
• Empirical and Quantitative Skills - an ability to apply knowledge of mathematics, science, and engineering; a knowledge of contemporary issues; an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
• Social Responsibility - an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

Civil Engineering Student Outcomes
a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. an ability to function on multidisciplinary teams
e. an ability to identify, formulate, and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i. recognition of the need for, and an ability to engage in life-long learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
Contribution of Course Outcomes to Program Outcomes

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<tr>
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Grading Policies
Homework 20% 100 A > 90
Quizzes 10% 89 > B > 80
Midterm Exams (2) 40% (20% each) 79 > C > 70
Class Projects 30%

Textbook and/or Resource Material
Required Text:

References:

Calendar of Activities
Be sure to include important dates relative to the academic calendar. The UTRGV academic calendar can be found at https://my.utrgv.edu/home at the bottom of the screen, prior to login. Some important dates for Spring 2020 include:

- January 13: First day of classes
- January 16: Last day to add a course or register for Spring 2020
- January 20: Martin Luther King Jr. Holiday – NO classes
- March 9-14: Spring Break – NO classes
- April 9: Last day to drop a course; will count toward the 6-drop rule
- April 10-11: Easter Holiday – NO classes
- April 30: Study Day – NO classes
- May 1-7: Final Exams
- May 7: Spring classes end; Official last day of the term
- May 8-9: Commencement Exercises
# Class Schedule (tentative)

<table>
<thead>
<tr>
<th>No</th>
<th>Week</th>
<th>Topic</th>
<th>Remark</th>
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<tbody>
<tr>
<td>1</td>
<td>13-17</td>
<td>Course introduction</td>
<td>Introduction</td>
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<tr>
<td></td>
<td>JAN.</td>
<td>Hydrologic cycles for water resources engineering</td>
<td></td>
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<tr>
<td>2</td>
<td>20-24</td>
<td>Peak discharge and rational method</td>
<td>Fundamentals of Hydrology</td>
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<tr>
<td></td>
<td>JAN.</td>
<td>Parking lot drainage design – Civil3D/SWMM application</td>
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<td>3</td>
<td>27-31</td>
<td>Hydrograph analysis</td>
<td>Hydrologic Design I</td>
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<td>JAN.</td>
<td>Design storm - Deterministic and frequency analysis</td>
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<td>4</td>
<td>3-7</td>
<td>Hydrologic and hydraulic routing - Reservoir design and management</td>
<td>Hydrologic Modeling I</td>
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<td></td>
<td>FEB.</td>
<td>HEC-HMS modeling project presentation – Introduction</td>
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<td>5</td>
<td>10-14</td>
<td>Watershed hydrologic modeling using HMS</td>
<td>Hydrologic Modeling II</td>
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<td></td>
<td>FEB.</td>
<td>Watershed flood protection management using frequency analysis</td>
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<tr>
<td>6</td>
<td>17-21</td>
<td>1st Midterm Exam</td>
<td>Exam I</td>
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<tr>
<td></td>
<td>FEB.</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>24-28</td>
<td>Groundwater introduction and aquifer properties</td>
<td>Groundwater Fundamentals</td>
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<td></td>
<td>FEB.</td>
<td>Groundwater flow governing equations</td>
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<tr>
<td>8</td>
<td>2-6</td>
<td>Groundwater well hydraulics</td>
<td>Groundwater Hydraulics</td>
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<tr>
<td></td>
<td>MAR.</td>
<td>Groundwater contaminant and remedy</td>
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<td>9</td>
<td>9-13</td>
<td>Spring break – no class</td>
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<tr>
<td></td>
<td>MAR.</td>
<td></td>
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<tr>
<td>10</td>
<td>16-20</td>
<td>Introduction of water distribution - closed/open conduit systems</td>
<td>Water Distribution Network</td>
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<tr>
<td></td>
<td>MAR.</td>
<td>Fundamentals of closed conduit flow and Head loss estimations</td>
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<tr>
<td>11</td>
<td>23-27</td>
<td>Pipeline network analysis</td>
<td>Water Distribution Network Design</td>
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<tr>
<td></td>
<td>MAR.</td>
<td>Pump applications in pipelines</td>
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<tr>
<td>12</td>
<td>30-3</td>
<td>Fundamentals of open channel hydraulics</td>
<td>Open Channel Hydraulics</td>
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<tr>
<td></td>
<td>APR.</td>
<td>Open channel flow controls</td>
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<tr>
<td>13</td>
<td>6-10</td>
<td>Estimation of water surface profiles</td>
<td>Open Channel Modeling I</td>
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<td>APR.</td>
<td>Computer modeling of River Analysis System – HEC-RAS model</td>
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<td>14</td>
<td>13-17</td>
<td>HEC-RAS model development</td>
<td>Open Channel Modeling II</td>
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<td>APR.</td>
<td>Cameron and Willacy County HEC-RAS model applications</td>
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<td>15</td>
<td>20-24</td>
<td>2nd Midterm Exam</td>
<td>Exam II</td>
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<td>APR.</td>
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<td>16</td>
<td>27-1</td>
<td>Final class project presentations</td>
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<td>17</td>
<td>4-8</td>
<td>Finals Week</td>
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</table>
Civil Engineering Course Policies

