



**One-week GIAN course  
on  
ADVANCES IN CORROSION ENGINEERING AND PROTECTION**



### **Overview**

Corrosion compromises structure safety and is a leading factor in the catastrophic failure in bridges, nuclear facilities, airplane components, and equipment used in chemical, petrochemical, transportation, and construction industries. It is a spontaneous, slow-progressing phenomenon. The rate is mainly governed by the environment, metal composition, and metallurgical, chemical, and electrochemical properties. It is often underestimated in industrial equipment and structure design because it takes a long time to evaluate the extent of corrosion. Corrosion pervades the entire gamut of engineering applications and is one of the primary methods for degradation in all structures exposed to the environment. Life extension and maintenance are therefore key issues in all industry sectors involved in infrastructure and installation.

### **Objectives**

The primary objective of this course is to provide an overview of all the corrosion processes, methods of measurements, challenges in non-destructive testing and surface treatments that can be used commercially for various substrates to mitigate corrosion. Attendees will be able to have an appreciation at the end of the course of the advantages and disadvantages of the various factors that cause corrosion and a real-world appreciation for the available coatings and methods along with some typical applications and case histories.

Course Contents	
<p><u>Date</u> Sep 23<sup>rd</sup> - 28<sup>th</sup>, 2019</p>	<p><b>Day 1</b></p> <p><b>Lecture 1</b> Historical perspectives &amp; Principles of Corrosion <b>Lecture 2</b> Corrosion Measurement techniques and their relevance to prediction</p>
	<p><b>Day 2</b></p> <p><b>Lecture 3</b> Non-destructive methods for identification of corrosion <b>Lecture 4</b> Protective coatings in the form of paints and challenges</p>
	<p><b>Day 3</b></p> <p><b>Lecture 5</b> Protective methods in the form of sacrificial anodes <b>Lecture 6</b> Surface treatments to mitigate corrosion at low and high temperatures using Plasma and their applications.</p>
	<p><b>Day 4</b></p> <p><b>Lecture 7</b> Surface treatments to mitigate corrosion at low and high temperatures using Thermal and their applications. <b>Lecture 8</b> Surface treatments to mitigate corrosion at low and high temperatures using Cold spraying methods and their applications.</p>
	<p><b>Day 5</b></p> <p><b>Lecture 9</b> Other methods to prevent corrosion including sol gel, laser, vapor deposition and diffusion coatings <b>Lecture 10</b> Other methods to prevent corrosion including sol gel, laser, vapor deposition and diffusion coatings (Contd.)</p>
	<p><b>Day 6</b></p> <p><b>Lecture 9</b> Omni phobic (Super hydrophobic – Oleo phobic and Ice phobic) coatings and their applications <b>Lecture 10</b> Other Omni phobic (Super hydrophobic – Oleo phobic and Ice phobic) coatings and their applications (Contd.)</p>
	<p><b>Date of Examination: Sep 28<sup>th</sup>, 2019</b></p>

<p><b>You should attend if you are...</b></p>	<ul style="list-style-type: none"> <li>❖ PG/PhD students, Faculty members with research focus in Manufacturing, Production and Design Fields (Mechanical Engineering)</li> <li>❖ Consulting Engineers working in Manufacturing and Design Fields</li> <li>❖ Pre-Final/Final year Undergraduate students (Mechanical Engineering)</li> </ul>
<p><b>Registration Fees</b></p>	<p><b>Participants from Abroad:</b> US \$500  <b>Industry/ Research Organizations:</b> Rs. 6000/-  <b>Faculty Members:</b> Rs. 5000/-  <b>Students (Pursuing PhD / Master/ Bachelor Courses):</b> Rs. 4000/-  <b>NIT Mizoram:</b> Free (Faculty / Student / Researcher)</p> <ul style="list-style-type: none"> <li>❖ Registration Fee only includes attendance to Sessions, Course material and Lecture notes.</li> <li>❖ UG and PG students need to produce a document as a proof of Student Identification and a letter of Nomination from their Institute/College.</li> <li>❖ The Registration Fee has to be paid by DD drawn in favor of Director, NIT Mizoram, payable at SBI Bawngkawn, Aizawl</li> </ul>

## Registration

Register for the course online at <http://www.gian.iitkgp.ac.in/GREGN/index>. The last date of registration is **1<sup>st</sup> Sep, 2019**. To register or for any questions please send E-mail to [basilkuriachen@gmail.com](mailto:basilkuriachen@gmail.com)

**Number of participants for the course is limited to 50.**

## Course Faculty



**Dr. T. S. Sudarshan**  
 Materials Modification Inc.  
 (MMI) Fairfax, Virginia  
 U.S.A

**Dr T.S. Sudarshan** is currently the President and Chief Executive Officer for Materials Modification Inc., (MMI) Fairfax, Virginia. Prior to this he worked as the Director for Research and Development at Synergistic Technologies, Maryland developing self lubricating coatings for cutting tools and weapon systems before the company was acquired by DuPont Ventures. In his early career, he has also worked as a Senior Metallurgist at Ashok Leyland, Madras. At MMI, he is responsible for the management and the technical development of innovative

materials, processes and techniques, and coordination of several Federally and industrially sponsored programs. He has raised over 60 million dollars in funding from the Government for high risk high payoff advanced technology related programs.

