



# Unit Outline (Higher Education)

**Institute / School:** Institute of Innovation, Science & Sustainability

**Unit Title:** HYDRAULICS AND HYDROLOGY

**Unit ID:** ENGIN2201

**Credit Points:** 15.00

**Prerequisite(s):** (ENGIN1007)

**Co-requisite(s):** Nil

**Exclusion(s):** (ENCIV2320)

**ASCED:** 030907

**Description of the Unit:**

The key objective of this unit is the development of the skills required to analyse and design an urban water supply system. This unit also introduces students to fundamental hydrological and hydraulic theories. The unit places particular emphasis on the fundamental basis for the estimation of the flow in the catchment and open channel flow hydraulics and estimating runoff for design of drainage structures.

**Grade Scheme:** Graded (HD, D, C, P, MF, F, XF)

**Work Experience:**

No work experience: Student is not undertaking work experience in industry.

**Placement Component:** No

**Supplementary Assessment:** Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

**Course Level:**

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory						

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Intermediate	■	■	✓	■	■	■
Advanced	■	■	■	■	■	■

### Learning Outcomes:

On successful completion of the unit the students are expected to be able to:

### Knowledge:

- K1.** Describe the various forms of energy that are relevant to the flow of fluid, concepts of hydrostatics and pressure measurement and Reynolds number.
- K2.** Apply the appropriate equations for the solution of simple pipe flow problems.
- K3.** Identify the equations available for the analysis of flow within both single pipelines and more complex pipeline systems; and open channels.
- K4.** Explain the various components of hydrology and drainage systems.
- K5.** Describe the principles of methods for the estimation of peak discharges from a catchment and groundwater flows.

### Skills:

- S1.** Calculate the water demand of communities; variation in demand and prediction of future requirements.
- S2.** Solve problems related to fluid statics, Bernoulli's equation, energy equations.
- S3.** Solve losses in pipes using different approaches.
- S4.** Laboratory experiments to calculate friction losses and measure flows in hydraulic structures.
- S5.** Undertake rainfall and runoff estimation from rainfall and catchment data.
- S6.** Gain practical understanding of hydraulic gradient and application of Darcy's equation.

### Application of knowledge and skills:

- A1.** Apply the equations available for the analysis of flow in pipes and open channels for the solution of practical hydraulic problems.
- A2.** Measure and analyse flows in hydraulic structures.
- A3.** Apply the equations available for the design of hydraulic structures for the solution of practical engineering problems.
- A4.** Apply rainfall and runoff calculations and use appropriate procedures for the design of stormwater drainage systems.

### Unit Content:

Topics may include:

- Pipeline and pumping systems, pipe networks; steady open channel flow; flow control and flow measurement;
- Design and analysis of hydraulic structures;
- Precipitation and its analysis; rainfall and runoff estimation; stormwater management and planning;

- Soil moisture and soil water movement; Groundwater; sediment characterisation and sediment transport;
- Flood plain management

**Learning Task and Assessment:**

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1 - K5, S1 - S6, A1 - A4	An assignment based around the design of an appropriate hydraulic and/or hydrologic system.	Group assessment including a report and/or presentation.	15 - 25%
K3, S4, S6, A2 - A3	Laboratory exercises and/or presentations & assessments	Report/Presentation/Quiz/Test	20 - 30%
K1 - K5, S1 - S6, A1 - A4	An examination on any or all of the unit material.	Examination	40 - 60%

**Adopted Reference Style:**

Other (Refer to the library website for more information: IEEE)

Refer to the [library website](#) for more information

Fed Cite - [referencing tool](#)