

ROY G. PERRY COLLEGE OF ENGINEERING
MECHANICAL ENGINEERING DEPARTMENT
PRAIRIE VIEW A&M UNIVERSITY

ASSESSMENT REPORT COVER PAGE

MCEG 3306 FLUID MECHANICS

FALL 2021 SEMESTER

NAME OF INSTRUCTOR: Dr. Rambod Rayegan

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 - 5.1. Assignments assessing students' ability to identify, formulate, and solve complex engineering problems (CEP) by applying principles of engineering, science, and mathematics. (Outcome 1)

Detailed Course Syllabus
(Distributed to Students at the beginning of the Semester)

Prairie View A&M University
Department of Mechanical Engineering
MCEG 3306 Fluid Mechanics, Y02
Fall 2021

Course Title	Fluid Mechanics
Course Prefix & No	MCEG 3306
Section	Y02
Credit	3 Credit Hour
Instructor Name	Rambod Rayegan
Office Location	C. L. Wilson Engineering Building , Room 105D
Office Phone	(936)261-9964
Email Address	rarayegan@pvamu.edu
Office Hours	M: 1 PM- 2 PM, TR: 11 AM -12 PM and 3:30 PM -5 PM or by appointment
Class Days & Times	MW: 11 AM-11:50 AM (S.R. Collins 116) M: 2 PM – 4:50 PM (New Electrical 119)
Catalog Description	Note: There is no face to face session for first 2 weeks of the semester MCEG 3306 Fluid Mechanics: Credit 3 semester hours. The fundamental conservation laws in fluid statics and dynamics are derived and solved analytically and numerically. Other topics include analysis of viscous and inviscid flow; laminar and turbulent flows in pipes and on external surfaces; open channel flow; hydraulic machinery; and introduction to compressible flow. Direct applications to problems encountered in practice and in engineering design will be covered. Problem solving and design application will be emphasized.
Pre-requisite(s)	MCEG 2013 (New number: MCEG 2301)
Pre-requisite(s) or co-requisite(s)	MATH 2043 (New Number: MATH 2320) MCEG 2053 (New Number; MCEG 2302)
Required Textbook	Fluid Mechanics Fundamentals and Applications; Yunus A. Cengel, John M. Cimbala, Third Edition, McGraw-Hill, New York, 2013. ISBN-13: 978-0073380322 ISBN-10: 0073380326 College of Engineering Textbook Policy – Students must acquire the textbook that is listed as “required” on the course syllabus. The textbook must be acquired by the 10th class day. Students are not allowed to share textbooks with other students who are currently registered in the same class. Failure to acquire (or show proof of purchase) the required textbook by the 10th class day will result in the student being administratively dropped from the course. The University will assess financial obligations for the course to the student as with any other dropped class according to the fee schedule. In addition, your financial aid may be affected by the subsequent registration action(s). If you are not financially able to purchase a required textbook for an engineering course prior to the 10th class day, you may apply to the College of Engineering Textbook Fund for a textbook voucher. <i>Please refer to https://www.pvamu.edu/cheg/wp-content/uploads/sites/94/textbookpolicy_122310.pdf for the Roy G. Perry College of Engineering Textbook Loan Program Policies and Procedures.</i>
Recommended Text	Fluid Mechanics, 7 th edition Frank White ISBN-10: 0077422414 ISBN-13: 9780077422417
Access to Learning	PVAMU Library:

Resources: Phone: (936) 261-1500;
web: <http://www.pvamu.edu/library/>

University Bookstore:
Phone: (936) 261-1991;
web: <https://www.bkstr.com/prairieviewamunivstore/home>

Course Objectives: To learn the basic flow analysis techniques. To study the hydrostatic pressure distributions in fluid and the hydrostatic forces on surfaces. To learn the fundamental conservation equations in fluid mechanics. To apply the theories to practical engineering applications, such as pipe flows, open channel flows. To present the necessary analysis for engineering design. To prepare students for FE examination.

Course Outcomes: An introductory course in fluid mechanics for engineering students, upon completion, the students will be able to perform basic engineering applications such as hydrostatic pressure distributions in fluid, pipe flows, and others. Provide the foundation of advanced studies in topics such as compressible fluid flow. CFD, and others.

Course Requirements & Evaluation Methods This course will utilize the following instruments to determine student grades and proficiency of the learning outcomes for the course:

Reading: Requiring students to read sections of the text book ahead of time
Homework: Requiring students to perform basic analysis of problem, formal homework presented using required format.

Homework submission format:

* Problems' solutions should be written in order.

* Number each page for homework submissions and indicate the problem number before your solutions.

