

PROSPECTUS
OF
PART-TIME COURSE
IN
STATISTICAL QUALITY CONTROL
(with Six Sigma Green Belt Certification)



SQC & OR UNIT
INDIAN STATISTICAL INSTITUTE

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PART-TIME COURSE

IN

STATISTICAL QUALITY CONTROL

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1. Introduction

- i) Statistical Quality Control has acquired great significance in India in the context of rapidly growing industrialization and economic activity and the corresponding need to make the best possible use of domestic resources for the manufacture of goods of standard quality at low cost and to sell such products at competitive prices in the world market. Consequently, there has been a growing demand from industry for persons trained in techniques and approach of SQC, Reliability, Industrial Experimentation and Quality Management referred to as Quality Technology. To meet this, Indian Statistical Institute has established training bases at Kolkata, Mumbai, Delhi, Chennai, Bangalore, Hyderabad, Coimbatore, Pune and Baroda.

- ii) However, existing courses cater mostly to the Engineers and Technologists of the middle and top managerial cadres. But, for a speedy growth of Quality Movement in the country; a substantial portion of training efforts will have to be directed towards Supervisory cadres.

- iii) The present course is designed to fulfill the above need, it will be particularly useful to persons employed in Supervisory cadres belonging to various functions like Inspection, Quality Control, Quality Assurance, Production, Industrial Engineering, Systems, Research & Development and Control Laboratories of Industrial (manufacturing/software/service), Commercial and Scientific Institutions.

2. Scope

- i) The course is intended to provide intensive training in theory and practice of Quality Technology. Emphasis would be on equipping the student with basic practical skills in Quality Technology approach with sufficient theory to understand the principles involved to develop in them the power of systematic thinking, practical approach and exposition.
- ii) Class room lectures will be supplemented by case studies, tutorials, home assignments and guest lectures.

- iii) As a part of the course it is compulsory that each candidate shall undertake during the course project work on live problems in their respective organizations. Sponsoring organizations should provide time and facilities to their candidates (s) to carry out and complete the project work shall be carried out under the guidance and supervision of guide nominated by the course-in-charge.

3. Duration

The course extends over a period of 6 to 9 months.

4. Eligibility

- i) Admission is restricted to persons working in Industrial (manufacturing / software / service), Commercial or Scientific organizations whose candidature is sponsored by their organizations OR self-sponsored with No Objection Certificate from their organization.
- ii) Minimum educational qualifications are any one of the following:
 - a) Bachelors degree (with mathematics at least of the PUC level or equivalent) from a recognized University or Institution.
 - b) Diploma in any branch of Engineering or Technology from a recognized Institution.
- iii) Candidate shall preferably possess a minimum of one year's working experience in Industrial, Commercial or Scientific Organizations.
- iv) The sponsoring organization must ensure
 - a) Regular attendance of their candidates at the classes.
 - b) Adequate opportunities for the candidates to carry out the project work on some problem of interest to them.
 - c) Transport facilities for project work.

5. Admission

- i) Admission will be based on academic records, selection test and interview.
- ii) Number of admissions will be around 30.
- iii) Applications in prescribed forms should be addressed to Course Co-ordinator, SQC Unit, Indian Statistical Institute, Street No.8, Habsiguda, Hyderabad – 500 007.
- iv) Attested copies of degree/diploma along with statements of marks should accompany the applications.

6. Course Fee

A fee (*) Will be charged towards tuition fee, cost of course material, course kit, etc. This fee has to be paid in one installment at the time of admission and is non-refundable.

(*) Please check the latest announcement for the course fee.

7. Scheme for Instruction

- i) Classes will be held for 8-12 hours per week during day time on holidays or evenings on other days.

- ii) The course comprises of lectures, practical exercises, assigned reading, home tasks, tutorials, seminars, group discussions and project studies.
- iii) Subjects of instruction are :

Statistical Methods Theory and Practical	80 hours
Quality Technology Theory and Practical	100 hours
Case Studies	10 hours
Special Lectures	10 hours
Special lectures on allied topics like Six Sigma, Quality Management Systems, Industrial Engineering, Etc. Seminars and Discussions	10 hours
- iv) Project work will run concurrently outside the class hours in candidate's own organization.
- v) Teaching faculty will consist of specialists from SQC Unit, Hyderabad and also practicing experts from Industry and other organizations.
- vi) Teaching faculty will also guide the students in their project studies.
- vii) Limited library facilities will be available to the students subject to regulations of the Indian Statistical Institute.

