

MEGR3114 - FLUID MECHANICS

Catalog Data	Basic concepts of a fluid and the fundamentals of ideal and real fluid flow. Topics include fluid statics, conservation principles, Bernoulli's equation, fluid flow in pipes, and measurement devices.
References	B. Munson, D. Young and T. Okiishi, Fundamentals of Fluid Mechanics, 6th Ed., Wiley, 2009.
Goals	The objectives of this course are to provide students with a working knowledge of engineering fluid mechanics, to introduce some of the fundamental concepts underlying fluid mechanics, and to prepare students for further work in heat transfer and thermal-fluids design.
Prerequisite	MEGR 3121. Students should have a good grasp of engineering statics, basic vector calculus, and dynamics.
Class Topics	Fluid Properties Fluid Statics, Bernoulli's Equation; Conservation of Mass, Linear Momentum, and Energy; Differential Analysis of Flow Problems; Dimensional Analysis; Pipe Flow; External Flow: Lift and Drag; Turbomachinery
Outcomes	Students should acquire the following skills: 1. The ability to analyze engineering flow problems using control volume, differential, and dimensional analysis techniques. 2. An understanding of the assumptions and limitations associated with each method of analysis. 3. The ability to find and use empirical data for solving flow problems. 4. An appreciation of the various flow regimes and physical phenomena that can occur in engineering flow problems.
Laboratory	None
Design Content	Although term design projects are not assigned, a significant number of homework exercises introduce fluid-related design principles, e.g., use of model studies and dimensional analysis for designing full-scale prototypes, application of existing data to the flow systems and devices, and using analytical control methods for flow handling and aerodynamic design.
Follow-up Courses	This course is a prerequisite for the following courses: MEGR 3251 Thermal-Fluids Design Laboratory, MEGR 3212 Heat Convection and Compact Heat Exchanger Design, MEGR 3216 Thermal/Fluid Design, and MEGR 4112 Intermediate Fluid Mechanics and Vehicle Aerodynamics.
Academic Integrity	Students have the responsibility to know and observe the requirements of the UNCC Code of Student Academic Integrity (http://legal.uncc.edu/policies/up-407). This code forbids cheating, fabrication or falsification of information, multiple submissions of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty.