

The 5<sup>th</sup> Conference on Science and Technology, Pacific Adventist University, Port Moresby,  
Koiari Park, Monday 25<sup>th</sup> June – Friday 29<sup>th</sup> June 2012.

**Masters Programme (MSc) on Solid Waste and Resource Management: A new  
Postgraduate Programme at UNITECH.**

**Chris A. Kobal**

Senior Lecturer

Department of Civil Engineering

PNG University of Technology

Lae, Papua New Guinea.

**Abstract**

The Department of Civil Engineering at the University of Technology will soon introduce and launch a new Master of Science programme. The new Master programme will be called Master of Science in Solid Waste and Resources Management. It will comprise of a course work component (9 core modules plus 3 elective modules) and a major project. The students will have the freedom to compile a combination of modules that will allow them to follow a programme which is relevant to their interest.

The problem of solid waste management has reached a state where it is becoming a serious matter, which if not addressed properly could escalate into a major concern and challenge for PNG and indeed the Pacific Region. This programme is expected to equip Engineers with the tools required to address the situation. The Programme is aimed at Engineers with a wide range of backgrounds. Other Science graduates may also be considered, as the modules will cover a wide range of topics.

**1.0 INTRODUCTION**

**1.1 Background**

Solid waste has been evolving into a major problem that has reached proportions requiring radical measures. Increase in generation rate and change in the quality and type of solid waste have been observed together with inadequate legislation and high costs for collection and disposal. It is therefore crucial to adopt an integrated approach to develop a framework for solid waste management. This includes social, economic, technological, political and administrative elements.

**1.2 Purpose**

The Masters program is intended to provide an in-depth study which will generate knowledge of solid waste and resources management with a focus on management systems and treatment methods related to environmental policies. Moreover, principles of solid waste management, design of treatment plants, recycling methods, environmental economics, treatment options, policy issues and sustainable production will also be considered in an integrated approach.

### **1.3 Scope**

The program will cover Waste Management, Environmental Economics and Policies, as well as Environmental Technologies and Processes, tailored especially to developing countries and transitional economies.

## **2.0 THE MASTER OF SCIENCE (MSc.) PROGRAMME.**

### **2.1 The CODWAP Project**

The Masters programme is the culmination of the three year CODWAP project (COllaborative Development of a syllabus on Waste management in Africa and the Pacific). The project was established in 2008, but did not start until 2009 for a 2011 ending. The project was granted an extension of six months to mid 2012, as a reward for offering and running the programme at the University of Mauritius. It was funded by the European Union.

The curriculum for this MSc was developed in the frame of the EDULINK project CODWAP, coordinated by Aristotle University of Thessaloniki, Greece, and sponsored by the European Union. Other participating countries and universities included: Bremen University of Applied Sciences and Dresden University, both from Germany; University of Mauritius, Mauritius; University of Sierra Leone, Fourah Bay College, Faculty of Engineering; and, PNG University of Technology.

The initial Project was set up to produce a syllabus for a Master of Science programme in Solid waste management for developing countries in Africa and the Pacific. This was later expanded to include Resources management, particularly the harnessing of the by-products of solid waste such as methane gas to produce electricity, and recycling and composting. This would combine and utilise the experience from developed European countries (Germany and Greece) and their past work in developing countries including Asia, sponsored either by the EU or the individual countries.

The project also included later on the running of the Masters programme at the University of Mauritius, in 2011/2012, as a test pioneering case. That programme in Mauritius is now into its second semester in 2012.

Much pioneering work has already been done by many countries in the world, both developed and still developing, that have many years of experience in this field.

### **2.2 The Masters Programme.**

The Master of Science programme provides the opportunity for the students to specialise in solid waste and resource management and prepares them to become experts in this very important field and emerging issue. The programme also covers in detail all aspects of the environment (air, water, waste water) in as far as it is related to solid waste management. All topics are covered in the greatest detail. The subjects are presented in modular form. The content of each module has been drawn and prepared from the experiences of the

participating partners, and each module is a stand alone subject which can be presented in a designed programme.

The programme provides the students with the potential to engage in a project from their work place or a selected project which may be based on current situation.

### **3.0 CURRICULUM**

#### **3.1 Composition of the Programme**

The course is made up of a course work component and a project component. The coursework component is further broken down into core subjects and elective subjects. All students enrolled for the programme must complete the basic core subjects. They are further required to complete a set number of elective subjects of their choice. Students are given the opportunity to study in depth a project of their choice to complete the programme. At the end of the programme the successful candidates are awarded a Master of Science degree. As with any normal MSc programme, students may choose to complete only the course work part of the programme for a PG Diploma in Solid Waste and Resources Management.

#### **3.2 Core Modules.**

The following eight modules have been chosen as the basic core modules for the programme:

1. Introduction to Solid Waste Management.
2. Recycling and Resource Management.
3. Mechanical, Biological and Thermal Waste Treatment.
4. Hazardous Waste Management.
5. Waste Management Systems.
6. Final Disposal / Land filling in Developing Countries.
7. Research Methods.
8. Research Project

#### **3.3 Elective Modules**

In addition to the above core modules the candidates are also required to study any three modules from the following list:

1. International Environmental Policy
2. Environmental Economics
3. Mining Waste Management
4. Sustainable Production Technologies
5. Environmental Management Systems
6. Special Waste Management.

#### **3.4 Project.**

It is a further requirement that the students also complete a project to successfully complete the programme. The project may be chosen from a topic related to the work being carried out or planned for the particular establishment from where the student is employed. The student may choose a project entirely from his/her own choice.

#### **3.5 Awards.**

At the end of the programme, the successful candidates will be awarded the Master of Science degree from the PNG University of Technology.

Possibilities may exist for exit points at Postgraduate Diploma/Certificate Level.

## **4.0 ASSESSMENT**

### **4.1 Marking and Assessment system.**

Two possible systems of Assessments may be adopted.

1. A credit award system, especially for students who may have done work on environment related studies at another place or students of a related field. The student may apply for exemption from a subject/module for which credit points are requested.

**Example:** Credit points according to European Credit Transfer System (ECTS):

1 credit is equivalent to 15 hrs.

2. The normal system of completing a certain number of core subjects/modules per semester plus a fixed number of elective modules, for a maximum credit, the pass mark being pre-determined by the system being used.

A minimum number of credits or modules must be passed for the completion of the programme.

### **4.2 Minimum Credits Required for Awards**

Each module has 3 credits except the Research Project which has 9 credits;

#### **4.2.1 Core Subjects**

All CORE modules have to be completed for the award of the Master Degree;

#### **4.2.2 Elective Subjects**

ELECTIVE modules are to be selected from the list of modules;

#### **4.2.3 Project**

Each module will be taught over a 13 week period (Unitech semester).

## **5.0 ENROLMENT**

### **5.1 Expected launching of the programme.**

All things being equal, the programme is expected to accept its first intake in the year 2013. The required minimum number of candidates for the offering of the programme in any one semester shall comply with the requirements of Unitech, in force at the time. It is expected that enough interest can be generated with the relevant authorities, initially in PNG, to sponsor or release candidates to attend the Programme.

## **5.2 Who may apply?**

Applicants holding a university degree other than engineering or science can also be admitted on the programme if they have at least 2 years of relevant work experience. Applicants will be expected normally to have adequate knowledge of the English language.

## **5.3 Required Documents**

The following documents will be required normally upon registration:

1. Copy of educational certificates and university degree (in English or translated in English and certified as authentic by an authorised independent body).
2. Copy of identity card (with photo, certified as true by an authorised independent body) and birth certificate.
3. Copy of English language skill certification.

## **5.4 Duration**

Full time: 1 year but should not exceed 2 years (4 semesters).

Part Time: 2 years but should not exceed 4 years (8 semesters).

