ENGineering and INdustry Innovative Training for Engineers (ENGINITE)

PROJECT NUMBER
2017-1-CY01-KA202-026728

A4 course

Applied Efficient Quality and Health & Safety Management Systems

Prepared by TUC

Erasmus+

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Contents

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1. PART A: General Information

Title: "Applied Efficient Quality and Health & Safety Management Systems"

Keywords (4-5): quality management system, health and safety management system, ISO standards, PBL approach

Authors: Prof. Konstantinos Komnitsas

Duration: 1 day online reading/study on Google Classroom, 1 week f2f

Language of materials: English and Greek

Type & number of sessions:

Day 1	• Get to know each other; brief presentation of participants (studies, employment, expertise, etc) • Applied Efficient Quality and Health & Safety Management Systems: present the approach, present problems to participants and discuss; reflect on answers • Understanding process, explain the 2 case studies, select groups, identify who is involved and how, set initial deadlines for subtasks • 20 min discussion
Day 2	• Summarizing progress of day 1, 20 min • Set targets for day 2 (for each case study) • Groups members get different roles and targets • Interaction with each group member • Interaction between groups (comparing progress and results) • Assessment of progress • Summary – discussion – need for additional work/corrective action?
Day 3	• Summarizing progress of day 2, 20 min • Set targets for day 3 (for each case study) • Groups members get different roles and targets • Interaction with each group member • Interaction between groups (comparing progress and results) • Assessment of progress • Summary - discussion– need for additional work/corrective action?
Day 4	• Summarizing progress of day 3, 20 min • Set targets for day 4 (for each case study) • Groups members get different roles and targets • Interaction with each group member • Interaction between groups (comparing progress and results) • Assessment of progress

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	• Summary – discussion – finalizing case studies • Qualitative and quantitative evaluation
Day 5	• Presentations • Questions and Answers (Q&A) with other groups • Final remarks • Overall assessment of the module • Providing guidelines / explanations / tips for the placement in industries / SMEs • Discussing of potential projects • Closing

Number of participating engineers: 20-25 engineers

Group's setting: Mixed gender, multidisciplinary groups of engineers, 5-7 members in each group (per guidelines of PBL literature)

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2. PART B: Module Overview & Key Learning Outcomes

I. Module Overview

The course aims to enrich engineers' knowledge and capabilities in *Efficient Quality and Health & Safety Management Systems: Theory, Applications, Cooperative Culture Integration* and enable them to successfully participate in or lead complex projects with tight schedule, limited resources, yet with high quality results. Besides, in real-world industrial workplaces parameters constantly change and problems have to be overcome, thus the engineers need to be properly trained. For this purpose, real industrial projects in combination with the Problem Based Learning (PBL) approach will be used during the course, to equip the engineers with the required skills. Great organizational and analytical skills, understanding of leadership, management and teamwork, along with a holistic grasp of the project-at-hand are just some of the capabilities that engineers need and will acquire through this course. Good practices will also be available as participants' tools.

II. Key learning outcomes:

Upon completion of the module, participants will be able to:

- Understand what a Quality Management System (QMS) is and its benefits for the business (with particular emphasis on SMEs) and the employees
- Understand what a Health and Safety Management System (HSMS) is and its benefits (with particular emphasis on SMEs) for the business and the employees.
- Realize why a QMS and a HSMS is a means to improve Quality (Q) and Health and Safety (H&S) at workplace, improve its market profile and prevent accidents and injuries.
- Learn about requirements, regulations and key elements of each system.
- Design QMS and HSMS in practice
- Recognize the important elements of efficient team working and leadership in such system design and operation
- Carry out a SWOT analysis pertinent to QMS and HSMS
- Validate existing systems with the use of Key Performance Indicators (KPIs) and propose improvements
- Introduce environmental aspects in both QM and HSM Systems

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3. PART C: Problem – Based - Learning Scenarios

Case Study 1. Management Systems in Restaurants

a. General Aspects

A reliable quality management system (QMS) is a vital component of any successful organization, but its characteristics may vary depending on the products, goods and services the organization provides.
Within the restaurant industry, while many companies develop in-house processes, several others seek for more advanced systems from third-party providers to improve the effectiveness of their food safety and quality assurance procedures.
The fact that restaurants are often comprised of a chain of widely disconnected, independent units leads to great challenges. A large restaurant chain may consist of several hundred to several thousand units spread throughout a country. These units obtain ingredients from dozens of suppliers and coordinate with several other dozens of distribution centers to deliver their products efficiently and maintain quality.
While restaurants may seem to be similar in structure, their policies and procedures vary a lot from one brand to another. An efficient QMS must be able to incorporate all these aspects and truly integrate itself within a chain and be fully adopted and utilized by the end users at restaurant level.
Furthermore, a QMS for a restaurant chain must be simple and efficient enough to be handled constantly by new employees, not just QA professionals and food scientists. Thus, a paperless QMS is today an intriguing alternative.

