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safetyculture
a way of life

Life safety discipline

safety
culture
a way of life

Duration: 1 semester, from October to January

Amount of classes: lectures - 1 hour a week, seminars - 1 hour a week

Forms of control: final test

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Life safety discipline

<u>The content of the course:</u>

Part I. **Introduction to the subject of study**

Part II. Electrical safety

Part III. Oil & gas safety

Part IV. Fire safety

Part V. Information technologies in safety

Part VI. Lean Management 5S-system

Part VII. Personal protective equipment and safe condition signs

Part VIII. First aid and injuries

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Life safety

1. The general concepts on emergency and safety engineering

An emergency is an adverse situation arising from an event or set of sequential conditions.

Emergencies and disasters can happen *suddenly*, *unexpectedly and anywhere;* from fires to flooding, from chemical leaks to explosions, from aircraft crashes to severe weather, and many others (**natural** and **man-made**).

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Industrial (**unnatural**) **hazards** consist of four principle hazards.
This is because industries employ many different processes involving a wide range of different raw materials, intermediates, waste products and final products.
The hazards encountered are **fire, explosion, toxic release and environmental damage.**

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Fire:

This is the most frequent of the hazards however the consequences are generally less.

The effect of fire on people usually takes **the form of skin burns** and **asphyxia** and is usually dependent on the exposure time and the intensity of the heat.

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Toxic/Chemical release:

Sudden releases of toxic vapors have the potential to cause death and severe injuries several miles from the release point. They are carried by water and air.

The effect of toxic/chemical release on people usually takes **the form of skin burns** and **intoxication**.

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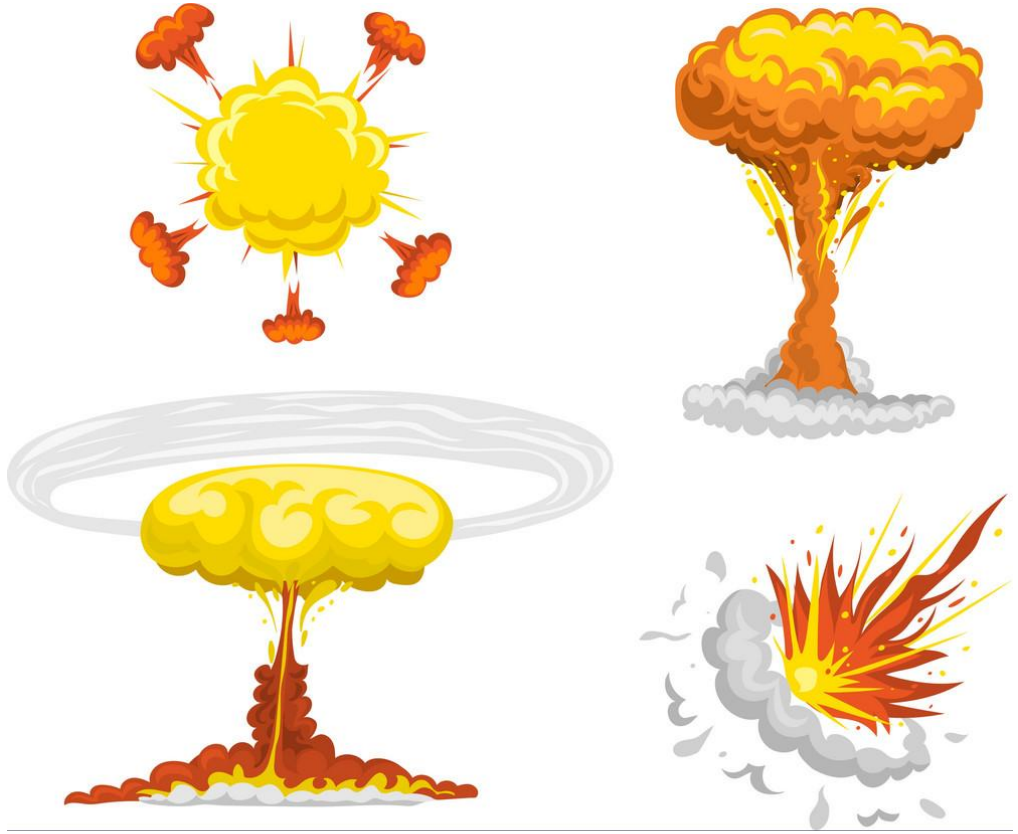

Explosion:

Explosions are usually heard from far away as a bang. This is the result of a shock wave.

