Advanced Concepts in The Synthesis of Pharmaceutical Drugs

Under the aegis of MHRD—Global Initiative of Academic Networks

URL: http://iiti.ac.in/GIAN/

Overview

India is one of the fastest growing economies in the world today. It is one of the emerging markets for pharmaceuticals, in particular generic drugs. In order to remain competitive in the fast growing global pharmaceutical industry it is necessary for Indian students and professionals to remain up to date with the current methods in drug synthesis. Although students receive good training in India on the principles of chemistry during their undergraduate and Master's course work, they are not specifically exposed to advanced synthetic concepts relevant to the pharmaceutical industry. Much of the training for new employees therefore occurs on site. The synthesis of pharmaceutical drugs comes with unique problems: the synthesis needs to be commercially viable, utilize relatively nontoxic reagents and be amenable to scale-up. In addition, it is important to develop environmentally friendly synthesis to pharmaceuticals so waste is minimized, and when generated is benign. Routine organic synthesis that students are typically exposed to does not often take these criteria into consideration, and hence students are often surprised that the synthetic tool box they have acquired over time from their course work is not very practical or useful in the real world situation. In this course students will be exposed to advanced synthetic concepts that are particularly relevant to the pharmaceutical industry. Even for students who may not pursue a career directly in pharmaceutical industry, it is important to be aware of current issues pertaining to the one of India's largest growing industry, viz. the pharmaceutical industry. It is also important for students to understand how the practice of green chemistry is relevant to the pharmaceutical industry.

Schedule of the Course

Schedule of the course	**:** June 14-20, 2018
Total Number of days/lectures	**:** 6-days/10-lectures and 10 tutorials

Registration Fee

Participant from outside India	**:** USD 500
Industry/ Business organization	**:** Rs. 20,000
Academic Institutions	**:** Rs. 5,000
Students	**:** Free for first thirty participants

The fee includes all instructional materials, computer use for tutorials, and internet facility. The participants will be provided with accommodation in IIT Indore hostels on payment basis.

Topics Covered

History of pharmaceutical synthesis; advanced synthetic conepts; important considerations in synthesis including solvent choice, flow versus batch synthesis, and green chemistry concepts; synthesis of generics, and case studies (synthesis of sitagliptin, viagra and taxol).

Faculty Information

Teaching Faculty

The course will be delivered by Professor Ram Mohan, currently the Wendell and Loretta Hess Professor of Chemistry, at Illinois Wesleyan University, USA. Professor Mohan is a synthetic organic chemist whose research is devoted to the development of environmentally friendly organic synthesis using bismuth compounds. Synthetic chemistry is at the heart of Professor Mohan's research program. Coming from a small undergraduate liberal arts school, Professor Mohan has considerable teaching experience. Professor Mohan is an internationally renowned scholar in the field of green synthetic chemistry and he has considerable experience teaching and practicing green chemistry. Recently, he was selected to be a recipient of the prestigious The ACS-CEI (American Chemical Society-Committee on Environmental Improvement) Award for Incorporation of Sustainability into Chemical Education. As per the American Chemical Society, this award "*recognizes individuals or groups who have made exemplary contributions to the incorporation of sustainability into chemical education*."

In 2005-06 he spent his sabbatical at The Center for Green Chemistry at Monash University in Melbourne, Australia. More recently, he has spent a year in India as a Fulbright scholar. During this time he delivered a green chemistry course at IISER, Mohali. Professor Mohan has also travelled extensively in India and visited numerous small undergraduate colleges. These included a remote place in a tribal belt in North Maharashtra (Shahada College). He believes that it is important to reach students, not just in premier institutes but also in small, remote areas of India. Professor Mohan has also close ties with Hong Kong University where he has conducted green chemistry workshops. His contributions to green chemistry and undergraduate education were recognized by a Pfizer Green Chemistry Award.

Coordinating Faculty

Dr. Venkatesh Chelvam, an Organic Chemist and Chemical Biologist is an assistant professor in the Discipline of Chemistry and Biosciences and Biomedical Engineering at IIT Indore. His long term goal is to establish a centre of excellence in the field of bio-science especially for detection and treatment of cancer and inflammatory diseases at IIT Indore. He has more than 8 years of experience in imaging and microscopic techniques for diagnosis and therapy of diseased condition from Purdue University, USA. He was also a postdoctoral fellow in the laboratory of Prof. Hans-Ulrich Reissig at Freie University Berlin, Germany in 2006-2008, where he was awarded Alexander von Humboldt fellowship and worked on total synthesis of natural products for cancer. He has published more than 30 peer reviewed journal papers in highly reputed international journals and some of his outstanding discoveries were published in prominent journals such as *Nanomedicine*, *Journal of Nuclear Medicine*, *Journal of Cell Sciences*, *Journal of Medicinal Chemistry*, *Molecular Pharmaceutics*, *Bioconjugate Chemistry*, *Journal of Organic Chemistry*, *European J. Organic Chemistry*, *Organic Letters*, etc. His revolutionary work on diagnosis and therapeutic applications of cancer and inflammatory diseases are US patented, and currently in clinical trials. Moreover he had appeared in ABC news for developing technology for intra-operative guided surgery of ovarian cancer in patients.

Who should attend this course?

1. Chemists from Pharmaceutical Industry
2. Undergraduates, M.Sc., and Ph.D. science stream students. Any student with a basic organic chemistry background will be able to follow these lectures and gain a lot from them.
3. B.Sc. and M.Sc. level organic chemistry teachers who wish to update their synthetic chemistry knowledge.

Course Coordinator

For any further information and registration, please contact:

Dr. Chelvam Venkatesh

Assistant Professor
Discipline of Chemistry
Discipline of Biosciences and Biomedical Engineering
Indian Institute of Technology Indore, Khandwa Road, Simrol, Indore-453 552, India.
E-mail: cvenkat@iiti.ac.in, homepage: http://people.iiti.ac.in/~cvenkat/
Phone: 0731-2438789