NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OUTLINE TEMPLATE

Course Title	Quality, Reliability and Safety Engineering
Programme	B.Tech. Production Engineering – V Semester (A Section)

Course Code	PRPC22	**No. of Credits**	3
Department	Production Engineering	**Faculty**	R. JEYAPAUL

Pre-requisites Course Code	General awareness about Statistical Theory and applications
Course Coordinator(s) (if, applicable)	-

Other Course Teacher(s)/Tutor(s) E-mail	jeyapaul@nitt.edu	**Telephone No.**	9444290049

Course Type	√ Core course	☐ Elective course

COURSE OVERVIEW

Quality control (QC) is a procedure or set of procedures intended to ensure that a manufactured product or performed service adheres to a defined set of quality criteria or meets the requirements of the client or customer.

The ability of a system or component to perform its required functions under stated conditions for a specified time. Reliability engineering relates closely to safety engineering and to system safety, in that they use common methods for their analysis and may require input from each other.

This course enables students to study the appropriate quality control tools for controlling the process or products and perform analysis to enhance the reliability of the product. Finally, the safety aspects in industrial environment shall be explained with practical examples.

COURSE OBJECTIVES

- To understand the importance of quality control in an organization
- To apply the quality control tool for controlling the process
- To apply the reliability models for assessing the life cycle of the product
- To list various safety measures concerned with environment described for a safety engineer

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
After studying this course, students are able to: 1. Understand the need, steps to be followed for controlling the quality of a product 2. Apply various quality control tools for process optimization 3. Apply reliability models for enhancing the quality of the products / process 4. Follow the various safety measures concerned with the environment.	PO 3, PO 5 and PO 6

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1	Week 1	Introduction to quality control, quality assurance and quality management and seven basic tools of quality control	PPT
2	Week 2	Contributions of quality gurus, control charts for process control	PPT
3	Week 3	Variable charts – X bar and R Chart, X bar and s chart & MR chart, tutorials	Chalk and Talk
4	Week 4	Attribute charts – p, np charts, tutorials	Chalk and Talk
Descriptive Assessment - 1			
5	Week 5	c, u and U charts, tutorials	Chalk and Talk
6	Week 6	Process capability studies	Chalk and Talk

7	Week 7	Acceptance sampling- single, double sampling plans	Chalk and Talk
8	Week 8	Design of sampling plans, performance measures of sampling plans, Tutorials	Chalk and Talk
9	Week 9	Reliability studies, life cycle of a product	Chalk and Talk
10	Week 10	Parallel, series and redundant connections	Chalk and Talk
		Descriptive Assessment -2	
11	Week 11	Weibull models for reliability prediction	Chalk and Talk
12	Week 12	Importance of safety	Invited industrial lecture
		Objective type quiz	
		Compensation Assessment	
		Descriptive final assessment	

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Descriptive Assessment – 1	End of 4 Weeks	1 Hr	20%
2	Descriptive Assessment – 2	End of 10 Weeks	1 Hr	20%
3	Objective type Quiz	End of 12 Weeks	10 Min	10%
4	Compensation Assessment	End of 12 Weeks	1.5 Hrs	30%
5	Descriptive Final Assessment	End of Semester	3 Hrs	50%

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

1. Amitava Mitra, Fundamentals of Quality Control and Improvement, Pearson, second edition.

Douglas, C. Montgomery, Introduction to Statistical Quality Control, IInd Edition, John Wiley & Sons, 2001.

2. Smith, D.J. "Reliability Maintainability and Risk; Practical methods for engineers", Butterworth-Heinemann, New Delhi, 2001

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

Course Exit survey will be collected at the end of the semester before the start of semester examination through online. Students can log in their MIS account to give the feedback. Mid-semester anonymous feedback shall be collected to improve the teaching-learning process. Apart from this, students can share feedback during class committee meetings.

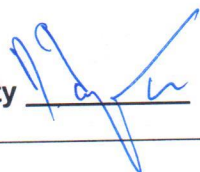## COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

- Attending classes regularly and continuously is required for the students to understand the concepts.
- Attendance will be taken in every class. If the student is not able to maintain 75% attendance, he/she is required to write the compensation assessment and obtain a minimum of 15 marks to become eligible to write the final assessment.
- Participation in the discussions is mandatory during the tutorial classes.
- Strict academic disciplines have to be maintained inside the class room.
- If any student is not able to attend any of the continuous assessments (1, 2, and 3) due to genuine reason, student is permitted to attend the compensation assessment with % weightage equal to maximum of the CAs. However, a student absent for more than one CAs, maximum of the % weightage among the assessments for which the student was absent will be considered for computing marks for CA.
- Reassessment shall be conducted for failed / absented (in final assessment) in the beginning of next session. Failed (in final assessment) candidates shall get a maximum of E grade in the reassessment.
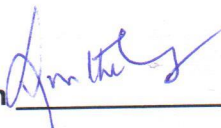
ADDITIONAL COURSE INFORMATION

The Course teacher is available for consultation in the department after class hours. Queries may also be emailed to the Course Coordinator directly at jeyapaul@nitt.edu

FOR SENATE'S CONSIDERATION

Course Faculty _____   **CC-Chairperson** _____   HOD _____