

# ENV1019 International Wastes Management



November 2014

## 1.0 Introduction and Module Overview

Solid Waste Management is a matter of great concern in the urban areas of both developed and developing countries. To preserve the environment from extensive pollution and to protect human health, wastes need careful storage, transfer and transport, treatment and disposal. This module provides students with the opportunity to assess the environmental impact and economics of current waste disposal practices in urban areas, the system deficiencies that exist, and the steps that need to be taken to correct solid wastes management practices in both developed and developing countries. Examples of best practices adopted in various parts of the world are discussed as well as the institutional, financial, social, and legal aspects of solid waste management, essential for sustainability of the system.

### 1.1 Aims and Learning Outcomes

To:

- develop an appreciation of the legal, ethical, social and environmental aspects of wastes management in the developed and developing worlds;
- develop the particular knowledge required to enhance wastes management practises.

#### **Learning Outcomes:**

On successful completion of the module, students will be able to:

#### **Knowledge and Understanding**

- a. demonstrate an understanding of the sources of wastes, their nature, classification, environmental and health impacts;
- b. demonstrate a detailed knowledge of the chemical and physical principles underlying methodologies for reducing emissions from wastes storage, collection, treatment and disposal facilities;

#### **Subject specific skills**

- c. discuss the hierarchy of wastes management and its applicability to the developing world;
- d. determine the biological and chemical processes associated with various wastes management treatments, and apply them;
- e. assess the key technological, economic and social factors involved in the collection/ sorting / separation processes for the segregation of wastes;
- f. evaluate treatment options for a variety of waste types;

#### **Key Skills**

- g. interpret information and assess its impact / influence;
- h. evaluate research, advanced scholarship and methodologies, and argue alternative approaches;
- i. analyse and generate data using a range of techniques, and present a compelling case for a proposed strategy in the context of key drivers and chosen tools.

### 1.2 Indicative Content

Wastes as an environmental issue: the urban challenge, solid waste management systems operating in developing and developed countries, principles of integrated

and sustainable wastes management; waste arisings and types; and their environmental impact; chemical and physical properties of hazardous materials; catastrophic exposure, endemic exposure and concomitant exposure; world-wide case studies.

Wastes Management Policy and Strategy: current situation across the developed and developing world; legal framework, status of compliance; prevalent deficiencies and challenges in the solid wastes management systems; steps toward an improved solid wastes management system

Financing for Municipal Solid Waste Services; existing financial situation of Municipal Authorities; strategies for improving the financial situation; costing and budgeting of wastes management services; carbon finance; private sector participation – opportunities, challenges Involvement

Waste Collection, Treatment and Disposal: Collection Systems; Landfill: - mandatory requirements for disposal of waste, disposal practices; sustainable landfill; worldwide landfill case studies. Organic Wastes Management- major sources of organic wastes; composting and anaerobic digestion; Incineration- objectives; principles of combustion; essential design features, combustion pathways; emission control systems; measurements of efficiency such as DRE's and PIC's; disposal of incinerator residues; legislation relating to gaseous discharges; case studies

Recycling: methods for minimising waste and reclamation; the types of materials currently recycled in the developing world; compare the effectiveness of recycling strategies; research the re-use of materials; case studies.

## 2.0 Assessment

### 2.1 Teaching and Learning Strategy

The Module will be delivered via a number of modes, ie traditionally taught, block and distance. All modes will be supported by comprehensive e-learning Module Learning Materials, self assessment questions and tutorials. In addition you will be expected to organise visit(s) to a wastes management facility (ie landfill site or recycling centre) within their locality.

