

Bioreaction Engineering (October 9 – 17, 2017)

Overview

The design of bioprocesses based on modeling of the system is one of the important goals of chemical and biochemical engineering. A quantitative approach in which fundamental results from the biosciences is combined with core disciplines from the engineering sciences will lead to the best design of the bioprocess.

Coupling of mathematics (linear equations, and ordinary differential equations) with the basic bio-subjects (biochemistry and biology) to solve design problems relevant to bioprocesses is the primary objective of the course. The course covers stoichiometry, kinetics, thermodynamics, metabolic flux analysis and the design of ideal and real bioreactors, illustrated by practical examples. In particular, the analysis and scale-up of bioreactions will be discussed. Course participants will learn the above topics through lectures and tutorials.

Modules	<ul style="list-style-type: none">▪ Basic definitions of rates, yield coefficients. Optimal yield▪ Black Block models and combination of black box models▪ Application to bioremediation of waste water▪ Metabolic flux analysis, Definitions▪ Substrate to products MFA Kinetics of bioprocesses▪ Classical matrix based MFA. Propagation of errors▪ Kinetics of enzymatic reactions▪ Kinetics of cell reactions. Industrial reactions▪ Design of ideal reactors▪ Metabolic Control Analysis▪ Mixing and mass transfer in bioreactors▪ Mixing and mass transfer in industrial size bioreactors
You Should Attend If...	<ul style="list-style-type: none">• Engineer or researcher from biochemical industry or R & D Laboratories.• Students at any level (BTech/MSc/MTech/PhD)• Faculty from reputed academic institution <p>Number of participants for the course will be limited.</p>
Fees	<p>The participation fees for taking the course is as follows:</p> <p>Registration Fee for Students from IITD: Rs. 500 Students from other Academic Institutes : Rs. 5,000 Faculties from other Academic Institute: Rs. 10,000 Professionals from Industry/ Research Organizations: Rs. 15,000 Participants from abroad : US \$500</p> <p>The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.</p>

The Participation fees for the CEP programmes under GIAN will be accepted only through Demand Drafts drawn in favour of "IITD CEP Account" or e-transfer/RTGS/NEFT and Taxes as applicable on participant fee. Bank details are as follows:

Bank Account No	36819334799
Bank Address	State Bank of India, IIT Delhi, Hauz Khas, New Delhi-16
MICR Code	110002156
Beneficiary	IITD CEP ACCOUNTS
IFSC Code	SBIN0001077
Account Type	Saving

The Faculty

John Villadsen



Professor John Villadsen, an established academician teaching at Technical University Denmark, DTU, also has vast experience working with industry, setting up centres and directing collaborative work of research groups with 500 faculty/staff.

John Villadsen's scientific interests have also been vast and varied over the years. While his initial career predominantly focused on chemical engineering, catalysis, mathematics and simulation, his later research mostly dealt with physiology, fermentation and with the application of mathematics to interpret experimental data.

Sunil Nath



Sunil Nath is a Professor at DBEB, IITD with research interests in the area of molecular mechanism and thermodynamics of fundamental bioenergetic reactions, such as ATP synthesis. He has published over 50 journal papers.

Course Coordinator

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