Lab reports: Requiring students to write reports from given data.
Quizzes: Several quizzes and the use of classroom performance system will be used to engage students in class throughout the semester.
Tests: There will be a total of **three** tests

Grading Matrix

Instrument	Total (%)
Homework Assignments (Many for Practice only) and Lab Work	12
Quizzes*	12
Test 1	26
Test 2	25
Test 3	25
Total:	100

** 5% bonus score will be considered for the students who earn more than 75% of the points of quizzes.*

Grade Determination

A = 90 - 100
B = 80 - 89
C = 70 - 79
D = 60 - 69
F = 0 - 59

Note: The instructor reserves the right to alter it during the semester.

Course Policy

Academic Integrity

Academic dishonesty of any sort (plagiarism, cheating, fabrication or facilitation) is prohibited under any circumstance. There is a zero tolerance policy for academic dishonesty. Cheating of whatsoever will result in an automatic 'F' in this course and the matter will be turned over to the appropriate student disciplinary committee.

Use of Canvas, PVAMU email

All class-related materials will be posted on Canvas. All emails will be sent to students' registered PVAMU email addresses. Students are responsible for checking their PVAMU email frequently.

Assignments & Due Dates

All homework will be submitted at the beginning of class on the assigned day. Late homework and lab reports will be charged a **25%** penalty for each day late – **weekend days do count**. Circumstances beyond your control (i.e. illness, computer failure, weather, etc.) will be considered as required, but should inform the instructor before the class begins except for the emergency. All assignments (including homework, projects, and exams) must be original work. Substantially similar work amongst students (past or present) will be appropriately penalized.

Examinations & Quizzes

All quizzes and tests are open book exams in which **only** the **hard-copy** textbook may be consulted. **There will be NO make-up test/quiz.** Only students who missed an exam with valid excuse (for instances: medical emergency of him/herself and close relatives, with valid hospital records or doctor's note) will be given make-up exam.

How Mechanical Engineering Courses meet Department Objectives & ABET Criterion 3

Specific objectives of the Mechanical Engineering Program are to produce graduates who will:

1. have the necessary knowledge and skills to enable them have successful careers in mechanical engineering and related fields;
2. have leadership skills to advance their careers through increasing levels of responsibilities and leadership;
3. have the necessary educational background to successfully pursue graduate or advanced professional degrees and continuing professional development, and
4. actively participate in professional and community services.

Program Outcomes and Assessment:

Engineering Programs must demonstrate that their graduates have:

ABET Student Learning Outcome 1:

an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

Program Outcomes Covered by Course

Program Outcomes "1" as defined above

Program Outcomes Measured by Course

Program outcomes "1" as defined above

**Data Used to Show
Student Proficiency
in Outcomes**

1. Samples of student work in a Binder
2. Excel Spreadsheet showing student performance and class average in outcomes
3. End of Semester Course Assessment report

**Fluid Mechanics
Tentative Topics and Schedule**

(Please note the schedule may change based on the needs during the semester)

Week	Topic
#1	Course Overview Chapter 1 Introduction and Basic Concepts
#2	Chapter 1 Introduction and Basic Concepts Chapter 2 Properties of Fluids
#3	Chapter 3 Pressure and Fluid Statics
#4	Chapter 3 Pressure and Fluid Statics
#5	Chapter 4 Fluid Kinematics
#6	Test 1: Monday, September 27, 2:00 pm to 4:50 pm (Tentative) Chapter 5 Bernoulli, and Energy Equations
#7	Experiment 1
#8	Chapter 5 Bernoulli, and Energy Equations Chapter 6 Momentum Analysis of Flow Systems
#9	Chapter 7 Dimensional Analysis and Modeling
#10	Chapter 8 Internal Flow
#11	Test 2: Friday, November 1, 2:00 pm to 4:50 pm (Tentative) Chapter 8 Internal Flow Chapter 9 Differential Analysis of Fluid Flow
#12	Chapter 9 Differential Analysis of Fluid Flow
#13	Chapter 11 External Flow: Drag and Lift
#14	Experiment 2
#15	Review and Preparation for Test 3

Student Support and Success

John B. Coleman Library

The John B. Coleman Library's mission is to enhance the scholarly pursuit of knowledge, to foster intellectual curiosity, and to promote life-long learning and research through our innovative services, resources, and cultural programs, which support the Prairie View A&M University's global mission of teaching, service, and research. It maintains library collections and access both on campus, online, and through local agreements to further the educational goals of students and faculty. Website: <https://www.pvamu.edu/library/>; Phone: 936-261-1500

Academic Advising Services

Academic Advising Services offers students a variety of services that contributes to student success and leads towards graduation. We assist students with understanding university policies and procedures that affect academic progress. We support the early alert program to help students get connected to success early in the semester. We help refer students to the appropriate academic support services when they are unsure of the best resource for their needs. Faculty advisors support some students in their respective colleges. Your faculty advisor can be identified in PantherTracks. Advisors with Academic Advising Services are available to all students. We are located across campus. Find your advisor's location by academic major at www.pvamu.edu/advising. Phone: 936-261-5911