b. Objectives

The main objectives are:

1. Understand the process of developing a QMS in a restaurant
2. Consider all required steps and requirements
3. Evaluate the developed QMS
4. Consider an QMS which is efficient and has low environmental footprint*

*Please consider that by eliminating the need for paper and automating several controls, operating costs are reduced and efficiency is improved too

c. Period of Implementation

1 week

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d. Potential Plan

You may consider covering the following aspects

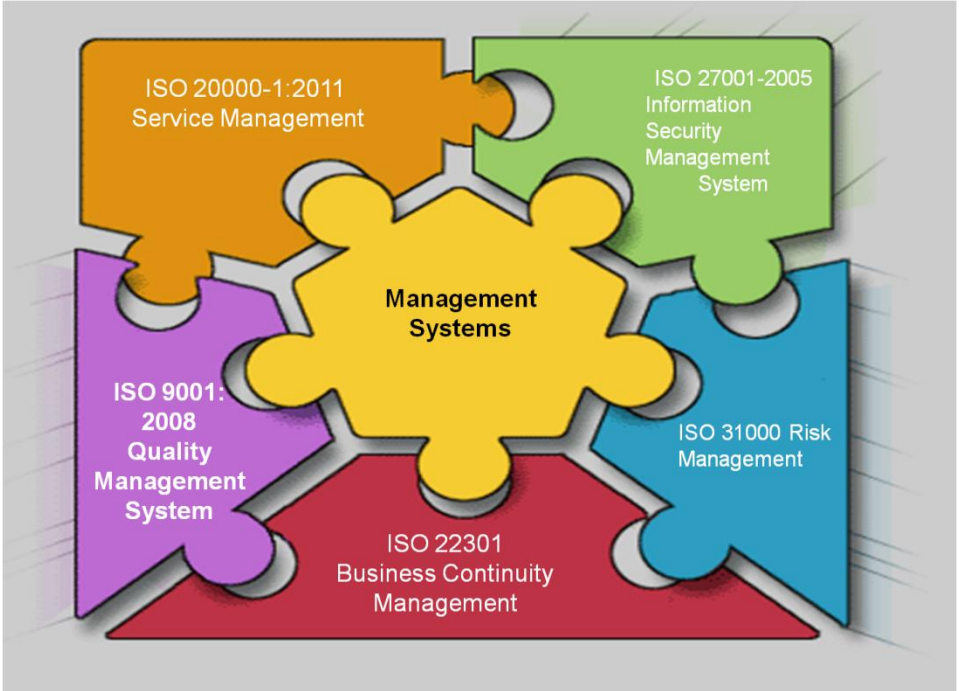
1. Scope of the QMS
2. Food Safety and QMS
3. Management Responsibility
4. Crisis Management
5. Fundamental Requirements
6. Food Safety System
7. Product Requirements
8. Verification and Continuous Improvement

e. Note

Please consider that most of the above steps can be applied in numerous other SMEs and industries of the food sector.

f. Final outcome

When you are ready, please present your findings (for 30 min), using a ppt presentation



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Case Study 2. Health and Safety Management Systems in Chemical Laboratories

a. General aspects

The Health and Safety Management System (HS-MS) of a chemical laboratory is a structured and documented set of activities designed to ensure and demonstrate that the laboratory complies with the minimum requirements of H&S standards and safety management. The HS-MS shall be implemented, maintained and updated through periodic reviews, monitoring activities and evaluations.

b. Objectives

The main objectives are:

1. To implement H&S standards that will address chemical laboratory's safety management practices.
2. To manage the risk of injury or illness for those who work in the laboratory by ensuring that they have the proper training, necessary information and adequate support to work safely.
3. To minimize the risk of environmental hazards by implementing safe handling practices and an appropriate waste management plan.
4. To safeguard laboratory resources from unauthorized access and misuse.
5. To ensure compliance with the national laws and regulations in managing safe laboratory operations.

c. Period of Implementation

1 week

d. Potential Plan

You may consider covering the following aspects:

1. Organizational structure
2. Laboratory activities carried out
3. Roles and responsibilities of all staff
4. Risk management: hazards of chemicals
5. Existing laboratory safety and control
6. Standards, procedures and document control
7. Implementation, monitoring and corrective actions

e. Note

Please consider that the above steps can be applied in almost any other laboratory in any other country.