This **overpressure can kill people** but usually the indirect effects of collapsing buildings, flying glass and debris causes far more loss of life and severe injuries.

There are different types of explosions which include gas explosions and dust explosions.

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Environmental Damage:

As well as having the potential for causing injury, loss of life and damage to property, the hazards of fire, explosion and toxic releases may pose a severe threat to the environment. **Release of other substances, not directly toxic to humans can cause major pollution problems.** It is becoming increasingly recognized that damage to natural resources such as plant and animal life can have serious long term consequences.

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Emergency management is a vast discipline; briefly speaking it is the process of:
- *mitigating threats*
- *preparing for*
- *responding to*
- *recovering from* an emergency.

The main task in any emergency plan is to identify what would constitute an emergency for a given business, workforce or local population.

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The process of risk evaluation can be broken up into the following steps:

- **assess:** identification and classification of all threats;
- **evaluate:** assess likelihood and impact of each threat;
- **mitigate:** identify actions that may reduce the risks in advance or mitigate the consequences;
- **prepare:** plan for required operations;
- **respond:** take the necessary actions to minimize the impact of the risks that materialize;
- **recover:** return to normal as soon as possible.

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The recovery stage begins as soon as the consequences of the incident are known. Emergency management is a valuable tool, which if done systematically **will enable** an organization to reduce the likelihood of an emergency, mitigate its consequence, and ultimately recover. That's why by adopting these fundamental principles, the impact of emergencies can be minimized.

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The **level of threat** must be evaluated.
An understanding of how failures occur and progress can be a valuable tool. Once the hazards are identified, the risks prioritized and the failure scenarios developed, teams and persons responsible for each stage of events must be arranged.

In planning the response to an emergency, some of the key questions that need to be asked are:

Impact of Risk (Consequence)				
	Major	Medium	High	Extreme
	Moderate	Medium	Medium	High
	Minor	Low	Medium	Medium
Seriousness of Risk = Probability x Impact		Unlikely (0-33%)	Moderately Likely (33%-66%)	Highly Likely (66%-100%)
		Probability of Risk (Likelihood)		

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- ✔ **evacuation plan:** do the staff know the alarms and how to respond, where the assembly points are and to whom they should report?
- ✔ **communication:** do the staff know one another, where the telephone is, what to say and if there is sufficient signage;
- ✔ **equipment:** do the people who need access to safety equipment know where it is and how to use it; is it accessible at all times;
- ✔ **training:** are key staff trained to understand and carry out the emergency procedures; do they have the necessary skills and experience; are the procedures rehearsed and who is responsible for the recovery process?

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5 minute break

(please, come back on time)

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Who should provide safety?

Safety engineers serve vital roles in a wide range of workplace settings, including manufacturing and the service sector. Safety engineers' jobs revolve around implementing and maintaining safety policies, procedures and equipment.
Workers' lives can depend on safety engineers' thoroughness and effectiveness. Because of this, safety engineer positions include strict applicant requirements.

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Audit

Safety engineers regularly perform audits of the facilities, systematically checking various mechanical components and work processes to ensure they are compliant with safety standards.

Engineers will **check things like emergency switches for factory equipment, hardhats and hazard warning systems on construction sites, and roller coaster machinery in theme parks.**

Safety audits often include **checking required safety documentation**, such as maintenance logs for equipment, to ensure that employees are following procedures.

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Monitoring

Part of a safety engineer's job is **to review a range of statistical reports** on vital safety issues. On any given day, a safety engineer may review reports showing the percentage increase or decrease in reported accidents for the month, or the number of times machinery has been shut down for maintenance, for example. **Engineers monitor these reports to spot potential safety hazards and address issues early.**

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Safety Programs

It is the job of safety engineers to develop **the formal safety compliance programs** of their companies or job sites. Engineers put policies in place to implement a comprehensive safety program, so that all employees know their duties and emergency procedures. Engineers continually assess current safety standards, making changes as operations change.

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Training

In addition to companywide safety policies, safety engineers may be required to create and lead **training programs** for new hires and existing employees.

Employees must be trained in a range of safety procedures, such as emergency evacuation procedures and hazard reporting systems. Safety engineers may conduct advanced training courses for employees with especially dangerous job roles.

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Thank you for your attention!

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