

**A 12-week Duration Training Programme**

on

**Quality Engineering in Products and Processes  
for OFB Officials**

**A PROPOSAL**

by

**Professor Pradip Kumar Ray**

and

**Professor Biswajit Mahanty**

**(Coordinators)**



Department of Industrial and Systems Engineering  
Indian Institute of Technology Kharagpur  
Kharagpur 721 302

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**1. Title of the Programme:** Quality Engineering in Products and Processes for  
OFB Officials

**2. Background**

Department of Industrial and Systems Engineering (ISE), Indian Institute of Technology Kharagpur has a long history of education and training in the field of Quality Engineering and Management (QEM). During the past several years, a number of short-term training programmes on quality have been offered by the department for a large number of reputed and well-established companies. There are many instances where such trained persons have played key roles in the implementation of quality improvement programmes in their organizations. Today, quality has become the key concern of every organization and manager. Considering the profound influence quality casts on the performance of an organization in today's environment, the ISE Department share their vast research, training and industrial experience and expertise of their faculty in the area of quality engineering and management with organizations and managers and to provide them with basic quality-related tools, techniques, and approaches that are useful in their pursuit for higher quality of products/services and improved and stable processes.

**3. Introduction**

After globalization of markets and liberalization of Indian economy, the Indian industries have been experiencing stiff competition. In such a competitive environment, development of Total Quality Systems in organizations is a necessity. Such a development ensures that everyone and every functional unit or department in an organization participate actively in achieving quality. Quality is no longer a quick fix as has been implied in the past. **Quality programmes, with support and commitment of top management, make significant difference to an organization's performance. The proposed programme on Quality Engineering and Management (QEM) has been planned keeping in view this scenario and purpose.**

The current trend of retraining of executives, senior management, and the entire labour force, and the growing emphasis on process technology management reflects the desire of Indian management for continuous improvement in order to achieve higher customer satisfaction through improved quality of products and processes, reduction of reworks and rejects, and reduction of production and product cost.

**To meet these goals, organizations will have to undertake vigorous quality improvement activities. They must use the tools and techniques of Quality Engineering and Management in formulating strategic plans, and programmes for on-line real-time as well as off-line control of processes prior to quality improvement.** Everyone in the organization must be aware of the importance of adherence to international norms and standards in both product and process improvement.

In this context, training programmes on quality control and improvement are highly important and useful. Such programmes help a participant assess the status of quality management and practices in their organizations vis-à-vis those desirable. Persons trained in these areas become the driving force behind the successful implementation of quality systems in their organizations.

#### **4. Objectives of the Programme**

The major objectives of the programme are as follows:

- Exposing participants to the fundamentals of QEM
- Building, in the participants, confidence and faith in quality measurement, monitoring, and methodologies
- Providing exposure to practical problems and their solutions, through case studies and live projects, in the field of QEM
- Enhancing the capability of the participants to identify, control, and remove the quality-related problems, in processes and products

- Reducing the gap between demand and supply of trained manpower in the field of QEM.

## 5. Criteria for Participation/Who Should Participate

- Managers and executives at middle and senior level from different manufacturing, design and research units of OFB.
- Graduates in engineering with work experience
- Diploma degree holders in engineering with good academic and track records and adequate work experience.
- Managers and executives recommended by OFB authority

6. **Maximum Number of Participants** : 35 - 40 per batch

7. **Duration and Contact Hours** :

Duration: 12 weeks

Contact hours: 6½ hours per day over 5-day week (Monday to Friday)

## 8. Course Curriculum

**The entire course content is divided into ten modules. Four modules** detail the lecture topics to be covered at IIT Kharagpur or at any OFB plant as decided, and termed as **Module at IIT** (MIIT-1 to MIIT-4). **Three modules** detail the cases to be developed by the participants in the plant and termed as **Module in Plant** (MIP-1 to MIP-3). **The cases developed under each of the MIPs will be discussed amongst the participants and IIT team** (DMIP-1 to DMIP-3) at the Plant and accordingly be modified by the participants.