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f. Final outcome

When you are ready, please present your findings (for 30 min), using a ppt presentation

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4. PART D: Pre-Module Preparation

Case Study 1. Quality Management Systems in Restaurants

ISO 9001 guidelines for food and drink industry

ISO (International Organization for Standardization) has published guidelines for the food and drink industry for implementing quality management systems based on ISO 9001:2000.

The new International Standard, ISO 15161, *Guidelines on the application of ISO 9001:2000 for the food and drink industry*, is aimed at organizations involved in all aspects of this industry sector, including sourcing, processing and packaging food and drink products.

ISO 15161, developed by ISO technical committee ISO/TC 34, Food products.

ISO 9001 focuses on customers' needs and expectations. It is known that one of the most important customer expectations (and often one which is implicit rather than stated directly) is to have safe food products.

ISO 15161 allows an organization to integrate its quality management system with the implementation of food safety systems such as HACCP (hazard analysis and critical control point).

TC 34 says that any other accepted food safety system can also be integrated with the quality management system, adding, "However, considering the fact that HACCP is used comprehensively, this system was chosen to demonstrate how integration may be achieved."

According to the committee's experts, application of HACCP within an ISO 9001:2000 quality management system can result in a food safety system that is more effective than the application of either ISO 9001:2000 or HACCP alone, leading to enhanced customer satisfaction and improved organizational effectiveness.

Scientific papers

General about QMS

Cherchi, C., Badruzzaman, M., Oppenheimer, J., Bros, C.M., Jacangelo, J.G. 2015. Energy and water quality management systems for water utility's operations: A review, Journal of Environmental Management, 153, 108-120, https://doi.org/10.1016/j.jenvman.2015.01.051

Fonseca, L. M., Domingues, J.P. 2017. Reliable and Flexible Quality Management Systems in the Automotive Industry: Monitor the Context and Change Effectively, Procedia Manufacturing, 11, 1200-1206, https://doi.org/10.1016/j.promfg.2017.07.245

Jeong, H.J., Kim, B.H., Jung, S.Y. 2017. Development of Hybrid Quality Management System for Construction Equipment Part Industry, Procedia Manufacturing, 11, 2139-2146, https://doi.org/10.1016/j.promfg.2017.07.345

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Lukichev, S., Romanovich, M. 2016. The Quality Management System as a Key Factor for Sustainable Development of the Construction Companies, Procedia Engineering, 165, 1717-1721, https://doi.org/10.1016/j.proeng.2016.11.914

Moldovan, L. 2015. Innovative Training Solutions for Quality Managers, Procedia Technology, 19, 988-995, https://doi.org/10.1016/j.protcy.2015.02.141

Rusu, C. 2016. From Quality Management to Managing Quality, Procedia - Social and Behavioral Sciences, 221, 287-293, https://doi.org/10.1016/j.sbspro.2016.05.117

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Daries, N., Cristobal-Fransi, E., Ferrer-Rosell, B., Marine-Roig, E. 2018. Maturity and development of high-quality restaurant websites: A comparison of Michelin-starred restaurants in France, Italy and Spain, International Journal of Hospitality Management, 73, 125-137, https://doi.org/10.1016/j.ijhm.2018.02.007

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Jang, Y.J., Zheng, T., Bosselman, R. 2017. Top managers' environmental values, leadership, and stakeholder engagement in promoting environmental sustainability in the restaurant industry, International Journal of Hospitality Management, 63, 101-111, https://doi.org/10.1016/j.ijhm.2017.03.005

Kwok, L., Huang, Y-K., Hu, L. 2016. Green attributes of restaurants: What really matters to consumers? International Journal of Hospitality Management, 55, 107-117, https://doi.org/10.1016/j.ijhm.2016.03.002

Principato, L., Pratesi, C.A., Secondi, L. 2018. Towards Zero Waste: an Exploratory Study on Restaurant managers, International Journal of Hospitality Management, 74, 130-137, https://doi.org/10.1016/j.ijhm.2018.02.022

