

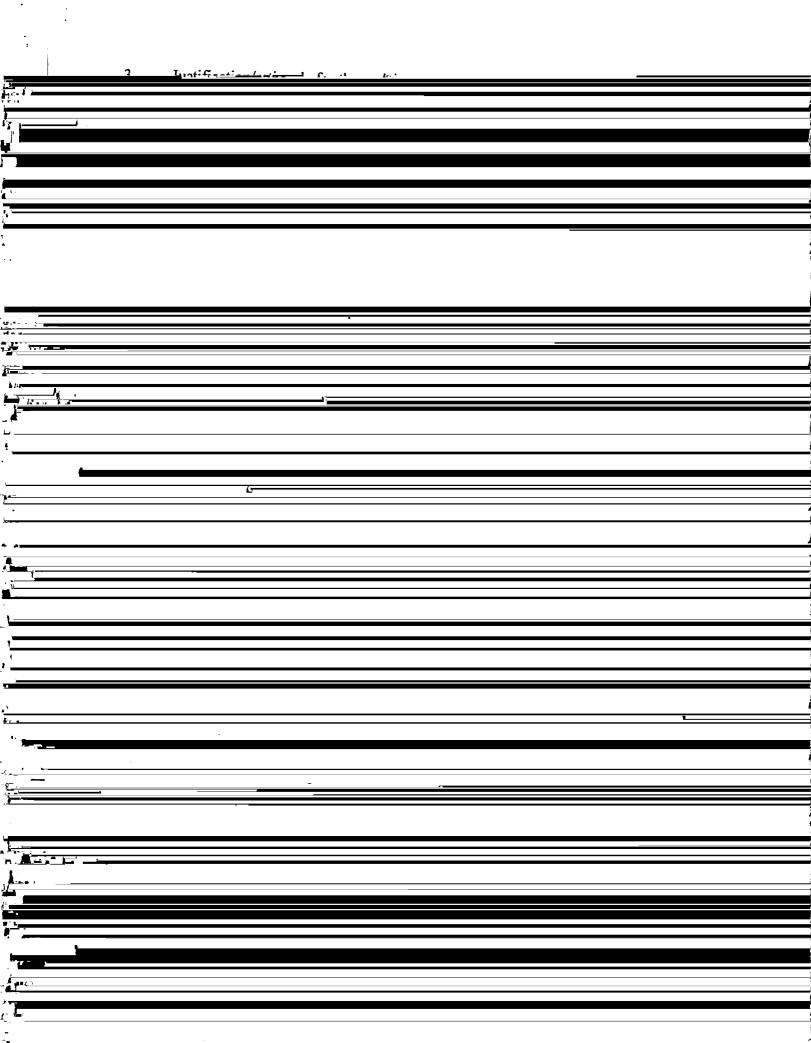
Course Revision: SAFE 345 Systems Safety Analysis

Part II. Description of the Curriculum Change

- l. 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. Roolean algebra-and-reliability. Skills a single statistical methods.



APPENDIX A: NEW SYLLABUS OF RECORD

I. Catalog Description

SAFE 345 Systems Safety Analysis 2 class hours 7 1-1---(2c-31- 3cr)

II	II. C	Course Outline	
	A. C	Overview of Systems Concepts 1. Systems	(2 hours)
		 Systems Subsystems 	
		3. Components	
		4. System Safety Lifecycle	
	B. M	lilitary Standard-882D System Safety Program Daguiramanta	(0.1. · · · · ·
		<u> </u>	
			
		· ,	
* _11			
		X-	
	3	3. Evaluation Criteria	
	C. Sy	ystems Safety Program Planning	(2 hours)
	i		(2 hours)
		. Milestone Charts	
	3	System Safety Workgroups	
	D. O	verview of Analysis Techniques	(2 hours)
	1	. Preliminary Hazard Lists	(2 hours)
	<u>1</u>		

	l control of the cont	
	Examination #2	(1 hour)
	 I. Failure Modes and Effects Analysis (FMEA) 1. Assumptions of FMEA 2. Analyzing Systems Using FMEA 	(2 hours)
-		-
	 J. Hazard Analysis Techniques 1. HAZOP 2. Cause-Consequence 3. Flow Analysis 4. What if 5. Energy Trace Barrier Analysis 	(3 hours)
	K. Operator and Support Hazard Analyses	(2 hours)

