# Global Initiative on Academic Network (GIAN)
# Course on
# *Internet of Things in Smart Living & Cyber-Physical-Social Systems*

**Call for Registration and Participation**

**Course on**

***INTERNET OF THINGS IN SMART LIVING AND CYBER- PHYSICL-SOCIAL SYSTEMS***

**January 08-17, 2018**

**Venue: PBCEC,VH- IIT Kanpur**

***Foreign Expert (Speaker)***


**Professor Sajal K. Das**

Professor of Computer Science and Daniel St. Clair Endowed Chair, Missouri University of Science and Technology, Rolla, USA


***Course coordinator: Organized by***


**Professor Laxmidher Behera**

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- **Speaker: Prof. Sajal K. Das**, Professor of Computer Science and Daniel St. Clair Endowed Chair, Missouri University of Science and Technology, Rolla, USA

**Course Coordinator**:**Prof Laxmidhar Behera, Department of EE, IIT Kanpur**

- **Date: 08-17 January, 2018**

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**Dr. Sajal. K. Das, (IEEE Fellow)** is a Distinguished Professor of Computer Science and Daniel St. Clair Endowed Chair at the Missouri University of Science and Technology, Rolla, USA. During 2008-2011, he served the National Science Foundation as a Program Director in the Computer Networks and Systems Division. Dr. Das received B.Tech. degree from Calcutta University, M.E. degree from Indian Institute of Science, and Ph.D. degree from University of Central Florida – all in Computer Science. He graduated 9 postdoctoral fellows, 40 Ph.D. students and 31 M.S. thesis students.

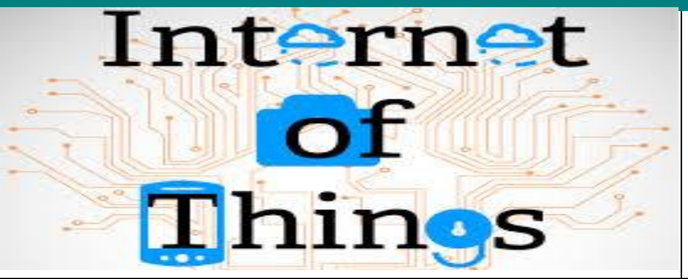
Dr. Das' interdisciplinary research interests include wireless and sensor networks, mobile and pervasive computing, cyber-physical systems, smart environments including smart city, smart healthcare and smart grid, distributed and cloud computing, big data analytics and IoT, cyber-security, biological and social networks, applied graph theory and game theory. He has directed numerous funded projects of over $15Million. He has published more than 600 research articles in high quality journals and conference proceedings.

Dr. Das holds 5 US patents, co-authored 52 invited book chapters, and four books on *Smart Environments: Technology, Protocols, & Applications* (Wiley 2005), *Handbook on Securing Cyber-Physical Critical Infrastructure: Foundations & Challenges* (Morgan Kauffman 2012), *Mobile Agents in Distributed Computing and Networking* (Wiley 2012), and *Principles of Cyber-Physical Systems: Interdisciplinary Approach* (Cambridge University Press 2017). According to DBLP, Dr. Das is one of the most prolific authors in computer science. His *h-index* is 76 with 23,500+ citations according to Google Scholar. He received 10 Best Paper Awards in conferences like ACM MobiCom, IEEE PerCom and IEEE SmartGridComm.

**Dr. Laxmidhar Behera** received B.Sc. (engineering) and M.Sc. (engineering) degrees from NIT Rourkela in 1988 and 1990, respectively. In 1996 h received PhD degree from IIT Delhi. He is currently working as a professor in the Department of Electrical Engineering, IIT Kanpur. He has worked as an assistant professor at BITS Pilani during 1995-1999 and pursued postdoctoral studies in the German National Research Center for Information Technology, GMD, Sank Augustin, Germany, during 2000-2001. He joined the Intelligent Systems Research Center (ISRC), University of Ulster, United Kingdom, as a reader on sabbatical from IIT Kanpur during 2007-2009. He has also worked as a visiting researcher/professor at FHG, Germany,and ETH, Zurich, Switzerland. He has more than 200 papers to his credit published in refereed journals and presented in conference proceedings.

