

Course Syllabus

SAFM 528: Economic Aspects of Safety – online

West Virginia University Benjamin M. Statler College of Engineering and Mineral Resources
Department of Industrial Management and Systems Engineering
Safety Management Program

Semester

Spring:

January 13th, 2020 – March 6th, 2020

March 9th, 2020 – May 1st, 2020

Instructor

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Office Hours by Appointment in Room 345-G Mineral Resources Bldg., WVU

SAFM 528. Economic Aspects of Safety. 3 Hours.

An overview of economic factors that must be considered when justifying the development and implementation of safety initiatives, including examining published research, cost estimating, ROI, risk assessment, benefit-cost analysis, and project planning.

General Course Information

The Mission of the Safety Management program is to develop Safety Leaders to preserve and protect the people, property, and efficacy of the organization.

Training is essential for an effective and efficient safety, health, and environmental [SHE] effort. Therefore, professionals who have SHE responsibilities must be knowledgeable of the various training approaches and techniques to improve the safe behavior of the organization's work force and how these techniques can be used to control losses and provide business continuity. They must be able to identify SHE performance discrepancies and decide if those discrepancies are the result of inadequate knowledge and/or skills that can be improved by training. When safety and health training programs are needed to improve the workers' performance.

Course Introduction

You will find the syllabus attached in the "Start Here" section of eCampus. The "Course Content" tab is where you will find all modules throughout the course. Each module will open and close according to the due dates in the syllabus (generally Sunday 12:30 am to Sunday 11:59 pm). As you will see, only the "Module 1" is available at this time. Once a Module closes, you will not have access back into it.

This course follows along with the book from chapter to chapter. There will be some supplemental material that is provided within the modules that you will not see in the book. It is crucial that you obtain a copy of the book and that you READ the chapters that correspond to the modules.

Text book

Engineering Economic Analysis 11th (eleventh) edition
By Ted Eschenbach

Newer version of the book is also acceptable.

Course Goals:

1. To provide students with a sound understanding of business economics as applied specifically to the Environmental, Safety and Health (ES&H) function.
2. To provide students with qualitative and quantitative business management problem-solving skills
3. To provide students the skills and knowledge to design, implement, evaluate, and monitor ES&H projects and programs.

Student Learning Objectives & Outcomes:

Upon completion of this course, students will be able to:

1. Explain the relationship of key economic functions to ES&H
2. Illustrate operating and capital budgeting principles.
3. Distinguish between ethical and unethical behaviors in ES&H
4. Assess the need for legal contracts
5. Derive the business value individual safety controls and comprehensive safety programs

Grading

Grading is based on a point system. Points are earned from a variety of activities including participation, homework assignments, and exams.

Doing minimal work will only receive minimal credit. You are in a Graduate level class. You are expected to go above and beyond minimal.

NOTE: All assignments expected to be turned in on time. Late assignments will not be accepted. Once a module has closed, it will not be reopened. There are NO special extra credit activities. However, bonus points MAY be awarded for exemplary performance on assignments and projects.

Syllabus is subject to change during semester

Do not send an email to me through eCampus. The best, quickest way for a response is through jgouzd1@mix.wvu.edu or jgouzd1@mail.wvu.edu

Graded Activity

- Assignments (12 assignments – 25 pts each)
- Journals (1 Journals – 25 pts each = 25 pts)
- Discussion (7 discussions – 25 pts each = 175 pts)
- Class participation (7 discussions responses – 15 pts each = 105)
- 2 exams (midterm and final – 100 pts each = 200)

Course Schedule

Week 1 (Module 1 – Jan. 13th to Jan. 19th)

- Read Ch. 1
- Explanation of course
- What is Business
- Price, supply, demand, equilibrium
- Trade
- Corporations (4 types)
- Organizational structure
- SWOT analysis
- Direct and indirect costs

- Integrated Safety Management
- Ethics
- Decision making process
- MARR
- WACC
- Opportunity cost
- Human Recourses (hiring, training, retention, Review)
- Employee Management (unions)
- Motivation
- Safety function motivation
- Marketing
- Intermediaries

Week 2 (Module 2 – Jan. 19th to Jan. 26th)

- Read Ch. 2 and Ch. 3
- Break Even analysis
- Variations of “cost”
- Cost Estimating (top down – Bottom up)
- Estimating Methods
- Cost Indexes
- Power sizing model
- Income Statement (w/ example)
- Balance Sheet (w/ example)
- Cash flow (diagram)
- Capital
- Economic study (decision making)
- Interest Rate
- Rate of Return
- Simple and compound interest
- Effective Interest
- Finding F, P, N, I.