Wang, M., Yang, Y., Gong, S. 2018. Food safety in restaurants: The consumer perspective, International Journal of Hospitality Management, in press, https://doi.org/10.1016/j.ijhm.2018.06.023

Wang, Y-F., Chen, S-P., Lee, Y-C., Tsai, C-T (Simon) 2013. Developing green management standards for restaurants: An application of green supply chain management, International Journal of Hospitality Management, 34, 263-273, https://doi.org/10.1016/j.ijhm.2013.04.001

Wen, Z., Hu, S., De Clercq, D., Beck, M.B., Zhang Hua, Zhang, Huanan, Fei, F., Jianguo Liu, J. 2018. Design, implementation, and evaluation of an Internet of Things (IoT) network system for restaurant food waste management, Waste Management, 73, 26-38, https://doi.org/10.1016/j.wasman.2017.11.054

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Books

General

https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/pub100080.pdf

https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/reaping_the_benefits_of_iso_9001.pdf

https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/selection_and_use_of_iso_9000_family_of_standards_2016_en.pdf

https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/iso_9001_-_moving_from_2008_to_2015.pdf

https://www.iso.org/publication/PUB100373.html

https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/pub100304.pdf

https://www.iso.org/iso-9001-quality-management.html

Specific

https://www.theseus.fi/bitstream/handle/10024/51087/Final_thesis_file_AnhN.pdf?sequence=1

https://www.amazon.co.uk/Food-Service-Management-Restaurant-High-risk-ebook/dp/B00CC1HUAS/ref=sr_1_2?ie=UTF8&qid=1530351087&sr=8-2&keywords=Quality+Management+systems+for+restaurants

https://www.amazon.co.uk/Food-Service-Management-Restaurant-High-risk-ebook/dp/B00CC1HUAS/ref=sr_1_2?ie=UTF8&qid=1530351087&sr=8-2&keywords=Quality+Management+systems+for+restaurants

Websites

General

https://committee.iso.org/home/tc176sc2

https://ec.europa.eu/eip/ageing/standards/general/general-documents/en-iso-90002015_en

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013XC1128(04)

http://www.uef.fi/en/uef/quality-management

https://www.tuv-sud.com/industries/medical-devices-healthcare/quality-management-amp-quality-control/iso-13485-quality-management-system-for-medical-devices

https://www.eip-water.eu/projects/development-quality-management-system-urban-wastewater-treatment-plants-ireland

https://www.british-assessment.co.uk/guides/what-is-a-quality-management-system/

https://www.whatissixsigma.net/quality-management-system/

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Specific

https://www.actionableqa.com/blog/the-problem-with-restaurant-quality-management-systems

https://www.iso.org/news/2001/12/Ref807.html

http://www.hotelympia.com/visiting/exhibitor-profile/testo-ltd/testo-saveris-restaurant--paperless-quality-management-system

Videos

https://www.youtube.com/watch?v=7n78htaOKaU

https://www.youtube.com/watch?v=OtR8XatWSsg&list=PLnIXQSIsn7B0CxAQ_ZO9R6y20Oqb9avSZ

