

## NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY CIV 240 – FLUID MECHANICS AND HYDRAULICS (3CR.)

### **Course Description**

Introduces the principles of fluid flow and development of practical hydraulics resulting from study of fluid statics, flow of real fluid in pipes, multiple pipe lines, liquid flow in open channels, and fluid measurement techniques.

Lecture; 3 hours per week

### **General Course Purpose**

This course is designed to complement student's education in Water and its environmental consideration from the use and application aspect. The course will be offered as a second-year topic in the curriculum. It will introduce students to:

- Study of hydraulics using to mathematical expressions for water flow both in pipes and open channels
- Quantitative understanding of the hydraulics in subsurface fluid flow and its applications
- Aspects of various pumps
- Design a system, component, or process to meet constraints such as environmental, health, safety and sustainability as well as economics. Socio-political and ethical context

### **Course Prerequisites/ Corequisites**

Prerequisite: Statics or divisional approval

### **Course Objectives**

Upon completing the course, the student will be able to:

- Apply knowledge of mathematics in Hydraulics through differential equations, calculus-based physics, chemistry, or other areas or science, consistent with the Civil Engineering educational objectives
- Apply knowledge of Hydraulics to technical areas such as water distribution and flow management
- Design a system, its component, and /or processes in various civil engineering context
- Write technical documentation that defines and presents findings
- Work and communicate well in a multi-disciplinary team environment

### **Major Topics to be Included**

- Engineering applications of groundwater hydraulics
- Water in the Vadose zone and unsaturated flow
- Characteristics of porous media, hydrologic cycle
- Darcy's law of fluid flow in porous media
- Infiltration, redistribution, evaporation, and the water balance
- Well hydraulics; aquifer and borehole testing
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### **Additional topics includes;**

- Fluid statics, and fluid dynamics,
- Laminar flow, turbulent flow, pipe flow, pipe networks,
- Pumps, hydrologic analysis,
- Open channel flow,
- Groundwater hydraulics, hydraulic structures,
- Pressure, velocity, and discharge measurements.