His book on Intelligent Systems and Control (Oxford University Press) is in 5th reprint and prescribed as graduate level text book in many Universities across the world.

His book on Intelligent Systems and Control (Oxford University Press) is in 5th reprint and prescribed as graduate level text book in many Universities across the world. He has supervised 13 PhD students to completion and is currently supervising 12 PhD students. His research interests include intelligent control, robotics, semantic signal/music processing, neural networks, control of cyber-physical systems, and cognitive modeling.

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# *Internet of Things in Smart Living and Cyber-Physical-Social Systems*

## Course Objectives:

- Exposing the participants to the science of IoTs, smart environments and cyber-physical-social systems (CPS) in terms of data gathering, learning, intelligence building, inferencing, and decision making;
- Building confidence and capability among the participants in theory and applications of wireless sensors, IoTs, smart systems, and CPS with emphasis on security and control with selected case studies of smart home, smart grid, health care, multi-robot and multi-UAV systems;
- Providing hands-on experience in practical problem solving through real experimental study, Lab demos, and MATLAB simulations;
- Enhancing the capability of the participants to design customized smart CPS systems.

## Course Descriptions:

- **Module A: Introduction (4 hrs)**

Introduction to wireless sensor networks, IoTs, cyber-physical systems, Smart environments; Research issues and challenges; Mathematical and algorithmic foundations.

- **Module B: Science of CPS and Smart Systems (6 hrs)**

CPS foundations and principles, Data Fusion algorithms, Wireless communication networks , Sensor coverage and connectivity, Situation-awareness and information quality.

- **Module C: CPS Control (4 hrs)**

Control Issues and challenges, Hybrid automata, Switching systems, Networked control

- **Module D: Case Studies (6 hrs)**

Smart homes and cities, Smart Grid, Smart healthcare

- **Module E: CPS and Sensor Security (8 hrs)**

Attack Models, Smart Grid security, Trust and belief models, Epidemic Theoretic models

- **Module F: Wrap Up (4 hrs)**

Intelligent systems design, Future Research Directions, Value-added learning, teaching, and mentoring

- **Lab Demonstrations and Hands-on Experiments: (10 hrs, Coordinator LB)**

The objective here is to provide hands on experience to participants in the general area of CPS. Using Arduino and Raspberry platforms, participants will learn to integrate cyber, communication and physical system while developing a prototype.

- **Grading and Certification**

On completion of course and final assessment, grade certificate will be provided to participants on the basis of performance

## Who can Participate ?

- Practicing Engineers, Business Executives (Tech), Research Scientists, Scientists/Engineers working in Government, Semi-government, Private sector companies, and others.
- Teaching and Research Faculty, Graduate/Post-graduate, PhD students from academic and technical institutions.

## Registration/Course Fee (Non- refundable )

*The participation fee for attending the course is as follows:*

- Participants from abroad:
- Industry/ Research Organizations: Rs. 3000/-
- Academic Institutions: Rs. 2500/-
- Students (UG/PG/PhD from India): Rs.1000/-

## Mode of Payment

On registration in the course, selected candidates will be intimated through e-mail. They have to remit the required course fee to the bank/through DD as per the details given below before the deadline.

Account Name: Registrar, IIT Kanpur

Account No.: 10426002126

Bank Name: : SBI IIT Kanpur

In addition to the above fee, one-time online fee of Rs. 500/- is to be paid for registration in the GIAN web portal. (See registration process step 1 in next column)

## Accommodation

Out station participants can be provided accommodation in the Institute Guest Houses (limited accommodation on first-cum-first serve basis) inside the campus on direct payment as the Registration fee does not include lodging and boarding. The lodging (twin sharing) may be charged at rate of Rs.350/- per day (food extra) in Institute Guest House for the duration of course.

**Note:** Maximum number of Participants: 60. (Participants will be selected on first-cum-first serve basis.