-	64T.	
,		
	·	
	•	
	7	
	3. Critical Incident Technique	
	4. Link Analysis5. Management Oversight Risk Tree	
	6. Technique for Operational Review	

Developing a Product Liability Loss Control Program

Using Systems Safety to Reduce Product Liability

(2 hours)

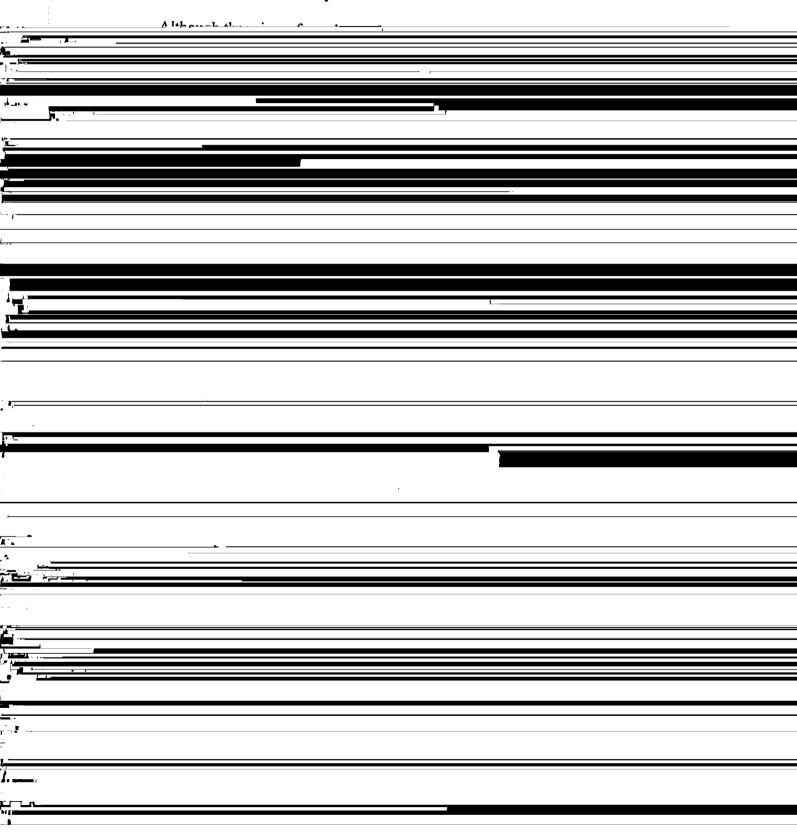
L. Product Liability

1. 2.

		Y	
1	Laboratory Session G	Title of Exercise	Lootung IInite C
ļ	G	Boolean Algebra/FTA	Lecture Units Covered
1	}	TINNICAU BEGENISCHIIA	1 Z. n. 11
· .			
· #			
t			
•			
•			
		· •	
5.77			
1			
, ,			
1			
1			
			A
			<u></u>

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

VI. Course Attendance Policy



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

Hammer, Willie. (1972). Handbook for System and Product Safety.

