SEMESTER S5

QUALITY ENGINEERING

Course Code	**PCIET503**	**CIE Marks**	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. 30 Min.
Prerequisites (if any)	None	**Course Type**	Theory

Course Objectives:

1. To familiarise the fundamentals of Quality Engineering and its role in quality improvement.
2. To enable students to integrate the quality engineering principles into product development and manufacturing processes.

SYLLABUS

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Module No.	Syllabus Description	Contact Hours
1	**Concepts related to quality engineering:** Philosophies of Deming, Juran and Crosby. Basic concepts of quality- quality of design, quality of conformance, quality of performance. Quality objectives, quality policy, quality function, quality control, quality assurance, total quality management, cost of quality, loss functions, manufacturing tolerances.	9
2	**Statistical process control:** Process control- process variability, causes of variation, control charts for variables, control chart for attributes. State of control and process out of control identification in control charts, patterns in control charts. Other control charts - cumulative sum control chart for process mean and exponentially weighted moving average control chart. Specifications and process capability - process capability indices, process capability analysis, tolerances for assemblies and subassemblies.	9
3	**Acceptance sampling plans:** Single, double, multiple and sequential sampling plans. Operating characteristic curves for single and double sampling plans. Evaluating sampling plans. Standard sampling plans - MIL-STD 105E sampling method and its equivalents, Dodge - Romig tables, ABC standards, AOQL and LTPD plans.	9

4	**Quality improvement tools and techniques:** Fault tree analysis, event tree analysis, failure mode and effect analysis, quality function deployment, Six Sigma- introduction, definition, DMAIC method, roles and responsibilities, Taguchi's methods - robust design, control and noise factors, S/N ratios, Quality circles - concepts, objectives, organisational structure, KAIZEN - meaning - management practices, quality standards- ISO 9000 Series, ISO 14000 standards.	**9**

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination-2 (Written)	Total
5	**15**	**10**	**10**	**40**

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End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Explain the philosophies and concepts related to quality engineering.	**K2**
CO2	Apply statistical quality control tools for process control.	**K3**
CO3	Apply the knowledge on acceptance sampling for sampling inspection.	**K3**
CO4	Explain the quality improvement tools and techniques and apply the same for process improvement.	**K3**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	-	-	-	-	2	2	-	-	2
CO2	3	2	3	2	-	-	-	2	2	-	-	2
CO3	3	2	3	2	-	-	-	2	2	-	-	2
CO4	3	2	3	2	-	-	-	2	2	-	-	2

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

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Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Fundamentals of Quality Control and Improvement	Mithra A.	Wiley	5th Edition, 2021
2	Statistical Quality Control	Mahajan M.	Dhanpat Rai & Co	4th Edition, 2018

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Statistical Quality Control	Grant, E., Leavenworth R.	McGraw Hill	7th Edition, 2017
2	Introduction to Statistical Quality Control	Montgomery D. C.	Wiley	8th Edition, 2020
3	Total Quality Management	Besterfield, D.H., Besterfield, C	Pearson Education	5th Edition, 2019
4	The Handbook for Quality Management	Pyzdek, T., Keller, P.A	McGraw Hill	2nd Edition, 2012

Video Links (NPTEL, SWAYAM…)	
Link ID	https://archive.nptel.ac.in/courses/110/104/110104080/

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