



# HYDRAULICS ENERGY AND FLOW RESISTANCE

## COURSE DESCRIPTION

The course is designed to provide an understanding on hydraulic energy and flow resistance concepts in sewer design. Topics include resistance law in open channel and closed conduit flow; applications flow equations; head losses in open channels and close conduits; and non-uniform flow and backwater curves.

## COURSE OBJECTIVES

At the end of the program, participants will understand and be familiar with:

- Resistance laws in both open channel and closed conduit systems.
- The applications of Darcy-Weisbach, Manning's and Hazen-Williams Equations.
- Conduit or channel roughness and configuration.
- Carrying out simple head losses analysis involved in a system.
- The requirements of the code of practice and guidelines in their design proposals to the approving Authority.

## COURSE CONTENTS

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## COURSE CONTENT

- Resistance Laws in Open Channel and Closed Conduit Flow
- Applications of Darcy-Weisbach, Manning's and Hazen-Williams Equations
- Localised Head Losses in Open Channels and Closed Conduits
- Applications of Minor Losses in Both Open and Closed Systems
- Non-Uniform Flow and Backwater Curves
- Demonstration on Flowmaster and StormCad Softwares

## DURATION

1 day

## WHO SHOULD ATTEND

Technical personnel from water and wastewater industries, consultants, planners, contractors, developers, government officials and all those who are directly involved in the sewerage industry

## COURSE SCHEDULE

RM600.00

**COURSE SCHEDULE**

9.00am - 10.45am	<input type="checkbox"/> Resistance Laws in Open Channel and Closed Conduit Flow <input type="checkbox"/> Applications of Darcy-Weisbach, Manning's and Hazen-Williams Equations
<b>10.45am - 11.00am</b>	<b>Coffee/Tea Break</b>
11.00am - 1.00pm	<input type="checkbox"/> Localised Head Losses in Open Channels and Closed Conduits <input type="checkbox"/> Applications of Minor Losses in Both Open and Closed Systems
<b>1.00pm - 2.00pm</b>	<b>Lunch</b>
2.00pm - 3.45pm	<input type="checkbox"/> Non-Uniform Flow and Backwater Curves
<b>3.45pm - 4.00pm</b>	<b>Coffee/Tea Break</b>
4.00pm - 5.30pm	<input type="checkbox"/> Demonstration on Flowmaster and StormCad Softwares