Soran University

Module Description

(Hydraulic Engineering)

KEY MODULE INFORMATION	
Module title	Hydraulic Engineering
Module code	SOU20152
Faculty/School/Department	Engineering / Civil and Environmental Engineering
Level	Postgraduate / 3rd Grade Students
ECTS Credits	4
Semester (s) in which taught	Spring 2023
Module Leader	Assistant Professor Dr.Abdulfattah Ahmad Amin Al-Najjar
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Module coordinator (s)	Dr.Aryanfar Sherwani
Email (s)	aryanfar.abd@soran.edu.iq
Pre-requisites	Permission of the instructor OR SOU20132
Co-requisites	/
Date of approval by department council	20/1/2024
Type of module	Core
Available for visiting students?	Yes

MODULE CONTENT

Summary module description

This course serves as a quantitative introduction to the principles of Hydraulics and its applications in industrial and engineering problems. The course covers the fundamentals of hydraulics, including water flows in closed and open channels, and losses in piping systems. Additional topics to be covered include hydraulic machinery such as pumps and turbines, measurement of flow, and the design of hydraulic structures. network project with software application of network analysis and design (EPANET, WATERCAD).

AIMS

Hydraulic engineering, as a sub-discipline of civil engineering, is concerned with the flow and conveyance of fluids. This course consists of the topic like viscous fluid flow, laminar and turbulent flow, boundary layer analysis, dimensional analysis, open channel flows, flow through pipes, and computational fluid dynamics. The objective of this course is to introduce various hydraulic engineering problems like open channel flows and hydraulic machines. In addition this course is a compulsory part of AICTE Civil Engineering curricula

LEARNING OUTCOMES

• State the basic concepts of hydraulic engineering and its application in practice
• Describe the laminar and turbulent flow
• Describe and identify the fundamental of closed-conduit flow and its applications.
• Describe and identify the fundamental of open channel flow and its applications.
• Use Hazen-Williams Formula in pipe flow related problems.
• Calculate the expected flow rates in pipes and open channels.
• Differentiate between the uniform and nonuniform flow concepts and their applications.
• Apply the concept of dimensional analysis in hydraulic engineering.
• Model hydraulic engineering problems using dimensional analysis.
• Perform basic design calculations.
• Demonstrate the application of turbines and pumps and choose the appropriate pumps for water supply.
• Design and analysis of hydraulic sections of open channels
• Illustrate the hydraulic jump phenomenon.
• Analysis the pipe in parallel, series and pipe networks.
• Ability to use the techniques, skills, and modern engineering tools necessary for hydraulic system practices
• Synthesize information and ideas in relation to issues relating to water system design (e.g. assumptions, design criteria, reliability)
• Demonstrate effective team membership, including the development of written, oral and listening skills

LEARNING AND TEACHING STRATEGIES		
Pedagogy	**Applicable**	**Description**
Lecturing		
Discussion		
Group Work		
Demonstration		
Practice by doing		
Fieldwork		
External visits		
Task-based learning		
Project-based learning		
Problem-based learning		
Case Study		
Role Play		

DELIVERY		
Type of Learning Time	**Number of Hours**	**Expressed as Percentage (%)**
Contact time		
Directed self-study		
Self-directed learning		
Assessment, review and revision		
Total		

WORKLOAD

The information below is provided as a guide to assist students in engaging appropriately with the course requirements. Please note that, in general, for each formal contact hour, it is expected that a minimum of 2 additional hours of independent study are undertaken. The following table shows an estimate of students' workload:

Work Type (Activities)	Quantity	Duration (Hrs.)	Total (Hrs.)
Wider reading (independent)			
Wider reading (directed)			
Exam revision / preparation			
Peer assisted learning			
Advances preparation for classes			
Preparation for tutorials			
Preparation for presentations			
Preparation for seminars			
Preparation for performance			
Preparation of practical report			
Completion of formative assessment tasks			
Revision and preparation for in-class or end of module examination			
Group study tasks			
Carry-out research project			
Dissertation writing			
Essay preparation – may include conducting research, analyzing data, editing the finished product			
Reflection – for example, lecture consolidation or engaging with feedback			
Total hours by term			
Module total hours			

ECTS allocated based on student workload by the course description			
Activates	**Quantity**	**Duration (Hrs.)**	**Total Workload (Hrs.)**
Course Duration	16 weeks	48	40
Tutorial	/	/	/
Mid-term Examination	1	1	2
Final Examination	2	2	4
Assignments	2	3	5
Hours for off-the-classroom learning	3	6	9
Term Project	/	/	/
Total		60	60

ASSESSMENT			
Task	**Weight (Marks)**	**The specific Weight**	**Relevant Learning Outcome**
Assignments/Quizes			
Term Projects			
Practical Work			
Midterm Exam			
Final Exam			
Written assignment, including essay			
Dissertation			

Set exercise			
Portfolio			
Project output (other than dissertation)			
Oral assessment and presentation			
Practical skills assessment			
Report			
Coursework			
Exam			
Group Presentation			
Group Work			
Individual Presentation			
Peer Assessment			
Project			
Practical			
Timed Test (in-module test e.g. MCQ)			
Extended Project			
Total			

Participation : Come to class on time. Class attendance is in accordance with the published university course schedule. **Attendance to class is required** and comprises a portion of your final grade.