https://www.youtube.com/watch?v=9bYkSCe9RMY

https://www.youtube.com/watch?v=zSjEQfjsZwA

https://www.youtube.com/watch?v=z93RYE45Lqo

https://www.youtube.com/watch?v=wEBPVQ7W2wg

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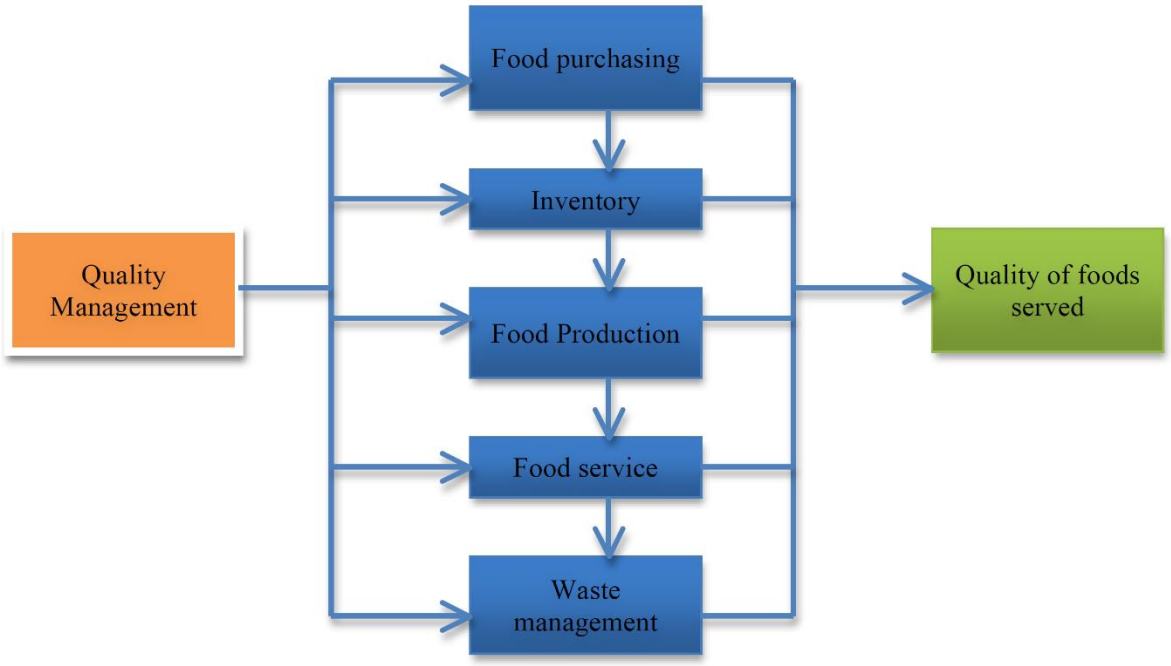
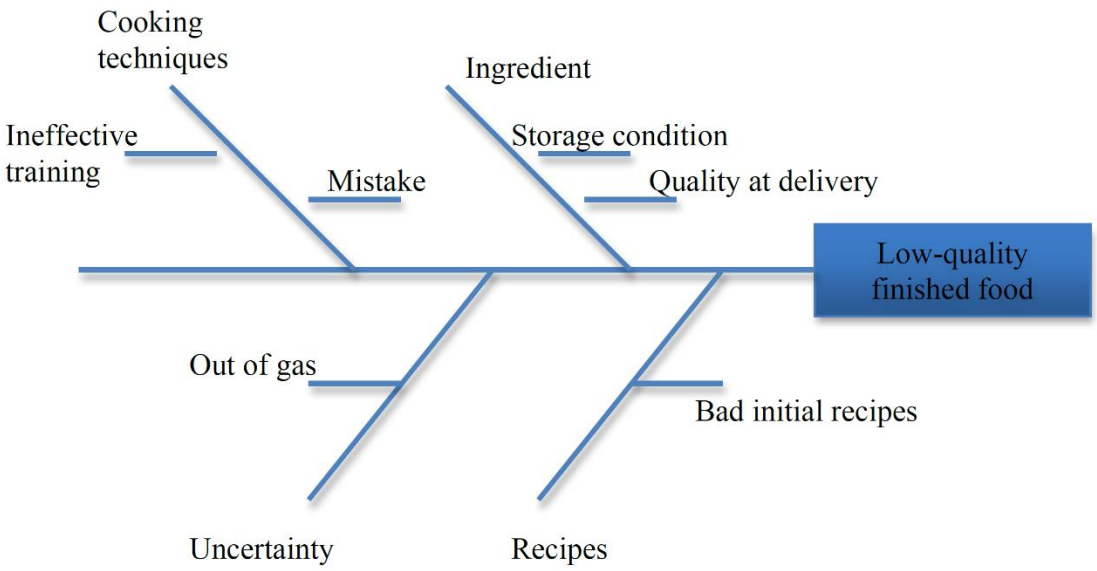


Food Quality Control Process



Some aspects leading to low quality food (meals)

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Case Study 2. Health and Safety Management Systems in Chemical Laboratories

Journal papers

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Lestari, F., Budiawan, Kurniawidjaja, M.L., Hartono, B. 2016. Baseline survey on the implementation of laboratory chemical safety, health and security within health faculties laboratories at Universitas Indonesia, Journal of Chemical Health and Safety, 23(4), 38-43, https://doi.org/10.1016/j.jchas.2015.11.002

Marendaz, J.L., Friedrich, K., Meyer, T. 2011. Safety management and risk assessment in chemical laboratories, Chimia (Aarau), 65(9), 734-737, https://doi.org/10.2533/chimia.2011.734

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Walters, A.U.C., Lawrence, W., Jalsa, N.K. 2017. Chemical laboratory safety awareness, attitudes and practices of tertiary students, Safety Science, 96, 161-171, https://doi.org/10.1016/j.ssci.2017.03.017

