IMU 303 - FLUID MECHANICS - Mühendislik Mimarlık Fakültesi - İnşaat Mühendisliği Bölümü

General Info

Objectives of the Course

To teach basic equations of fluid mechanics. To apply basic equations to fluid mechanics problems.

Course Contents

In this course, unit systems, basic concepts, properties of fluids, hydrostatics, manometers, pressure forces on planar and curved surfaces, equilibrium of submerged and floating bodies, relative equilibrium, Lagrange and Euler approaches, one-, two- and three-dimensional flows, continuity equation and its applications, energy equation and its applications, impulse-momentum equation and its applications, one-, two- and three-dimensional flows of ideal fluids, one-, two- and three-dimensional flows of real fluids are covered.

Recommended or Required Reading

Prof. Dr. Yalçın YÜKSEL - Akışkanlar Mekaniği ve Hidrolik Prof. Dr. B. Mutlu SÜMER, Prof. Dr. İstemi ÜNSAL, Prof. Dr. Mehmetçik BAYAZIT – Hidrolik

Planned Learning Activities and Teaching Methods

Lecture, question and answer

Recommended Optional Programme Components

There are no recommended optional programme components.

Instructor's Assistants

There is no instructor's assistant

Presentation Of Course

Computer, Projector

Dersi Veren Öğretim Elemanları

Assoc. Prof. Dr. Mehmet Çağrı Tüzemen

Program Outcomes

1. To convert the units and unit systems
2. Calculate the pressure forces on plane and curved surfaces
3. To apply the basic equations of ideal and real fluids for practical problems
4. To check the flow rotational irrational
5. To give interpretation about boundary layer

Weekly Contents

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
1	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Units and Properties of fluids	
2	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Fluid Types	
3	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	The concept of pressure	
4	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Statics of Fluids	
5	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Fluid kinematics	
6	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Pressure Forces Acting on Planar and Curved Surfaces	
7	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Relative balance	
8				Midterm Exam	
9	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	One-dimensional currents	
10	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Fluid dynamics	
11	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Continuity and energy equations	
12	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Impulse-momentum equations	

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
13	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Real flows	
14	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	One-dimensional flows of real fluids	
15	Prepare for the relevant week's lecture notes		Lecture Method, Discussion Method, Problem Solving Method, Question and Answer	Two-Dimensional Flows of Ideal Fluids	
16			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
17			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
18			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
19			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
20			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
21			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
22			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
23			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
24			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
25			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
26			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
27			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
28			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
29			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
30			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
31			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
32			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
33			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
34			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
35			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		
36			Lecture Method, Discussion Method, Problem Solving Method, Question and Answer		

Workload

Activities	Number	PLEASE SELECT TWO DISTINCT LANGUAGES
Vize	1	2,00
Final	1	2,00
Ders Öncesi Bireysel Çalışma	14	1,00
Ders Sonrası Bireysel Çalışma	14	3,00
Ara Sınav Hazırlık	6	3,00
Final Sınavı Hazırlık	7	4,00
Derse Katılım	14	3,00

Assesments

Activities	Weight (%)
Proje	60,00
Dönem Ödevi	40,00

	P.O. 1	P.O. 2	P.O. 3	P.O. 4	P.O. 5	P.O. 6	P.O. 7	P.O. 8	P.O. 9	P.O. 10	P.O. 11
L.O. 1	2	3						2			
L.O. 2	3	2	1		2			1			
L.O. 3	1	3	4		3			3			
L.O. 4	3	4	2		2			2			
L.O. 5	2	3	2		2			1			

Table :

P.O. 1 : Temel matematik, fen bilimleri ve inşaat mühendisliği alanında yeterli bilgi birikimi; bu alanlardaki kuramsal ve uygulamalı bilgileri inşaat mühendisliği problemlerini modelleme ve çözme için uygulayabilme becerisi.

P.O. 2 : Karmaşık mühendislik problemlerini saptama, tanımlama, formüle etme ve çözme becerisi; bu amaçla uygun analiz ve modelleme yöntemlerini seçme ve uygulama becerisi.

P.O. 3 : Karmaşık bir sistemi, süreci, cihazı veya ürünü gerçekçi kısıtlar ve koşullar altında, belirli gereksinimleri karşılayacak şekilde tasarlama becerisi; bu amaçla modern tasarım yöntemlerini uygulama becerisi.

P.O. 4 : Mühendislik uygulamaları için gerekli olan modern teknik ve araçları geliştirme, seçme ve kullanma becerisi; bilişim teknolojilerini etkin bir şekilde kullanma becerisi kullanabilme

P.O. 5 : Mühendislik problemlerinin incelenmesi için deney tasarlama, deney yapma, veri toplama, sonuçları analiz etme ve yorumlama becerisi.

P.O. 6 : Bireysel, disiplin içinde ve disiplinler arası takım çalışması yapabilme

P.O. 7 : Fikirlerini ve çözüm önerilerini sözlü, yazılı ve grafik anlatım teknikleri kullanarak anlatabilme, 3 Boyutlu düşünebilme, tasarım konularında yaratıcı olabilme

P.O. 8 : Yaşam boyu öğrenmenin gerekliliği bilinci; bilgiye erişebilme, bilim ve teknolojideki gelişmeleri izleme ve kendini sürekli yenileme becerisi

P.O. 9 : Mesleki sorumluluk ve etik değerlere sahip olabilme

P.O. 10 : Proje yönetimi ile risk yönetimi ve değişiklik yönetimi gibi iş hayatındaki uygulamalar hakkında bilgi; girişimcilik, yenilikçilik ve sürdürebilir kalkınma hakkında farkındalık.

P.O. 11 : Mühendislik uygulamalarının evrensel ve toplumsal boyutlarda sağlık, çevre ve güvenlik üzerindeki etkileri ile çağın sorunları hakkında bilgi; mühendislik çözümlerinin hukuksal sonuçları konusunda farkındalık.

L.O. 1 : Birim ve birim sistemlerini çevirebilme

L.O. 2 : Düz ve eğrisel yüzeylere gelen basınç kuvvetlerini hesaplayabilme

L.O. 3 : İdeal ve gerçek akışkanların temel denklemlerini pratikte uygulayabilmek

L.O. 4 : Çevrintili ve çevrintisiz akımları çözebilmek

L.O. 5 : Sınır tabakası hakkında yorum yapabilmek