Week 3 (Module 3 – Jan. 26th to Feb. 2nd)

- Read Ch. 4
- Overhead allocating
- Business case for safety (steps for development)
- PERT
- CPM
- GANT
- Contracting/Contracts
- Voluntary Consent and Illegality
- Oral and Written Contracts

- Third Parties
- Acts affecting Federal Contracts
- Equivalence for Cash Flow (F, P, A, i)
- Derive for all variables (N, I, P, A, F)
- Amortization
- Excel Amortization Tables
- Excel Functions
- Excel Graphs

Midterm Exam

Week 4 (Module 4 – Feb. 2nd to Feb. 9th)

- Read Ch. 5, 6, 7, 9
- Review HW
- Special Cases of Cash Flow
- Uniform Series Compound Interest Formulas
- Arithmetic Gradient
- Geometric Gradient
- Uniform Payment Series
- Continuous compound Series Compound Amount
- Continuous compound Series Present Worth
- Deferred Annuity
- Review HW
- Single Investment Selection
- Sign off on Spending
- Corporate Capital Budgeting Process
- Evaluation methods
- Present Worth Method
- Future Worth Method
- Annual Worth Method

Week 5 (Module 5 – Feb. 9th to Feb. 16th)

- Read Ch. 5, 6, 7, 9
- Review HW
- Examples of PW, FW, AW
- Specialized Case of PW
- Endowments
- Linear interpolation
- IRR
- Payback Period
- Review HW
- Analysis comparison

- Investment alternatives with equal lives
- Cost alternatives with equal lives
- Analyze alternatives with unequal lives
- Using Internal Rate of return for alternatives
- Incremental IRR investment analysis

Week 6 (Module 6 – Feb. 16th to Feb. 23rd)

- Read Ch. 11 and Ch. 12
- Review HW
- Taxes
- Depreciation
- Straight line
- DDB
- Unit production Method
- MACRS (GDS-ADS)
- Trade in Cost basis
- Special case cost basis
- Review HW
- Income Taxes
- Capital Gain/Loss
- After Tax Cash Flow
- Breakeven analysis
- Sensitivity analysis
- Multi-Factor Sensitivity analysis

Week 7 (Module 7 – Feb. 23rd to March 1st)

- Read Ch. 14
- Inflation
- Price Change
- Currencies

Final Exam

Discussion Board Instructions and Grading – Creating a Thread to Posted Topic

Each week a discussion topic will be posted within the module/discussion board.

Your role is to develop a discussion response to the topic that is posted. To ensure the discussion is productive, answer any follow up questions that other students may have posted to your discussion thread. Remember that the goal is to answer or elaborate on the module’s discussion topics and prompt further discussion; so, your response to the topic must be significant enough to encourage responses, debate, sharing of stories, elaboration, further questions, etc.

Grading will follow the rubric below:

Criteria	Always True	Mostly True	Sometimes True	Rarely True
Did the student post a relevant discussion response on time?	5	3	2	-5
Was the submitted response significant enough to carry a discussion forward?	3	2	1	0
Did the student keep the conversation relevant and on track?	3	2	1	0
Did the student contribute to the continuation of the discussion by prompting follow up questions, additional comments or elaboration, or making contributions of his/her own?	5	4	2	1
Was the student able to express his/her thoughts in a way that others could understand?	1	1	0	0
Did the student monitor the discussion throughout the discussion period?	3	0	0	0
Did the student use respectful language and show an appreciation for what others had to say?	5	Zero for the Assignment	Zero for the Assignment	Zero for the Assignment

Discussion Board Instructions and Grading – Participants responding to other students Threads

Each week there will be 1 discussion topic posted on the Discussion Board. Each student must create a discussion thread on the topic (see above). You as a participant are required to make a minimum of 1 response to a student’s thread. Note that making the minimum number of posts will not necessarily earn you full credit for the week; you should be fully engaged in the discussion and make posts as appropriate throughout the discussion period to earn full credit.

