



UNIVERSITI TEKNOLOGI MARA

CMT460: MEKANIK BENDALIR

Course Name (English)	MEKANIK BENDALIR APPROVED
Course Code	CMT460
MQF Credit	2
Course Description	This course is aimed at providing students with knowledge on understanding basic laws, principles and phenomena in the area of fluid mechanics. The basic concepts of fluid mechanics, including various properties such as density, viscosity and pressure will also be introduced. Students will also be exposed to solve simplified examples of fluid mechanics.
Transferable Skills	Obtain the fundamental concepts and principles of Fluid Mechanics.
Teaching Methodologies	Lectures, Discussion
CLO	CLO1 Perform calculations involving properties of fluids, pressure and flow measurement devices. CLO2 Analyse the behavior of fluids when subjected into different conditions of pressure, resistance due to the friction, and flow of fluids through various conditions and also the factors that can affect its flow. CLO3 Relate the concepts and laws in fluid mechanic to solve quantitative problems visually and mathematically.
Pre-Requisite Courses	No course recommendations
Topics	
1. Introduction to properties of fluids and measurements 1.1) 1.1. Basic concepts of fluid mechanics 1.2) 1.1.1 Fluid static 1.3) 1.1.2 Fluid kinematics 1.4) 1.1.3 Fluid dynamics 1.5) 1.2 Fluids and their properties 1.6) 1.2.1 Density 1.7) 1.2.2 Viscosity 1.8) 1.2.3 Surface tension	
2. Fluid Static 2.1) 2.1 Pressure head 2.2) 2.2 Pascal's law 2.3) 2.3 Hydraulic jack/press 2.4) 2.4 Manometer 2.5) 2.4.1 Simple 2.6) 2.4.2 Differential 2.7) 2.4.3 Inverted	
3. Liquid in motion 3.1) 3.1 Types of flow 3.2) 3.1.1 Laminar flow 3.3) 3.1.2 Transitional flow 3.4) 3.1.3 Turbulent flow 3.5) 3.6) 3.2 Reynolds number	

4. Bernoulli's equation

- 4.1) 4.1 Definition and description of Bernoulli's equation
- 4.2) 4.2 Mechanical-energy balance in potential flow
- 4.3) 4.3 Principle operation and applications of Bernoulli's equation in
 - 4.4) 4.3.1 Venturimeter
 - 4.5) 4.3.2 Orifice meter
 - 4.6) 4.3.3 Pitot tube
 - 4.7) 4.3.4 Siphon
 - 4.8) 4.3.5 Nozzle
- 4.9) 4.4 Bernoulli's equation with resistance
 - 4.10) 4.4.1 Resistance due to pipe friction
 - 4.11) 4.4.2 Resistance due to fittings
 - 4.12) 4.4.3 Equivalent length

5. Hydraulic coefficients

- 5.1) 5.1 Coefficient of discharge
- 5.2) 5.2 Coefficient of contraction
- 5.3) 5.3 Coefficient of velocity

6. Flow in Open Channel

- 6.1) 6.1 Introduction to notch and weir
- 6.2) 6.2 Flow measurement in rectangular notch and weir (Francis Formula, Torricelli's Theorem, Effect of End Contraction and velocity of Approach)
- 6.3) 6.3 Flow Measurement for triangular Notch
- 6.4) 6.4 Ventilation over the rectangular weirs

7. Pipe Flow measurement

- 7.1) 7.1 General Characteristic of pipe flow
- 7.2) 7.2 Introduction to pipe system
- 7.3) 7.3 Pipe Flow vs Open Chanel Flow
- 7.4) 7.4 Lamina vs Turbulent Flow in pipe system
- 7.5) 7.5 Introduction to Hagen Poiseuille's law
- 7.6) 7.6 Assumption in Hagen Poiseuille's law, Boundary Condition
- 7.7) 7.7 Distribution of Velocity over a pipe section, Mean velocity
- 7.8) 7.8 Darcy-Weisbach formula for head loss dua to frictional resistance
- 7.9) 7.9 Friction Factor Chart, Shear stress and Reynolds Number
- 7.10) 7.10 Flow through a pump (Calculation of head develop, power input, power ouput, power efficiency)

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Assignment	20%	CLO3
	Test	Average of two tests	30%	CLO1

Reading List	Recommended Text	• Cangel, Y.A .and Cimbala, J.M. 2006, <i>Fluid Mechanics Fundamentals and Applications</i> , 1 Ed., McGraw Hill
	Reference Book Resources	<ul style="list-style-type: none"> • 1. J.F.Douglas, R.D.Matthews. 1996, <i>Solving Problems in Fluid Mechanics, vol. 1. Pearson Longman.</i> • 2. John F. Douglas, Janusz M. Gasiorek, John A. Swaffield, Lynne B. Jack. 2005, <i>Fluid Mechanics</i>, 5 Ed., Pearson Longman. • Robert W.F., Alan T.M. and Philip J.P., 2008, <i>Introduction to Fluid Mechanics</i> • Bansal R. K. 2008, <i>A Textbook of Fluid Mechanics and Hydraulic Machines</i> • David C. Wiggert, Bassem and H. Ramadan 2012, <i>Mechanics of Fluids</i>

Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources