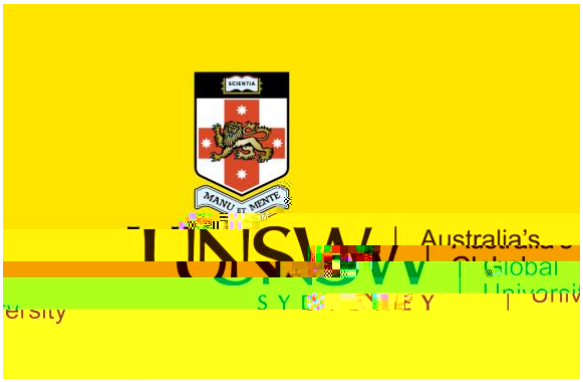

School of Civil and Environmental Engineering

Term 3, 20

CVEN9872 SOLID WASTE MANAGEMENT

OBJECTIVES

The objectives of this course are to:

Provide an appreciation of the management of solid waste in a systems context; i.e. to understand the nature of the various functional elements in waste management systems and the relationships among them, so that optimal systems can be designed;
Provide an understanding of the characteristics of urban solid waste, and be able to predict the composition and quantities for a city / town / region;
Be able to understand the data requirements for, and then be able to prepare concept designs of common functional elements e.g. transfer stations, recycling and resource recovery facilities, composting facilities, waste to energy plants, and landfills; and
Provide an understanding of waste management policy and how to prepare a waste management strategy or plan.

lectures, electronic copies of the lectures, and course notes and then will be expected to prepare workable solutions to assignment problems that have been drawn from a composite of real world problems.

The course objectives, content and assessment concentrate on encouraging the development of the following attributes in students, with particular application to Waste Management, as below:

An in-depth engagement with the relevant disciplinary knowledge in its inter-disciplinary context: the influence of socio-economic circumstances on waste generation will need to be included in waste generation predictions, and in the commentary on the implementation stages of waste facility establishment, in the design of one of the facilities in a region.
The capacity for analytical and critical thinking and for creative problem solving: Data will be incomplete, and an analysis of the fundamental influences on waste generation will need to be made to arrive at reasonable projections; then creative designs for facilities to suit the circumstances of the hypothetical region will need to be produced in the second assignment.
The ability to engage in independent and reflective learning: lectures will give standard procedures for the design of waste facilities such as landfills and waste sorting facilities; you will then need to independently develop appropriate solutions for the hypothetical region and draw on the Principal Engineer (lecturer) for reactive advice after you have developed and reflected on their own designs the Principal Engineer will not do creative design work for you.
Information literacy: you will need to find appropriate web sites and use suggested texts and journals

TEACHING STRATEGIES

Lectures will provide an explanation of procedures to follow to quantify waste generation in a town / city / region and then to prepare conceptual designs of waste management facilities. Examples will be given in these lectures. You then need to learn these procedures by characterizing waste generation in a town / city / region and preparing conceptual designs for selected waste facilities to a standard typical in a consulting office.

All material will be provided on Moodle. Printed and photocopied notes, overheads etc. will not be provided.

The approaches to learning are:

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	¶ Take notes the slides do not contain all information ¶ Refer to specified reference material for additional information ¶ Participate in activities and example problems in class. ¶ Check for announcements
Workshops	¶ Be guided by Demonstrators ¶ Practice solving set problems ¶ Ask questions
Assessments	¶ Formative and summative assessment of knowledge and skills in assignments, with students encouraged to seek formative informal assessment via consultation with the Principal Engineer/lecturer during preparation of assignments. ¶ Demonstrate higher understanding and problem solving on real world problems in a hypothetical region/context. ¶ Exams are summative assessments on knowledge gained in the course, particularly as indicated by the ability to quickly undertake exercises set in the Exercise problems
Emails	¶ You are strongly advised to check your UNSW emails daily for course related messages that are sent via News forum in Moodle. Use Q&A in Moodle to ask questions, as this builds an archive for all students in the course.
Moodle	¶ The Waste Management lectures can be found on MOODLE. From time to time, other information will be placed on MOODLE.

06/10/2019
(Week 4)

2021 (inclusive) should you be required to sit one. You are required to be available during these dates. Please do not to make any personal or travel arrangements during this period.

PENALTIES

Penalties for late submissions should also be included here. For example, late work will be penalised at the rate

RELEVANT RESOURCES

2. Waste generation:

   - Blue Environment, 2016. Australian National Waste Report. Report prepared for the Department of Environment & Energy.
   - Australian Environment Protection and Heritage Council (EPHC), Waste Overview, 2009
   - Australian Dept of Env & Energy
     Waste generation and resource recovery in Australia 2010-11 (http://www.environment.gov.au/protection/national-waste-policy/publications/waste-generation- and-resource-recovery-australia-report-and-data-workbooks)
   - NSW Waste data surveys (http://www.epa.nsw.gov.au/wastetools/surveys.htm)

   NSW Local Government Waste and Resource Recovery Data Report 2012-13 (http://www.epa.nsw.gov.au/wastetools/surveys.htm)

3. Waste minimisation and recycling: Nil

4. Waste storage, collection and transfer: Nil

5. Waste processing, resource and energy recovery:

   - NSW EPA Environmental Guidelines: Composting and Related Organics Processing Facilities (http://www.epa.nsw.gov.au/waste/organics-guidelines.htm

6. Landfill waste disposal:

   - NSW EPA Environmental Guidelines: Solid Waste Landfills, 2016 (http://www.epa.nsw.gov.au/waste/landfill-sites.htm)
   - EPA Victoria, Siting, design, operation and rehabilitation of landfills, 2015 (http://www.epa.vic.gov.au/business-and-industry/guidelines/landfills-guidance)
   - Townsend, Powell, Jain, Xu, Tolaymat, Reinhart. Sustainable Practices for Landfill Design and Operation, 2015

Technical papers can be found in the following journals:

Waste Management, International Journal of Integrated Waste Management, Science and Technology. Journal of the International Waste Working Group (IWWG).
Waste Management & Research, Journal of the International Solid Waste Association (ISWA).

If you have strong interest in waste management you might like to join one of the following professional / industry organisations:

Waste Management Association of Australia (WMAA): https://www.wmaa.asn.au/
International Waste Working Group (IWWG): https://www.tuhh.de/iue/iwwg/welcome.html
International Solid Waste Association (ISWA): https://www.iswa.org/

Each association offers a range of resources which may be of use. Notably, membership of the IWWG provides members access to past proceedings of the Sardinia International Waste Management & Landfill Symposium (see: http://www.sardiniasymposium.it/) which are particularly useful references.

Appendix A: Engineers Australia (EA) Competencies

Stage 1 Competencies for Professional Engineers

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
PE2: Engineering Application Ability	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
PE3: Professional and Personal Attributes	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership