



## **PhD Course in International Environmental Engineering Sciences for Eco-Cyclic Systems**

*- Swedish Centre of Excellence for Support of  
Development of a Sustainable Society in Nepal*

Sida - Laqua Research Group - Kathmandu  
University - Tribhuvan University – AIT –  
Anna University

## PhD Course

### International Environmental Engineering Sciences for Eco-Cyclic Systems

#### Part 1: Solid Waste and Water Management

16-24 October, Kathmandu, Nepal

(8 ECTS)

#### Swedish Centre of Excellence for Support of Development of a Sustainable Society in Nepal

*Sida- Laqua Group-Katmandu University- Tribhuvan University  
- AIT- Anna University – University of Kalmar*

**Objective:** To increase the knowledge and the scientific level of the PhD students from Sweden and from Nepal concerning waste and water management problems in developing countries and to increase the research cooperation with South East Asia with the help of the knowledge of the Laqua Research Group, and researchers from the Sida ARRPET program. The Laqua Research Group is formed by researchers from University of Kalmar, University of Lund and University of Kristianstad. The daily life shall be improved in developing countries towards a global sustainability based on knowledge and experience already archived by the Sida programme in South East Asia. The activity will be connected to the ‘Swedish Center of Excellence for Support of Development of a Sustainable Society in Nepal’ sponsored by Sida and built up by the Laqua Research Group.

The course will stimulate Swedish PhD students and PhD students from other continents to work with teaching, research and in cooperation with trade and industry with focus on the situation in developing countries. In particular the efforts are to increase their interest towards protection of water resources, implementation of proper waste and water management in fast increasing urbanization areas including aspects on energy, air pollution control and climate changes. In particular we will focus on under developed research areas in the developing countries and thus 2008 is “the UN International Year of Sanitation” that will highlight ‘Silent Humanitarian Crises’ e.g. the lack of sustainable toilets.

The key is to teach the PhD Students to use creativity and scientific knowledge to change attitudes, to achieve more production efficiency, sustainable use of resources, and to achieve recycling of materials and energy, using a combination of new technology and traditional knowledge.

Three PhD Sub-Courses are planned of which this course in Nepal is the first. The following courses are planned in the series:

- 1) Solid Waste and Wastewater Treatment in Nepal
- 2) Air Pollution and Soil Remediation in (Bangladesh, Thailand, Malaysia or India)
- 3) Chemical Analytical Studies - Sampling and Analyses in Practice in Sweden

**Lecturers:**

Dr Sanjay Nath Khanal – Prof., Dep. of Envir. Sci. & Eng, Kathmandu University  
 Dr Nawa Raj Khatiwada Exec. Director, Nepal Dev, Research Inst., Kathmandu  
 Dr Bim P. Shrestha - Asst. Prof. and Head of Dep. Dept. of Mechanical Eng., Kathmandu University  
 Dr Maya Prakash Bhatta - Assis. Prof., Kathmandu University  
 Dr Mangala Manandhar - Prof., Department of Chemistry, Tribhuvan University  
 Dr Bhupendra Devkota - Principal, College of Applied Sciences  
 Dr Atindra Sapkota - Assistant Prof., Kathmandu University  
 Dr Jagannath Shrestha - Prof. Institute of Engineering, Pulchowk, Tribhuvan University  
 Dr Kurian Joseph – Anna University, India  
 Dr William Hogland - Prof. Environmental Engineering, University of Kalmar; Sweden  
 Dr Ulla Zetterlind - Prof., Sweden  
 Dr Lennart Mathiasson - Prof. Analytical Chemistry, Lund University, Sweden  
 Dr Lennart Mårtensson - Assoc. Prof., University of Kristianstad, Sweden  
 Dr Marcia Marques - Professor in Ecotechnology, University of Kalmar/UERJ, Sweden  
 Dr Leif Gustavsson - Dep. of Eng., Physics and Mathematics, Mid Sweden Univ., Östersund, Sweden

**Proposed Schedule:**

**Start date: 16 October 2008**

**Registration and Opening Session: 8:30 a. m -9:30 a. m**

<b>Date</b>	<b>Time</b>	<b>Subject</b>	<b>Lecturer/person in charge</b>
16 October	09:30 -10.30	Waste Management in Nepal and Future Strategies	Dr. Sanjay Nath Khanal
	10.30-12.00	Integrated Waste Management in Sweden and EU in a Historical Perspective, the EU-Directive	Dr.William Hogland
	12:00-14.00	Lunch	
	14.00-16.00	Waste Management in Asia, the ARRPET program	Dr. Kurian Joseph
	16.00-	Landfill mining and land remediation	Dr Kurian Joseph