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Weil, M. 2016. The Laboratory Safety Standard at 25: Implementation of the Standard through the Chemical Hygiene Plan and the Chemical Hygiene Officer – Is it trickling down?, Journal of Chemical Health and Safety, 23(5), 31-40, https://doi.org/10.1016/j.jchas.2016.01.002

Books

https://www.wiley.com/en-us/Handbook+of+Laboratory+Health+and+Safety%2C+2nd+Edition-p-9780471026280

https://www.amazon.co.uk/Health-Safety-Management-Principles-Practice/dp/0273684825/ref=sr_1_fkmr2_1?ie=UTF8&qid=1530222893&sr=8-1-fkmr2&keywords=Health+and+Safety+management+Systems+in+chemical+laboratories

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https://ehs.princeton.edu/laboratory-research/laboratory-safety/laboratory-safety-manual/appendix-e

http://www.nus.edu.sg/osh/aboutus/overview-safety-health-mgmtsys.pdf

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http://dche.coe.upd.edu.ph/wp-content/uploads/2015/01/UP-DChE-HSE-MS.pdf

https://protect.iu.edu/environmental-health/laboratory-safety/lab-safety-chemical-hygiene/sops.html

https://www.nap.edu/read/12654/chapter/3

http://www.ipcalabs.com/environment-health-safety-management-system.html

https://chemicalsafety.com/

https://ehs.ncsu.edu/laboratory/chemical-safety/

Videos

https://www.youtube.com/watch?v=dfDATKpfPWQ

https://www.youtube.com/watch?v=IlGjOpRffLc

https://www.youtube.com/watch?v=RhlOYhOvCsQ

https://www.youtube.com/watch?v=0tLJFb3YrWA

https://www.youtube.com/watch?v=0tLJFb3YrWA&t=12s

https://www.youtube.com/watch?v=zcMxy0GfU1o

https://www.youtube.com/watch?v=Mj37XXnnkwE

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5. PART E: Case Study Description

Case Study 1. Quality Management Systems in Restaurants

A Quality Management Systems (QMS) in the food sector plays a critical role in ensuring food safety and quality requirements while it meets expectations for both the organization and the customers.

The objective of this study is to develop a QMS for restaurants that will assist them to improve their services. During the development of a QMS all existing standards and criteria should be considered.

The QMS implies that management will go through training to learn how to work with the system, how to implement and how to evaluate it. Management should then be the ones providing training and advice on how to treat customers. Employees will also go through training and procedures that a restaurant should comply with, in order to be considered a quality restaurant.

Implementing an advanced QMS is usually expensive and if restaurants want to improve their services through it they have to invest in their employees. On the other hand, by implementing a QMS, restaurants can save money and become more productive and efficient.

Today, a critical output of a QMS is the reduction of environmental footprint of the restaurant. This can be implemented by considering all aspects of the product chain, from raw materials (production and) supply to waste management.

Tips for your approach

1. The problem that you are called to investigate must be addressed through the Efficient Quality Management Systems approach and should be considered in a holistic view
2. You should first define your problem and think of its solution
3. The approach that you are going to follow should be well structured
4. Please try to consider all aspects of the process. It is obvious that if the process is well defined and implemented the product, namely the QMS, will be optimized, efficient and useful for the organization.
5. You should focus on the whole system but you should consider all subsystems. Please consider which parameters can be optimized in each subsystem. If you manage to do so, then the whole system will be optimized.
6. The resources that you are going to use must be presented as well
7. You should follow the steps Understand the process – Obtain information for all subprocesses – Identify the key stakeholders – Design and implement the QMS – Validate the QMS – Carry our continuous monitoring and improvement activities
8. See how you can enhance employees' motivation in implementing and continuously improving the applied QMS
9. Consider if the implementation of the QMS will result in a reduced environmental footprint for the restaurant or the chain

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10. Consider if, and to which degree, a paperless QMS can be developed
11. Please bear also in mind that the approach you will design and follow can be applied in many other organizations of the wider food sector

Aspects that need to be considered:

Problem Statement

1. How can QMS be defined?
2. What are the advantages and disadvantages of QMS?
3. What are the aspects for the development process of a QMS for restaurants?
4. Please consider that the starting point is suppliers; they should provide products of the highest safety and quality
5. Will the needs of customers, employers and employees be satisfied?
6. How should a QMS be implemented?
7. Do you have all the resources? (it is impossible to develop an excellent QMS if resources are insufficient)

