DEPARTMENT OF PRODUCTION ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSEPLAN–PART I

Name of the Programme and specialization	B. Tech – Production Engineering		
Course Title	Quality Engineering		
Course Code	PRMI14	No. of Credits	03
Course Code of Pre-requisite subject(s)	Please Refer Curriculum		
Session	July 2022-2023	Section (if, applicable)	M
Name of Faculty	Mr.G.Rajeshkannan	Department	Production Engineering
Email	414119002@nitt.edu	Telephone No.	
Name of Course Coordinator(s) (if, applicable)	-		
E-mail	-	Telephone No.	-
Course Type	☐ Core course	☐ Elective course	

Syllabus(approved in BoS)

QUALITY FUNDAMENTALS: Importance of quality- evolution of quality- definitions of quality-dimensions of quality- quality control- quality assurance- areas of quality- quality planning- quality objectives and policies quality costs- economics of quality- quality loss function- Quality Gurus and their contributions.

CONTROL CHARTS FOR VARIABLES: Process variation- preliminary decisions- control limits and their computation- construction and application of X bar, R and S charts- warning and modified control limits- process adjustment for trend, - Comparison of process variation with specification limits

STATISTICAL PROCESS CONTROL: Process stability- process capability study using control charts- capability evaluation- C_p, C_{pk} and C_{pm} - machine capability study- gauge capability study- setting statistical tolerances for components and assemblies - individual measurement charts- X-chart, moving average and moving range chart.

CONTROL CHARTS FOR ATTRIBUTES: Limitations of variable control charts- Control charts for fraction non-conforming- p and np charts, variable sample size, - Control chart for nonconformities (defects)- c, u, demerits control chart- applications.

ACCEPTANCE SAMPLING: Need- economics of sampling- sampling procedure- single and double sampling- O.C. Curves-Average outgoing quality- Average sample number- Average total inspection- Multiple and sequential sampling- Design of sampling plans.

TEXTBOOK:
1. Douglus C. Montgomery, "Introduction to Statistical Quality Control", John Wiley & Sons, 2004.

REFERENCES:
1. Krishnaiah K., "Applied Statistical Quality Control and Improvement", PHI, 2014.

2. Eugene L. Grant and Richard S. Leaven Worth, "Statistical Quality Control", TMH, Seventh Edition, 2000.

3. Dale H. Besterfield, Quality Control, Pearson Education Asia, Seventh Edition, 2004.

COURSEOUTCOMES(CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Control the quality of process using control charts for variables in manufacturing industries.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11and PO12
2. Control the occurrence of defective product and defects in the companies.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11and PO12
3. Achieve savings in rupees to the companies through quality control and improvement programmes.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11and PO12

COURSE PLAN–PART II
COURSE OVERVIEW
This course is to teach the principles and application of Quality concepts, Control charts for variables, Control charts for Attributes, Statistical Process Control and Acceptance Sampling in such a way that the students can understand and use it in practical applications. This course gives (i) Overall view of Quality fundamentals and its application for manufacturing Industries. (ii) Introductions to the concepts of Control charts for variables for monitoring the processes in industrial. (iii) Introduction to SPC and integrating control charts for investigation of process capability. And (iv) Introductions to the concepts of Control charts for Attributes for monitoring the processes in iindustrial

COURSETEACHINGANDLEARNINGACTIVITIES

S.No.	Week/Contact	Topic	Mode of Delivery
1	Week1, 3 Hrs	Importance of quality- evolution of quality- definitions of quality- dimensions of quality	PPT/Chalk and Talk
2	Week2, 3 Hrs	Quality control- quality assurance- areas of quality- quality planning- quality objectives and policies quality costs	PPT/Chalk and Talk
3	Week3, 3 Hrs	Economics of quality- quality loss function- Quality Gurus and their contributions.	PPT/Chalk and Talk
4	Week4, 3 Hrs	Process variation- preliminary decisions- control limits and their computation	PPT/Chalk and Talk

5	Week5, 3 Hrs	Construction and application of X bar, R and S charts- warning and modified control limits	PPT/ChalkandTalk
6	Week6, 3 Hrs	Process adjustment for trend, - Comparison of process variation with specification limits	
7	Week7, 3 Hrs	Process stability- process capability study using control charts- capability evaluation	PPT/ChalkandTalk
8	Week8, 3 Hrs	Cp, Cpk and Cpm - machine capability study- gauge capability study	
9	Week9, 3 Hrs	Setting statistical tolerances for components and assemblies - individual measurement charts- X-chart, moving average and moving range chart.	
10	Week10, 3 Hrs	Limitations of variable control charts- Control charts for fraction non-conforming	PPT/ChalkandTalk
11	Week11, 3 Hrs	p and np charts, variable sample size, - Control chart for nonconformities (defects)	
12	Week12, 3 Hrs	c, u, demerits control chart- applications.	
13	Week 13, 3 Hrs	Need- economics of sampling- sampling procedure- single and double sampling	PPT/ChalkandTalk
14	Week 14, 3 Hrs	O.C. curves-Average outgoing quality- Average sample number- Average total inspection	
15	Week 15, 3 Hrs	Multiple and sequential sampling- Design of sampling plans.	PPT/ChalkandTalk
16	Week 16	Compensation assessment	
17	Week 17	Final Exam	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S. No.	Mode of Assessment	Week/Date	Duration	%Weightage
1	Assessment1	End of 7th Week	1Hr	20%
2	Assessment2	End of 12th Week	1Hr	20%
3	Assignment	Once in three weeks		10%
CPA	Compensation Assessment*	End of 16th Week	1Hr	20%
4	Final Exam	End of the semester	3 Hrs	50%

*Mandatory; refer to guidelines on page5

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

Course exit survey will be collected after a few classes in the beginning the semester and at the end of the semester through online. Students can login their MIS account to give their feedback. Mid-semester feedback shall be collected to improve teaching-learning process. Also, students may give their feedback during class committee meeting.

COURSE POLICY (preferred mode of correspondence with students, compensation Assessment policy to be specified)

MODE OF CORRESPONDENCE (email/phone.etc.)

The mode of correspondence may be through mobile or email. Mobile

No.: +91-9003829687
Email: 414119002@nitt.edu

COMPENSATION ASSESSMENT POLICY

As per norms

ATTENDANCEPOLICY (A uniform attendance policy as specified below shall be followed)

➢ At least 75% attendance in each course is mandatory.

➢ A maximum of 10% shall be allowed under On Duty (OD) category.

➢ Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade**
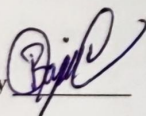
ACADEMIC DISHONESTY & PLAGIARISM

➢ Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.

➢ Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.

➢ The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
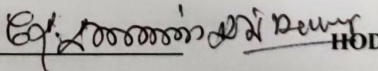
The above policy against academic dishonesty shall be applicable for all the programmes.
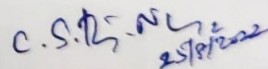
FOR APPROVAL

Course Faculty _____   CC-Chairperson _____ HOD _____

Guidelines:

a) The number of assessments for a course shall range from 4 to 6.

b) Every course shall have a final assessment on the entire syllabus with at least 30% weightage.

c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered. Details of compensation assessment to be specified by faculty.

d) The passing minimum shall be as per the regulations.

e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.

f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.

g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.