	17.00		
	17.00-18.00	Sorting schemes SWM and storage of organic material	Dr William Hogland
17 October	09:00-12:00	Visit to the Landfill	Municipality of Kathmandu
	12.00-14.00	Lunch	
	14-16	Visit a sorting plant for waste	Municipality of Kathmandu
	16-18	How to implement changes in waste handling procedures among decision makers and the population	Dr. Ulla Zetterlind, Sweden
18 October	09.00-12.00	Sampling and handling of samples for advanced chemical analyses (including interpretation of data)	Dr Lennart Mathiasson Dr. Lennart Mårtensson,
	12.00-14.00	Lunch	
	14.00-15.00	Instrumental Analysis of Water Pollution	Dr. Maya Prakash Bhatta,
	15.00-16.30	Fundamental chemistry for environmental control	Dr. Mangala Manandhar
	16.30-18.00	Persistent Organics Pollutants and other relevant pollutants from the modern society	Dr. Bhupendra Devkota,
19 October	09.00-10.30	Drugs in wastewater and medical waste	Dr Lennart Mathiasson
	10.30-12.00	Experiences of analysis of pharmaceuticals in waste water treatment plants	Dr. Lennart Mårtensson
	12.00-14.00	Lunch	
	14.00-15.30	Environmental hazards for Nepal – air, land and water	Dr. Nawa Raj Khatiwada
	15.30-16.30	Water, Waste Water Treatment, Air Pollution Control in Nepal and South East Asia	Dr. Atindra Sapkota
	16.30-18.00	Storage of Organic Materials and Fire Fighting	Dr William Hogland
20 October	09:00-10.30	Energy from Waste and Renewable Energy in the Perspective of Nepal	Dr. Jagannath Shresthal
	10.30-12.00	Technical Development and Implementation of Advanced Techniques in Nepal: Possibilities and Obstacles	Dr. Bim P. Shresthal
	12.00-13.00	Lunch	
	13.00-14.00	Bioremediation of contaminated soils	Dr Marcia Marques
	14.00-	Methodology for System Analytical	Dr Leif Gustavsson

	15.30	Studies	
	15.30-16.30	Phytoremediation of contaminated soils and Phytotechnologies for wastewater treatment	Dr Marcia Marques
	16.30-17.30	Effective Bioenergy Production from Rest Products	Dr Leif Gustavsson
	17:30-18.30	Treatment strategies for landfill leachate-from bench scale up to full scale	Dr Lennart Mathiasson Dr. Lennart Mårtensson

### Assignments:

1) Assignment for the first course: Water and Waste Management in Nepal

Activities: Together with City Engineers from Kathmandu, mapping of water and waste management in Mountain Villages and downstream effects

Assignments:

- a) Practical inventory of contaminated sites, e.g. petrol stations, industries, dump sites etc.
- b) Situation of waste and water handling in rural areas-performed by the students during trekking routes, 21-24 October
- c) Comparison of low-tech with high-tech treatment methods using handouts of scientific literature and discussions in groups

### Travelling to Kathmandu

The travelling to Kathmandu is organized by the PhD student himself/herself.

### Course fee

The course fee 6 000 SEK includes accommodation, breakfast, lunch and dinner during 5 day course period, course material, trekking cost. Other personnel cost need to be borne by the participants themselves. **The fee covers just the first course.**

**Registration to the course:** Is made to professor to professor William Hogland e-mail: [william.hogland@hik.se](mailto:william.hogland@hik.se) not later than 15 of September.

