



American University of Ras Al Khaimah

AURAK Syllabus

Course Title: Fluid Mechanics Lab (Core Course)

Course Code: MENG 342

Credit Hours: 1

Semester and Academic Year: Fall 2019

Prerequisite course(s) and/or co-requisite courses, if applicable: MENG 341

Faculty Name: Mr. Mohammad Zaid

Contact Information and Office Hours:

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Office Hours: Sunday, Thursday 12:00 -1:00pm;

Course Description:

This course is composed of a set of selected experiments about general fluid mechanics. The Lab experiments will be mostly coordinated with the lecture. The experiments will be either performed in groups by the students or demonstrated by the instructor. Individual class work will be strongly encouraged as well as teamwork. The lab also includes an open-ended design of experiment.

Course Textbooks and Materials:

- **Fluid Mechanics Laboratory Manual**

Other Resources:

- **Handouts and notes that will be provided by the instructor**

Web Resources:

Course Learning Outcomes (CLOs)

Course Learning Outcomes At the end of this course, students should be able to:	
CLO 1	Illustrate the physical concepts of fluid mechanics developed in MENG 341
CLO 2	Recognize different fluid mechanics equipment and measurement devices.
CLO 3	Implement experimental techniques in fluid mechanics.
CLO 4	Design an experimental procedure and setup for a fluid mechanics application.
CLO 5	Demonstrate the applicability and limitation of the theory and the uncertainties involved in measurements.
CLO 6	Develop the student's ability to communicate technical information.

Assessment Activities

The dates for quizzes, exams, and submission of assignments are specified in the schedule. You will be graded in this class based on the number of points you earn for quizzes, exams written assignments, or other activities, including your class participation. Keep track of your scores in Blackboard.

Assessment Activities and Grading Weight	Lab Reports 40%	Quizzes 15%	D.O.E (Project) 20%	Final Exam 25%
CLO 1	X	X	X	X
CLO 2	X	X	X	X
CLO 3	X		X	X
CLO 4	X	X	X	X
CLO 5	X		X	X
CLO 6	X		X	X

Mapping Course to Program Outcomes: (PO)

<i>ABET Standards (1-7)</i>	<i>Program Outcomes</i>	<i>Program Outcomes Addressed in Course</i>
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	X
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	X
3	An ability to communicate effectively with a range of audiences.	X
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	X
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	X

Grading Scale:

The grading system and scale for AURAK, as established by the Board of Trustees, is as follows:

AURAK Grading System and Scale		
Grade	Percentage Scores	Grade Points
A	95-100	4
A-	90-94	3.7
B+	86-89	3.3
B	83-85	3
B-	80-82	2.7
C+	76-79	2.3

C	73-75	2
C-	70-72	1.7
D+	66-69	1.3
D	60-65	1
F	0-59	0

Schedule of Course Topics, Required Reading, and Assignments and Assessments				
Week	Topic	Required Readings	Assignment, Assessment (with grade weighting) & Due Date	Mapping of CLO's to Assessments
1	Laboratory introduction and health and safety guidelines			
2	Viscosity variation with temperature and it can be used to measure the kinematics' viscosity.	LAB MANUAL	Lab Report -	CLO 1,2,3,6
3	Flow through an orifice.	LAB MANUAL	Lab Report	CLO 1,2,3,6
4	Visualization of flow field in a pipe at different Reynolds's number (Re) (laminar, transition, and turbulent flow visualization).	LAB MANUAL	Lab Report & Quiz	CLO 1,2,3,6
5	The relation between the total head, velocity head and static head and compared with Bernoulli's theorem and also to study the flow through the Venturi meter.	LAB MANUAL	Lab Report	CLO 1,2,3,6

