School of Civil and Environmental Engineering

Term 1, 2020

CVEN9625 FUNDAMENTALS OF WATER ENGINEERING

COURSE DETAILS

Units of Credit	6		
Contact hours	5 hours per week		
Class	Thu,	14:00 - 17:00	Colombo Theatre A (K-B16-LG03)
Workshop	Thu,	17:00 - 18:00	Goldstein G03 (K-D16-G03)
	Thu,	17:00 - 18:00	Electrical Engineering G10 (K-G17-G10)

Course Coordinators and lectures

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INFORMATION ABOUT THE COURSE

If a flood happens, how many people could lose their lives and how much damage could happen to infrastructure? Is it possible to predict a flood? How does climate change affect floods? How can water be guided/transferred from one location to another? The answer to these questions and the way to approach them lies within the Water Engineering discipline. This course will introduce the basic principles of Water Engineering with a focus on hydrology and hydraulics. You will learn about the movement of water on earth (hydrological cycle), what makes water flow, how water is transferred to desired locations through engineering (hydraulics) and how water behaves in natural and human made environments. This course will introduce you the basic principles of water engineering and enable you to apply your understandings to develop solutions to water engineering problems.

HANDBOOK DESCRIPTION

OBJECTIVES

The objectives of this course are:

- to provide an overview of surface water hydrology and the atmospheric processes that lead to variability/change in rainfall and hence streamflow; and
- to provide an understanding of the rationale behind design flood estimation in hydrology.
- to introduce you to the theory of steady state closed conduit or pipe flows (i.e. pressurised flows) and free surface flows (open to the atmosphere).
- to give you an understanding of the properties of fluids, hydrostatics and the principles of fluid flow based on mass, energy and momentum.
- to enable you to apply the principles of fluid flow to different flow scenarios; to quantify energy losses due to pipe friction, pipe fittings and channel roughness for laminar and turbulent flows.
- to introduce you to the theory of channel transitions, rapidly varied flows and gradually varied flows.

Generally, the final exam and the assignments are designed to assess:

- Your understanding of the principles of Water Engineering

The course objectives, content and assessment focuses on encouraging the following attributes in you, with particular application to water engineering:

- Capacity for analytical and critical thinking and for creative problem solving. You will be exposed to, and be required to solve, numerous hydrologic problems in the Lectures, the workshops and the assignments --- “the learning is in the doing”. All these problems will cover a variety of scenarios, and where possible, will be drawn from engineering practice.
- Skills for effective communication: Throughout this course, the skills to be developed are in written communication. In your assignments and exam it is important that you clearly communicate your knowledge.
- Ability to engage independent and reflective learning: By revising the material from the lectures and the workshops you will gain improved skills in independent learning.

TEACHING STRATEGIES

Teaching in this course is centred on the lectures which are technical in content. You will develop your analysis skills in water engineering by applying the theory to problems which you undertake in the workshops. Detailed lecture notes will be provided. The purpose is to free up your time to think and comprehend during the lectures.

Private Study	¶ Review lecture material and textbook ¶ Do set problems and assignments ¶ Join Moodle discussions of problems ¶ Reflect on class problems and assignments ¶ Download materials from Moodle ¶ Keep up with notices and find out marks via Moodle
Lectures	¶ Find out what you must learn ¶ See methods that are not in the textbook ¶ Follow worked examples ¶ Hear announcements on course changes
Workshops	¶ Be guided by demonstrators ¶

EXPECTED LEARNING OUTCOMES

ASSESSMENT

PENALTIES

Penalties for late submissions will be accounted for. More specifically, late assignments will be penalised at the rate of 10% per day after the due time and date have expired.

FINAL EXAMINATION

Final examination will be held in the University examination period (Closed book, 2 hours duration) and has a value of 60% of the total mark; **You are allowed to take one A4 page into the exam with any material (hand written or typed) on both sides of the page.**

The final exam will assess your knowledge of the hydrological assessment of a catchment, estimation of design floods, evaporation, basic fluid properties, fluid flow in pipes and channels.

Short Course/Distance Courses:

(Sydney). If you reside further than 40 Km from the Kensington campus, and you wish to sit your exam externally (by distance), you must register for an external exam by the UNIVERSITY CENSUS DATE (Term 1: 15th March; Term 2: 28th June, Term 3: 11th October) more information found here

RELEVANT RESOURCES

There is no textbook for this course but a number of recommended reference books for this course are indicated below - there will be further recommended reading indicated within the lecture notes and course delivery

- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors) Australian Rainfall and Runoff: A Guide to Flood Estimation, © Commonwealth of Australia (Geoscience Australia), 2016.(available from http://arr.ga.gov.au/arr-guideline)
- Pilgrim,