To receive full credit, your posts must apply information and ideas from the course materials. You must add to the discussion by directly addressing the topic, elaborating on points made, raising new questions, and/or adding a different perspective on the issue. Responses such as, “I agree”, do not help move the discussion forward and will not receive full credit. Your responses can be brief (usually no more than 250 words) and can use any formatting devices that are appropriate (bullets, subtitles, etc.).

Keep in mind that the instructor will be viewing the discussions and stepping in as necessary. As you post, you should keep "netiquette" guidelines in mind.

Discussion board submissions will be graded using the rubric below. No credit will be awarded to a student who engages in inappropriate conduct on the discussion board (disrespecting fellow students, using profanity, etc.).

Criteria	Always True	Mostly True	Sometimes True	Rarely True
Did the student’s comments build on the comments of other students?	5	4	2	1
Did the student have a unique and helpful insight?	4	3	2	1
Was the student able to express his/her thoughts in a way that others could understand?	1	1	0	0
Did the student contribute throughout the discussion period?	3	2	1	0
Did the student make contributions on all aspects of the discussion?	2	1	0	0

Did the student use respectful language and show an appreciation for what others had to say?	0	Zero for the Assignment	Zero for the Assignment	Zero for the Assignment
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SOCIAL JUSTICE

West Virginia University is committed to social justice. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and non---discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to further such positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in class, please advise me and make appropriate arrangements with Disability Services (293---6700) No Later than the 2nd week of class.

For the WVU policy on Social Justice go to – <http://socialjustice.wvu.edu/>

CHEATING

If you cheat (copy someone else’s work, knowingly allow someone to copy your work, use someone else’s training manual or turn in a manual that is already developed by a company) then you may receive a failing grade in the class and could be subject to further disciplinary measures (Mountie, 1998, p.15).

Plagiarism will not be tolerated. Everything that you turn in for the class is automatically scanned by “Turn it in” software for plagiarism. In order to

protect yourself from being accused of cheating you must reference (cite) any thought, idea, or fact that is not your original thinking. This means “noting” in the body of your manual the source of the fact or idea and if you are quoting a source directly, including the page number where the quote may be found. In this course we will use the latest American Psychological Association edition as a guide for citing work.

MASTERS OF SCIENCE, SAFETY MANAGEMENT

The mission of the safety management program is to prepare program graduates to meet the safety mission of any enterprise. This is stated simply as: The safety mission of an organization is to protect, conserve, and improve the resources—people, property, and efficacy—of the organization. The Master's of Science with a major in Safety Management is accredited by the Applied and Natural Sciences Accreditation Commission (ANSAC) of ABET, <http://www.abet.org>.

PROGRAM EDUCATIONAL OBJECTIVES

Drawing from the university's mission, the program mission, the needs of our constituents, and the Applied Science Accreditation Commission Criteria of ABET, the following educational objectives were developed for the Masters of Science program in Safety Management:

A graduate of the Safety Management program will be able to:

1. Communicate effectively, orally and in writing, including the transmission of safety data to management and employees.
2. Demonstrate knowledge and skills in the area of safety management.
3. Demonstrate knowledge of ethical and professional responsibilities and knowledge of applicable legislation and regulations.
4. Demonstrate the ability to apply various research activities through the decision-making process used in safety management.

STUDENT LEARNING OUTCOMES CRITERION 3

In order to meet Program Educational Objectives of the Safety Management program, students must be able to meet the following outcomes at the time of their graduation:

1. An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.
2. An ability to formulate or design a system, process, procedure or program to meet desired needs.
3. An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.
4. An ability to communicate effectively with a range of audiences.
5. An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
6. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

STUDENT LEARNING OUTCOMES CRITERION 8

1. Anticipate, recognize, evaluate, and develop control strategies for hazardous conditions and work practices.
2. Demonstrate the application of business and risk management concepts.
3. Demonstrate an understanding of the fundamental aspects of safety, industrial hygiene, environmental science, fire science, hazardous materials, emergency management, ergonomics and/or human factors

4. Design and evaluate safety, health, and/or environmental programs;
5. Apply adult learning theory to safety training methodology;
6. Identify and apply applicable standards, regulations, and codes
7. Conduct accident investigations and analyses;
8. Apply principles of safety and health in a non-academic setting through an intern, cooperative, or supervised experience