

Sensing and Related Technologies for the Grand Challenges of the 21st Century: Climate, Energy, Water, Food, Health and Mega-Cities

11 - 22 July, 2022

Overview of the Course

The crises of energy, water, food, health, and rapidly changing climatic conditions alongside increasing population, especially in mega-cities have become essential global challenges. Furthermore, we must address these challenges in constructive, sensitive, democratic ways. The conservation of natural resources, as well as sustaining development while nevertheless permitting necessary growth is required for assuring that natural and productive resources will be available for future generations. Hence optimum utilization as well as alternate means of resource generation and utilization is the need of the hour -- and all the more so in developing countries. To consume minimally, and to conserve what we extract, it is essential that our knowledge base regarding resources and methods be broad and exhaustive. Knowledge of existing systems and their utilization trends can be obtained by devising technologies that will capture exhaustive information and transform information into knowledge from diverse perspectives in multiple dimensions. Over-the-horizon sensing and related technologies under development at research laboratories and institutes will, when applied to build human assistive systems, permit us to capture the full spectrum of potentially available critical knowledge. Visualization of real, virtual, and augmented environments comprehensively, precisely, and converging to the desired reality in a minimal number of iterations, is a top challenge for the systems of today, and for future decades. To meet these challenges, we and our technical communities must learn how to design, build, and disseminate knowledge-rich measurement systems supported by global-scale instantly-available freely-shared data and context.

International Resource Person



Prof. Emeritus Mel Siegel, IEEE Life Fellow, has been a faculty member at the Carnegie Mellon University SCS Robotics Institute since 1982. He is the Founding Director of the MS in Robotics Technology program. His degrees are all in physics: BA at Cornell, MS and PhD under Nobel Laureate John L. Hall at JILA. Before graduate studies, he served

in the US Peace Corps in Ghana, where he taught physics and math. After a few years in academic physics, and before entering robotics at CMU, he was R&D director of a scientific instrumentation company. His research in robotics focuses on sensing, perception, and human-machine interfaces. He created and taught the core course in Sensing, Sensors, & Perception. During 2011-2012 he served as Founding Chair of the Physics and Robotics Departments at Nazarbayev University in Kazakhstan.

About GIAN Course

Govt. of India approved a programme titled Global Initiative of Academic Networks (GIAN) in Higher Education, aimed at tapping the talent pool of internationally renowned scientists and entrepreneurs. This is to encourage their engagement with the institutes of Higher Education in India so as to augment the country's existing academic resources, accelerate the pace of quality reform, and elevate India's scientific and technological capacity to global excellence.

For more details, visit <http://www.gian.iitkgp.ac.in>

Course Schedule

Date and Day	9:00 to 9:45 AM IST	9.45 to 10:30 AM IST	7 to 9 PM IST
Day 1-Mon-(11/07/22)	A historical overview of global challenges related to sensing and technology of the 21st century towards sustainability I	Introduction to grand challenges and aspects of measurements and knowledge-rich measurement systems	Tutorial session
Day 2-Tue-(12/07/22)	Carbon, Climate-GHGs and climate change, environmental changes	Grand challenges and opportunities in environmental Engineering (IOT solutions)	Tutorial session
Day 3-Wed-(13/07/22)	Sustaining oceans, pollution in air, water, and soil.	Systems-oriented approach that characterizes environmental engineering. (IOT solutions)	Tutorial session
Day 4-Thr-(14/07/22)	Sustainable water resource	Technologies, policies, and strategies	Tutorial session
Day 5-Fri-(15/07/22)	Energy challenges in 21st century	Solutions to global energy crisis (renewable technologies)	Tutorial session
Day 6-Mon-(18/07/22)	Food challenges in 21st century	Technological solutions towards food crisis (sensors, robotics)	Tutorial session
Day 7-Tue-(19/07/22)	Health challenges in 21st century	Modern health solutions towards health challenges (CV, AI n ML)	Tutorial session
Day 8-Wed-(20/07/22)	Smart cities development towards 21st century	Sustainable solutions for smart cities (CV, AI n ML)	Tutorial session
Day 9-Thr-(21/07/22)	Robotics to address global problems	Designing of robots to address challenges	Tutorial session
Day 10-Fri-(22/07/22)	Self-driving vehicles and industry 4.0-challenges	Technical solutions towards driverless vehicles and industry 4.0	Tutorial session



ABOUT BMSCE

The B.M.S. College of Engineering is the first private Engineering college in India, established by the great visionary and philanthropist, Late Sri. B. M. Sreenivasaiiah in the year 1946, located opposite to the historical Bull Temple in Basavanagudi, Bangalore. It is an autonomous institution affiliated to Visvesvaraya Technological University, Belagavi and approved by All India Council for Technical Education, New Delhi. It is the first few institutions in India to be bestowed with NBA in Tier-I Format (Washington Accord) in the year 2013. BMSCE is accredited by National Assessment and Accreditation Council (NAAC) with highest grade of A++ in the second Cycle with a CGPA of 3.83 on a scale of four. Proud recipient of TEQIP-III (World Bank Funded Project) after successful participation in TEQIP-I and II. BMSCE is the only partner institution in the country associated with the Melton Foundation, USA which promotes cross-cultural learning for selected students along with peers from five other countries. It is one of the most preferred higher educational destinations for students from all across the country and also attracts students from South Asian and African countries. BMSCE is in its 75 year of dedicated service in the field of Engineering Education. BMSCE is currently offering fourteen UG, fifteen PG programs and doctoral programs, besides several consultancy and research activities.

