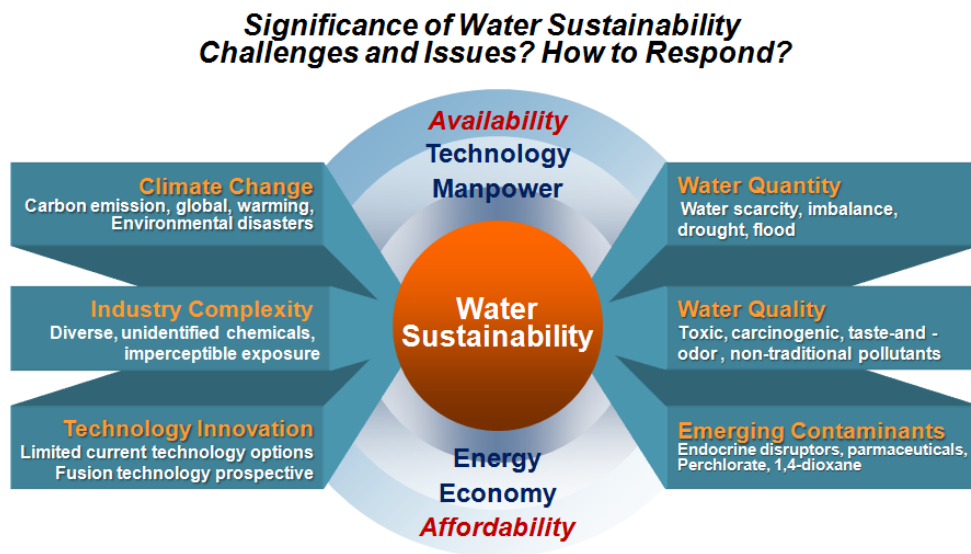


**MHRD Scheme on  
Global Initiative Academic Network  
(GIAN)**

**Sustainable Water Technology Innovation**

**Overview:**

The subject of water sustainability is one of the key issues in many reasons such as climate change, industrial diversity and complexity, conventional technology limitations, water scarcity, and water quality deterioration (see figure below). Furthermore, great attention is being now paid to emerging and non-traditional contaminants (e.g., persistent organic compounds, endocrine disrupting chemicals, and pharmaceuticals and personal care products) in water since such compounds have been detected with sophisticated instrumental analyses and known to be highly toxic and carcinogenic at an extremely low level of a few ng/L.



This course, ultimately pursuing water sustainability, focuses on the technical innovation and understanding of water/wastewater treatment processes, which will be developed to degrade both traditional and emerging contaminants for advanced water/wastewater treatment and reuse. Furthermore, a basic understanding of the functional capabilities of complex microbial communities in the contaminated environments will be highlighted.

## Objectives:

The primary objectives of the course are as follows:

- i) Providing students with advanced water/wastewater treatment technologies
- ii) Learning how mathematical models can be formulated on the basis of scientific principles to simulate the behavior of water/wastewater treatment processes
- iii) Learning how multivariate statistical methods can be formulated to monitor and simulate the behavior of water/wastewater treatment processes
- iv) Design elements and application of microbial fuel cells
- v) Exposing the students to nano-materials as novel adsorbents for emerging and non-traditional contaminants in water/wastewater

## Course Schedules:

Lecture 1: Basic principles of water/wastewater treatment technology

Lecture 2: Advanced biological nitrogen removal processes

Lecture 3: Advanced biological phosphorus removal processes

Lecture 4: Basics and application of membrane bioreactors

Lecture 5: Mathematical modeling of water/wastewater treatment processes

Lecture 6: Model-based process optimization of water/wastewater treatment processes

Lecture 7: Basics of multivariate statistical methods

Lecture 8: Process monitoring based on multivariate statistical methods

Lecture 9: Basic principles of microbial fuel cells

Lecture 10: Application of microbial fuel cells

Lecture 11: Emerging and non-traditional contaminants

Lecture 12: Nano-materials: preparation, properties and applications

<b>Module</b>	Evolutionary morphology of land plants: 8-14 <sup>th</sup> August 2016. Number of participants for the course will be limited to fifty.
<b>Who Can Attend</b>	You are UG or PG Student/ Research scholar/ Teacher/ person from Industry, Institute in the subject of Life Sciences, Biochemistry, Biotechnology, Environmental Biotechnology and Environmental Science and Technology.
<b>Fees</b>	The participation fees for taking the course are as follows: 1. UG and PG student: Rs. 1000/- 2. M. Phil./Ph. D. Student of Shivaji University- without fellowship: Rs. 1000/-; with fellowship: Rs. 2500/- 3. M. Phil./Ph. D. Student of other University- without fellowship: Rs. 1000/-; with fellowship: Rs. 3000/- 4. Teacher: Rs. 5000/- 5. Person from Industry/ Institute: Rs. 10,000/- 6. Foreign student: \$300/-

## The Faculty



**Prof. Dae Sung Lee** is the Vice Dean of Engineering College and Head of Department of Environmental Engineering at Kyungpook National University in South Korea. He was a visiting professor at Department of Chemical Engineering and Biotechnology in Cambridge University in 2012. He is internationally recognized for his integrated approaches to all aspects of modeling, simulation, design, operation, control and management for environmental processes. He has published more than 150 scientific papers and inventor/co-inventor of more than 10 patents related to water and wastewater treatment.



**Prof. S.P. Govindwar** (FISBT, FMASc, FBRS) has done internationally acclaimed research in the area of bioremediation using microbes, fungi, plants & topping first in scopus (decolorization). Work on phytoremediation (lab scale phytoreactors) is well suited for developing a wetland-phytoreactor technology for an efficient bioremediation of textile industry effluent and of textile dye contaminated sites. Presently working for the development of wetland for textile waste water treatment. He is also working on DNA barcoding and bioprospecting of medicinal plants from Western Ghats. He has published more than 200 scientific papers having *h*-Index: 32 and citations about 3500.

### Course Co-ordinator

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