Teaching Learning + Assessment Activities	Study Hours
Learning Materials	100
Seminar, Tutorials, Web-Based activity, E- Mail	20
Self Assessment Questions / Activities (formative)	20
Assessments	60
<b>Total</b>	<b>200</b>

### 2.2 Assessment Strategy

The Module will be assessed by three distinct elements:

- 1) Time Constrained Assignment-1 (TCA-1)
- 2) Written Assignment 1 (WA-1)
- 3) Time Constrained Assignment-2 (TCA-2)

Assessment Items	Weighting	Learning Outcomes
TC1(1 hour) – eg short test to be completed under examination conditions covering all topics	20	a,b,c,d,e,f,g,i
AS1- Written Assignment 1, eg a wide range of questions – data analysis, interpretation, short response, short reviews etc	40	a,b,c,d,e,f,g,h,i
TC2- eg a series of wide ranging questions covering all aspects of international wastes management to be completed within a 5 day time period	40	a,b,c,d,e,f,g,h,i

### 2.3 Deadline Dates

Written assignments must be completed by the dates given below.

Assessment Type	Deadline Dates
TCA- 1	Last submission date –
Written Assignment – 1	Last submission date –
TCA-2	Last submission date –

#### Submission of Assignments

All assignments (unless stated otherwise) should be submitted via the Submit Your Work button on the Module NILE site on or before the deadline date (see above). Remember that the deadline date is the latest date by which assignments can be submitted – you can submit earlier!

If nothing is received by the last date for submission you will be automatically granted a referral for the assignment (the complete Course Regulations can be found in the *Programme Guide*). Such action would mean that you can only achieve 50% for the work, which of course will make a significant impact on your overall grade for the module. It is therefore essential that you maintain regular contact with both your Module and Course Tutor to ensure such a situation never arises. Remember the tutors are here to help and advise you – so use them!

#### Return of Assignments

Graded /moderated assignments will be released via NILE on the stated return date (see above). Additional one-to-one feedback will be given on request.

#### Failure & Resubmission

If you achieve a fail grade (F+, F, F- or G) for an item of assessment, you are permitted a second opportunity at the item, usually involving an alternative piece of work- which will be posted on the Module NILE pages. The maximum grade you can achieve for a second attempt is D-. If you are affected by external circumstances and are permitted to defer your assessment by the mitigating circumstances panel, your grade for the deferred work is not limited to D-, you are given the full grade that the work merits. There is a fixed schedule for these second attempt or deferred deadlines (see above):

- ◆ If the original deadline is up to and including 28<sup>th</sup> February 2014, the resubmission/deferred deadline is **28<sup>th</sup> March 2014**.
- ◆ Items with a deadline later than w/c 24<sup>th</sup> February 2014, and all coursework will

have a referral/deferral date of **14<sup>th</sup> July 2014**.

These are the only opportunities to improve on a failed grade. But you do not necessarily have to achieve a pass grade in every item of assessment: to pass a module you need to achieve a grade of D- or better overall.

Full details of the module course tutors and the programme support team can be found on the NILE web-site ([www.northampton.ac.uk/nile](http://www.northampton.ac.uk/nile)).

In addition to the summative assessments you are required to participate in a range of Activities. Some require you to participate in group tasks / on-line discussions, whilst others require you to short written responses to the Module Leader as outlined in the Study Timetable below:

Week	Date	Suggested Teaching & Learning Timetable
-1		Enrol on NILE site and read Module Guide and On-Line Guide to Learning material
0		Activity 1
1		Lessons 1 & 2 + SAQs
2		Lessons 3 and 4 + SAQs
3		Lesson 5 + SAQs
4		Lesson 6 + SAQs + Activity 3
5		Lessons 7 & 8 + SAQs
6		Lessons 9 + SAQs + Activity 4
7		Activity 5 + TCA-1 Deadline
8		Lesson 10 + SAQs + Assignment - WA Deadline
9		Lessons 11 and 12 + SAQs
10		TCA-2 Deadline

**Failure to engage in the Activities will severely hinder your learning experience**

## 2.4 Assessment Criteria

Generic grading criteria are given in the Programme Guide, whilst grading criteria for specific assignments are given in appropriate Assignment Briefing Notes

## 2.5 Module Leader/Tutor

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## 3.0 Indicative Reading

### Indicative Reading and Other Learning Resources:

Anon,(2010) *Solid Waste Management in the World's Cities: Water and Sanitation in the World`s Cities 2010*; Earthscan Ltd

Bhide A.D and Sundaresan B.B (2001) , *Solid waste management – collection, processing and Disposal*,Mudrashilpa Offset Printers, Nagpur.