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

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

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

APPENDIX B: OLD SYLLABUS OF RECORD

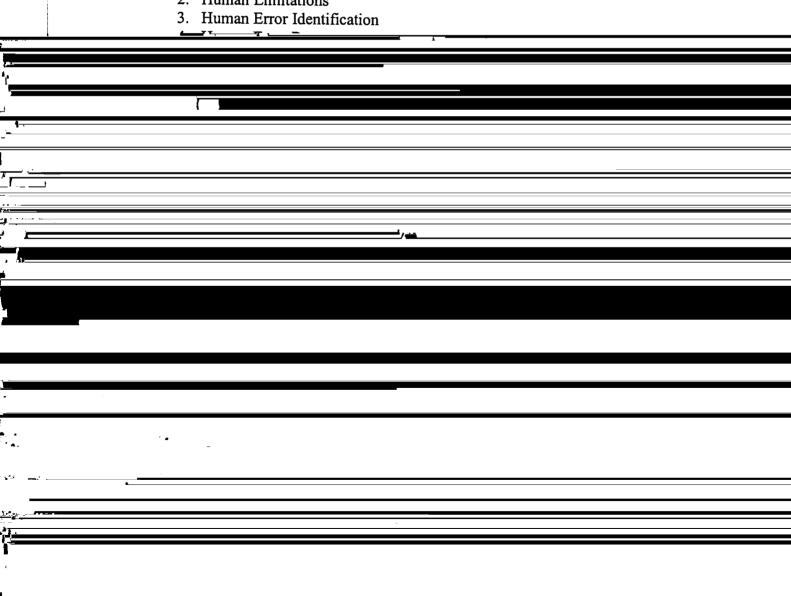
Syllabus of Record

I. **Catalog Description**

SA 345 Systems Safety Analysis 3 credits Prerequisites: SA 211, MA 217 2 lecture hours

•.		
	E Chadanta will 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	E. Students will be able to utilize each of the techniques above to assess the risks	
<u> </u>		
1		
<u>yar</u>		
,	11 	
1		
<u>.</u>		
1	_	
•		,
	F. Students will diagram Event Trees and Cause Consequence Charts and	
	explain how these can be used to provide useful information about system risk.	
	IISK.	
	G. Students will be able to explain the methodologies associated with the	
	following hazard analysis techniques:	
	 Job Safety Analysis Sneak Circuit Analysis 	
:	2. Sheak Circuit Analysis 2. Engrave Trace and D	
	•	
\f=		
)		
7	\$ ₂	
	· · · · · · · · · · · · · · · · · · ·	
it.		
•		
-		
<u>. </u>		
, and a		
# T	·	

- 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

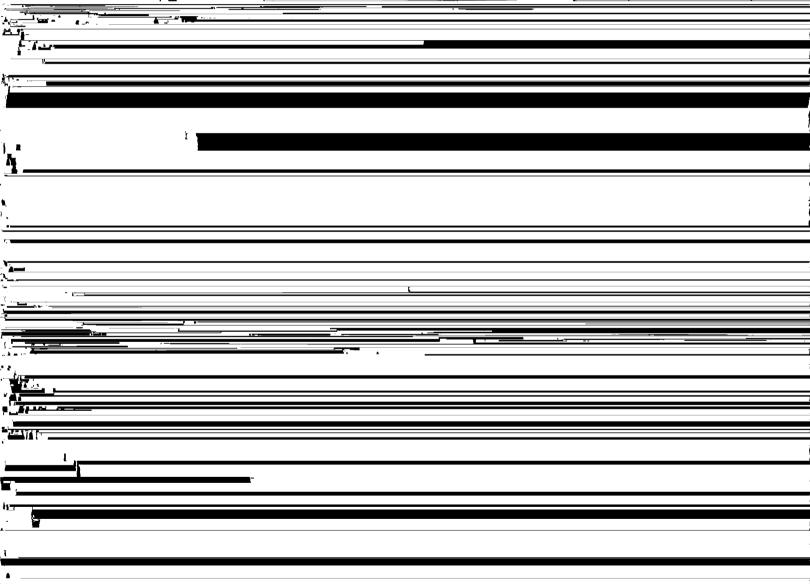


- L. Concepts of Risk, Risk Assessment and Risk Management (2 hours)1. Review of Risk Concepts

 - 2. Risk Assessment
 - 3. Risk Management

Laboratory Exercises (Fourteen 3-hour Sessions)

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



		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, 6 th edition, 1990.
	YI. ,	Special Resource Requirements
τ		
<u> </u>		
-		
!		
	VII.	Bibliography
		<u>·</u>
<u>. </u>		
ਪੰਜ		
-		
· · · · · · · · · · · · · · · · · · ·		
<u> </u>		

The grading scale will be based on the following:

l	the state of the s
	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
<u> </u>	
<u>~</u> ••••••••••••••••••••••••••••••••••••	
· · · · · · · · · · · · · · · · · · ·	
1	
	Browning, R.L. The Loss Rate Concept in Safety Engineering. New York:
E. T	
2 () 	·
2 / 1	·
- 1	Engineering Design Handbook – Fault Tree Analysis Washington DC: US
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
	Engineering Design Handbook – Fault Tree Analysis Washington DC: US
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
: :-	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 1971.
	Engineering Design Handbook – Fault Tree Analysis. Washington, DC: US Army Material Command, 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

