

Under the aegis of GIAN
**An Advanced Course on
Reliability-based Robust Product Design**

8th to 12th July, 2019



Sponsored by: MHRD, Govt. of India

Organized By

**Department of Mechanical Engineering,
MNIT, Jaipur (Rajasthan)**

Jawahar Lal Nehru Marg, Malaviya Nagar,

Jaipur, Rajasthan -302017,

Website: www.mnit.ac.in

Overview

The increasing customer awareness and global competition have forced manufacturers to capture entire life-cycle issues during product design and development stage. The acceptance of a product largely depends on its ability to satisfy performance related customer requirements and total ownership cost during its designed life. Therefore, the thorough understanding of product behavior (degradation processes) and various uncertainties associated with product performance is paramount to produce reliable and robust design. The varying environmental factors as well as user behavior contribute significantly to uncertainties in product reliability and durability.

Many characteristics of a product are subjected to degradation behavior and therefore, during the product usage, this behavior results in the deterioration of the product performance. Moreover, the varying environmental exposure such as different users, different locations, and different environmental conditions create a distribution of degradation behavior. Since the product reliability is closely linked to performance characteristic values, the degradation in performance characteristic, to certain extent, reflects the decrease of product reliability. Therefore, the failure to capture degradation phenomenon during product design and development process costs heavily to manufacturer through repair and replacement during its warranty period as well as loss of credibility due to after warranty failures.

Another challenge design community faces is achieving optimization or in most case optimal trade-off among multiple characteristics. It is well known that every product satisfies multiple performance or quality characteristics with some level of dependency or interaction among these characteristics. Therefore, for complete system optimization it is essential to achieve a feasible trade-off among multiple characteristics. In such cases, simultaneous optimization of multiple characteristics is necessary to have better design solution. Additionally, to capture entire life-cycle of the product during product design stage, it is important to account dynamic behavior i.e., aging of multiple performance characteristics into the design analysis. It is therefore an essential prerequisite to consider dynamic behavior of multiple performance characteristics in design analysis and optimization to reduce losses incurred to the customers or stakeholders.

The reliability-based robust product design requires seamless integration of reliability, robustness, design of experiments, and optimization tools into product design and development process. Individual and independent application of these tools does not help improve and optimize product reliability and robustness. Therefore, the objective of this course will be to provide critical sense and importance of building reliability into product design at early design stages of product design and development processes. Course material will cover topics on product design and development process, design of experiment, robust design, reliability models, design optimization (including multi-optimization), and integrated models on reliability-based robust design methods to give overview of seamless integration of these tools into product design and development process.

Objectives of the course	<ol style="list-style-type: none"> 1. Highlight importance of role of reliability in effective product design and development process. 2. Provide basic understanding of system reliability tools and methods required for designing reliable and durable products. 3. Demonstrate the integration of reliability tools into design processes.
Course duration	<ul style="list-style-type: none"> • Duration: 08th– 12th July,2019 • Total Contact Hours: 25 hours: 2.5 hour lectures/day, 2.5-hour lab, over one week • Number of participants for the course will be limited to fifty
Course contents	<ul style="list-style-type: none"> • Principles of reliability • Reliability-based Design • Robust Design Methods • Degradation modelling • Design of Experiments • Design Optimization
Who should attend the course	<ul style="list-style-type: none"> • Executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories. • Students at all levels (B.Tech./M.Sc./M.Tech./Ph.D.) or Faculty Members from academic institutions and technical institutions.
Course Fees	<p>The participation fees for taking the course is as follows:</p> <ul style="list-style-type: none"> • Participants from abroad: US\$100 • Industry/Research Organizations: Rs. 5000 /- • Faculty from Indian academic Institutions: Rs.2500 /- • Research Scholars and students: Rs.1000/- <p>Note:</p> <ul style="list-style-type: none"> • The above fee includes all instructional materials, computer use for tutorials and assignments.(Exclusive of GIAN Portal Registration fee) • The participants will be provided accommodation on payment basis. • Please note that no TA/DA shall be paid to participants.
Registration date and Mode of fee payment	<p>Participants are requested to send a Demand Draft in favor of “REGISTRAR, MNIT Jaipur” payable at Jaipur with a print out of the filled in Registration form, by Courier/ Speed Post/ Registered Post before 20th June, 2019 to: Dr. Gunjan Soni, Assistant Professor, Department of Mechanical Engineering, J.L.N. Marg, MNIT, Jaipur-302017, Rajasthan, India. Please email a scanned copy of the DD and the signed registration form by the deadline to Dr. Gunjan Soni at gsoni.mech@mnit.ac.in</p>
Local accommodation	<p>Accommodation at the Institute Guest houses will be available on payment basis. The details regarding boarding and lodging are as follows:</p> <p>Rates:</p> <p>Guest House 1 (Limited capacity): (Single occupancy, double-bedded a/c room): Rs. 900/- per day + Taxes</p> <p>Guest House 2: (Single occupancy, double-bedded a/c room): Rs. 350/- per day + Taxes</p> <p>Aurobindo Boys Hostel: (Single occupancy, double-bedded non a/c room): Rs. 100/- per day.</p> <p>Gargi Girls Hostel: (Dormitory): Rs. 100/- per day</p> <p>There are many good fair price lodging facilities available nearby the campus. TA/DA will not be paid to any participant.</p>

International Expert:



Prof. O.P. Yadav

Professor Om Prakash Yadav received his B.E. (Mechanical Engineering) from Malviya National Institute of Technology, Jaipur in 1986; M.Sc. (Industrial Engineering) from National Institute of Industrial Engineering, Bombay in 1992; and Ph.D. (Industrial and Manufacturing Engineering) from Wayne State University, Detroit (USA) in 2002. He has always been interested in developing a strong link between industry and academia to provide better education to students and conduct research that can help industries. The establishment of CQRME is an evidence of his continued efforts and hard work to realize that dream and make an impact on both student learning as well as industries. His research interests mainly include reliability modelling, robust design, data analytics, supply chain modelling, and manufacturing system analysis. His current research projects are focused on degradation modelling and reliability analysis, remaining useful life prediction, prognostic health management, and designing logistic support based on degradation or condition monitoring.

Coordinator:

Dr. Gunjan Soni
Department of Mechanical
Engineering
MNIT Jaipur
Rajasthan - 302017
Mobile: +91-9549654559
Email:
gosni.mech@mnit.ac.in;
gunjan1980@gmail.com

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Registration form

Name (In Block Letters):

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Designation:.....

Qualification:

Institution:

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Address:

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Email address:

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Mobile No:

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Payment by DD in favor of "REGISTRAR, MNIT JAIPUR" payable at Jaipur.

Details of Demand Draft:

DD No: Bank Name:..... Date: Amount Rs:

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Signature of the Candidate

****Speed Post latest by 20th June, 2019 and send scanned copy of the same on gsoni.mech@mnit.ac.in**

Dr. Gunjan Soni
Assistant Professor
Department of Mechanical Engineering,
J.L.N. Marg, MNIT, Jaipur-302017,
Rajasthan, India.