Fluid Mechanics ENGR 3315
Department of Engineering
Summer II 2019

A. COURSE INFORMATION
Course number/section: ENGR 3315.001
Class meeting time: MTWR 08:00-09:55 A.M.
Class location: CS-108
Course Website: Blackboard

B. INSTRUCTOR INFORMATION
Instructor: Iltai Isaac Kim, Ph.D.
Office location: EN-318
Office hours: MTW 10:00am- 12:00pm
Telephone: 361-825-2734
E-mail: ikim@tamucc.edu
Appointments: Correspond using ISLANDER email

C. COURSE DESCRIPTION
Catalog Course Description
Explores fluid properties, hydrostatics, fluid dynamics & kinematics, energy and momentum principles, similitude and dimensional analysis, incompressible and viscous flow, laminar and turbulent flow.

D. PREREQUISITES AND COREQUISITES
Prerequisites
ENGR 2326 - Dynamics and MATH 2415 - Calculus III.
Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES
Required Textbook(s)

Optional Textbook(s) or Other References

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
Assessment is a process used by instructors to help improve learning. Assessment is essential
for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:
1. Have a basic understanding of fluid statics, kinematics, and dynamics
2. Be able to perform engineering calculations of forces in hydrostatic systems
3. Be able to perform engineering calculations of momentum and energy changes using control-volume methods
4. Be able to apply Buckingham pi theorem and the concepts of modeling and similitude to develop prediction equation
5. Be able to apply appropriate equations and principles to analyze a variety of pipe flow situations
6. Be able to perform engineering calculations of friction losses of pipe flow depending on flow characteristics

G. INSTRUCTIONAL METHODS AND ACTIVITIES

Communications: All outside-of-class communications will be conducted through the message and e-mail functions of the Blackboard site for the class. Announcements will be posted to Blackboard and e-mailed to your Islander account. Homework assignments, solutions, handouts, and other course materials will be posted to Blackboard. Grades will not be posted to Blackboard. For any e-mails from students to instructor, please enter ENGR 3315 in the email’s subject field. Each student should make sure his or her preferred e-mail address is the one in the Blackboard system, and each student should check e-mail and the Blackboard message site regularly.

H. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
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<tbody>
<tr>
<td>Attendance</td>
<td>5</td>
</tr>
<tr>
<td>Homework</td>
<td>10</td>
</tr>
<tr>
<td>Exam#1</td>
<td>25</td>
</tr>
<tr>
<td>Exam#2</td>
<td>25</td>
</tr>
<tr>
<td>Final Exam</td>
<td>35</td>
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<tr>
<td>Bonus (quizzes, participation in class discussion, etc.)</td>
<td>Extra 5</td>
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</tbody>
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*Grades will be assigned on a 10-point scale: 90-100=A, 80-89=B, 70-79=C, 60-69=D, below 60=F.
I. COURSE CONTENT/SCHEDULE

Lecture Notes: Downloadable from blackboard http://bb9.tamucc.edu or provided through email or class

- Drop Day: Last day to drop a class is Monday, 29 July 2019.

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

<table>
<thead>
<tr>
<th>WEEK</th>
<th>Days/Date</th>
<th>TOPIC</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7/8, 9</td>
<td>Introduction (1.1-1.10)</td>
<td>HW#1</td>
</tr>
<tr>
<td>1</td>
<td>7/10, 11</td>
<td>Fluid Statics (2.1-2.6)</td>
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<tr>
<td>2</td>
<td>7/15</td>
<td>Fluid Statics (2.7-2.12)</td>
<td>HW#2</td>
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<tr>
<td>2</td>
<td>7/16, 17</td>
<td>Elementary Fluid Dynamics (3.1-3.6)</td>
<td>HW#3</td>
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<tr>
<td>2</td>
<td>7/18</td>
<td>Review &amp; Fluid Kinematic (4.1)</td>
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<tr>
<td>3</td>
<td>7/22</td>
<td>Midterm Exam#1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>7/23</td>
<td>Fluid Kinematic (4.2-4.4)</td>
<td>HW#4</td>
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<tr>
<td>3</td>
<td>7/24, 25</td>
<td>Control Volume Analysis (5.1-5.3)</td>
<td>HW#5</td>
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<tr>
<td>4</td>
<td>7/29</td>
<td>Control volume (5.3, 5.4)</td>
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<tr>
<td>4</td>
<td>7/30</td>
<td>Midterm Exam#2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>7/31, 8/1</td>
<td>Dimensional Analysis and Similitude (7.1-7.8)</td>
<td>HW#6</td>
</tr>
<tr>
<td>5</td>
<td>8/5-7</td>
<td>Viscous Flow in Pipes (8.1-8.6)</td>
<td>HW#7</td>
</tr>
<tr>
<td>FE</td>
<td>8/8</td>
<td>Final Exam: 08:00-10:30 A.M.</td>
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*Target dates may be adjusted depending on material covered.