For more details, visit : <http://www.bmsce.ac.in/>

REGISTRATION PROCEDURE And PAYMENT MODE

Step#1: Web Portal Registration: Visit GIAN website at link:

<https://gian.iitkgp.ac.in/GREGN/index>

and create a login user ID, and password. Fill up the GIAN registration form and complete web registration by paying Rs.500/- online through Net Banking/Debit/Credit Card as per instructions given there in. This provides the user with the life time registration to enroll in any number of GIAN courses offered. This step is not required, if already registered with GIAN portal.

Step #2: Course Registration: Login to the GIAN portal again with the user ID and password already created in Step #1. Click on course registration option at the top of the registration form. Select the course titled "Sensing and Related Technologies for the Grand Challenges of the 21st Century: Climate, Energy, Water, Food, Health and Mega-Cities " from the list and click on the Save option. Confirm your registration by clicking on the Confirm Course option.

Step #3: The participant may then proceed for the course registration with the course coordinator by filling out the online registration form (google form), after making the payment for the course registration through IMPS/NEFT/Demand Draft on or before July 5th, 2022.

Link for the course registration:

[Click Here →](#)

Step #4: The scanned image of the payment transaction receipt may be sent to the coordinator at veenahegdebms.intn@bmsce.ac.in

The maximum number of participants of the program would be limited to 100. Selected participants will be informed by the coordinators.

Payment to be made through NEFT. The details are as follows:

Name of Account Holder HOD EIE

Account Number: A/C Number 20274185024

Bank & Branch: Indian Bank, Hanumanth Nagar Branch,

IFSC Code: IDIB000B607

MICR Code: 560010007

Fill the details in the google form provided in the link to complete registration process.

HOST FACULTY/COURSE COORDINATORS



Dr. Veena N. Hegde, Member International Society of Automation (ISA), has been a faculty in the department of Electronics and Instrumentation Engineering, B.M.S. College of Engineering, Bangalore, since 1993. She has received her BE in Instrumentation Technology from Mysore University, M.E in Electronics from Bangalore University and Ph.D from VTU, Belgaum, and Karnataka. She has been teaching core course on Measurements and Instrumentation, Microprocessors, Microcontrollers, Digital Signal Processing, Algorithm and System Design and Embedded systems. She is faculty Advisor for ISA student section at BMSCE and also served as student Liaison of ISA Bangalore. She has 27 years of experience in teaching and served as head of the Department twice at BMSCE. Her research interest includes Biomedical Signal Processing, Modelling & Signal Analysis and Embedded System.



Prof. Preethi K Mane received her BE degree in Instrumentation Technology, in the year 1996 from Bangalore university and ME in Electronics from Bangalore university in the year 2000. She is pursuing PhD in Electronics and communication Engineering from Visvesvaraya Technological University. She has work experience of 21 years in teaching and is currently serving as Associate Professor in the department of Electronics and Instrumentation Technology.

Fees

Participation fees for the course are as follows:

Participants from abroad:	US \$500
Industry or Research Organizations:	INR 14,000
Students/Faculty at Academic Institutions:	INR 500

The above fee includes all instructional materials, tutorials, and assignments. The course will be presented by Mel Siegel, PhD in Physics, Professor Emeritus, CMU SCS Robotics Institute, plus Bangalore-area university senior faculty experts in several specialized curriculum topics. prominent CMU-educated Indian entrepreneurs will speak about their companies' capabilities and advances in the course's topical areas. Lectures will be recorded and made available for future personal use by the participants.

IMPORTANT DATES

Registration closes on : 09/07.2022

Classes commences on : 11/07/2022

You Should Attend If

- You are a scientist, engineer, or advanced technology manager whose responsibilities require up-to-date insight into the technical and social challenges of evolving climate, energy, water, food, health, and megacity conurbations.
- You need to learn about traditional, emerging, and over-the-horizon technologies for sensing, perception, and knowledge-rich analysis for conceiving, building, and maintaining sustainable solutions to these rapidly evolving problem classes.
- You are a student or faculty member at an academic institution, and you need to learn or update your knowledge of modern research methods and devices for human protection and augmentation in hazardous and time-critical environments.

ADDRESS FOR CORRESPONDENCE

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