Dr Sudarshan was a member of the “National Materials Advisory Board” of the National Research Council that directs policy and provides important input to Congressional initiatives regarding materials science, holder of 27 US patents, winner of 2 - R&D 100 awards, winner of 2 Design News awards, winner of the Outstanding Manufacturing Engineer award given by the Society of Manufacturing Engineers – USA, Fellow of ASM International, Fellow of International Federation of Heat Treatment and Surface Engineering, Fellow of IMMM, Distinguished Alumni IITM, co-author of over 175 papers in journals and peer reviewed conferences, co-editor of 35 books in surface engineering, and books on "Rapid Solidification Technology", Intermetallic and Ceramic Coatings", "Chemical Vapour Deposition" and "Additive Manufacturing". He has delivered over 30 invited (keynote and plenary) lectures in the fields of nanotechnology and surface engineering around the world. He is also the founder of the “Surface Modification Technologies” conference that has been held for the past 30 years in various countries that include USA, UK, France, Japan, Singapore, Switzerland, India, Austria, Sweden, Germany, Finland and Denmark and serves on the editorial boards of several international journals. Dr Sudarshan is also the Co-editor of two international peer reviewed journals “Materials and Manufacturing Processes” published by Taylor and Francis for the past 29 years and “Surface Engineering” published by Maney Publishing on behalf of IOM, UK for the past 19 years.

In addition, Dr Sudarshan has served as a mentor for several high school and coop students and is a member of numerous review committees in the US government including NSF, NIH, DoE, OTA and U.S. Army. He has served on Blue Ribbon Panels for the US Army, Technical Advisory Boards of various commercial companies worldwide and chaired numerous committees in professional societies like TMS and ASM and Ohio Third Frontier. Dr Sudarshan is an enthusiastic lecturer and has taught several short courses on surface engineering, failure analysis of engineering materials and nanotechnology worldwide. He has been profiled in Wall Street Transcripts on Nanotechnology and has served on the Governor’s Review panel on Research and Development in the Commonwealth of Virginia. Dr Sudarshan’s professional contributions are significant and have been recognized worldwide by numerous institutions and professional bodies. His most significant achievement has been the sustained contribution to the field of surface engineering for which he is well recognized by his peers worldwide. His book is currently used widely around the world for offering courses in “Surface Engineering” at the graduate level. Dr Sudarshan enjoys creativity in engineering by reducing science to practice and is one of the very few individuals that has excelled in academics, entrepreneurship and business besides providing leadership on public policy.

## Course Coordinator



### Dr. Basil Kuriachen

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National Institute of Technology Mizoram

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**Dr. Basil Kuriachen** is an Assistant professor in the Department of Mechanical Engineering, National Institute of Technology Mizoram. His vivacity and dexterity towards abiding commitment to sublime work ethic conferred him with the Ph. D and M. Tech degree from NIT Calicut (2015) and M G University, Kottayam (2011) respectively. Prior to his joining at NIT Mizoram, he served as an Associate Professor in the School of Mechanical Science at VIT University, Vellore. His resolute research niches are in the field of micro and nano-machining processes, precision and ultra-precision machining, modeling and analysis in machining of 'difficult to machine' materials, etc. He has to his credit, 45 research publications in international referred journals and conferences alongside with two filed patents. Several M. Tech theses has been efficaciously completed through his versatile contribution and professionalism. In addition, he is an esteemed reviewer of many international journals (SCI) and conferences (AIMTDR) of phenomenal repute.

**A**  
**One Week GIAN Course**  
**on**

**ADVANCES IN CORROSION ENGINEERING AND PROTECTION**

(Under the aegis of MHRD- Global Initiative of Academic Networks)

**Sep 23 - 28, 2019 at NIT Mizoram**

**Registration Form**

GIAN Portal Application Number:

1. Name of the Candidate:
2. Category: Academic / Industry /Student
3. Category of Registration: SC/ ST/ General & OBC
4. Organization:
5. Address:
  
6. Mobile Number:
7. E-mail:
8. Highest Academic Qualification:
9. Demand Draft Details:

Bank Draft Number:

Date:

Amount:

Drawn on:

Signature of the Candidate

Signature of the Head of the Dept. /Institution

**Important Points:**

- ❖ First, **register** in GIAN portal, <http://www.gian.iitkgp.ac.in/GREGN/index>. Get Application Number.
- ❖ Fill in this Registration Form. Take a print out of it. Get it signed by Corresponding Authority.
- ❖ Draw DD (amount specified in brochure) in favour of "**Director, NIT Mizoram**" payable at SBI Bawngkawn, Aizawl – 796012 and send the hard copy of the filled in Registration Form along with DD to: **Dr. Basil Kuriachen, Assistant Professor, Department of Mechanical Engineering, National Institute of Technology Mizoram, Chaltlang, Aizawl, Mizoram - 796012**, Contact: +91-9947187133, E-mail: [basilkuriachen@gmail.com](mailto:basilkuriachen@gmail.com).