International Solid Waste Association (ISWA) and United Nations Environmental Programme (UNEP) (2002); *Waste Management* , UN  
[http://www.uneptie.org/outreach/wssd/docs/sectors/final/waste\\_management.p](http://www.uneptie.org/outreach/wssd/docs/sectors/final/waste_management.p)

[df](#)

Luis F. Diaz, George M. Savage and Linda L. Eggerth (1997), "Managing Solid Wastes in developing Countries" Journal of Waste Management, October 1997, pp 43 - 45.

Manoj Datta(1997) *Waste Disposal in Engineered Landfills*. Narosa Publishing house, New Delhi.

Savage, G.M., et.al; (1998) Guidance for Landfilling Waste in Economically Developing Countries, US Environmental Protection Agency" EPA-600/R-98-040 <http://www.epa.gov/ord/WebPubs/projsum/600sr98040.pdf>

Schübeler, Peter et.al (1996() ; "Conceptual Framework for Municipal Solid Waste Management in Low-Income Countries" Working Paper #9, Urban Management Programme, World Bank/UNDP/UNCHS, 1996 [http://wbln0018.worldbank.org/External/Urban/UrbanDev.nsf/Attachments/UE\\_Conceptual+ Framework/\\$File/conceptualframework.pdf](http://wbln0018.worldbank.org/External/Urban/UrbanDev.nsf/Attachments/UE_Conceptual+ Framework/$File/conceptualframework.pdf)

Srinivas, Hari; "Solid Waste Management: A Policy and Programme Matrix" <http://www.gdrc.org/uem/waste/swm-matrix.html> United Nations Human

Settlements Programme (UN-Habitat) "Urban Environment," Chp. 4, section on "Waste" in State of the World's Cities Report 2001 <http://www.unchs.org/istanbul+5/statereport.htm> and <http://www.unchs.org/istanbul+5/70.pdf>

Williams, P.T (2005), *Waste Treatment & Disposal*, 2<sup>nd</sup> Edition, Wiley, London

Omojime E (2006), Municipal Solid Waste Management Solutions for Developing Countries (1<sup>st</sup> ed.) LL Publishers  
World Bank, Urban Waste Management Division, Strategic Services Planning, Institutional Arrangements, Private Sector Participation, Financial Management, and Environmental Management [http://www.worldbank.org/urban/solid\\_wm/swm\\_body.htm](http://www.worldbank.org/urban/solid_wm/swm_body.htm)

World Resources Institute (WRI)(1997) "Urban Priorities for Action" Chp. 5 in The Urban Environment 1996-1997 Oxford University Press, New York. (a joint publication of WRI, UNEP, UNDP, and the World Bank) <http://www.wri.org/wr-96-97/index.html>

Zhu, Da, Asnani, P. U., Zurbrugg, C (2008) *Improving Municipal Solid Waste Management in India: A Sourcebook for Policy Makers and Practitioners*, World Bank Publications

Zurbrugg, C and Ahmed R (1999); "Enhancing Community Motivation and Participation in Solid Waste Management" SANDEC News, No. 4, January 1999, Department of Water and Sanitation in Developing Countries (SANDEC) at the Swiss Federal Institute for Environmental Science and Technology (EAWAG) [http://www.sandec.ch/files/sandecnews\\_4.pdf](http://www.sandec.ch/files/sandecnews_4.pdf)