Methodology

Please consider the following aspects:

9. Scope of the QMS
10. Food Safety and QMS
11. Management Responsibility
12. Crisis Management Plan (mainly for suppliers)
13. Fundamental Requirements
14. Food Safety System
15. Allergy issues (very important issue in our days)
16. Product Requirements
17. Verification and Continuous Improvement

Implementation – Validation - Monitoring

Try to answer, among others, the following questions:

1. Does the applied QMS meet your expectations?
2. Has the personnel sufficient motivation in implementing it?
3. Did the personnel, including contractors, receive sufficient training?
4. Which are the benefits? (e.g reduced cost, customer satisfaction, increase of turn-over, reduced environmental footprint)
5. Did you notice any problems?
6. Did you plan monitoring activities?
7. Did you plan self-audits?
8. Is on time and quality reporting envisaged?
9. Have any of the other parts of the supply chain been improved?

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10. Has customer satisfaction been improved?

Case Study 2. Health and Safety Management Systems in Chemical Laboratories

Safety in chemical laboratories, either located in educational institutions or in other public or private organizations, is a very important issue. Programs to improve safety in laboratories have been launched since the late 1980s when the Occupational Safety and Health Administration (OSHA) in the USA and other organizations in other countries demanded new legislation to improve safety standards and coordinated its implementation.
A safe laboratory, as any other workplace, is a place where researchers and all other workers are protected from physical, chemical and biological injuries. Today, regulations have evolved and national agencies demand uniformity and continuity. For example, chemicals in all departments should have uniform labeling. The reporting of incidents and exposures must follow the same process for all employees. The laboratory's safety officer should participate in other facility safety meetings to ensure shared expertise and tasks. Such meetings might include risk management, hazardous materials, infection control/laboratory safety, employee health, emergency preparedness, life safety/utilities/equipment and radiation, and product/value analysis.

Tips for your approach

1. The problem that you are called to investigate must be addressed through the Health and Safety Management System approach and should be considered in a holistic view
2. You should first define your problem and think of its solution
3. The approach that you are going to follow should be well structured
4. Please try to consider all aspects of the process. It is obvious that if each aspect is optimized the Health and Safety Management System will be optimized too.
5. You should focus on the whole system but you should consider all subsystems. Please consider which parameters can be optimized in each subsystem. If you manage to do so, then the whole system will be optimized
6. The resources that you are going to use must be presented as well.
7. Please bear also in mind that the approach you will design and follow can be applied in any other chemical laboratory, regardless of its type and the organization it belongs to.

Try to answer, among others, the following questions:

1. Is there an existing health and safety manual in the laboratory or you are going to develop a new one?
2. Is there a chemical hygiene plan?
3. Is there an exposure control plan?
4. Are there hazard communication standards?
5. Is there infection control policy and procedure manual?
6. Are there material safety data sheets (MSDS)?
7. Have you considered adequate training of all personnel?
8. Have you planned verification and continuous improvement activities?

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9. Have you considered waste management issues?

Deliverables

The deliverables that you should prepare for each case study are the following:

- A short report that will include:
  - Executive summary (2 pages)
  - The problem definition
  - Your proposed solution
  - Your analysis
  - Your supportive material, e.g drawings, excel sheets (if they exist)
- A public summary (this is a report that can be uploaded in a website, is written in simple words and does not contain equations, sensitive data, engineering designs, cost or SWOT analyses, data from feasibility studies, risk analyses, etc). The target group of this report is the general public
- Finally, please note that the case study will be presented for 20 minutes and then questions will be asked

Important note:

It is best if each case study is undertaken by a group of young engineers, so that both groups can interact and exchange views, ideas, expertise and findings.