The University Tutoring Center

The University Tutoring Center (UTC) offers free tutoring and academic support to all registered PVAMU students. The mission of the UTC is to help provide a solid academic foundation that enables students to become confident, capable, independent learners. Competent and caring staff and peer tutors guide students in identifying, acquiring, and enhancing the knowledge, skills, and attitudes needed to reach their desired goals. Tutoring and academic support are offered face-to-face in the UTC, in virtual face-to-face sessions (<https://www.pvamu.edu/student-success/sass/university-tutoring-center/>), and through online sessions (<https://www.pvamu.edu/pvplace/>). Other support services available for students include Supplemental Instruction, Study Break, Academic Success Workshops, and Algebra Study Jam. Location: J. B. Coleman Library, Rm. 307; Phone: 936-261-1561; Email: pvtutoring@pvamu.edu; Website: <https://www.pvamu.edu/student-success/sass/university-tutoring-center/>

Writing Center

The Writing Center provides well-trained peer tutors to assist students with writing assignments at any stage of the writing process. Tutors help students with various writing tasks from understanding assignments, brainstorming, drafting, revising, editing, researching, and integrating sources. Students have free access to Grammarly online writing assistance. Grammarly is an automated proofreading and plagiarism detection tool. Students must register for Grammarly by using their student email address. In addition, students have access to face-to-face and virtual tutoring services either asynchronously via email or synchronously via Zoom. Location: J. B. Coleman Library, Rm. 209; Phone: 936-261-3724; Website: <https://www.pvamu.edu/student-success/writing-center/>; Grammarly Registration: <https://www.grammarly.com/enterprise/signup>

Academic Early Alert

Academic Early Alert is a proactive system of communication and collaboration between faculty, academic advisors, and PVAMU students that is designed to support student success by promptly identifying issues and allowing for intervention. Academic Early Alerts help students by providing a central location to schedule advising appointments, view advisor contact information, and request assistance. Students who recognize that they have a problem that is negatively affecting their academic performance or ability to continue school may self-refer an Academic Early Alert. To do so, students will log in to PV Place and click on Academic Early Alert on the left sidebar. Phone: 936-261-5902; Website: <https://www.pvamu.edu/student-success/early-alert/>

Student Counseling Services

The Student Counseling Services unit offers a range of services and programs to assist students in maximizing their potential for success: short-term individual, couples, and group counseling, as well as crisis intervention, outreach, consultation, and referral services. The staff is licensed by the State of Texas and assists students who are dealing with academic skills concerns, situational crises, adjustment problems, and emotional difficulties. Information shared with the staff is treated confidentially and in

accordance with Texas State Law. Location: Hobart Taylor, 2nd floor; Phone: 936-261-3564; Website: <https://www.pvamu.edu/healthservices/student-counseling-services/>

Office of Testing Services

Testing Services serves to create opportunities by offering a suite of exams that aid in the students' academic and professional success. Currently, we administer entrance (HESI A2), college readiness (TSI assessment), Prior Learning (CLEP, DSST), and proctored exams. Location: Wilhelmina Delco, 3rd Floor, Rm. 305; Phone: 936-261-3627; Email: aetesting@pvamu.edu; Website: www.pvamu.edu/testing

Office of Diagnostic Testing and 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, contact the Office of Disability Services. As a federally-mandated educational support unit, the Office of Disability Services serves as the repository for confidential disability files for faculty, staff, and students. For persons with a disability, the Office develops individualized ADA letters of request for accommodations. Other services include learning style inventories, awareness workshops, accessibility pathways, webinars, computer laboratory with adapted hard and software, adapted furniture, proctoring non-standardized test administrations, ASL interpreters, ALDs, digital recorders, Livescribe, and a comprehensive referral network across campus and the broader community. Location: Hobart Taylor, Rm. 1D128; Phone: 936-261-3583; Website: <https://www.pvamu.edu/disabilityservices/>

Center for Instructional Innovation and Technology Services (CIITS)

Distance Learning, also referred to as Distance Education, is the employment of alternative instructional delivery methods to extend programs and services to persons unable to attend college in the traditional manner. The Center for Instructional Innovation and Technology Services (CIITS) supports student learning through online, hybrid, web-assist, and 2-way video course delivery. For more details and contact information, visit:

<https://www.pvamu.edu/dlearning/distance-learning-2-2/students-2/>; Phone: 936-261-3283

Veteran Affairs

Veterans Services works with student veterans, current military and military dependents to support their transition to the college environment and continued persistence to graduation. The Office coordinates and certifies benefits for both the G.I. Bill and the Texas Hazlewood Act. Location: Evans Hall, Rm. 102; Phone: 936-261-3563; Website: <https://www.pvamu.edu/sa/departments/veteranaffairs/>

