[161003H04] Biomedical Engineering Systems

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Overview

This course gives an overview of engineering physiology and medical devices supporting patients in life-threatening conditions. In particular, the course covers circulatory physiology, lung physiology, cerebrospinal fluid physiology, glucose metabolism and renal physiology as well as therapeutic devices currently used in clinical practice.

These include heart pacemakers, implantable defibrillators, ventricular assist devices, total artificial hearts, artificial ventilators, ECMO devices, anaesthesia devices, hydrocephalus shunts, sensors to measure blood glucose level, insulin pumps, dialysis machines.

Furthermore, the following topics will be covered: determination of hemodynamic parameters using optical sensors and other non-contact sensors and ophthalmic anaesthesia training and simulation.

Dates for the Course	**25th July, 2016 to 5th August, 2016**
Host Institute	**IIT Madras**
No. of Credits	**2**
Maximum No. of Participants	**60**
You Should Attend If…	▪ You are an engineer or research scientist interested in designing medical devices that support patients in life-threatening conditions ▪ You are a bio-medical instrumentation engineer, student or a faculty, who would like to learn more in detail about (a) the circulatory, ventilator and renal physiology (b) how to model pathophysiology and man-machine interaction using first principles and electro-physiological analogues. (c) the function of life-supporting devices (d) upcoming new monitoring technologies (e) get a feeling for the growing demand for surgical simulators and the connected Technologies, etc.
Course Registration Fees	The participation fees for taking the course is as follows: **Student Participants:** Rs.2000 **Faculty Participants:** Rs.6000 **Government Research Organization Participants**: Rs.10000 **Industry Participants:** Rs.20000 The above fee is towards participation in the course, the course material, computer use for tutorials and assignments, and laboratory equipment usage charges. **Mode of payment: Demand draft in favour of "Registrar, IIT Madras" payable at Chennai** The demand draft is to be sent to the Course Coordinator at the address given below.
Accommodation	The participants may be provided with hostel accommodation, depending on the availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel

Course Faculty

Prof. Steffen Leonhardt was born in Frankfurt, Germany, in 1961. He received the M.S. degree in computer engineering from the State University of New York at Buffalo, NY, USA, the Dipl.-Ing. degree in electrical engineering and the Dr.-Ing. degree in control engineering from the Technische Universitt Darmstadt, Darmstadt, Germany, and the M. D. degree in medicine from J. W. Goethe University, Frankfurt, Germany. In 2003, he became a Full Professor and Head of the Philips endowed Chair of Medical Information Technology, RWTH Aachen University, Aachen, Germany. His research interests include physiological measurement techniques, personal healthcare systems, and feedback control systems in medicine.

Prof. Jagadeesh Kumar received the B.E. degree in electronics and communication engineering from the College of Engineering, Chennai, India, in 1978, and the M.Tech. and Ph.D. degrees from IIT Madras, Chennai, in 1980 and 1986, respectively.

He was with King's College London, London, U.K., in 1988, the Asian Institute of Technology, Bangkok, Thailand, in 1996, the University of Braunschweig, Braunschweig, Germany, in 1998, and the University of Aachen, Aachen, Germany, in 1999. He had guided 7 Ph.D. scholars and 11 M.S. scholars. He is currently a Professor of Electrical Engineering with IIT Madras, where he is the Head of the Central Electronics Center. He has authored 50 journal articles, mostly in the IEEE journals, and presented 90 papers in international conferences. He holds six patents. His current research interests include measurements, instrumentation, and signal processing. Dr. Kumar received the Young Scientist Award from the Department of Science and Technology in 1988 and the DAAD Fellowship Award in 1997.

Dr. Boby George received the M.Tech. and Ph.D. degrees in electrical engineering from IIT Madras, Chennai, India, in 2003 and 2007, respectively. He was a Post-Doctoral Fellow with the Institute of Electrical Measurement and Measurement Signal Processing, Technical University of Graz, Graz, Austria, from 2007 to 2010. Since 2010, he has been with the faculty of the Department of Electrical Engineering, IIT Madras, where he is currently an Associate Professor. His current research interests include sensors and electronic instrumentation.

Course Co-ordinator

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