8. Examinations

- i) Each candidate's performance shall be judged through classroom exercises, home assignments, periodical tests, final examination and the project report.
- ii) The final examination shall be conducted by Teachers' Committee consisting of the teaching faculty on four days during the regular working hours of SQC Unit of the Institute.
- iii) The final examinations will normally be held during the months of February/August. The candidates who do not submit their project study reports at least one week before the commencement of the examinations will not be allowed to sit for the examinations.

- iv) Each candidate shall be awarded marks in respect of the following 4 subjects:

<u>S.No.</u>	<u>Particulars</u>	<u>Maximum Mark</u>
I	Statistical Methods (Theory)	100
II	SQC Techniques (Theory)	100
III	Statistical Methods & SQC Techniques (Practical)	100
IV	Project Work	100

- v) The percentage marks obtained in the home assignments, periodical and final examinations are combined in the ratio 1:1:3 to a single percentage score for each student in each paper.

- vi) On the basis of this combined score the grade of a student in a particular paper is determined at the end of the course as follows:

Grade	Marks
A (Honours)	80 or more
A	60 - 79
B	45 – 59
C	25 – 44
D	Less than 25

- vii) A candidate shall be declared to have passed the course if he fulfills all the following:

- He has attended at least 75% of the total number of lectures.
- He has carried out the project work.
- His conduct has been satisfactory.
- He does not obtain grade D in any of the 4 papers.
- He obtains grades above C in at least 3 papers.
- He has an overall composite score of 45% or above.

- viii) He has an overall composite score of 45% or above. A candidate will be declared to have passed with distinction if he fulfills the condition a, b, c in rule (vii) and obtains grade A or above in all the 4 papers.

- ix) A failed candidate or a candidate who does not appear for the final examination will be permitted to appear at the final examination to be held for the next course. In such cases, it is the responsibility of the candidate to keep in touch with the course co-ordinator for knowing the exact dates of the next batch final examinations and other details. This shall be his last chance. Grades shall be awarded to him based purely on the marks obtained in these examinations.

- x) Normally, no fee is charged for the periodical tests or the final examinations. However, a fee of Rs.25/- per paper shall be charged at the final examination for the candidates who had failed/did not appear.

9. Award of Certificates

A candidate who is declared to have passed the course will be awarded the certificate in Statistical Quality Control.

10. Syllabus

Paper -I: Statistical Methods – Theory

Descriptive Statistics

Some statistical concepts – sample, population, parameter, qualitative and quantitative characteristics etc., summarization of data; frequency distributions; histograms; visual methods of representation of data; measures of central tendency and dispersion; Skewness and Kurtosis; regression and correlation.

Probability Theory

Classical definition of probability, probability as a limit of relative frequency, conditional probability, independence, random variables, expectation, Hypergeometric, Binominal, Poisson and Normal distributions.

Inference

Sampling distributions : Chi-square, t and F. Estimation of parameters; point and interval estimates standard error of estimates. Tests on proportions, means and standard deviations, simple non-parametric tests, introduction to analysis of variance.

Paper II : SQC Techniques – Theory

Control Charts

Concepts of quality and meaning of control, basic philosophy and principle of rational subgrouping. Different types of control charts (Xbar-R, np, p and c-charts). Specification and process capability. Economic centering of the process; Setting approval, statistical concepts of fits and tolerances. Modification of Control Charts - Group control charts, sloping control charts, modified control charts, median and midrange charts, narrow limit gauging, Control Chart to eccentricity, Cumulative sum charts, Master control charts.

Acceptance Sampling

Sampling Vs. 100 percent inspection, basic concepts of sampling inspection, conflicting interests of producer and customer, attributes inspection, producer's and consumer's risk, AQL, LTPD, OC curves, AOQL, ATI, Single, Double, Multiple and Sequential sampling plans. Published sampling plans – Dodge Romig, Philips Standards, MIL-STD 105D, IS-2500 (Part-I), variables inspection plans, MIL-STD 414, IS-2500 (Part-II), Hamilton Lot-Plot Method.

Industrial Experimentation

Principles of experimentation: randomization, replication, local control. Basic ideas on randomized block and Latin squares. Introduction to factorial experiments and Orthogonal Array Designs.

Management & Organization of Quality Control

Economics of quality, quality policy, objectives and specification of quality; Planning for quality-creating and preventing changes. Organizing for quality, quality improvement and assurance of quality; quality motivation, costs, reports and manpower for quality etc., TQC systems for Engineering, Chemicals, and Textiles etc. Role of Supervisory staff in QC programme.

Reliability

Paper III : Statistical Methods and SQC Techniques – Practical

The examination will be on numerical exercises and practical on topics covered in Paper-I (Statistical Methods) and Paper II (SQC Techniques).