Office for Student Engagement

The Office for Student Engagement delivers comprehensive programs and services designed to meet the co-curricular needs of students. The Office implements inclusive and accessible programs and services that enhance student development through exposure to and participation in diverse and relevant social, cultural, intellectual, recreational, community service, leadership development, and campus governance. Location: Memorial Student Center, Rm. 221; Phone: 936-261-1340; Website: <https://www.pvamu.edu/studentengagement/>

Career Services

Career Services supports students through professional development, career readiness, and placement and employment assistance. The Office provides one-on-one career coaching, interview preparation, resume and letter writing, and career exploration workshops and seminars. Services are provided for students at the Northwest Houston Center and College of Nursing in the Medical Center twice a month or on a requested basis. Distance Learning students are encouraged to visit the Career Services website for information regarding services provided. Location: Anderson Hall, 2nd floor; Phone: 936-261-3570; Website: <https://www.pvamu.edu/careerservices/>

University Rules and Procedures

Academic Misconduct

Academic dishonesty is defined as any form of cheating or dishonesty that has the effect or intent of interfering with any academic exercise or fair evaluation of a student's performance. The college faculty can provide additional information, particularly related to a specific course, laboratory, or assignment.

You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with the *University Administrative Guidelines on Academic Integrity*, which can be found on the [Academic Integrity webpage](#). Students who engage in academic misconduct are subject to university disciplinary procedures. As listed in the *University Administrative Guidelines on Academic Integrity*, the University Online Catalog, and the Student Code of Conduct, the following are examples of prohibited conduct. This list is not designed to be all-inclusive or exhaustive. In addition to academic sanctions, any student found to have committed academic misconduct that is also a violation of criminal law may also be subject to disciplinary review and action by the Office of Student Conduct (as outlined in the Student Code of Conduct).

Forms of Academic Dishonesty:

1. Cheating: Deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not learned, giving or receiving aid unauthorized by the instructor on assignments or examinations. Examples: unauthorized use of notes for a test; using a "cheat sheet" on a quiz or exam; any alteration made on a graded test or exam which is then resubmitted to the teacher;
2. Plagiarism: Careless or deliberate use of the work or the ideas of another; representation of another's work, words, ideas, or data as your own without permission or appropriate acknowledgment. Examples: copying another's paper or answers, failure to identify information or essays from the internet and submitting or representing it as your own; submitting an assignment which has been partially or wholly done by another and claiming it as yours; not properly acknowledging a source which has been summarized or paraphrased in your work; failure to acknowledge the use of another's words with quotation marks;
3. Collusion: When more than one student or person contributes to a piece of work that is submitted as the work of an individual;
4. Conspiracy: Agreeing with one or more persons to commit an act of academic/scholastic dishonesty; and
5. Multiple Submission: Submission of work from one course to satisfy a requirement in another course without explicit permission. Example: using a paper prepared and graded for credit in one course to fulfill a requirement and receive credit in a different course.

Nonacademic Misconduct

The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor's ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. The Office of Student Conduct will adjudicate such incidents under nonacademic procedures.

Sexual Misconduct

Sexual harassment of students and employees at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating the university's sexual harassment policy will be subject to disciplinary action. In accordance with the Texas A&M University System guidelines, your instructor is obligated to report to the Office of Title IX Compliance (titleixteam@pvamu.edu) any instance of sexual misconduct involving a student, which includes sexual assault, stalking, dating violence, domestic violence, and sexual harassment, about which the instructor

becomes aware during this course through writing, discussion, or personal disclosure. The faculty and staff of PVAMU actively strive to provide a learning, working, and living environment that promotes respect that is free from sexual misconduct, discrimination, and all forms of violence. If students, faculty, or staff would like assistance or have questions, they may contact the Title IX Coordinator at 936-261-2144 or titleixteam@pvamu.edu. More information can be found at www.pvamu.edu/titleix, including confidential resources available on campus.

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 conditions, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Disability Services or the Dean of Students' Office for additional information and to request accommodations.

Non-Discrimination Statement

Prairie View A&M University does not discriminate on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, or gender identity in its programs and activities. The University is committed to supporting students and complying with The Texas A&M University System non-discrimination policy. It seeks to establish an environment that is free of bias, discrimination, and harassment. If you experience an incident of discrimination or harassment, we encourage you to report it. If you would like to speak with someone who may be able to afford you privacy or confidentiality, there are individuals who can meet with you. The Director of Equal Opportunity & Diversity has been designated to handle inquiries regarding the non-discrimination policies and can be reached at Harrington Science Building, Suite 109 or by phone at 936-261-1744 or 1792.

Class Attendance Policy (See the University Online Catalog for Full Attendance Policy)

Prairie View A&M University requires regular class attendance. Attending all classes supports the full academic development of each learner, whether classes are taught with the instructor physically present or via distance learning technologies such as interactive video and/or the internet. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in the assignment of a grade of "F." Absences are accumulated beginning with the first day of class during regular semesters and summer terms. Each faculty member will include the University's attendance policy in each course syllabus.

