

A short term course on

Reliability Engineering and Asset Management

Under the aegis of
Global Initiative of Academic Networks (GIAN)

March 19 - 23, 2018 , IIT Indore

Course Overview:

Reliability engineering and asset management are interrelated fields and are of high importance for industries. The proposed course on “Reliability Engineering and Asset Management” aims to introduce these interdisciplinary areas to students, researchers and industry personnel. It further explains the concepts with the help of tutorials/ laboratory hands-on sessions and case studies. Case studies are mainly designed to provide real life applications of reliability engineering and asset management in the areas of manufacturing and Infrastructures.

Course Objectives:

The primary objectives of the course are as follows:

- (1) Exposing participants to the fundamentals of reliability engineering and asset management.
- (2) Building confidence and capability amongst the participants in the application of reliability engineering and asset management tools and techniques to real world problems.
- (3) Providing exposure to practical problems and their solutions, through case studies and live projects in reliability engineering and asset management.

Who Should Attend:

- ✓ Executives, engineers, managers and researchers from manufacturing, service and government organizations including R&D laboratories.
- ✓ Higher level representatives from municipal corporations
- ✓ Infrastructure companies responsible for maintenance of toll roads, bridges, railway tracks, etc.
- ✓ Students at all levels (B.Tech/MSc/M.Tech/PhD)
- ✓ Faculty members from technical institutes.

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Course Content

Module 1: 06 hours

- Introduction to Reliability, Life Data Analysis and Reliability Estimation, Reliability Models.
- Bath tub curve and its importance in product design.
- Laboratory demonstration on accelerated life testing (Shape memory alloy and cutting tool life tests).
- Problem solving on Weibull probability plotting, use of Matlab or other tools for reliability estimation.

Module 2: 06 hours

- System Reliability Models, Redundancy, Repairable System, Availability, Maintainability, Use of Simulations in Reliability Engineering.
- Problem solving on system reliability models.
- Use of Matlab or other tools in simulation modelling for system reliability/availability estimation.
- Case studies on smart manufacturing.
- Lab demonstration on smart manufacturing

Module 3: 03 hours

- Asset Management: Introduction to Asset Management, Whole-Life Thinking, Asset Hierarchy, Asset Criticality, Asset Management Systems.
- ISO 55000, Asset Information Management.

Module 4: 05 hours

- Introduction to Infrastructure Management: Key Challenges in Infrastructure, Examples from Different UK Infrastructure Sectors.
- Value Based Decision Making: What is Value, Understanding Stakeholders and their Requirements, Value-Mapping.
- Case Studies: Tunnel Repair Strategy at London Underground, Bridge Maintenance Prioritization at Cambridge City Council.
- Smart Infrastructure: Smart Infrastructure Vision, Key Enablers for Smart Infrastructure, Technological Enablers, Gaps in Capabilities and Opportunities.
- Digitization of Factory: Industry 4.0, Cyber Physical Systems, Intelligent Products, Social Networks for Machines.

Module 5: 06 hours

- Maintenance Strategies, RCM, FMECA, Component Replacement Decisions, Spare Parts Decisions, Maintenance Performance Measurement, Warranty Planning.
- Case study on maintenance management.
- Diagnostics and Prognostics.
- Case study on diagnostics and prognostics.

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Speakers



Course Faculty (Foreign Expert): Dr. Ajith Kumar Parlikad, University of Cambridge, UK, [Webpage: http://www.ifm.eng.cam.ac.uk/people/aknp2/](http://www.ifm.eng.cam.ac.uk/people/aknp2/)

Dr. Ajith Kumar Parlikad is a Senior Lecturer at Cambridge University Engineering Department. He is based at the Institute for Manufacturing (IfM), where he is the Deputy Director of the Distributed Information and Automation Laboratory and leads the Asset Management research group. His particular focus is examining how asset information can be used to improve asset performance through effective decision-making. He actively engages with industry through research and consulting projects. He is a member of The Institution of Engineering and Technology (IET) Technical Professional Network Committee on Asset Management and sits on the judging panel for the IET/IAM Awards in Asset Management. He is also a member of the steering committee of the IFAC Working Group on "Advanced Maintenance Engineering, Services and Technology".