Grades:
- Course grades will be based upon demonstrated understanding of course content.
- An understanding of prerequisite knowledge is assumed and will not be graded.
  - To be graded, student work must demonstrate retention, understanding and confidence in the exercising of prerequisite knowledge.
- At least 10% of the course grade will be attributed to participation; tardiness, alertness, disruptive conversation, web surfing, texting, working on homework, listening to music or any other behavior that does not contribute to course success may be penalized.

Attendance:
- Lecture, laboratory, quiz, exam and any other course related meetings are required.
- Students not attending course meetings and/or not turning in assignments will be dropped from the course by the instructor.

Homework:
- will be completed in a consistent format in all Civil Engineering courses;
  - The student's full name will be provided in the upper right corner of the first page.
  - The student's last name will be provided in the upper right corner of additional pages.
  - The page number and total number of pages will be shown in the upper right corner of the second and any additional pages.
  - Homework will not be stapled.
  - Only one side (the front side, binding holes on the left, heavily printed grid on the back) of the paper will be used.
  - Homework that is not legible will not be graded.
- will be turned in on time and at the beginning of lecture (first 6 minutes), when due at a lecture;
  - No late homework will be accepted for full credit.
  - Two assignments (maximum) per course may be submitted at the beginning of the following lecture for at most 50% credit.
- problems involving calculations will be completed on engineering paper;
  - Homework completed on paper from a spiral notebook will have any spiral perforations trimmed from the pages.
  - Engineering paper created using a watermark, title block and/or border may be printed.
  - Spreadsheet solutions will include algebraic equations and adequate notations to follow the development of the solution and facilitate checks with hand calculations.
- problem solutions will include the problem statement at the top of the problem followed by any data or other information given to solve the problem.
- Assumptions used to solve problems will be clearly identified.
- References to materials used to solve the problem will be provided, including (when used) solution manuals.
  - Solutions appearing to have been copied from a solution manual will not be graded.
  - Solutions will include detailed progression of calculations.
- Answers will be well identified (circled, boxed, underlined or highlighted) and will include units
- Completed homework solutions will be folded in half (4.25” x 11” when folded, typical) with the students full name written in the upper right corner of the back page.

Electronic Devices:
- During lectures, all electronic devices will be turned off and put away: cell phones, i Pods, PDA’s, etc.
  Electronic devices, including computers, may only be used to reference and/or support course materials, content and discussions.

Exams:
- Exams are to be taken at scheduled exam times.
- Academic dishonesty will not be tolerated.
  - When observed, cheating will result in a failing grade
  - Instances of cheating will be referred to the Dean of Students
- Exams will generally be taken with tables/desks cleared.
  - The use of calculator app’s on i-devices may be prohibited.
• Students should consider using an FE approved calculator.
  o No materials may be shared among students, including: calculators, erasers, pencils, paper, reference materials, etc.
  o Wandering eyes may constitute cheating; look at your paper or your calculator.
• Student will not be permitted to leave the classroom during lectures and exams except for extreme emergencies.
• Make-ups for in-class exams for extreme emergencies will be scheduled at the end of the semester.

UTRGV Policy Statements
STUDENTS WITH DISABILITIES:
Students with a documented disability (physical, psychological, learning, or other disability which affects academic performance) who would like to receive academic accommodations should contact Student Accessibility Services (SAS) for additional information. In order for accommodation requests to be considered for approval, the student is responsible for providing sufficient documentation of the disability to SAS and participating in an interactive discussion with SAS staff. Accommodations may be requested at any time but are not retroactive. Please contact SAS early in the semester/module for guidance. Students who experience a broken bone, severe injury, or undergo surgery may also be eligible for temporary accommodations.