6	Production and measurement of force due to impact of water jet on a target.	LAB MANUAL	Lab Report & Quiz	CLO 1,2,3,6
7	Measurement of the friction loss in pipes, valves and other fittings.	LAB MANUAL	Lab Report	CLO 1,2,3,6
8	Hydrostatic bench measurements; calibration of bourdon gauge, center of pressure on a plane surface, measurement of density and specific gravity using hydrometer, capillary raising measurement.	LAB MANUAL	Lab Report	CLO 1,2,3,6
9	Behavior of aero foil and other geometric figures operating in a uniform air flow inside a closed test section.	LAB MANUAL	Lab Report & Quiz	CLO 1,2,3,6
10	Open lab for D.O.E			
11	Midterm Project Presentation.		Final report & Presentation	CLO1,2,3,4,5,6
12	Measurement of the operation condition and generate the characteristic curves for the following pumps: Centrifugal, Gear, Axial, Turbine	LAB MANUAL	Lab Report	CLO 1,2,3,4
13	The operating conditions and generation of the characteristic curve for two centrifugal pumps connected in series or in parallel.	LAB MANUAL	Lab Report	CLO 1,2,3,4
14	The characteristic behavior of Pelton turbine, reaction turbine and axial flow impeller turbine.	LAB MANUAL	Lab Report	CLO 1,2,3,4
15	FINAL EXAM	LAB MANUAL		CLO 1,2,3,4,5

Attendance Policy

University policy is that students are to attend all classes and to arrive on time. Students are required to:

- Attend all learning and teaching sessions associated with their program of study.
- Notify their course instructors in advance (in person, by phone or e-mail) that they will be absent from time-tabled class sessions.
- Obtain prior permission from their instructor or course manager, for planned absences of two or more consecutive class sessions during the semester.
- Provide a medical certificate or other corroborating evidence to explain their absence, if required by the University.

Unsatisfactory student attendance includes failure to regularly attend learning and teaching sessions without providing a satisfactory reason to instructors for absence and/or persistent late arrival at, or early departure from, learning and teaching sessions. Where a student fails to attend classes for **four or more weeks cumulatively**, or where a recurring pattern of non-attendance is observed over the course of the semester, the instructor has the option of deeming that the student has failed the course, in which case that student may receive an "F (Fail)" or "U (Unsatisfactory)" grade, as appropriate. At this point, and at the instructor's recommendation, the dean also has the authority to instruct the registrar to remove or withdraw the student from the course.

Disability Accommodations

Students with disabilities may find they require additional support, services, or considerations. AURAK will endeavor to support students with disabilities or special needs where resources are available. Accommodations will be provided, for students with verified needs, allowing equal access to educational facilities, programs, services, and activities at AURAK. Disability Accommodations are never applied retroactively – only students who have previously requested and have been approved for supporting accommodations can have them apply to a given academic semester/course. Students needing support must make the request from the Department of Counseling, Testing, and Disability Services located in Building H.

Other Relevant Policies

A. Academic Integrity

The Honor Code

The American University of Ras Al Khaimah strongly supports the concept of academic integrity and expects students and all other members of the AURAK community to be honest in all academic endeavors. The AURAK Honor Code can be found in the AURAK Student Handbook.

The role of the Honor Code and associated Academic Integrity Policy is to protect the academic integrity of the university, encourage consistent ethical behavior among students, and foster a climate of honorable academic achievement. The Honor Code is an integral part of university life and students are responsible, therefore, for understanding and abiding by the code's provisions. While a student's commitment to honesty and personal integrity is assumed and expected, this Code and associated policy and procedures provides clarity of expectations.

Expectations

Cheating, plagiarism, and all other forms of academic fraud are unacceptable; they are serious violations of university policy. AURAK expects all students to be familiar with university policies on academic integrity. The university will not accept a claim of ignorance – either of the policy itself or of what constitutes academic fraud – as a valid defense against such a charge.