J. COURSE POLICIES

Attendance/Tardiness
Attendance is mandatory and any absences should have university approval and inform instructor in advance. Showing up to take the quiz and leaving will not count as attendance, will be factored into grade at the end of term. Each absence will result in 1 point deduction in your final grade.

Exams
Instructions and date of each midterm exam will be given one week in advance. No makeup exam is allowed by the Instructor unless for extreme situations with sufficient proof

Assignments
Multiple problems will be assigned for all homework and all of them will be graded. So, to
avoid missing grade, students should complete all assigned problems. The neater and more coherent the work, the better grade may be expected.

**Late Homework**
Late submission of homework will be subjected to lowering of Maximum points (1 day late, 15% off, 2-3 days late, 30% off, 4+ days late, 60% Off). Homework submission is not accepted after the graded work has been returned to the class.

**Make-up Exam**
It will only be allowed with a valid (university approved) excuse. Exams need to be made up within one week from the missed time. Make-up exam may be different with what was given to other students.

**Extra Credit**
Up to 5 points extra credit may be granted to those students who show excellent behavior in the classes, which include but not limited to having good onsite quizzes, actively participating the class discussion or answering the instructor’s questions, and so on.

**Cell Phone Use**
During the class, cell phone should be muted and can only be used for emergency purposes. If you have a potential need, set it to vibrate only and speak to phone outside the classroom. No recording of the lectures is allowed without express written consent of the instructor or expressed authorization by disability services.

**Laptop Use:**
In general, use of laptop is prohibited during class unless have instructor’s approval.

**Food in Class**
No eating or drinking is permitted during class.

**Missed Exam**
Make-up exam will only be allowed with a valid (university approved) excuse.

**Participation**
Students are expected to play an active role in class by asking or answering questions.

**Emailing**
Must use your Islander Email. If emailing, must include course number and section in subject heading as well as purpose of email. Example: ENGR2316.002: Missed quiz 10.

**Others**
Blackboard will be used through the semester to provide access to notes, example problems, and notifications regarding quizzes, homework, exams, projects, and so forth.
K. COLLEGE AND UNIVERSITY POLICIES

• Academic Integrity (University)
  University students are expected to conduct themselves in accordance with the highest
  standards of academic honesty. Academic misconduct for which a student is subject
  to penalty includes all forms of cheating, such as illicit possession of examinations or
  examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is
  the presentation of the work of another as one’s own work.) In this class, academic
  misconduct or complicity in an act of academic misconduct on an assignment or test
  will result in a failing grade.

• Classroom/Professional Behavior
  Texas A&M University-Corpus Christi, as an academic community, requires that each
  individual respect the needs of others to study and learn in a peaceful atmosphere. Under
  Article III of the Student Code of Conduct, classroom behavior that interferes with either
  (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit
  from the instructional program may be considered a breach of the peace and is subject
  to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students
  engaging in unacceptable behavior may be instructed to leave the classroom. This
  prohibition applies to all instructional forums, including classrooms, electronic classrooms,
  labs, discussion groups, field trips, etc.

• Statement of Civility
  Texas A&M University-Corpus Christi has a diverse student population that represents the
  population of the state. Our goal is to provide you with a high quality educational
  experience that is free from repression. You are responsible for following the rules of the
  University, city, state and federal government. We expect that you will behave in a manner
  that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial
  origin, religious background, sexual orientation or disability. Behaviors that infringe on the
  rights of another individual will not be tolerated.

• Deadline for Dropping a Course with a Grade of W (University)
  The grade of W will be assigned to any student officially dropping a course. Please
  consult with the instructor before you decide to drop to be sure it is the best thing to
  do. Just stopping attendance and participation WILL NOT automatically result in your
  being dropped from the class. Should dropping the course be the best course of action,
  visit the Office of the University Registrar for the Course Drop Form that must
  submitted. No student is eligible to receive a W without completing the official drop
  process by this deadline. Please consult the Academic Calendar
  (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

• Grade Appeals (College of Science and Engineering)
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a
  student who believes that he or she has not been held to appropriate academic standards
  as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading,
may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.  

  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins.
Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

- **Copyright Statement**
  The handouts used in this course are copyrighted. By “handouts,” I mean all materials generated for this class, which include but are not limited to lecture note materials, syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless I expressly grant permission. As commonly defined, plagiarism consists of passing off as one’s own the idea, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.