UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

Coursework Master of Science in Engineering

MScEng Waste and Resources Management
NQF Exit Level 9

Prof Cristina Trois

Background

- Responding to the –
  - Invitation from DSI to develop a post-graduate degree/diploma in Waste Management and
  - Internal restructuring/re-design of the UKZN undergraduate and post-graduate qualification in Environmental Engineering (BScEng level)
- New MScEng in Waste and Resources Management Degree
- Full-time (1 year) or Part-time (2 years) Coursework Masters degree

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Curriculum outline

Course Work MScEng Waste Management

CORE MODULES (Compulsory) (80 Credits):

- Research methodology IN WM (ENPD8RM)	(16C) – Semester 1
- IWM Systems and Logistics (ENCV8IWMSL)	(16C) – Semester 1
- Waste as Resource (ENCV8WR)	(16C) – Semester 1
- Environmental Sanitary Engineering (ENCV8ES)	(16C) – Semester 1
- Waste Management in Developing Countries	(16C) – Semester 1

SPECIALISATION MODULES (choice of one - 16 Credits):

- Landfill Design and Management (ENCVLD)	(16C) – Semester 2
- Management of Industrial and Organic	(16C) – Semester 2
- Design of W/WWT Plants (ENCV8WWT)	(16C) – Semester 2

Dissertation (96 Credits)

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Entry requirements

BScEng (All disciplines)
Or
BScHons (Disciplines: Construction Management, Land Surveying, Biology/BioTechnology, Agriculture, Hydrology, Environmental Science, Geography, Engineering Geology, and Chemistry) **via GR7b** (admitted to status of BScEng).
Or
BTech Eng (Disciplines: Civil, Environmental, Resource and Bioresource Eng., Agriculture, Chemical, Industrial, Mechanical, Mining) via GR7b (admitted to status of BScEng).

Parameters for application of GR7: Portfolio of evidence will be assessed in terms of the learning the students are assumed to have to meet the cognitive requirements to be admitted to the status of a B Sc Eng.

Research methodology in WM (ENPD8RM)
16 Credits – Semester 1

Summary of themes	Motivation
• What is Research • The Research Process • Research Methodology • Data Collection • Data Analysis • Validity and Reliability	The objective of this module is to provide the student with the theoretical foundation of research methodology, which will support them in their own independent research projects. To form the foundation for the research dissertation.

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Core Module 3

Management of Waste as Resource
16 Credits – Semester 1

Summary of themes	Motivation
• Overview of biological, chemical, thermal and physical waste management technologies supporting reuse, recycling and recovery • WROSE – Development of a Waste Resource Optimisation and Scenario Evaluation model	Recognizing the value in waste as secondary resource, this module focuses on approaches/technologies to ensuring maximum value recovery from waste through materials recycling and energy recovery

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Core Module 4

Environmental Sanitary Engineering (ENCV8ES)
16 Credits – Semester 1

Summary of themes	Motivation
• Waste degradation and landfill emissions • Pollution dispersion in natural water bodies • Leachate and wastewater treatment	The module will introduce the students to the fundamentals of environmental sanitary engineering, especially with reference to pollution of water systems, wastewater treatments (municipal waste waters, landfill leachate and mine effluents) and solid waste management and control of gaseous emissions.

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Core Module 2

Integrated Waste Management Systems and Logistics
16 Credits – Semester 2

Summary of themes	Motivation
• Systematic approach to implementing integrated waste management systems in municipalities • The financial and technological considerations to implementing IWM solutions • Scenario analysis for municipalities	The objective of this new module is to provide the student with an overview of managing waste from cradle-cradle through the implementation of integrated waste management systems (collection, separation, reuse, recycling, recovery, treatment and disposal)

WM in Developing Countries (ENCV8WMDC)
16 Credits – Semester 2

Summary of themes	Motivation
• Appropriate technologies, technology adaptation/localization, low-cost strategies. Learning through case studies from Africa and BRIC countries	The module will introduce the students to the fundamentals of waste management in developing countries, especially with reference to pollution of water systems, wastewater treatments (municipal waste waters, landfill leachate and mine effluents) and solid waste management and control of gaseous emissions.

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Elective Modules – 1 x choice

Elective Modules	Summary
• Landfill Design and Management (ENCVLD)	• Design and management of landfills according to the National Norms and Standards for disposal of waste to landfill (leachate collection, landfill gas, liner design)
• Management of Industrial and Organic Waste	• Technology solutions for industrial and organic waste (industrial biomass, food waste, domestic putrescibles, etc.) (e.g. composting, AD, WtE, biorefinery).
• Design of Water/Wastewater Treatment Plants (ENCV8WWT)	• Theory and design of water/wastewater and leachate treatment facilities.

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Dissertation

Dissertation – Year-long module
96 Credits

Summary of themes	Motivation
• Research topics to be guided by the research priorities of the Waste RDI Roadmap to ensure relevance and build national capability • Providing mechanism for further specialization (e.g. economics, law, specific waste streams)	Objective is to provide students with an opportunity for practical exposure to – • the theory as covered in the core and elective modules, and • Real waste management problems within the workplace (applied research)

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Delivery Schedule – Full Time

FULL TIME STUDENTS The full-time Programme must be completed in one year.
Those who do not complete on time, will have to change their registration to part-time and proceed accordingly. Start: Jan/Feb End and Submission of Dissertation: Oct/Nov. every year.

FULL TIME OPTION	
1ST SEMESTER	2ND SEMESTER
• *Research methodology in Waste Management (16C)* • *Management of Waste as a Resource (16C)* • *Environmental Sanitary Engineering (16C)* • *Dissertation (96 C) (year-long module)*	• *Waste Management in Developing Countries (16 C)* • *Integrated Waste Management Systems and Logistics (16C)* • *1 x Electives (16 C)* • *Dissertation (96 C) (year-long module)*

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Delivery Schedule – Part Time

PART-TIME STUDENTS *(Changes are subjected to the availability of the elective modules).* The part-time Programme must be completed in two years.

PART TIME OPTION	
1ST SEMESTER	2ND SEMESTER
• *Research methodology in Waste Management (16C)* • *Environmental Sanitary Engineering (16C)* • *Dissertation (96 C) (year long)*	• *Waste Management in Developing Countries (16 C)* • *Integrated Waste Management Systems and Logistics (16C)* • *Dissertation (96 C) (year long)*
2nd YEAR	
1st SEMESTER	2nd SEMESTER
• *Management of Waste as a Resource (16C)* • *Dissertation (96C) (year long)*	• *1 x Electives (16 C)* • *Dissertation (96 C) (year long)*

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QUESTIONS

Fees Structure/Scholarships: **TOT**: **R50685** (R5885 x 16C + R15375 x 96C Dissertation)

Delivery mode: Block release – **ONE week lecture time x 3 modules per semester**

Dissertation runs from Feb to Oct – Opportunities for supervision

Interested Lecturers from the School can negotiate with the ALD for integration of lecturing in the Master Programme as part of their PMA

Relevant Committees/College-School-Programme Interaction: HDC and STLC

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