Republic of Iraq

The Ministry Of Higher Education

& Scientific Research

بسم الله الرحمن الرحيم

University: Diyala
College: Engineering
Department: Chemical Engineering
Stage: Second
Lecturer name: Salah N. Farhan
Qualification: pH-D chemical Eng.
Place of work: Chemical Eng. Dept.

Flow up of implementation celli pass play

Course Instructor	Salah N. Farhan				
E-mail	drsalahchem@gmail.com				
Title	Fluid flow				
Course Coordinator	Annual				
Course Objective	this is a basic lectures for a first-level course in process engineering fluid mechanics, which emphasizes the systematic application of fundamental principles (e.g., macroscopic mass, energy, and momentum balances and economics) to the analysis of a variety of fluid problems of a practical nature.				
Course Description	The scope of coverage includes internal flows of Newtonian and non-Newtonian incompressible fluids, adiabatic and isothermal compressible flows (up to sonic or choking conditions), two-phase (gas–liquid, solid–liquid, and gas–solid) flows, external flows (e.g., drag), and flow in porous media. Applications include dimensional analysis and scale-up, piping systems with fittings for Newtonian and non-Newtonian fluids (for unknown driving force, unknown flow rate, unknown diameter, or most economical diameter), compressible pipe flows up to choked flow, flow measurement and control, pumps, compressors, fluid-particle separation methods.				
Textbook	١- Coulson, J.M. and J.F. Richardson, “Chemical Engineering”, Vol.I “ Fluid Flow, Heat Transfer, and Mass Transfer” ٥th edition, (١٩٩٨). ٢- Holland, F.A. “Fluid Flow for Chemical Engineers” Arnold, (١٩٨٠).				
Course Assessments	Term Tests	Laboratory	Quizzes	Project	Final Exam
	As (٣٥%)	As (١٠%)	As (٥%)	----	As (٥٠٪)
General Notes	Type here general notes regarding the course				

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Course Weekly Outline

Week	Date	Topes Covered	Lab. Experiment Assignments	Notes
١	٢٣,٢٤-٩-٢٠١٤	Introduction, physical properties of fluids, useful information, important laws, flow patterns, Newton's law of viscosity and momentum transfer, Newtonian and non-Newtonian fluids		
٢	٣٠-٩,١-١٠-٢٠١٤	Introduction, Fundamentals Dimensions, Dimensional Homogeneity, Methods of Dimensional Analysis, Rayleigh's method (or Power series).		
٣	٧,٨-١٠-٢٠١٤	Buckingham's method (or Π-Theorem), Selection of repeating variables, Dimensions of some important variables.		
٤	١٤,١٥-١٠-٢٠١٤	Introduction, Pressure in a Fluid, Absolute and Relative Pressure, Head of Fluid, Measurement of Fluid		

		pressure		
٥	٢١,٢٢-١٠-٢٠١٤	The Nature of Fluid Flow, Reynolds Number (Re), Overall Mass Balance and Continuity Equation.		
٦	٢٨,٢٩-١٠-٢٠١٤	Energy Relationships and Bernoulli's Equation, Equations of Motion , Euler's equation of motion.		
٧	٤,٥-١١-٢٠١٤	Modification of Bernoulli's Equation Friction in Pipes, Relation between Skin Friction and Wall Shear Stress, Evaluation of Friction Factor in Straight Pipes.		
٨	١١,١٢-١١-٢٠١٤	Figure (٣.٨)- Vol.I , Form Friction, Total Friction Losses, Friction Losses in Noncircular Conduits, Selection of Pipe Sizes.		
٩	١٨,١٩-١١-٢٠١٤	The Boundary Layer, Unsteady State Problems		
١٠	٢٥,٢٦-١١-٢٠١٤	**Exam +** The Boundary Layer, Unsteady State Problems(continued)		
١١	٢,٣-١٢-٢٠١٤	Introduction , The Total Head (Δh) , System Heads		
١٢	٩,١٠-١٢-٢٠١٤	Power Requirement , Types of Pumps , The advantages and disadvantages of the centrifugal pump		
١٣	١٦,١٧-١٢-٢٠١٤	Priming The Pump, Operating Characteristics.		

١٤	٢٣,٢٤-١٢-٢٠١٤	Centrifugal Pump Relations, Homologous Centrifugal Pumps		
١٥	٣٠,٣١-١٢-٢٠١٤	Centrifugal Pumps in Series and in Parallel , Centrifugal Pumps in Parallel, Centrifugal Pumps in Series.		
١٦	٦,٧-١-٢٠١٥	Types of Non-Newtonian Fluids, Time-Independent Non-Newtonian Fluids, Time-Dependent Non-Newtonian Fluids.		
Half – year break				
١٧	١٧,١٨-٢-٢٠١٥	Flow Characteristic [٨u/d] , Flow of Genral Time-Independent Non-Newtonian Fluids , Flow of Power-Law Fluids in Pipes	HYDRAULIC BENCH	
١٨	٢٤,٢٥-٢-٢٠١٥	Friction Losses Due to Form Friction in Laminar Flow, Turbulent Flow and Generalized Friction Factor.	OsbornReynolds Demonstration	
١٩	٣,٤-٣-٢٠١٥	Flow Measurement Apparatus	Energy losses ALONG A pipe	
٢٠	١٠,١١-٣-٢٠١٥	Pitot Tube	Pitot Tube	
٢١	١٧,١٨-٣-٢٠١٥	Measurement by Flow Through a Constriction	Flow Through A VENTURE Meter	
٢٢	٢٤,٢٥-٣-٢٠١٥	Venturi Meter, Orifice Meter	Dead Weight Calibration	
٢٣	٣١-٣,١-٤-٢٠١٥	Notches and weirs	Fluid Friction In Smooth And Roughened Pipe	

٢٤	٧,٨-٤-٢٠١٥	**Exam**	Flow Measuring And Valves	
٢٥	١٤,١٥-٤-٢٠١٥	Unsteady State Problems	Impact of A Jet	
٢٦	٢١,٢٢-٤-٢٠١٥	Velocity of Propagation of a Pressure Wave , General Energy Equation for Compressible Fluids , Isothermal Flow of an Ideal Gas in a Horizontal Pipe	Cavitations Phenomena	
٢٧	٢٨,٢٩-٤-٢٠١٥	Maximum Velocity in Isothermal Flow, Adiabatic Flow of an Ideal Gas in a Horizontal Pipe ,	Study Of Porous Bead In Venture Tubes	
٢٨	٥,٦-٥-٢٠١٥	Maximum Velocity in Adiabatic Flow, Fans, Blowers, and Compression Equipment .	Centrifugal Pump Characteristics	
٢٩	١٢,١٣-٥-٢٠١٥	Converging-Diverging Nozzles for Gas Flow, Maximum Velocity and Critical Pressure Ratio , The Pressure and Area for Flow		
٣٠	١٩,٢٠-٥-٢٠١٥	Liquid mixing,Types of Agitators , Small Blade, High Speed Agitators, Small Blade, High Speed Agitators , Dimensionless Groups for Mixing , Power Curve		
٣١	٢٦,٢٧-٥-٢٠١٥	Fluid flow through packed bed and terminal falling velocity		

INSTRUCTOR Signature: **Dean Signature:**