

COURSE NUMBER: IE 5522, 4 credits	COURSE TITLE: Quality Engineering & Reliability
TERMS OFFERED: Fall	PREREQUISITES: IE 4521 - Statistics
TEXTBOOKS/REQUIRED MATERIAL: Creating Quality by Kolarik	PREPARED BY: Professor Sant Arora DATE OF PREPARATION: May 2007
COURSE LEADER(S): Professor Sant Arora	CLASS/LABORATORY SCHEDULE: Four 50 minute sessions per week CONTRIBUTION OF COURSE TO MEETING PROFESSIONAL OBJECTIVES: 100% engineering topics
CATALOG DESCRIPTION: Quality engineering/ Management, economics of quality, statistical process control, reliability, maintain ability, availability	COURSE TOPICS: <ol style="list-style-type: none"> 1. Quality improvements through improved product process designs. 2. Quality philosophy, concepts and issues. 3. Strategic and tactical quality tools. 4. Tolerance Engineering. 5. Statistical process control (SPC). 6. Quality function deployment (QFD). 7. Failure mode effect analysis (FMEA). 8. Quality and competitive advantage. 9. System thinking. 10. Logic, fault, event, and goal trees. 11. Process capability studies and process capability measures 12. Design of experiments, single factor multiple factors, fractional factorial, Taguchi experiments. 13. Regression and response surfaces. 14. Reliability, maintainability, availability. 15. Quality costs. 16. Total quality management, learning, creativity, leadership empowerment, team work, communication, integration, ethics. 17. ISO 9000, Balridge Award.

<p>COURSE OBJECTIVES</p>	<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 about the design of diagnostic procedures in trouble shooting. 5. To teach about 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 to be pursued pro-actively. 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, team work, good communication.
<p>COURSE OUTCOMES</p>	<p>(Letters shown in brackets are linked to program outcomes a-k)</p> <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 about the design of diagnostic procedures in trouble shooting [e]. 5. To teach about the importance of formulating design problems as multi-objective problems, the objectives being functionality, manufacturability, maintainability, life cycle cost including disposal, reliability etc. [a, c, e]. 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 to be pursued pro-actively [c]. 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 [e, i, k]. 11. To demonstrate that quality projects are usually broad in scope, cross functional in nature requiring cooperation, team work, good communication.
<p>ASSESSMENT TOOLS:</p>	<ol style="list-style-type: none"> 1. Class exams. 2. Homework. 3. Class discussions.

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Nature Of Changes

This syllabus was reviewed by Dr. Arora and no changes were made.