Quizzes will be periodically administered to keep a record of your participation and preparedness. Any absence should be coordinated before the absence, if possible.

Homework Assignments: Daily homework will be due at the beginning of the next class after it is assigned unless otherwise noted in class. All homework assignments should be turned in before class begins. Work turned in late will be penalized in increments of 10% per day. Work will not be accepted beyond two days late without special coordination affected prior to the due date.

Academic Integrity: The engineering profession does not need, and should not tolerate, dishonesty. Students are required to be familiar with and abide by the University's Academic Integrity Policy. Students may consult with each other about homework assignments. However, each student is responsible for understanding the principles behind the correct homework solution (not just the correct answer). Cheating (e.g. copying other students' work) on homework assignments will NOT be tolerated. Violations will be dealt with immediately and severely in accordance with the university policies.

Term Project:

Some possible general topics for projects:

WEEKLY SYLLABUS		
Weeks	**Subject(s)**	**Short Description**
W1		
W2		
W3		
W4		
W5		
W6		
W7		
W8		
W9		
W10		
W11		
W12		
W13		
W14		
W15	**Final Assessment**	Sitting exam and a project
W16		

GUIDELINES ON GRADING POLICY					
ECTS Grade	**Definition**	**US Grade**	**US %**	**IRQ%**	**Grade point Average**
A – Excellent	Outstanding performance	A	90-100%	90-100%	5.0
B – Very Good	Above average with some errors	B	80-89%	80-89%	4.0
C - Good	Sound work with notable errors	C+	75-79%	70-79%	3.0
D – Satisfactory	Fair but with major shortcomings	C	70-74%	60-69%	2.0
E – Sufficient	Work meets minimum criteria	D	60-69%	50-59%	1.0
FX - Fail	More work required but credit awarded			0-49	0.0
F- Fail	Considerable amount of more work required				

RESOURCES		
Materials	**Text**	**How to access? / e-link**
Required Textbook		
Recommended Texts		
Websites	• LMS	

CLASSROOM CODE OF CONDUCT

All students have the right to learn without interference from others. Instructors have the authority to protect this right by creating and maintaining an environment that is conducive to learning. Meanwhile, students are required and expected to conduct themselves in a safe, mature and considerate manner. Students should conduct and express themselves in a way that is respectful to all individuals. This includes respecting the rights of others to comment and participate fully in class. Classroom misconduct is any behavior which disrupts or interferes with the learning environment.

STUDENT RESPONSIBILITIES

1. Don't read a newspaper or other document; don't sleep during class; don't hold side conversations with your neighbor(s); and don't check your email, update your Facebook page, or tweet in class. Remember, you may be called upon to answer a question and if you are not prepared, you will not be given credit for attending that class. This is a participative course.
2. Attend all classes unless an emergency arises. If that occurs, please let me know by e-mail or in person. Remember, the quizzes are based on class discussions. Unexcused absences from the midterm may lead to a grade of zero for that assignment.
3. Do your own work. Cheating will not be tolerated. It is unfair to students who work diligently to get the best grade possible in this module.
4. Using cell phones or other electronic devices that disrupt the learning process or teaching environment is prohibited.
5. Be a contributing member of your group. Don't let others carry the load for you. The business world revolves around teamwork and a consultative approach to problem solving. This is what I expect of you in class discussions whenever I break you up into groups.
6. If you violate any of these rules, I may ask you to leave class for the day. I don't want to embarrass anyone but I expect to have your respect and attention throughout the module.

INSTRUCTOR (MY) RESPONSIBILITIES

1. Model ethical behavior in the classroom and during office hours and in out-of-class discussions.
2. Be respectful towards all students; not to talk down to you.
3. Be diligent and provide interesting and informative lectures and discussions that challenge your intellectual curiosity.
4. Provide a diverse learning experience including using social media and Internet research in class discussions and assignments.
5. Be available during office hours and, when necessary, at other times during the course.

Be attentive to your questions and concerns. Feel free to see me if you have a personal issue related to the course that you think I should know about. I do care about your well-being and hope to contribute towards your growth as a person. All of our communication about such matters is on a confidential basis.

6. Assist you in any way that I can to help you learn the course material. This includes meeting outside of office hours at a mutually convenient time and place.
7. Be fair in the grading process including grading quizzes, examinations, term papers, and the group case presentation. My evaluation of your work and grading process simulates the way performance evaluations should be done in the business world. I view the classroom as a learning laboratory to get you ready to be contributing members of society.
8. Be diligent in returning work with a grade and, where appropriate, my explanations of why points were deducted from your grade. See me if you have any questions on your grade but first review my comments to better understand why points have been deducted.

READING LISTS	
1	https://rosap.ntl.bts.gov/view/dot/40555
2	https://www.fhwa.dot.gov/engineering/geotech/pubs/hif22024.pdf
3	https://wsdot.wa.gov/publications/manuals/fulltext/m46-03/chapter8.pdf
4	
5	
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8	