

**Govt. of India, Ministry of Human Resources Development (MHRD),**  
**Scheme on Global Initiative on Academic Network**  
**(GIAN)**

**ALGORITHMIC FOUNDATIONS OF WIRELESS SENSOR**  
**NETWORKS WITH APPLICATIONS**

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### **1. Overview**

Wireless Sensor Networks (WSNs) are finding wide spread applications in the areas of Internet of Things (IoT), smart environments, industrial automation, home automation, health care, and so on. Due to the fact that wireless sensors are often battery operated and have small form factor, there arise significant challenges in the efficient design and deployment sensor networks. Although a lot of work has been done in recent years on the design and simulation of WSN protocols, relatively less attention has been given to the algorithmic and theoretical foundations of WSNs. This course focuses on the algorithmic foundations of WSNs with emphasis on current applications, such as cyber-physical systems and smart environments.

This course will cover some of the important problems in WSNs, such as topology control, data fusion, clustering, coverage and connectivity, and localization. The course will also examine current security issues in WSNs and counter measures to handle them. The use of these algorithms in present day applications like cyber physical-systems, IoTs, and smart environments will be presented. The course will also include interactive tutorials, demonstration of current research work being carried out related to the above topics. The course will end with a discussion on future research trends of WSNs and their application in further emerging areas. Additionally, the participants will learn how to conduct excellent research and publish in high quality journals and conferences.

### **2. Objectives**

1. Introduce the participants to the architecture and modelling of WSNs.
2. Expose the participants to the various algorithmic aspects of WSNs.
3. Enable the participants to critically analyze and design solutions to new problems arising out of this domain.
4. Extend the theoretical concepts towards applications and provide tutorials to address real world problems.

5. Exposure to some present day applications and their solutions, through demonstrations.
6. Introduce participants to open problems in WSNs and give future research directions.
7. Develop skills to do original research and write high quality scientific papers.

<b>Course duration</b>	<i>Dec 11-15, 2017</i>
<b>Host institution</b>	National Institute of Technology Karnataka, Surathkal
<b>Maximum number of participants</b>	60
<b>Who should attend?</b>	<ul style="list-style-type: none"> <li>• Students at all levels (B. Tech / MCA / MSc / M. Tech. / Ph. D).</li> <li>• Faculty members from academic institutions and practicing engineers from research organizations.</li> <li>• Professionals from industry working on design and development of algorithms related to wireless sensor networks and their applications.</li> </ul>
<b>Course fees:</b>	<p>Faculty and students from NITK: Free</p> <p>UG and PG students from other institutes: ₹ 1000/-</p> <p>PhD and Post Doctoral fellows from other institutes: ₹ 2000/-</p> <p>Participants from academia and research organizations: ₹ 3000/-</p> <p>Participants from industry: ₹ 5000/-</p> <p>Foreign Participants: US \$200</p> <p>This registration fee includes all instructional materials, use of laboratory facilities for tutorials, access to the Internet and lunch and tea on all days.</p> <p>The participants will be provided with on campus accommodation on payment basis.</p>

### **3. The Faculty:**

#### **Prof. Sajal K. Das:**



Dr. Sajal K. Das is a Distinguished Professor of Computer Science and the Daniel St. Clair Endowed Chair Professor at the Missouri University of Science and Technology, Rolla, USA. During 2008-2011 he served the US National Science Foundation as a Program Director in the division of Computer Networks and Systems. His research interests include theory and practice of wireless and sensor networks, mobile and pervasive computing, cyber-physical systems, smart environments (including smart grid and smart health care), security, distributed and cloud computing biological and social networks, applied graph

[theory](#) and [game theory](#). His research on wireless sensor networks and pervasive and mobile computing is widely recognized as pioneering. He is a Fellow of the [IEEE](#). Das has published 680+ papers, gathering 24,000+ citations according to Google Scholar and 52 invited book chapters. He is one of the most prolific authors in [computer science](#) according to DBLP. His current [h-index](#) is 77 and has an [Erdős number](#) of 3.

**Pushparaj Shetty D. (Host Faculty):**



Dr. Pushparaj Shetty D, obtained his B.E. degree in Computer Science and Engineering in 1999 from NMAMIT Nitte, Mangalore University and M.E. degree in Computer Science and Engineering in 2005 from IEST Shibpur, Kolkata (formerly BESU Shibpur). He completed his doctoral studies in the Computer Science and Applications group at the Indian Institute of Technology Delhi and was awarded the Ph.D. degree in July 2014. He is working as an

Assistant Professor in the Department of Mathematical and Computational Sciences at the National Institute of Technology Karnataka, Surathkal, India. His research interests are in the area of Wireless Sensor Networks, Graph algorithms and Cloud computing. He is a member of several professional bodies like IEEE (senior), IEEE Computer Society, ACM (senior), ACM SIGACT, Computer Society of India (CSI), Indian Society for Technical Education (ISTE) and the Institution of Engineers, India (IEI).

**Saumya Hegde (Host Faculty)**



Mrs. Saumya Hegde is presently working as an Assistant Professor in the Dept. of Computer Science and Engineering at the National Institute of Technology Karnataka, Surathkal. She has completed her B. E. in Computer Engineering from Mangalore University and her M. Tech. in Computer Science and Engineering from NITK Surathkal. She is currently pursuing her doctoral research at NITK Surathkal in the area of Software Defined Networking. She is a member of

professional bodies like IEEE and ACM.

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**Coordinators:**

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