Student Academic Appeals Process

Authority and responsibility for assigning grades to students rest with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the University Online Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

Technical Considerations

Minimum Recommended Hardware and Software:

- Intel PC or Laptop with Windows 10 or later version; Mac with OS High Sierra*
- Smartphone or iPad/Tablet with Wi-Fi*
- High-speed Internet access
- 8 GB Memory
- Hard drive with 320 GB storage space
- 15" monitor, 800x600, color or 16 bit
- Sound card w/speakers
- Microphone and recording software
- Keyboard & mouse
- Most current version of Google Chrome, Safari, or Firefox

Note: Be sure to enable Java & pop-ups in the Web browser preferences

* Smartphones, Google Chrome books, and Android tablets may not be supported. iPads are the only tablets supported.

Participants should have a basic proficiency of the following computer skills:

- Sending and receiving email
- A working knowledge of the Internet
- Microsoft Word (or a program convertible to Word)
- Acrobat PDF Reader
- Windows or Mac OS
- Video conferencing software

Netiquette (online etiquette)

Students are expected to participate in all discussions and virtual classroom chats as directed. Students are to be respectful and courteous to others on discussion boards. Foul or abusive language will not be tolerated. Do not use ALL CAPS for communicating to others AS IT CAN BE INTERPRETED AS YELLING. Avoid slang terms such as "wassup?" and texting abbreviations such as "u" instead of "you." Limit and possibly avoid the use of emoticons. Be cautious when using humor or sarcasm as tone is sometimes lost in an email or discussion post, and the message might be taken seriously or sound offensive.

Video Conferencing Etiquette

When using Zoom, WebEx, or other video conferencing tools, confirm the visible area is tidy, clear of background clutter, inappropriate or offensive posters, and other distractions. Ensure you dress appropriately and avoid using high traffic or noisy areas. Stay muted when you are not speaking and avoid eating/drinking during the session. Before the class session begins, test audio, video, and lighting to alleviate technology issues.

Technical Support

Students should go to <https://mypassword.pvamu.edu/> if they have password issues. The page will provide instructions for resetting passwords and contact information if login issues persist. For other technical questions regarding eCourses, call the Center for Instructional Innovation and Technology Services at 936-261-3283 or email ciits@pvamu.edu.

Communication Expectations and Standards

Emails or discussion postings will receive a response from the instructor, usually in less than 48 hours. Urgent emails should be marked as such. Check regularly for responses.

Discussion Requirement

Online courses often require minimal to no face-to-face meetings. However, conversations about the readings, lectures, materials, and other aspects of the course can occur in a seminar fashion. The use of the discussion board will accomplish this. The instructor will determine the exact use of discussion boards.

It is strongly suggested that students type their discussion postings in a word processing application such as Word and save it to their PC or a removable drive before posting to the discussion board. This is important for two reasons: 1) If for some reason your discussion responses are lost in your online course, you will have another copy; 2) Grammatical errors can be greatly minimized by the use of the spell-and-grammar check functions in word processing applications. Once the post(s) have been typed and corrected in the word processing application, copy and paste to the discussion board.

COVID-19 Campus Safety Measures

To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, PVAMU has adopted policies and practices to limit virus transmission.

- **Self-monitoring** - Students should follow CDC recommendations for self-monitoring. Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction.

- **Face Coverings** - Face coverings (cloth face covering, surgical mask, etc.) are recommended in classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource, and support offices, and outdoor spaces where 6 feet of physical distancing is challenging to maintain reliably.
- **Physical Distancing** - Physical distancing should be maintained between students, instructors, and others in course and course-related activities where possible.
- **Personal Illness and Quarantine** - Students required to quarantine are to participate in courses and course-related activities remotely and must not attend face-to-face course activities. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities. Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence. To receive an excused absence, students must provide appropriate documentation to the Office for Student Conduct, studentconduct@pvamu.edu.

Fall 2018-Spring 2022 Student Learning Outcomes Assessment Matrix for MCEG Courses
ENGINEERING ACCREDITATION COMMISSION OF ABET NEW STUDENT LEARNING OUTCOMES

MCEG Courses	ABET EAC Criteria							
	Fall 2018	Spring 19	Fall 2019	Spring 2020	Fall 2020	Spring 2021	Fall 2021	Spring 2022
1021 Mech. Drawing & Desg.	2	2	2	2	2	2	2	2
2013 Thermodynamics I	8	8	8	8	8	8	8	8
2023 Materials Sci/Engr.	8	8	8	8	8	8	8	8
2053 Engineering Mechanics II	8	8	8	8	8	8	8	8
3011 Measurement Lab	7	6	7	6	7	6	7	6
3013 Heat Transfer	1		1		1		1	
3021 Thermal Sci. Lab	6	6	6	6	6	6	6	6
3023 Thermodynamics II	1	1	1	1	1	1	1	1
3031 Manufacturing Lab		2		4.2		2		4.2
3033 Manufacturing Proc		2		4.2		2		4.2
3043 Machine Design I	2		2		2		2	
3053 Kinematic Design	1		1		1		1	
3063 Fluid Mechanics	1	6	1	6	1	6	1	6
4043 Machine Design II	2		2		2		2	
4063 Dynamic Systems		1		1		1		1
4093 Finite Element	1		1		1		1	
4472 Senior Project I	4, 5		4, 5		4, 5		4, 5	
4482 Senior Project II		2,3,7		2,3,7		2,3,7		2,3,7