Pregnancy, Pregnancy-related, and Parenting Accommodations
Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related condition, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Accessibility Services for additional information and to request accommodations.

Student Accessibility Services:
Brownsville Campus: Student Accessibility Services is located in 1.107 in the Music and Learning Center building (BMSLC) and can be contacted by phone at (956) 882-7374 or via email at ability@utrgv.edu.

Edinburg Campus: Student Accessibility Services is located in 108 University Center (EUCTR) and can be contacted by phone at (956) 665-7005 or via email at ability@utrgv.edu.

MANDATORY COURSE EVALUATION PERIOD:
Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available on or about:

Module 1 February 19-25, 2020
Module 2 April 15-21, 2020
Full Spring Semester April 10-29, 2020

ATTENDANCE:
Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences.
UTRGV’s attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

SCHOLASTIC DISHONESTY:
As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism (including self-plagiarism), and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations, STU 02-
100, and UTRGV Academic Integrity Guidelines). **All scholastic dishonesty incidents will be reported to Student Rights and Responsibilities.**

**SEXUAL MISCONDUCT and MANDATORY REPORTING:**
In accordance with UT System regulations, your instructor is a “Responsible Employee” for reporting purposes under Title IX regulations and so must report to the Office of Institutional Equity & Diversity (oie@utrgv.edu) any instance, occurring during a student’s time in college, of sexual misconduct, which includes sexual assault, stalking, dating violence, domestic violence, and sexual harassment, about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at [www.utrgv.edu/equity](http://www.utrgv.edu/equity), including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect that is free from sexual misconduct, discrimination, and all forms of violence. If students, faculty, or staff would like confidential assistance, or have questions, they can contact OVAVP (Office for Victim Advocacy & Violence Prevention) at (956) 665-8287, (956) 882-8282, or OVAVP@utrgv.edu.

**COURSE DROPS:**
According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

**STUDENT SERVICES:**
Students who demonstrate financial need have a variety of options when it comes to paying for college costs, such as scholarships, grants, loans and work-study. Students should visit the Students Services Center (U Central) for additional information. U Central is located in BMAIN 1.100 (Brownsville) or ESSBL 1.145 (Edinburg) or can be reached by email (ucentral@utrgv.edu) or telephone: (888) 882-4026. In addition to financial aid, U Central can assist students with registration and admissions.

Students seeking academic help in their studies can use university resources in addition to an instructor’s office hours. University Resources include the Advising Center, Career Center, Counseling Center, Learning Center, and Writing Center. The centers provide services such as tutoring, writing help, counseling services, critical thinking, study skills, degree planning, and student employment. In addition, services such as the Food Pantry are also provided. Locations are listed below.

<table>
<thead>
<tr>
<th>Center Name</th>
<th>Brownsville Campus</th>
<th>Edinburg Campus</th>
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<tbody>
<tr>
<td>Advising Center</td>
<td><a href="mailto:AcademicAdvising@utrgv.edu">AcademicAdvising@utrgv.edu</a></td>
<td>BMAIN 1.400 (956) 665-7120</td>
</tr>
<tr>
<td>Career Center</td>
<td><a href="mailto:CareerCenter@utrgv.edu">CareerCenter@utrgv.edu</a></td>
<td>BCRTZ 129 (956) 882-5627</td>
</tr>
<tr>
<td>Counseling Center</td>
<td><a href="mailto:Counseling@utrgv.edu">Counseling@utrgv.edu</a></td>
<td>BSTUN 2.10 (956) 882-3897</td>
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<tr>
<td>Food Pantry</td>
<td><a href="mailto:FoodPantry@utrgv.edu">FoodPantry@utrgv.edu</a></td>
<td>BCAVL 101 &amp; 102 (956) 882-7126</td>
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<tr>
<td>Learning Center</td>
<td><a href="mailto:LearningCenter@utrgv.edu">LearningCenter@utrgv.edu</a></td>
<td>BMSLC 2.118 (956) 882-8208</td>
</tr>
<tr>
<td>Writing Center</td>
<td><a href="mailto:WC@utrgv.edu">WC@utrgv.edu</a></td>
<td>BUBLB 3.206 (956) 882-7065</td>
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