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6. PART F: Overall Module Presentation

Discussion questions

Case study 1. Quality Management Systems in Restaurants

Please refer to the questions indicated in the Case Studies Description part

Put emphasis on:

1. The development of a paperless QMS
2. The estimation of the environmental footprint of the business a couple of years after its implementation (provide guidelines which the organization can consider)
3. Establish some Key Performance Indicators (KPI) to assess its efficiency

Case study 2. Health and Safety Management Systems in Chemical Laboratories

Please refer to the questions indicated in the Case Studies Description file

Other issues to be considered for both case studies

1. Please try to create a health and safety organization chart (if one exists, review it and detect any points that are either missing or they need improvement)
2. See if there is any coordination between different steering committees, if they exist (Risk Management, Organisational Development, Biosafety, Laboratory Safety, Construction Safety)
3. Try to improve the use of information technologies to improve the efficiency and monitoring of the HSMS
4. Put special emphasis on H&S training (on general, biological, chemical, radiation, laser, fire safety courses)
5. e-courses from experts may be also considered for employees

Try to implement all required steps as shown in the graph

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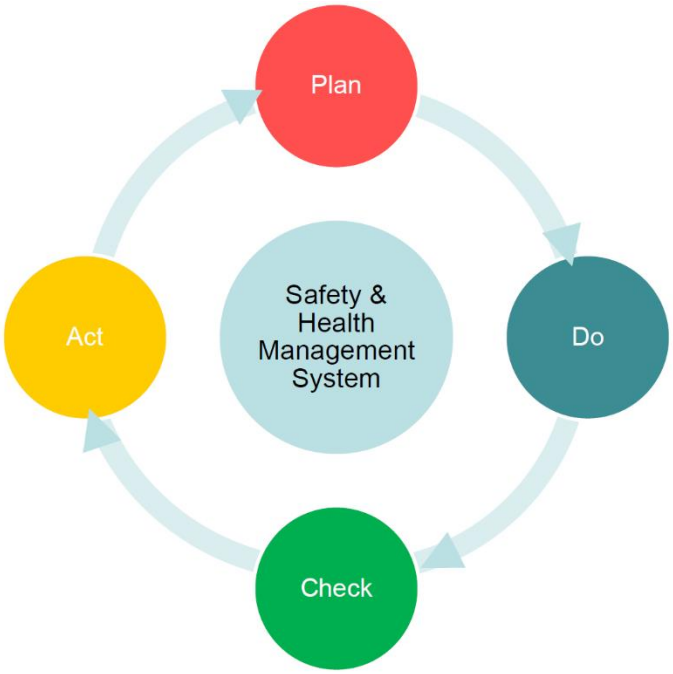

Check if all the following aspects are considered

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Note for university laboratories and students

If students see and experience safety & health best practices being implemented in chemical and other laboratories in the university, they will most likely enter the workforce well aware of safety & health issues. This is considered in the longer term a very important aspect. So, the responsibility of universities to maintain high safety and health standards in chemical and other laboratories is even greater.

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7. PART G: Overall Module Presentation

Reflective questions

Initial questions:

- How would you define the problem you are dealing with?
- Which are the objectives?
- Are the objectives feasible?
- What kind of aspects (processes, parameters, legislation, etc) do you want to explore?
- Did you classify/categorize the steps to deal with the problem?
- Did you make a plan?
- Do you think that this plan is correct?

Navigating questions:

- Is the approach considered helpful to achieve the objectives?
- Does this make sense?
- Should you make any adjustments based on what you have learned so far?
- Do you get sufficient information from your group members?
- Do you need any additional sources?

Experimental questions:

- Do you have any previous experience from similar problems?
- Is there anything important missing?
- Can you obtain all required data?
- How would you deal with the problem if you were the company's CEO, or a chief engineer or a quality / health & safety expert?
- Is your overall approach correct?
- Did you identify any mistakes?

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- Is there sufficient time for corrective action, if needed?

Other questions:

- What is feasible?
- How can you prioritize your steps?
- Who is going to do what?
- Did you identify synergies among team members?
- Other???

Assessment

PBL Assessment

	Poor/Low	Good	Excellent
Definition of the problem			
Analysis of the problem			
Discover what they need to learn			
Identify, find, use of appropriate resources			
Critical assessment of knowledge			
Application of selected information to the problem			
Reflection of gained knowledge effectively			
Self-direct the learning strategies			
Group meetings evaluation			
Participation skills in their teams			
Problem solved?			

Case study assessment

Please select one case study

☐ Case Study 1. Quality Management Systems in Restaurants

☐ Case Study 2. Health and Safety Management Systems in Chemical Laboratories

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		Poor/Low	Good	Excellent
Applied Efficient Quality and Health & Safety Management Systems	Degree of overall appreciation			
	Quality of strategy followed			
	Degree of problem identification			
Case study	Report			
	Project folder			
	Quality of presentation			
	Individual contribution to the presentation			
	Timeline			
	Accuracy of reflective questions			

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P6-GRANTXPERT CONSULTING LTD [GrantXpert]

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