Description of Performance Criteria Being Assessed	Excellent (90-100)	Very Good (80-89)	Average (70-79)	Below Average (55-69)	Poor (0-54)
1. Identify and Formulate engineering/technical/computing problems using principles of engineering/mathematics/science Given a complex engineering problem (CEP), the student is able to: (i) Understand the given problem and identify the subject area and concepts involved. (ii) Convert the problem into a well labeled sketch (such as free body diagram, flow chart, functional block diagram, schematic diagram). (iii) Formulate the CEP into a mathematical model [using basic, intermediate and advanced mathematics ranging from algebra & trigonometry, calculus, probability & statics, complex analysis to Fourier transform & LaPlace transforms] or experimental framework stating all relevant assumptions. (iv) Formulate the CEP into an engineering model [using relevant laws and equations from engineering and science areas] stating all relevant assumptions.	Clearly identifies engineering problems beyond those discussed in class. Demonstrates very good understanding of the given problem and able to clearly identify the subject/topic area and concepts involved. Consistently converts the problem into a well labeled sketch (such as free body diagram, flow chart, functional block diagram, schematic diagram. Identifies the system of units applicable to the problem and uses them appropriately. Clearly defines the known and the unknown variables in the problem. States all relevant laws and equations needed for solving the problem. Lists and applies assumptions to the relevant laws and equations to obtain the specific equations appropriate to the problem.	Demonstrates understanding of the given problem and able to identify the subject/topic area and concepts involved. Convert the problem into a well labeled sketch (such as free body diagram, flow chart, functional block diagram, schematic diagram. Identifies the system of units applicable to the problem and uses them appropriately. Defines the known and the unknown variables in the problem. States relevant laws and equations needed for solving the problem. Lists and applies assumptions to the relevant laws and equations to obtain the specific equations appropriate to the problem.	Demonstrates adequate understanding of the given problem and reasonably able to identify the subject /topic area and concepts involved. In most cases converts the problem into a well labeled sketch (such as free body diagram, flow chart, functional block diagram, schematic diagram. Fairly able to identify the system of units applicable to the problem and uses them most of the time. Adequately defines the known and the unknown variables in the problem. States most of the relevant laws and equations needed for solving the problem. Lists and applies most of the assumptions to the relevant laws and equations to obtain the specific equations appropriate to the problem.	Student unable to identify even those problems that were explicitly discussed in class. Does not show an understanding of the given problem and unable to identify the subject /topic area and concepts involved most of the time. Unable to convert the problem into a well labeled sketch (such as free body diagram, flow chart, functional block diagram, schematic diagram. Rarely able to identify the system of units applicable to the problem and does not show units most of the time. Poorly defines the known and the unknown variables in the problem. States very few of the relevant laws and equations needed for solving the problem. Unable to lists and apply assumptions to the relevant laws and equations. Unable to obtain the specific equations appropriate to the problem.	Student unable to identify even those problems that were explicitly discussed in class. Does not show an understanding of the given problem and unable to identify the subject /topic area and concepts involved. Unable to convert the problem into a well labeled sketch (such as free body diagram, flow chart, functional block diagram, schematic diagram. Does not identify the system of units applicable to the problem and does not show units on work. Does not define the known and the unknown variables in the problem. Unable to state the relevant laws and equations needed for solving the problem. Unable to list and apply assumptions to the relevant laws and equations. Unable to select the specific equations appropriate to the problem.
2. Solve CEP/computing problems Given a CEP that has been formulated, the student is able to: (i) Solve the resulting engineering/mathematical/science formulations analytically, numerically, experimentally or through the use of appropriate software or computer program. (ii) Evaluate and interpret the result.	Implements very good strategy to solve the problem. Solves the problem and gets the right solution/answer showing consistent units throughout. Evaluates and reasonably interprets the result.	Implements strategy to solve the problem. Solves the problem and gets the right solution/answer showing consistent units throughout. Evaluates and interprets the result.	Implements fairly good strategy to solve the problem. Solves the problem and gets an acceptable solution /answer showing consistent units most of the time. Evaluates and provides a fair interpretation of the result.	Implements poor strategy to solve the problem. Unable to solve the problem and usually gets the wrong solution. Does not show consistent units most of the time. Seldom evaluates and provides an interpretation of the result.	Implements poor strategy to solve the problem. Unable to solve the problem and usually gets the wrong solution /answer. Does not show consistent units. Does not evaluate and nor interpret the result.

