

B. E. INDUSTRIAL AND PRODUCTION ENGINEERING
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
SEMESTER - V

QUALITY ASSURANCE AND RELIABILITY

Course Code	18IP53	CIE Marks	40
Teaching Hours/Week (L:T:P)	(3:2:0)	SEE Marks	60
Credits	04	Exam Hours	03

Course Learning Objectives:

- To understand the fundamentals of Quality tools and techniques
- To apply the quality and reliability tools and techniques to real world problems
- To Interpret the results of quality and reliability study for decision making

Module-1

Introduction: Definition of Quality, Quality function, Dimensions of Quality, Quality Engineering terminology, Brief history of quality methodology, Statistical methods for quality improvement, Quality costs – four categories costs and hidden costs. Brief discussion on sporadic and chronic quality problems.

Quality Assurance: Definition and concept of quality assurance, departmental assurance activities. Quality audit concept, audit approach etc. Structuring the audit program, planning and performing audit activities, audit reporting, ingredients of a quality program.

Module-2

Statistical Process Control: Introduction to statistical process control – chance and assignable causes variation. Basic principles of control charts, choice of control limits, sample size and sampling frequency, rational subgroups. Analysis of patterns of control charts. Case Studies on application of SPC. Process capability – Basic definition, standardized formula.

Control Charts for Attributes: Controls chart for defectives ('p' and 'np' charts) and defects ('c' and 'u'

Module-3

Control Charts for Variables: Controls charts for X bar and Range, statistical basis of the charts, development and use of X bar and R charts, interpretation of charts. Control charts for X bar and standard deviation (S), development and use of X bar and S chart. Brief discussion on – Pre control Xbar and S control charts with variable sample size, control charts for individual measurements, cusum chart, moving-range charts

Module-4

Sampling Inspection: Concept of accepting sampling, economics of inspection, Acceptance plans – single, double and multiple sampling. Operating characteristic curves – construction and use. Determinations of average outgoing quality, average outgoing quality level, average total inspection, producer risk and consumer risk, published sampling plans

Module-5

Statistical Theory of Tolerances: Application of statistical theory of tolerances to design of tolerances in random assemblies and application in other areas.

Reliability and Life Testing: Failure models of components, definition of reliability, MTBF, Failure rate, common failure rate curve, types of failure, reliability evaluation in simple cases of exponential failures in series, paralleled and series-parallel device configurations

Course Outcomes: At the end of the course the student will be able to:

- Understand the fundamentals of Quality tools and techniques
- Apply the quality and reliability tools and techniques to real world problems
- Interpret the results of quality and reliability study for decision making

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub- questions) from each module.
- Each full question will have sub- question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Sl. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbook/s				
1	Introduction to statistical Quality Control	D C Montgomery	John Wiley and Sons	3rd Edition
2	Quality Planning & Analysis	J M Juran, Frank M	Tata McGraw Hill	3rd edition
3	Total Quality Management	NVR Naidu, KM Babu and G. Rajendra	New Age International Pvt. Ltd	2006
Reference Books				

4	Statistical Quality Control	Grant and Leavenworth, McGraw Hill	6th Edition	
5	Total Quality Management	Kesavan R	I.K. International, New	2007
6	ISO 9000 a Manual for Total Quality Management	Suresh Dalela and Saurabh	S. Chand and Co.	1st Edition