London South Bank University
EST 1892

School of Engineering

Division of Chemical and Energy Engineering (CEE)

Module Guide

Module title: **Process Safety and Environmental Management**

Level: 6

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Assessment of the module

The module is assessed by closed book examination 70% and coursework 30%.

Examination

The examination will be held in May 2020[1] (correct as appropriate)

Coursework

Component	Hand out date	Hand in date	Feedback date
Coursework	06/03/20	08/05/20	29/05/20

FEEDBACK GUIDELINES

Feedback will normally be given to students within 15 working days after the final submission of an assignment or as advised by their module leader.

General feedback, applying to all students, will also be placed on the module VLE site within 15 working days.

EXTERNAL EXAMINER

Details of the external examiner appointed for this module can be obtained from the course director.

[1] The examination timetable will be circulated late in 2019 for January exams and around Easter 2020 for May exams.

What skills you will develop in this module

Knowledge and Understanding

On completion of the module the students will be able to:

- Acquire un understanding of the hazards inherent in industrial activities
- Acquire an understanding of risk analysis techniques and consequence models for the assessment of risks and environmental impacts
- Demonstrate an understanding of the impact of pollutants on air, soil, water and living organisms
- Acquire skills in risk and pollution analysis and mitigation
- Acquire and understanding of the need to design safe and environmentally friendly industrial processes
- Assess social and economic impacts of pollution and emissions on ecological systems

Intellectual Skills

- Produce risk and assessment studies on industrial processes
- Produce economic, risk and environmental assessments of industrial projects

Practical Skills

- Acquire self-learning, presentation and report writing skills
- Demonstrate the importance of ethical conduct

Transferable Skills

- Communicate effectively across a wide range of related disciplines sharing common principles
- Assess development opportunities outside the oil and gas sector and use acquired skills to innovate

Short description of the module

This module is designed to introduce undergraduate students to an understanding of process safety and environmental management principles within the prevailing economic, regulatory and environmental constraints.

The module will focus on process safety and environmental management within the context of industrial activities related to the oil, gas and chemical industries.

Evaluation of the module

This course is assessed using Module Evaluation Questionaires (MEQs). There is also the opportunity to provide feedback on the module at the student-staff course board meetings.

Learning resources

Reading List

- Daniel A. Crowl and Joseph F. Louvar (2011) *Chemical Process Safety*. Third Edition, Pearson Education International.
- Jones J. C. (2003) Hydrocarbon Process Safety. Second Edition, Latimer Trend & Compant Ltd., Plymouth
- Mannan, S. (2005) *Lees' Loss Prevention in the Process Industries*. Third Edition, Elsevier Butterworth –m Heinemann
- Boeker E. and van Grondelle (2011) *Environmental Physics*. Third edition, Wiley
- Sportisse, B. (2009) *Fundamentals in Air Pollution: From Processes to Modelling.* Springer
- Sharmal *et al*. (2018) *Air pollution and Control*. Springer
- Williams, P. T. (1998) *Waste treatment and disposal.* Wiley
- Droste, R. L. (1997) *Theory and Practice and water and wastewater treatment*. Wiley
- Hocking, M. B. (2005) *Handbook of Chemical Technology and Pollution Control*
- Forstner, E. (1995) *Integrated Pollution Control.* Spring
- Weiner, R. F. and Matthews, R. A. (2003) *Environmental Engineering.* 4th edition, Butterworth Heinemann

Additional Information

Module Title:	**Chemical Process Management**
Module Level:	6
Module Reference Number:	ENG_6_476
Credit Value:	20
Student Study Hours:	Student-managed learning hours: 150 hours
Contact Hours:	48 hours
Private Study Hours:	111
Pre-requisite Learning:	None Specified
Course(s):	
Year and Semester:	2019-2020, Semester 2
Module Coordinator:	Dr A. Fenghour
MC Contact Details:	Email: fenghoua@lsbu.ac.uk Room Number: FW-304
Teaching Team & Contact Details:	Dr A. Fenghour Email: fenghoua@lsbu.ac.uk Room Number: FW-304 Dr C. Benson Email: bensoncb@lsbu.ac.uk Room Number: E-252a
Subject Area:	Engineering
Summary of Assessment Method:	70% Examination, 30% Coursework
External Examiner appointed for module:	Dr Faizan Ahmad

AIMS OF THE MODULE

The aims of the module are summarise below:

- To introduce the students to the principles of process safety and environmental principles
- To introduce risk analysis, risk assessment and risk reduction techniques and methodologies
- To address the impact of pollution on air, water, soil and living organisms
- To introduce the main technologies employed in pollution abatement in the processing industries
- To assess the social and economic impact of hazards and environmental pollution
- To highlight the role of ethics, sustainability and life cycle considerations in the design of environmentally-friendly processes

INTRODUCTION TO STUDYING THE MODULE

Process Safety

- Introduction to Chemical Process safety
- Toxicology and Industrial Hygiene
- Source Models
- Toxic Release and Dispersion Models
- Fires and Explosions
- Hazards Identification
- Fires and Explosion Prevention Concepts
- Chemical Reactivity
- Risk Assessment

Atmospheric pollution and its control

- Atmospheric Pollutants
- Solar radiation and the Greenhouse Effect
- Atmospheric Conditions/Stability conditions
- Modelling of Atmospheric Dispersion using the Gaussian Model
- Removal of Particulate Matter using Electrostatic Precipitation and Cyclones

Water pollution and oil pollution and their control

- The hydrological Cycle
- Classification of Water Pollutants
- Oxygen-Demanding Wastes
- Water and Wastewater Treatment
- Photochemical Transformation
- Biodegradation of Pollutants
- Oil Pollution / Polycyclic Aromatic Hydrocarbons (PAHs)
- Halogenated Hydrocarbons

Overview of Types of Classes

Lectures (4 hours per week)

Lectures

Lectures will be delivered to the students in a lecture theatre. The lecture notes will be uploaded on VLE. The students are encouraged to supplement their learning through further independent reading of the topics covered in order to enhance and deepen their understanding of the subject matter.

Coursework

A coursework will be issued to the students. Each student is required to independently carry out the assignment and submit a report by a fixed deadline. The coursework will

serve as a measure of a student's engagement and understanding of the contents of the module. The coursework will be assessed according to a mark scheme and feedback will be given to the student on his performance over the assessment criteria.

Importance of Student Self-Managed Learning Time

The students are encouraged to supplement their contact hours with more independent research and problem solving. Peer to peer learning is also encouraged.

Employability

The principles and skills conveyed by the module will help the students develop critical thinking and independent inquiry aptitudes which will enable them to be independent and competent practitioners in their professional life.

The contents of the module will help the graduates find employment in the Chemical Engineering industry; Oil and Gas industry; Energy Sector, Engineering Design, Renewable Energy and Pharmaceuticals industry.