

## **165:197 International Development (3 S.H.)**

### **Section 06: Water, Health, and the Environment: Technological Innovations for a Sustainable Society**

Dec. 27, 2009 - Jan. 15, 2010

#### **The course instructors are Madhavan Lakshmi Raghavan and Mary Skopec.**

Madhavan Lakshmi Raghavan is an Associate Professor of Biomedical Engineering and Director of the Biomechanics of Soft Tissues Division at the Center for Computer Aided Design at University of Iowa, Iowa City, IA, USA. He teaches courses on engineering mechanics, biomechanics, and biomedical device design. He has a BS in mechanical engineering from Coimbatore Institute of Technology, India (1992) and a PhD in Bioengineering from University of Pittsburgh, USA (1998). His interdisciplinary research aims to leverage engineering principles to address challenges in medicine.

Dr. Mary Skopec, brings 18 years of experience in the field of water resources to the class including the last 10 years as the director of water monitoring activities for the state of Iowa with the Iowa Department of Natural Resources. Dr. Skopec has worked closely with regulatory and non-regulatory water programs including drinking water, source water protection, wastewater permitting, groundwater remediation, and nonpoint source pollution programs at both the state and federal levels.

#### **Course description**

The overall objective of the course is to provide students with on-the-field exposure to the environmental and health challenges of creating a sustainable society. The course will take place in the state of Karnataka, India. Students will visit a hospital serving a tribal population in order to appreciate their unique challenges and technology needs. Students will also be exposed to the work of a number of socially conscious organizations working to improve health and combat pollution in southern India with particular emphasis on issues of water resource availability and sanitation. Students are expected to gain an appreciation of current and potentially future technological solutions to challenges in water, environment and health in India. Students will form teams, discuss their experiences and brainstorm on current and potential technological needs facing the communities they encounter. In the final days, each student will give a presentation on their experiences with a focus on technology in water, health and environment related issues.

#### **Sponsoring Organization(s),**

The Swamy Vivekananda Youth Movement (<http://www.svym.net/>) is a long-standing collaborator with the Study Abroad Program of the University of Iowa. Their current activities are in the areas of health, education, community development, organizational management, and training, research, advocacy, and consultancy. Course activities will involve significant coordination with staff at the SVYM-affiliated Vivekananda Memorial Hospital.

Arghyam is a nonprofit foundation working in the water sector of India ([www.arghyam.org](http://www.arghyam.org)). Arghyam's mission is to support efforts towards equity and sustainability in access to water for all citizens. Capacity building through the sharing of knowledge and grassroots water projects is a hallmark of this institution. Most recently,

Arghyam is spearheading an Urban Water Initiative aimed at integrating urban water management in an innovative approach currently being piloted in the small town of Mulbagal in Karnataka, India. Students will get to learn directly from researchers at Arghyam and also take day trips to visit many of the villages where projects are being implemented. Knowledge of Kannada the local language is not a requirement, though most of the villagers will not speak English. Several Arghyam professionals who speak both Kannada and English will serve as translators.

### **Logistics**

1. Enrollment
  - a. About 10-12 students from Iowa
  - b. About 5-6 students from India
2. Locations and schedule
  - a. The course will take place in the vicinity of two cities – Mysore and Bangalore, about 100 miles from each other
  - b. Dec 27-Dec 29: Flight to Bangalore
  - c. Dec 30 – Jan 6 @ Mysore (vicinity), Karnataka; Hosted by SVYM-affiliated Vivekananda Memorial Hospital (<http://www.svym.net/>); Field trips to hospital and rural clinic; Discussion sessions among students and with instructors
  - d. Jan 7 – Jan 14 @ Bangalore, Mysore, Karnataka; Hosted by Arghyam (<http://www.arghyam.org>); Field trips to visit many of the villages and towns in Karnataka where water management projects are being implemented and exposure to socially conscious organizations working to improve health and combat pollution in southern India; ; Discussion sessions among students and with instructors
  - e. Jan 15: Course wrap up, student presentations.
  - f. Jan 16-Jan17: Return flight to Chicago

### **Recommended readings (before beginning of course)**

- About the Swamy Vivekananda Youth Movement (<http://www.svym.net/>) and the affiliated hospital (<http://www.svym.net/ACTIVITIES/ACTIVITIESTEMP.htm#HEALTH>)
- About Mysore, a city located in southern India in the state of Karnataka (<http://en.wikipedia.org/wiki/Mysore>)
- Examples of biomedical engineering design projects for the developing world
  - Beyond Traditional Borders: [http://beyondtraditionalborders.rice.edu/design.cfm?doc\\_id=12096](http://beyondtraditionalborders.rice.edu/design.cfm?doc_id=12096)
  - Engineering World Health: [http://216.92.64.45/uploads/docs//09-10\\_EWH\\_Projects\\_that\\_Matter.pdf](http://216.92.64.45/uploads/docs//09-10_EWH_Projects_that_Matter.pdf)
- Data sharing for water information (India Water Portal) <http://www.indiawaterportal.org/>
- Safe drinking water technologies
- Rooftop water harvesting
- Capacity Building to provide sustainable water resources

- Community Managed water resources
- Wastewater disposal and treatment technologies
- Integrated urban water management
- Water monitoring design and implementation