Give your full names and surname, sex, date and place of birth, nationality, passport number, private and working address, phone numbers, and e-mail, name and address of person to contact in case of emergency, name and telephone/e-mail to supervisor

### Venue of the course

The addresses to the hotels are:

#### DHULIKHEL OFFICE

Dhulikhel, Kavrepalanchowk, Nepal  
Tel. 977-11-490114, 490494, 490042, 490043  
Fax. 977-11-490001; E-mail. [dlrdhuli@mos.com.np](mailto:dlrdhuli@mos.com.np)

#### KATHMANDU OFFICE

PO Box 6020, Kamaladi, Kathmandu, Nepal  
Tel. 977-1-4222389, 4247663, 4248299  
Fax. 977-1-4222926  
E-mail. [dlrdhuli@mos.com.np](mailto:dlrdhuli@mos.com.np)  
[www.dhulikhellodgeresort.com](http://www.dhulikhellodgeresort.com)

### **Information of importance**

#### *Visa*

Visa is required for visitors other than Indian nationals. Indian nationals traveling from air have to produce identity card (passport, driving license, voter's card etc.) Visa can be obtained from embassies/consulates abroad or on arrival at Kathmandu airport. Visa is provided free of cost to the people visiting Nepal from SAARC countries. Single entry Visa fee is US\$ 30 valid for 60 days and addition US\$ 50 is levied for multiple entry visa. The Visa fee may be changed as per Government of Nepal rule and regulations.

#### *Insurance*

Secure that you insurances including coverage of costs for medical care in the event of acute illness or accident

#### *Currency*

The unit of Nepalese currency is Nepalese Rupees. Exchange rate (as of 14th July, 2008) is 1 US\$ = 68 Nepalese Rupees)

#### *Climate*

The climate in Kathmandu during the course should be fine. The temperature will be around 28 +/- 1<sup>0</sup> Celsius.

### **Clothes for field work and trekking**

The clothes for field work and trekking will be casual and if you have apron it will be better. Better to bring an umbrella and a good trekking boot. It is advisable to bring along a light jacket.

### **Contact persons**

#### **William Hogland**

Professor in Environmental Engineering and Recovery  
The School of Pure & Applied Natural Sciences, University of Kalmar

SE-391 82 Kalmar, Sweden  
Phone: +46 (0)480 44 67 21  
Mobile: +46 (0)70 58 58 352  
e-mail: [william.hogland@hik.se](mailto:william.hogland@hik.se)

**Dinesh Raj Manandhar**

Research Fellow  
Kathmandu University  
e-mail: [mrdinesh@wlink.com.np](mailto:mrdinesh@wlink.com.np)  
Tel: 977-9851051822

**BIBLIOGRAPHY (Other texts/publications will be available during the course)**

- Hogland, W., Marques, M. and Björklund, B., (2007). Fires in Organic Wastes Storages: Prevention, Fire Fighting and After Care. *Proceedings of Kalmar Eco-Tech 07 - Technologies for Waste and Wastewater Treatment, Energy from Waste, Remediation of Contaminated Sites and Emissions Related to Climates, November 26-28, 2007, Kalmar, Sweden, V I, 3-10.*
- Hogland, W., Marques, M., Nimmermark, S. (2004). Landfill mining and waste characterization: a strategy for remediation of contaminated areas. *The Journal of Material Cycles and Waste Management*, v. 6 (1), p.672-681.
- Kriipsalu, M., Marques, M. Hogland, W., Nammari, D.R. (2008). Fate of polycyclic aromatic hydrocarbons during composting of oily sludge. *Environmental Technology*, v.29, p.43-53.
- Kriipsalu, M., Marques, M., Hogland, W. (2005). Remediation of an oily leachate pond in Estonia. *Waste Management & Research*, v.23, p.541-549.
- Kriipsalu, M., Marques, M., Hammari, D.R., Hogland, W. (2007). Bio-treatment of oily sludge: The contribution of amendment material to the content of target contaminants and the biodegradation dynamics. *Journal of Hazardous Materials*, v. 148, p.616-622.
- Kurian, J., Nagendran, R., Thanasekaran, K., Visvanathan, C., Hogland, W. (2008). *Dumpsite Rehabilitation Manual*, Anna University Chennai, India, p 140.
- Marques, M. (2007) Stormwater runoff pollution at waste management sites. *Urban Water Journal*, v.4, p. 173-181.
- Nammari, D.R., Marques, M., Thörneby, L., Hogland, W. Mathiasson, L, Mårtensson, L., (2007). Emissions from baled municipal solid waste: I. Methodological approach for investigation of gaseous emissions. *Waste Management & Research*, v. 25, p. 39-48.
- Nammari, D.R., Hogland, W., Marques, M., Nimmermark, S., Moutavtchi, V. (2004). Emissions from a controlled fire in municipal solid waste bales. *Waste Management*, v. 24, p. 9-18.