Zurbrugg, C (1999)"The Challenge of Solid Waste Disposal in eveloping Countries" SANDEC News, No. 4, January 1999, Department of Water and Sanitation in Developing Countries (SANDEC) at the Swiss Federal Institute for Environmental Science and Technology (EAWAG) [http://www.sandec.ch/files/sandecnews\\_4.pdf](http://www.sandec.ch/files/sandecnews_4.pdf)

*Planning Guide for Municipal Solid Waste Management – Facilitators Guide*,  
World Bank

This Facilitator's Guide is structured into 8 modules and five sub-modules introducing strategic planning for MSWM. It presents a short summary of key concepts and issues contained in each of the steps in the Planning Guide.

- Module 0: Strategic Planning
- Module 1: Mobilising the Planning Process
- Module 2: Defining the Baseline
- Module 3: Establishing the Planning Framework
- Module 4: Identifying and Evaluating Options
- Module 4A – Institutional Framework
- Module 4B – Waste Collection and Recycling
- Module 4C – Waste Treatment and Disposal
- Module 4D – Financial Sustainability
- Module 4E – Public Awareness and Participation
- Module 5: Developing the Strategy
- Module 6: Preparing the Action Plan
- Module 7: Implementing the Strategic Plan

Rothenberger, S.; Zurbrugg, C.; Enayetullah, I. and Maqsood Sinha, A.  
H. *Decentralised Composting for Cities of Low - and Middle - Income Countries - A User's Manual*. Waste Concern, 2006.

Schübeler P (1996), *Conceptual Framework for Municipal Solid Waste Management in Low-Income Countries*, SKAT, Switzerland

UNFCCC (2003). *Clean Development Mechanism Project Design Document: Municipal Solid Waste Treatment cum Energy Generation Project, Lucknow, India*. Infrastructure Development Finance Company, Ltd., September 2003.

United Nations Environment Programme, (2005), *Closing an Open Dumping and Shifting from Open Dumping to Controlled Dumping and to Sanitary Landfill: Training Module*, DNER

WSP (2008) *Secured Landfills The Bucket at the End of the Solid Waste Management Chain*, WSP

Voegeli Y, Zurbrügg C(2008). Decentralised Anaerobic Digestion Of Kitchen And Market Waste In Developing Countries – "State-Of-The-Art" In South India. *Proceedings Venice 2008, Second International Symposium on Energy from Biomass and Waste Venice, Italy; 17-20 November 2008*

Zerbock O, Candidate M S, (2003), *Urban Solid Waste Management: Waste Reduction in Developing Nations*. Michigan Technological University

\_\_\_\_\_ (2009) *Developing Integrated Solid Waste Management Plan Training Manual. Volume 2: Assessment of Current Waste Management System and Gaps therein*. United Nations Environment Programme

\_\_\_\_\_ (2009) *Developing Integrated Solid Waste Management Plan Training Manual Volume 3: Targets and Issues of Concern for ISWM*. United Nations Environment Programme,

\_\_\_\_\_ (2009) *Developing Integrated Solid Waste Management Plan Training Manual Volume 4 ISWM Plan*. United Nations Environment Programme



*A Proposal for Solid Waste management – Environmental Protection that benefits the Poor; Hand in Hand*

Up to date information and technical papers are available from journals including:

- Journal of Waste Management
- Waste Management Bulletin
- Warmer Bulletin
- ENDS Newsletter

all available in the library.

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all available from the Wastes Management library, Northampton, UK

### **e-Books**

W'O Okot-uma (2000), Pollution Control and Wastes management in Developing Countries, Commonwealth Secretariat & WFI Publishing

<http://books.google.co.uk/books?id=msGJvnJePbYC&printsec=frontcover&dq=developing+countries+wastes+management&lr=&cd=1#v=onepage&q=developing%20countries%20wastes%20management&f=false>

See **Introduction to Module Learning Material** for lots of additional reading and sources of wastes management information