

<b>Course Plan Part I</b>			
<b>Name of the programme and specialization</b>	<b>B.Tech- Production Engineering</b>		
<b>Course Title</b>	<b>Quality Engineering</b>		
<b>Course Code</b>	<b>PRMI14</b>	<b>No. of Credits</b>	<b>3</b>
<b>Course Code of Pre-requisite subject(s)</b>	<b>Please Refer Curriculum</b>		
<b>Session</b>	<b>July 2021</b>	<b>Section (if, applicable)</b>	<b>4<sup>th</sup> year</b>
<b>Name of Faculty</b>	<b>Dr. Vineet Kumar Yadav</b>	<b>Department</b>	<b>Production</b>
<b>Official Email</b>	<b>vineet@nitt.edu</b>	<b>Telephone No.</b>	<b>9456049198</b>
<b>Name of Course Coordinator(s) (if, applicable)</b>	<b>Dr.V.Satheeshkumar</b>		
<b>Course Type</b> (please tick appropriately)	<b>Core course</b>	<input checked="" type="checkbox"/> <b>Elective course</b>	
<b>Syllabus (approved in BoS)</b>			
<p>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.</p> <p>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</p> <p>STATISTICAL PROCESS CONTROL  Process stability- process capability study using control charts- capability evaluation- Cp, Cpk and Cpm – machine capability study- gauge capability study- setting statistical tolerances for components and assemblies - individual measurement charts- X-chart, moving average and moving range chart.</p> <p>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.</p> <p>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.</p>			

<b>COURSE OBJECTIVES</b>			
<b>Course outcomes</b>		<b>Aligned Programme Outcomes(PO)</b>	
1. To control the quality of process using control charts for variables in manufacturing industries.		PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11, and PO12	
2. To control the occurrence of defective product and defects in the companies.		PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11and PO12	
3. To achieve savings in rupees to the companies through quality control and improvement programmes.		PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11and PO12	
<b>Course Outcomes</b>			
1. Control the quality of processes using control charts for variables in manufacturing industries. 2. Control the occurrence of defects in services. 3. Achieve savings in rupees to the companies through quality control and improvement programmes.			
<b>COURSE PLAN PART II</b>			
<b>COURSE OVERVIEW</b>			
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 industrial			
<b>COURSE TEACHING AND LEARNING ACTIVITIES</b>			
<b>Sl.No</b>	<b>Week/Contact Hours</b>	<b>Topic</b>	<b>Mode of Delivery</b>
1.	Week 1	Importance of quality- evolution of quality- definitions of quality- dimensions of quality	Online Mode, PPT
2.	Week 2	Quality control- quality assurance- areas of quality- quality planning- quality objectives and policies quality costs	Online Mode, PPT
3.	Week 3	Economics of quality- quality loss function- Quality Gurus and their contributions.	Online Mode, PPT
4.	Week 4	Process variation-	Online

		preliminary decisions- control limits and their computation	Mode, PPT
5.	Week 5	Construction and application of X bar, R and S charts- warning and modified control limits	Online Mode, PPT
6.	Week 6	Process adjustment for trend,- Comparison of process variation with specification limits	Online Mode, PPT
7.	Week 7	Process stability- process capability study using control charts- capability evaluation <b><i>1<sup>st</sup> Assessment</i></b>	Online Mode, PPT
8.	Week 8	Cp, Cpk and Cpm - machine capability study- gauge capability study	Online Mode, PPT
9.	Week 9	Setting statistical tolerances for components and assemblies - individual measurement charts- X-chart, moving average and moving range chart.	Online Mode, PPT
10.	Week 10	Limitations of variable control charts- Control charts for fraction non-conforming <b><i>II<sup>nd</sup> Assessment</i></b>	Online Mode, PPT
11.	Week 11	p and np charts, variable sample size, - Control chart for nonconformities (defects)	Online Mode, PPT
12.	Week 12	c, u, demerits control chart- applications.	Online Mode, PPT
13.	Week 13	Need- economics of sampling- sampling procedure- single and double sampling	Online Mode, PPT
14.	Week 14	O.C. curves-Average outgoing quality- Average sample number- Average total inspection	Online Mode, PPT
15.	Week 15 & 16	Multiple and sequential sampling- Design of sampling plans. (Final Assessment)	Online Mode

<b>COURSE ASSESSMENT METHODS</b>				
<b>S.No.</b>	<b>Mode of Assessment</b>	<b>Week</b>	<b>Duration</b>	<b>% Weightage</b>
1	I <sup>st</sup> Class Test	Week 7 5-9 Oct 2021	60 minutes	20
2	II <sup>nd</sup> Class Test	Week 10 26-30 Oct 2021	60 minutes	20
3	Assignments/Quiz/ Projects/PPT/Viva	Throughout Semester		30
4	Final Assessment	Week 18/19 24 Nov-11 Dec 2021	120 minutes	30
<b>ESSENTIAL READINGS: Textbooks, Reference books</b>				
<b>REFERENCES:</b>				
1. Douglas C. Montgomery, "Introduction to Statistical Quality Control", John Wiley & Sons, 2004.				
2. Krishnaiah K., "Applied Statistical Quality Control and Improvement", PHI, 2014.				
3. Eugene L. Grant and Richard S. Leaven Worth, "Statistical Quality Control", TMH, Seventh Edition, 2000.				
4. Dale H. Besterfield, Quality Control, Pearson Education Asia, Seventh Edition, 2004.				
<b>COURSE EXIT SURVEY</b>				
<ul style="list-style-type: none"> <li>• Feedback from the students during class committee meetings</li> <li>• End semester feedback on course outcomes</li> </ul>				
<b>COURSE POLICY (including compensation assessment to be specified)</b>				
<ul style="list-style-type: none"> <li>• Attending all the assessments mandatory for every student</li> <li>• One compensation assessment will be conducted for those students who are being physically absent for the assessment 1 and/or 2, only for the valid reason.</li> <li>• Absolute/Relative grading will be adopted for the course.</li> </ul>				
<b>Attendance Policy (A uniform attendance policy as specified below shall be followed)</b>				
<ul style="list-style-type: none"> <li>• At least 75% attendance in each course is mandatory.</li> <li>• A maximum of 10% shall be allowed under On Duty (OD) category.</li> <li>• Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.</li> </ul>				
<b>Academic Dishonesty &amp; Plagiarism</b>				
<ul style="list-style-type: none"> <li>• Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.</li> <li>• Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.</li> <li>• 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.</li> <li>• The above policy against academic dishonesty shall be applicable for all the</li> </ul>				

programmes.

**ADDITIONAL INFORMATION, IF ANY**

**FOR APPROVAL**



Dr. Vineet Kumar Yadav  
**Course Faculty**



V. Satheeshkumar  
**CC- Chairperson**



**HOD**