



**Faculty of Engineering – Assiut University
Bachelor Degree**

Civil Engineering Program

Dept. of Civil Engineering

Course specification

Hydraulics (1) C226

1. Course Aim	
Main Aim	The course is designed to give all civil engineering students the ability to understand the principles of hydraulics engineering and to apply it in appropriately in designing and evaluating civil engineering projects. The course seeks to provide a grounding in fluid static, steady uniform and non-uniform incompressible flow in pipelines, flow measurements, hydraulics simulation.
Sub-Aims	<ol style="list-style-type: none">1-1 Apply knowledge of mathematics and hydraulics to the solution of water supply networks.1-2 Apply knowledge of mathematics and hydraulics to the solution of open channels flow (Sanitary networks, canals and drains).2- Design a system of water supply networks, Sanitary networks, canals and drains3- Design and conduct hydraulics experiments as well as analyze and interpret the data.4- Identify, formulate and solve fundamental hydraulics problems.5- Use the hydraulic measurements techniques and tools, necessary for engineering practice and project management.6- Work and communicate effectively within multi-disciplinary teams..7- Engage in self- and life- long learning.8- Act professionally in design and supervision of hydraulic structures9- Select and design adequate water control structures, irrigation and water networks, sewerage systems and pumping stations10- Design and construct structures for protection against dangers of unexpected natural events such as floods and storms11. Lead and supervise a group of designers and site or lab technicians.

2. Course Content

Properties of fluids – Fluid pressure measurements – Forces in static fluids – Hydrostatic pressure Forces on Surfaces – Buoyancy and Flotation – applications of dimensional analysis - Dynamic similitude – Kinematics of fluid motion – pressure intensity and velocity changes in moving fluids – Energy equation – Newton second law–Introduction to hydrodynamics – Flow in pipes and closed conduits – pipe networks.

3. Course Topics

Topic No.	Topics	No. of hours	Week No.
1 st topic	Fluids and their properties	6	1-2
2 nd topic	Fluid pressure and its applications	6	2-3
3 rd topic	Static forces on surfaces	8	4-5
4 th topic	Buoyancy and floatation	-	-
5 th topic	Dimensional analysis and similarity	6	6-7
6 th topic	Kinematics of fluid motion	-	-
7 th topic	Energy equation and its applications	10	7-9
8 th topic	Fundamentals of classical hydrodynamics	-	-
9 th topic	The momentum equation and its applications	6	10-11
10 th topic	Steady flow through pipes	12	11-14

- Due to the factor of time limit, topics 4, 6 and 8 are excluded.

Grades Distribution

Assesment Methods	Value (degrees)	Percentage	Time
Final Exam	100	66.67 %	By the end of semester
(Oral + Lab.) Final Exam	20	13.33 %	Week No. 15
Semester Assessments*	30	20%	*
Total	150	100%	

4. List of References

Course notes	Nashaat A. Ali, "Fundamentals of engineering fluid mechanics and hydraulic" Theory and problems, 1997.
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Required books	1- Kurmi, R.S, "Elements of hydraulics", New Delhi, 1970. 2- Vennard, J.K., " Elementary fluid mechanics", Jon Willey & Sons, London, 1961.
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Periodicals, web sites.. etc.	Journal of Hydraulic Engineering. Journal of Hydraulic Division. Journal of Engineering Science, Assiut university, Egypt. - Web Sites related to hydraulics and water resources.