Violations of Academic Integrity

Violations of academic integrity constitute academic fraud. Academic fraud consists of any actions that serves to undermine the integrity of the academic process or that gives the student an unfair advantage, including:

- Inspecting, duplicating or distributing test materials without authorization.
- Cheating, attempting to cheat, or assisting others to cheat – relevant here is the prohibition on being in possession of a mobile telephone or similar electronic device during a test or examination. In case such devices are found with a student, the student will be deemed to have attempted to cheat and will be subject to disciplinary action under the Student Academic Integrity Policy.
- Altering work after it has been submitted for a grade.
- Plagiarizing.
- Using or attempting to use anything that constitutes unauthorized assistance.
- Fabricating, falsifying, distorting, or inventing any information, documentation, or citation.

Plagiarism

One of the most common violations of academic integrity is plagiarism. Plagiarism can be intentional or unintentional. However, since each student is responsible for knowing what constitutes plagiarism, unintentional plagiarism is as unacceptable as intentional plagiarism and thus will bring the same penalties.

Plagiarism – submitting the work of others as one's own - is a serious offense. In the academic world, plagiarism is theft. Information from sources – whether quoted, paraphrased, or summarized – must be given credit through specific citations. When a student paraphrases a work, it is still necessary to cite the original source. Merely rearranging a sentence or changing a few words is not sufficient. The citation style should be appropriate for the discipline and should clearly indicate the beginning and ending of the referenced material. All sources used in

the preparation of an academic paper must also be listed with full bibliographic details at the end of the paper, as appropriate in the discipline.

Faculty and Student Expectations

- Every student, faculty member, and administrator is responsible for upholding the highest standards of academic integrity. Every member of the AURAK community shall honor the spirit of this policy by refusing to tolerate academic fraud.
- It is the responsibility of the instructor to provide students with additional guidelines for what constitutes “authorized” and “unauthorized” assistance.
- It is the responsibility of every student to see clarification if in doubt about what constitutes “authorized” and “unauthorized” assistance. In cases involving collaborative work, all students within the collaborative group may be help responsible for violating the code if any member of the group receives, accepts, or utilizes "unauthorized" assistance.
- Students are required to obtain permission prior to submitting work, any part of which was previously or will be submitted in another course. The instructor has the option of accepting, rejecting, or requiring modification of the content of previously or simultaneously submitted work.

A student who suspects that a violation of academic integrity has occurred should report the violation to the dean or to the Office of the Provost. In this report, the student should describe any action taken, such as talking with the person involved or with a faculty or staff member. Every effort will be made to preserve the anonymity of the student reporting the incident;

Possible penalties for academic fraud include: Formal warning, Reduction in grade for the assignment, Reduction in the grade for the course, A failing grade for the assignment, A failing grade (F) in the course, and/or Dismissal or Expulsion from the University.

Please refer to the relevant section in the *Student Handbook* and ensure a clear understanding of the provisions of the University Honor Code and the Student Academic Integrity Policy.

B. Concerns about Grades or Other Course Matters

Students are responsible for their learning experiences. If you are concerned about a class matter, first discuss it with the instructor. If the matter is not resolved, the next step is to meet with the Chair of the department in which the course is taught. If you still have a concern, meet with the Dean of the school in which the course is taught. The matter is likely to be resolved before it reaches that point, but if it is not, then visit the Associate Provost for Academic and Student Affairs. Students who decide to “jump to the top” will be referred “back” to the appropriate next step.

C. Assignments

University policy is that assignments are due on the date assigned. Instructors may refuse to accept late assignments or lower the grade that would be otherwise given.

D. Mobile Phones

All mobile phones, pagers and/or other communication devices should be turned off before entering the classroom. Students may NOT have mobile telephone or other electronic devices in their possession while completing examinations. Any violation will be deemed as having attempted to cheat.

E. Diversity and the Use of English

English is the common language of the AURAK campus for everyone. It is the only language to be used in the classroom. AURAK brings together students and faculty from diverse cultural and linguistic backgrounds, which is one of the strengths of the university. This diversity provides an opportunity to share our different experiences and enlarge our understanding of the world.