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### MIIT-1

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#### 1. QE in Current Industrial and Business Scenario

- Issues, challenges and strategies for QE in current industrial and business environment
- Quality-related issues and problems in products and processes

## **2. Total Quality System Building and Quality Management Philosophies**

- Components of QMS: Products and processes, organization, leadership and commitment
- QM philosophies: Deming's, Crosby's, and Juran's philosophies and their contributions

## **3. Quality Management Practices, Tools and Standards**

- Seven tools and new seven tools for quality management
- Waste elimination and lean engineering
- Quality function deployment
- Software quality management

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### **MIP-1 + DMIP-1**

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- (i) Formation of cases by participants in plants, and
- (ii) Discussion on the cases among the participants and IIT team

#### Topics:

- (i) System description
- (ii) Problem identification
- (iii) Problem quantification
- (iv) Consequence assessment
- (v) Quality system assessment

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### **MIIT-2**

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#### **1. Statistical Process Control**

- Fundamentals of statistical process control
- Control charts for attributes and variables

#### **2. Process Capability Analysis**

- Fundamentals and different techniques and methodologies for process capability measurement and analysis
- Measurement system capability analysis
- Concepts of Zero Defects (ZD) and its applications

#### **3. Six Sigma Methodology and Applications**

- Basic concepts and methodology
- Different case examples

- Applications in products and processes

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**MIP-2 + DMIP-2**

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- (i) Formation of cases by participants in plants, and
- (ii) Discussion on the cases among the participants and IIT Team

Topic: The participants will develop possible alternative solutions with due consideration to the redesign options.

- Process /jobs require design changes
- Process /jobs require maintenance changes
- Process /jobs require operations and procedure changes

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**MIIT-3**

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**1. Design of Experiments (DOE)**

- Experimental design fundamentals
- Types of experimental designs
- Details of experimental designs: steps, examples, and exercises
- Application of experimental design techniques in industries and case discussion

**2. Taguchi Method**

- Taguchi philosophy
- Details of Taguchi method and QE framework
- Applications of Taguchi Method in industries
- Implementation Issues in QE

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**MIP-3**

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- (i) Formation of cases by participants in plants

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**DMIP-3 + MIIT-4**

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- (i) Discussions on the cases among the participants & IIT Team
- (ii) End training test and evaluation
- (iii) Project presentation
- (iv) Closing ceremony

## 9. Teaching/Learning Methodology

- Lecture sessions, discussions, hands-on exercises, case studies

## 10. Course Schedule:

Sl. No.	Module	Duration*	Place
1.	MIIT-1	1 week	IIT Kharagpur
2.	MIIT-2	1 week	IIT Kharagpur
3.	MIIT-3	1 week	IIT Kharagpur
4.	MIP-1	2 weeks	OFB units (Participants)
5.	MIP-1 + MIIT-2	1 weeks	OFB units (Coordinators)
6.	MIP-2	2 weeks	OFB units (Participants)
7.	DMIP-2 + MIIT-3	1 week	OFB units (Coordinators)
8.	MIP-3	2 weeks	OFB units (Participants)
9.	DMIP-3 + MIIT-4	1 week	OFB units (Coordinators)

**\*From-To Dates to be decided**

## 11. Lecture Schedule at IIT Kharagpur:

<b>09:30 -11:30</b>	<b>11:30 – 11:45</b>	<b>11:45 – 12:45</b>	<b>12:45 – 14:30</b>	<b>14:30 – 16:30</b>	<b>16:30 – 17:45</b>
Lecture	Tea	Lecture	Lunch	Lecture	Quiz/Tutorial

## 12. Course Fee:

The envisaged expenditure for the course is given below:

Sl. No.	Particulars	Amount (in Rs.)
1.	Faculty Honorarium	13,00,000
2.	Supporting Staff Honorarium	1,50,000
3.	Preparation of Lecture Materials	1,50,000
4.	Contingency	2,00,000
5.	Coordinators' Fee (10% of Total)	3,00,000
6.	Travel Cost for IIT Faculty	3,00,000
7.	Institute Overhead (20% of Total)	6,00,000
<b>TOTAL</b>		<b>30,00,000</b>

(Rupees Thirty Lakh only)

- Accommodation and food charges for the participants during their stay at IIT Kharagpur are to be borne by the participants.
- Accommodation and local hospitality to IIT coordinators/faculty for their stay at OFB units are to be borne separately by OFB.
- Mode of Payment:
  - 50% of the total course fee along with the firm order
  - 50% of the total course fee on completion of the course
  - Payment is to be made through a bank draft drawn in favour of “**CEP-STC, IIT Kharagpur**” payable at Kharagpur.

## 13. Programme Coordinators

- i. Professor P K Ray, Department of ISE, Principal Coordinator
- ii. Professor B Mahanty, Department of ISE, Coordinator