

# Quality Engineering in Products and Processes

---

## Overview

After globalization of markets and liberalization of Indian economy, the Indian industries have been experiencing stiff competition. In such a competitive environment, industries need to continually improve quality of their products, services and processes. Establishment of total quality system in an organization with support and commitment of top management makes significant difference to its performance and pursuit of excellence. The main aim of quality engineering (QE) is to achieve good and affordable design and management control assurance of quality performance of an organization's products and processes.

This programme offers a full implementation package and operational guidelines for an integrated Quality Engineering approach including an initial assessment of the existing methods and processes, identification of steps involved in QE processes and issues pertaining to optimal/best parameter setting and DOE-based approaches for ensuring product/processes robustness. Quality Engineering uses quality assurance and control of processes as well as products to achieve more consistent quality. It is a comprehensive, organization-wide effort to improve the quality of products and processes, applicable to all organizations. To respond to these challenges, this programme will assist students, teachers, researchers and industry professionals in learning the pertinent issues, concepts and methodologies as needed for critically evaluating quality of products, processes and systems from QE perspective.

Academicians with proven knowledge, industrial experience, and demonstrable ability in teaching, consultancy, research, and training in the field of quality engineering and related areas will handle sessions and case-based real-life problems solving exercises in the training programme. Lectures will be delivered by internationally-renowned faculties from India and abroad.

## OBJECTIVES

The primary objectives of the course are as follows:

1. Exploring participants to the fundamentals of Quality Engineering.
2. Building, in the participants, confidence and faith in quality measurement, monitoring, and methodologies.
3. Providing exposure to practical problems and their solutions, through case studies and live projects in the field of quality.
4. Enhancing the capability of the participants to identify, control, and remove the quality engineering-related problems.
5. Reducing the gap between demand and supply of trained manpower in the field of quality engineering.

## COURSE DETAILS

The main topics that will be covered in the programme are as follows:

1. Relevance of QE in constantly changing industrial and business environment
2. Quality-related issues and challenges in products and processes
3. Quality engineering practices, tools and standards
4. Statistical Process Control and Process Capability
5. Fundamentals of Design of Experiment (DOE) and its applications in product and process development
6. Taguchi Method (TM) and its applications
7. QE Framework: Modelling and Implementation

## LECTURE SCHEDULE

The two-week duration (10-day) course will be conducted at IIT Kharagpur during **December 19 to 30, 2016**. The detailed **lecture schedule** is as follows:

- Day-1 (December 19, 2016):** QE in current industrial and business scenario  
**Lecture-1:** Issues, challenges and strategies for QE in current industrial and business environment  
**Lecture-2:** Quality-related issues and problems in products and processes
- Day-2 (December 20, 2016):** Total Quality System Building blocks and Quality management philosophies  
**Lecture-3:** Products and processes, organization, leadership and commitment  
**Lecture-4:** Deming's, Crosby's, and Juran's philosophies and their contributions
- Day-3 (December 21, 2016):** Quality management practices, tools and standards  
**Lecture-5:** Seven tools and new seven tools for quality management  
**Lecture-6:** Waste elimination and Lean engineering
- Day-4 (December 22, 2016):** Quality management practices, tools and standards  
**Lecture-7:** Quality function deployment  
**Lecture-8:** Software quality management
- Day-5 (December 23, 2016):** Statistical process control  
**Lecture-9:** Evolution of quality and fundamentals of statistical process control  
**Lecture-10:** Control charts for attributes and variables
- Day-6 (December 26, 2016):** Process capability analysis  
**Lecture-11:** Fundamentals and different measurement models of process capability  
**Lecture-12:** Concepts and Zero Defects (ZD) and Six-Sigma and their applications
- Day-7(December 27, 2016):** Design of Experiments (DOE)  
**Lecture-13:** Experimental Design Fundamentals  
**Lecture-14:** Types of Experimental Design
- Day-8 (December 28, 2016):** Design of Experiments (DOE)  
**Lecture-15:** Details of Experimental Designs: Steps, examples, and exercises  
**Lecture-16:** Application of Experimental Design techniques in industries and case discussion.
- Day-9 (December 29, 2016):** Taguchi Method  
**Lecture-17:** Taguchi philosophy  
**Lecture-18:** Details of Taguchi method and QE framework
- Day-10(December 30, 2016):** Taguchi Method  
**Lecture-19:** Applications of Taguchi Method in industries  
**Lecture-20:** Implementation Issues in QE

<b>Module</b>	<b>Quality Engineering in Products and Processes: December 19 to 30, 2016.</b> <b>Number of participants for the course will be limited to fifty.</b>
<b>Who Should Attend</b>	<ul style="list-style-type: none"> <li>▪ Undergraduate, Postgraduate and PhD students in Industrial Engineering, Engineering and Business Management and allied disciplines</li> <li>▪ Middle level and senior managers in manufacturing and service organizations requiring an in-depth understanding of POM practices and implementation principles for enhancing functional and operational performance and organizational competitiveness</li> <li>▪ Executives and administrative officials from Government/Public sectors and research organizations</li> </ul>
<b>Fees</b>	<p>The participation fee for taking the course is as follows:  <b>Participants from abroad : US \$500</b>  <b>Industry/ Research Organizations: INR 30,000</b>  <b>Academic Institutions: INR 10,000</b></p> <p>The participation fee includes instructional lecture materials, computer use for tutorials and assignments use charges and 24-hr internet facility. The participants will be provided with accommodation on payment basis.</p>

## The Faculty



**Professor Amit Mitra** is a professor of Quality and Business Analytics in the College of Business in the Department of Aviation & Supply Chain Management at Auburn University. His research interests include Quality Assurance, Statistical Process Control, Regression Analysis, Warranty Analysis, Applied Statistics, and Multi-Criteria Modeling.



**Professor Pradip Kumar Ray** is a professor at the Department of Industrial and Systems Engineering of Indian Institute of Technology (IIT), Kharagpur, India. His research interests include Productivity Management/Modeling and Analysis of Manufacturing and Service Organizations, Quality Design and Control, Total Quality Management, Process Optimization, Ergonomics/Human Factors Engineering, Safety Engineering, Modelling and Analysis of Healthcare Management Systems, and Industrial/Production System Sustainability.



**Professor Biswajit Mahanty** is a professor at the department of Industrial and Systems Engineering of Indian Institute of Technology, Kharagpur, India. His research interests are in Operations Research, System Dynamics, Project Management, and Information Systems. He has guided research work in the areas of Supply Chain Management, Quality Systems, Software Project Management, and in various other Operations Management areas.

## Course Coordinators

**Prof. Pradip Kumar Ray**

Phone: 03222- 283742

E-mail: pkr@vgsom.iitkgp.ernet.in

**Prof. Biswajit Mahanty**

Phone: 03222-283736

E-mail: bm@hijli.iitkgp.ernet.in

.....  
<http://www.gian.iitkgp.ac.in/>