

Case/Invoice Number

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Director of Liberal Studies

Course Revision: SAFE 345 Systems Safety Analysis

Part II. Description of the Curriculum Change

1. A new Syllabus of Record appears in Appendix A.
2. A summary of the proposed revisions:
 - Course description – Revise the course description, see below:

New Description:

Focuses on the evaluation of system designs using detailed system analysis techniques. Topics covered include system definition, economics of systems safety, systems safety methodology, mathematics of systems analysis including statistical methods, Boolean algebra, and reliability. Skills include

III. Course Outline

- A. Overview of Systems Concepts (2 hours)
 - 1. Systems
 - 2. Subsystems
 - 3. Components
 - 4. System Safety Lifecycle

- B. Military Standard-887D System Safety Program Requirements (2 hours)

- 3. Evaluation Criteria

- C. Systems Safety Program Planning (2 hours)
 - 1. Management Planning
 - 2. Milestone Charts
 - 3. System Safety Workgroups

- D. Overview of Analysis Techniques (2 hours)
 - 1. Preliminary Hazard Lists
 - 2. Fault Tree Analysis

Examination #2 (1 hour)

- I. Failure Modes and Effects Analysis (FMEA) (2 hours)
1. Assumptions of FMEA
 2. Analyzing Systems Using FMEA

- J. Hazard Analysis Techniques (3 hours)
1. HAZOP
 2. Cause-Consequence
 3. Flow Analysis
 4. What if
 5. Energy Trace Barrier Analysis

- K. Operator and Support Hazard Analyses (2 hours)

3. Critical Incident Technique
4. Link Analysis
5. Management Oversight Risk Tree
6. Technique for Operational Review

- L. Product Liability (2 hours)
1. Developing a Product Liability Loss Control Program
 2. Using Systems Safety to Reduce Product Liability

Laboratory Session	Title of Exercise	Lecture Units Covered
G	Boolean Algebra	ETA

A grading curve that results in an appropriate distribution of grades may be used as needed.

VI. Course Attendance Policy

Although the



Engineering Design Handbook – Fault Tree Analysis. (1971). Washington, DC: US Army Material Command.

Hammer, Willie. (1972). Handbook for System and Product Safety. Englewood Cliffs, CA: Prentice Hall.

Henley, G. and Kumamoto. (1980). Reliability Engineering and Risk Assessment. Englewood Cliffs, CA: Prentice Hall.

Iredon, W. Grant, ed.. (1966). Reliability Handbook. New York, NY: McGraw Hill Book Co..

Layton, Donald M. (1989). System Safety Including DOD Standards. Chesterland: Weber Systems Inc.

APPENDIX B: OLD SYLLABUS OF RECORD

Syllabus of Record

I. Catalog Description

SA 345 Systems Safety Analysis
Prerequisites: SA 211, MA 217

3 credits
2 lecture hours

E. Students will be able to utilize each of the techniques above to assess the risks associated with any technology.

F. Students will diagram Event Trees and Cause Consequence Charts and explain how these can be used to provide useful information about system risk.

G. Students will be able to explain the methodologies associated with the following hazard analysis techniques:

1. Job Safety Analysis
2. Sneak Circuit Analysis
3. Energy Trees and ID

- D. Preliminary Type of Analyses (2 hours)
 - 1. Areas of Application
 - 2. Capabilities and Limitations
 - 3. Organizing Analysis Results

- E. Reliability and Failure Mode Type of Analyses (3 hours)
 - 1. Reliability Concepts and Problems
 - 2. Functional Block Diagrams
 - 3. Capabilities and Limitations of the FMEA
 - 4. Organizing Analysis Results

- F. Software Safety Analysis (2 hours)
 - 1. Software Systems
 - 2. Analysis Techniques
 - 3. Organizing Analysis Results

- G. Human Control Functions in a Human-Machine System (2 hours)
 - 1. Human Functioning in System Operation
 - 2. Human Limitations
 - 3. Human Error Identification

- L. Concepts of Risk, Risk Assessment and Risk Management (2 hours)
1. Review of Risk Concepts
 2. Risk Assessment
 3. Risk Management

Laboratory Exercises (Fourteen 3-hour Sessions)

Laboratory Session	Title of Exercise	Lecture Units Covered
A	Defining a System for Analysis	C
B	Introduction to Preliminary Hazard Analysis	D
C	Conclusion of Preliminary Hazard Analysis	D
D	Introduction to Failure Mode and Effects Analysis	E

The grading scale will be based on the following:

A = 90-100%
B = 80-89%
C = 70-79%
D = 60-69%
F < 60%

or a grading curve that results in a normal distribution of grades.

V. Required Textbooks

Readings in System Safety Analysis. IUP, 6th edition, 1990.

VI. Special Resource Requirements

VII. Bibliography

- b. Historic Titles (Some of the most important work was done in this area in the 1970's and early 1980's.)

Barlow, R.E., et al. Reliability and Fault Tree Analysis. Philadelphia: Society for Industrial and Applied Mathematics, 1975.

Browning, R.L. The Loss Rate Concept in Safety Engineering. New York:

Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.

Green, A. E. Safety Systems Reliability. Columbus, OH: Battelle Press, 1971.

Appendix C: Catalog Description

SAFE 345 Systems Safety Analysis

(2c-31- 3cr)

Prerequisites: SAFE 211 and MATH 217

Focuses on the evaluation of system designs using detailed system analysis techniques. Topics covered include system definition, economics of systems safety, systems safety methodology, mathematics of systems analysis including