

COURSE NUMBER IE 3552 (cross listed with 5522)	COURSE TITLE Quality Engineering and Reliability
TERMS OFFERED Spring	PREREQUISITES Math 1371, 1372, 2372, 2374, and ISyE 2010 or instructor consent
TEXTBOOKS/REQUIRED MATERIAL Quality (latest edition) by Donna C.S. Summers	PREPARED BY Sant Arora DATE OF PREPARATION 10/25/2011
COURSE LEADER(S)	CLASS/LABORATORY SCHEDULE Four 50-min sections per week CONTRIBUTION OF COURSE TO MEETING PROFESSIONAL OBJECTIVES 100% Engineering objectives
CATALOG DESCRIPTION Quality engineering/Management, economics of quality, statistical process control, reliability, maintain ability, availability	
COURSE TOPICS <ol style="list-style-type: none"> 1. Customer focused approach to quality, avoiding cost of poor quality through corrective/preventive measures, adding value from customer point of view. 2. Quality evolution, philosophy and concepts. 3. Quality systems, ISO 9000, Balridge Award, Six Sigma, Lean manufacturing methods, minimizing non-value adding activities. 4. Strategic and tactical quality tools. 5. Tolerance Engineering. 6. Cause-and-effect diagrams, assignable causes. 7. Problem Solving Process. 8. Statistical Process Control (SPC), Attribute and variable control charts. 9. Process Capability Studies, process Capability measures. 10. Quality Function Deployment (QFD). 11. Failure Mode Effect Analysis (FMEA) 12. Design of experiments, single factor, multiple factors, fractional factorial, Taguchi experiments. 13. Reliability, maintainability, availability. 14. Total quality management, learning creativity, leadership, empowerment, teamwork, communication, integration, and ethics. 15. Process Optimization and Process Robustness with Response Surface Methodology. 	
COURSE OBJECTIVES <ol style="list-style-type: none"> 1. To teach various statistical control procedures. 2. To demonstrate how SPC procedures are useful in avoiding special causes from operating during manufacturing. 3. To teach how to establish cause effect relationships, cause effect diagrams. 4. To teach how the design of diagnostic procedures work in trouble shooting. 	

5. To teach the importance of formulating design problems as multi-objective problems, the objectives being functionality, manufacturability, maintainability, life cycle cost including disposal, reliability, etc.
6. To teach how to conduct statistically designed experiments to generate new knowledge needed for improving product and process designs.
7. To emphasize that quality improvement focus has to be on improving product and process designs and on improving SPC procedures during manufacturing instead of on acceptance sampling.
8. To emphasize that quality improvement is a continuous process and how it is to be pursued proactively.
9. To teach about quality costs and importance of reporting quality costs on regular basis.
10. To use quality cost information for identifying opportunities for improvements, developing re-engineering proposals, conducting benefit cost analysis and developing a schedule for their perusal.
11. To demonstrate that quality projects are usually broad in scope, cross functional in nature requiring cooperation, teamwork, and good communication.

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ASSESSMENT TOOLS

1. Class exams.
2. Homework.
3. Class discussions.
4. Assigned a paper to write on some quality topic.