## **5.5 Fees**

The fees to be paid by each student will be set by the University as for normal post graduate studies, currently in force at the time of enrolment.

## **6.0 JUSTIFICATION FOR THE PROGRAMME.**

### **6.1 Undergraduate programme - Current situation.**

The syllabus of the undergraduate course on Environmental Engineering offered by the Civil Engineering Department at the PNG University of Technology covers the vast topic of Environment in one subject, in one semester, in the final year of the course. It concentrates mostly on water and waste water treatment, and discusses only the basic importance of solid waste disposal. An elective subject in the second semester expands a little bit more into the proper disposal of hazardous waste.

Both subjects dedicated to the study of the Environment do not cover in any depth and detail the subject of solid waste management, even though it is becoming an important subject matter for engineers and scientists involved with the important task of solid waste management in practice.

The potential exists for students wishing to cover in more depth the subject to take up a final year project to expand on their knowledge of solid waste and its proper management. But this again cannot be expected to result in a sustained interest in the subject/topic.

### **6.2 Postgraduate Programme – The Way Forward.**

The introduction of the MSc. programme at the PNG University of Technology can only be a good thing, not only for PNG but for the South Pacific region as a whole. The problem of

solid waste and resource management is a common concern for every developing country in the Pacific region. It is unfortunately one of the prices of the type of development which we have adopted from our foreign settlers and colonisers.

Papua New Guinea, and, Unitech especially, have been educating Pacific islands students at the undergraduate level for sometime now. It is only fair that this education is continued right up to post graduate level.

The problem of solid waste and resource management is a growing concern and the sooner it is addressed as such the better it will be for the country and region.

### **6.3 Other Levels of Solid Waste Management.**

Apart from the post graduate level it may be in our best interest to also address other levels of the overall solid waste and resources management problem. The introduction of the Local level Government system in PNG also means that the responsibility of managing solid and other wastes has wider implications for the community.

It is hoped that the offering of the programme will be welcomed by all the relevant authorities involved with the task of managing waste at all levels of society.

## **7.0 CONCLUSION**

The PNG University of Technology has taken the initiative and lead in the offering of the Master of Science programme in the specialised topic of Solid Waste and Resources Management. The programme will be relevant for Papua New Guinea and the Pacific region. It will address an emerging issue and will equip its graduates with the specialised knowledge and skills required to manage responsibly the problem of solid waste in our region.

## **8.0 RECOMMENDATION**

In view of all that was said above, the following recommendations are made with respect to the introduction and launching of the new Postgraduate programme:

1. that the offering of the Masters programme by the Department of Civil Engineering at Unitech is a positive development that should be supported by the government of PNG, and all other levels of government, including the town and city authorities and Local Level Governments, all industries (private and institutional),
2. that the Masters programme is a natural extension of the undergraduate degree programme which offers a specialised qualification for the successful candidates of the Programme,
3. that the inclusion of other Pacific Island nations in the programme enhances our role as a leading Technological University in the South Pacific, and enhances our efforts to respond to the challenge.
4. that solid waste and resource management is given the right priority by the government, by requiring and supporting the adoption of integrated solid waste management (ISWM) systems and efforts to improving the current solid waste management (SWM) conditions in PNG.

## REFERENCES

1. Aristotle University of Thessaloniki Document: - Proposal and Grant application for 9<sup>th</sup> European Development Fund: EuropeAid/126851/D/ACT/Multi title of action being CODWAP in the Solid Waste Management Sector, 18<sup>th</sup> June 2008.
2. CODWAP Group: MSc Programme Submission and Promotion, University of Mauritius, 2010.
3. Dias, L, F., Eggerth, L.L., Savage, G.M. (Editors): Management of Solid Waste in Developing Countries (DC), IWWG Monograph Series, 2007, CICA Eurowaste, Padova, Italy.
4. Auditor General's Performance Audit Report No. 01/2010: The Effectiveness of Solid Waste Management in PNG.