**Program Outcomes
Covered by Course**

Program Outcome "1" as defined above

**Data Used in Assessing
Outcomes in Course**

Tests

**Data Used to Show
Student Proficiency
in Outcomes**

1. Samples of student work in a Binder
2. Excel Spreadsheet showing student performance and class average in outcomes
3. End of Semester Course Assessment report

End of Semester Course Assessment Report

This summary contains the following Information

1. Performance Statistics

- Total number of students in class
- The class average performance (stated as %) in each course outcome assessed in this class and the two previous times course was assessed.
- The acceptable class average for the class in each outcome area as set by your Department.
- Percentage of students who scored below the expected average in each outcome.

2. Implementation Summary

- Brief summary of plans implemented during the semester based on last assessment report

3. Perceived Problems

- Instructor's critical evaluation of perceived problems that affected students' performance. Realistic problems should be identified throughout the semester and summarized in this section of the report.

4. New Plans for Addressing Problems

- Instructor's plans for addressing the perceived problems the next time the class is taught.

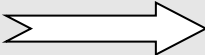
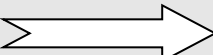
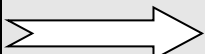
5. Overall Trend over last three assessment periods

- Instructors summary of overall performance trend for each outcome measured over the last three periods.

5. Were Expectations Met?

- Answer **YES** if the class average was above the expected average and the stated percentage of students scored at or above the expected average, else answer NO.

END OF SEMESTER COURSE OUTCOME ASSESSMENT REPORT
MCEG 3306 FLUID MECHANICS, Y01
Fall 2021 SEMESTER
Report Prepared by: Dr. Rambod Rayegan
Report Date: December 20, 2021

Semester	Analysis Type	Number of Students	Outcome 1 (Previously Outcome a) Identify & Formulate CEP (i-vi) based on E, S, M (Outcome 1.1), Solve CEP (i-vi) based on E, S, M (Outcome 1.2)			
			Expected Class Average/	Expected Percent of students at or above average	Class Average	% Students meeting Expected Average
Fa11 2021	Direct	10	70	70	47.2	30
Fa11 2020	Direct	26	70	70	74	73
Fall 2019	Direct	28	70	70	67	68
Fall 2018	Direct	43	70	70	63	39.5
Fall 2017	Direct	38	70	70	63	37
Fall 2016	Direct	55	75	70	55	15
Fall 2015	Direct	55	75	70	58	33
Fall 2014	Direct	38	75	70	68.7	39.1
Fall 2013	Direct	46	75	70	51.6	33.3
Implementat ion Summary	Items implemented from previous report or after meeting previous instructor		- Detailed Class notes were prepared from the Text book and made available to students - Review sheets for differential and integral calculus were handed out. - Different problems with various levels of difficulty practiced with students in class.			
Perceived Problems			Students were kept informed of their standing after each quiz and test. The major problems were: - Transition to post-pandemic conditions and from online to face-to-face mode of delivery for classes imposed students to significant difficulties. - Quality of students learning for pre-requisites of the current course was very low - Students are not good in simple Differentiation and Integration (D&I) needed for Fluid Mechanics. - Lack of desire to study to improve even when counseled to do so repeatedly. - Students do not normally reach out if they need any part of the course to be explained further although repeatedly encourage to contact instructor with any questions.			
Recommend ations for Addressing Problems			The following is recommended for implementation: - Department should have a pool of questions in algebra and calculus (basic Mathematics for Fluid mechanics) to be admitted in the beginning of the semester and students who do not pass be required to take a required remedial Basic Mathematics course/Tutorial and be requested to retake the Basic Mathematics for Fluid Mechanics exam and pass before mid-term or be asked to drop the course. - Students need to be motivated to study - College/Department should set admission requirements at a level to allow quality students into the College of Engineering/ME department because a large percentage of the students do not have the necessary background and motivation to succeed in engineering.			
Were Expectations Met?			No			

**Grade Sheet Showing
Student and Class Performance in Outcomes
The computed semester average in each outcome
as stated in the Assessment report are
highlighted in boldface**

Grade Sheet Showing Student and Class Performance in Course Outcomes
MCEG 3306 Fluid Mechanics, Section Y02, Fall 2021 Semester

Outcome	1			
Assignment Description	Test3- Question 1	Test3- Question 3	TOT	%
MAX POINTS	44	28	72	100
Last Name, First Name				
Afzal, Heba	38	28	66	91.7
Bujato, Daniel	9	3	12	16.7
Carter, Nehemiah M.	4	6	10	13.9
Combs, Caleb N.	44	28	72	100.0
Jackson-Rubio, Darius A.	14.5	0	14.5	20.1
Lira, Anette	36	16	52	72.2
Nweke, Christopher K.	18	12	30	41.7
Smith, Dwayne K.	15	9	24	33.3
Williams, Calvin	14	13	27	37.5
Zaidi, Muhammed Y.	24	8	32	44.4
Average	21.7	12.3	34.0	47.2
Total No. of students	10			
No. of students above accepted AVG	3			
% of students above accepted AVG	30			

**OUTCOME SPECIFIC ASSIGNMENTS
USED TO ASSESS OUTCOMES**

ASSIGNMENTS FOR OUTCOME 1

An ability to identify, formulate, and solve **complex engineering problems** by applying principles of engineering, science, and mathematics.