National Expert: Professor Makarand S. Kulkarni, IIT Bombay, INDIA, [Webpage: http://www.me.iitb.ac.in/faculty/34/profile/](http://www.me.iitb.ac.in/faculty/34/profile/)



Dr. Makarand. S. Kulkarni is a Professor with the Department of Mechanical Engineering at the Indian Institute of Technology Bombay since Dec 2015. He is associated with the Manufacturing Engineering group of the Department. Prior to joining IIT Bombay, he was with the Production and Industrial Engineering Group in the Department of Mechanical Engineering at IIT Delhi for 10 years. He graduated in Production Engineering and later did his masters in Materials Technology from the Department of Metallurgical Engineering and Materials Science at the Indian Institute of Technology Bombay. Subsequently, he completed his Ph.D. in the area of Manufacturing Engineering from the Department of Mechanical Engineering at the Indian Institute of Technology Bombay. His post Ph.D. industry experience includes application of quality and reliability engineering techniques in manufacturing and IT industry. His research interests include quality, reliability, maintenance engineering, smart manufacturing and product service systems.

National Expert: Professor Ashish K Darpe , IIT Delhi, INDIA, [Webpage: http://mech.iitd.ac.in/content/darpe-ak](http://mech.iitd.ac.in/content/darpe-ak)



Dr. Ashish K Darpe is Professor of Mechanical Engineering, Indian Institute of Technology Delhi, New Delhi, India. His research interests include Vibration based Condition Monitoring, Fault modeling and Diagnosis of machine elements, Rotor Dynamics, and Aeroacoustics. He heads the Vibrations Research Lab at IIT Delhi. He has filed two patents and has supervised 5 doctoral students. He has been involved in various sponsored research projects funded by various agencies including BARC, DST, DRDO, Office of the PSA-GOI, European Union, ARDB, and ISRO. He has been a consultant to various organizations and industries, notable among them Wartsila Finland Oy., Finland, Powerplate Inc., USA, Delhi Metro Rail Corporation, DRDO (LASTEC, NSTL), SDD (Indian Army), NBC Bearings, DIAL, etc. He has been a member of ARDB Propulsion Panel and founder Director of a start up company Silverknight Technologies Pvt. Ltd. at IIT Delhi.

National Expert (Host Faculty): Dr. Bhupesh Kumar Lad, IIT Indore, INDIA [Webpage: http://www.ifm.eng.cam.ac.uk/people/aknp2/](http://www.ifm.eng.cam.ac.uk/people/aknp2/)



Dr. Bhupesh Kumar Lad is an Associate Professor in Discipline of Mechanical Engineering at the Indian Institute of Technology Indore, India. He received the Ph.D. degree in the area of Reliability Engineering from the Department of Mechanical Engineering at the Indian Institute of Technology Delhi, India, in 2010. He worked with GE Global Research Center, Bangalore, India as a Research Engineer from 2010 to 2011. He is also serving as Regional Editor-South Asia, for the International Journal of Performability Engineering (IJEPE), USA. He is the author of the book, Machine Tool Reliability, Scrivener-Wiley Publishing, USA, 2016. He is investigator of various research projects funded by national and international funding agencies. His major research interest includes smart manufacturing, reliability engineering, and prognostics. Dr. Lad is a recipient of Newton-Bhabha grant of Royal Academy of Engineering (RAE), London and the Hamied-Cambridge Visiting Lecture Fellowship of University of Cambridge, UK, in 2016.

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Registration Process

Registration for this course is a two-step process:

Step 1: One-Time Registration at GIAN Portal: <http://www.gian.iitkgp.ac.in/GREGN/index>

Step 2: Course Registration:

Registration fee (**Excluding GIAN portal registration fee**)

- Students: INR 4000
- Faculty members from academic institutes: INR 8000
- Participants from industry/R&D organizations: NR 16000
- Participants from host institute: free

Note: The above fee includes all instructional material, computer use for the tutorials and assignments, laboratory equipment usage charges, internet facility. Registration kit, lunch/tea/snack.

The participants will be provided with accommodation on payment basis based on the availability.

Bank Details for Fund Transfer (e-payment only)

Name of the Beneficiary: **IIT Indore Project and Consultancy Account**

Name of Bank: **Canara Bank**

Branch: **IIT Indore, Simrol Campus Branch**

Beneficiary Account No.: **1476101027440**

Bank MICR Code: **452015003**

Bank IFS Code: **CNRB0006223**

IMPORTANT: Please send the online transfer details to the course coordinator through email at bklad@iiti.ac.in with a copy (CC) to bklad1979@gmail.com

Feel free to contact/email the course coordinator for any queries or clarifications .

Course Coordinator:

Dr. Bhupesh Kumar Lad

Associate Professor, IIT Indore

Email: bklad@iiti.ac.in

Phone: **07324-306515**