MECHANICAL ENGINEERING DEPARTMENT OUTCOMES SPECIFIC ASSIGNMENT COVER SHEET

Fluid Mechanics

Fall 2021

Instructor: Dr. Rambod Rayegan

Title of Assignment

Test 3 – Question 1

Outcome Measured Using this Assignment

Outcome 1

An ability to identify, formulate, and solve **complex engineering problems** by applying principles of engineering, science, and mathematic.

Check the complex engineering problem characteristics related to this assignment

Assignment problem	
	involves wide-ranging or conflicting technical issues,
X	has no obvious solution
	Addresses problems not encompassed by current standards and codes
	involves diverse groups of stakeholders
X	includes many component parts or sub-problems
	involves multiple disciplines
	has significant consequences in a range of contexts
Assignment problem involves the application of the principles of	
X	engineering
	science
X	mathematics

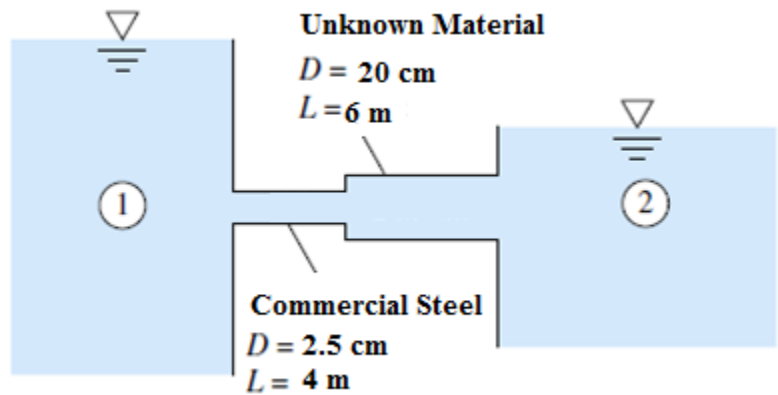
Brief justification of why this assignment is suitable for this outcome

The problems on this section of Test 1- Question 1 test the students ability to identify relevant laws and equations, and use them to derive an equation applicable to specific conditions, formulate the solution methodology, and solve the resulting engineering equations in fluid systems

Test 3- Question 1

The reservoirs in the figure are connected by 2 different pipes joined abruptly, with sharp-edged entrance and exit. The flow rate in the pipes is $250 \text{ cm}^3/\text{s}$. Including minor head losses, estimate the difference between the water surfaces at 2 reservoirs. The kinetic energy correction factor (α) is 1.1 for both pipes.

$$\rho = 1000 \text{ kg/m}^3 \quad \mu = 9 \times 10^{-4} \text{ kg/m.s}$$



MECHANICAL ENGINEERING DEPARTMENT OUTCOMES SPECIFIC ASSIGNMENT COVER SHEET

Fluid Mechanics

Fall 2021

Instructor: Dr. Rambod Rayegan

Title of Assignment

Test 3- Question 3

Outcome Measured Using this Assignment

Outcome 1

An ability to identify, formulate, and solve **complex engineering problems** by applying principles of engineering, science, and mathematic.

Check the complex engineering problem characteristics related to this assignment

Assignment problem	
	involves wide-ranging or conflicting technical issues,
X	has no obvious solution
	Addresses problems not encompassed by current standards and codes
	involves diverse groups of stakeholders
X	includes many component parts or sub-problems
	involves multiple disciplines
	has significant consequences in a range of contexts
Assignment problem involves the application of the principles of	
X	engineering
	science
X	mathematics

Brief justification of why this assignment is suitable for this outcome

The problems on this section of Test 3- Question 3 test the students ability to identify relevant laws and equations, and use them to derive an equation applicable to specific conditions, formulate the solution methodology, and solve the resulting engineering equations in fluid systems

Test 3- Question 3

A cylindrical chimney with a diameter of 1 m and height of 25 m is exposed to a uniform 50 km/hr wind at standard atmospheric conditions. End effects may be neglected. Estimate the bending moment at the base of the chimney due to wind forces.

$$\rho_{\text{air}} = 1.23 \text{ kg/ m}^3$$

$$\mu_{\text{air}} = 1.79 \times 10^{-5} \text{ kg/m.s}$$

