Form 2B

City University of Hong Kong
Information on a Course
offered by Department of Biology & Chemistry
with effect from Semester A 2013-2014

Part I

Course Title:	Quality and Environmental Management for Laboratory
Course Code:	BCH6116
Course Duration:	One Semester
No. of Credit Units:	3
Level:	P6
Medium of Instruction:	English
Prerequisites:	Nil
Precursors:	Nil
Equivalent Courses:	Nil
Exclusive Courses:	Nil

Part II

Course Aims:

The aim of this course is to provide essential knowledge of the contemporary concepts, principles and technical skills in quality and environmental management systems, measurement, calibration, audit practices, assurance of energy efficiency and green practices for laboratories to students. Upon the completion of this course, students should be able to apply their knowledge and techniques to various aspects of work of Quality & Environmental Officers/Engineer/Laboratory Professionals.

Course Intended Learning Outcomes (CILOs)

Upon successful completion of this course, students should be able to:

No.	CILOs
1	Describe the basic concept of quality, safety and environmental management in laboratory operations environment, including ISO 17025, ISO 9001, ISO14001 and OHSAS 18001.
2	Elaborate and apply principles of managerial and technical requirements of quality, safety and environmental management systems in laboratory management and auditing.
3	Identify and apply appropriate calibration methods and measurement of uncertainties in different types of testing equipment for environmental analysis.
4	Critically evaluate requirements (especially HOKLAS requirement) and implementations of laboratory integrated management system included quality, health, safety, environmental and security.

Teaching and Learning Activities (TLAs)

(Indicative of likely activities and tasks designed to facilitate students' achievement of the CILOs. Final details will be provided to students in their first week of attendance in this course)

ILO No	TLAs
CILO 1	Lectures and tutorials will provide fundamental concepts and principles of the various quality systems relevant to laboratory management and environmental management to students.
CILO 2	Small group tutorials and company visits will provide knowledge of managerial and technical skills for the quality management of environmental analytical laboratories to students.
CILO 3	Laboratory practicals will provide necessary training to students on the principles and techniques for the proper calibration and uncertainty measurement for different types of testing equipment for environmental analysis, and opportunity to assess and validate new environmental analytical techniques.
CILO 4	Lectures, small group tutorials and company visits will provide knowledge of how requirements of integrated management systems (e.g. the HOKLAS system) are implemented, and opportunity to critically evaluate such implementation in real-world environmental testing laboratories to students.

TLA	Remarks	CILOs to be addressed
Large Class Activities	Learning through teaching is primarily based on lectures and tutorials. Group discussion will be used to facilitate conceptual understanding of the various management system requirement	1,2,3,4
Laboratory Practicals	The team-based laboratory exercises provide students with the opportunities to understand, perform and report different testing and calibration requirement, as well as, measurement uncertainty reporting.	3
Tutorial Exercises (plus site visit)	The individual exercise enables student to understand the basic requirement of different management system, calibration practice and measurement uncertainty calculation. It includes a site visit to commercial laboratory operations.	1,2,3,4

Assessment Tasks/Activities

(Indicative of likely activities and tasks designed to assess how well the students achieve the CILOs. Final details will be provided to students in their first week of attendance in this course)

ILO No	Type of assessment tasks/activities
CILO 1	In the end-of-course examination, students will demonstrate their understanding of the fundamental concepts and principles of the various quality systems relevant to laboratory management and environmental management.
CILO 2	The end-of-course examination and company visit reports will provide students with the opportunity to demonstrate their knowledge of managerial and technical skills for the quality management of environmental analytical laboratories.
CILO 3	The laboratory performance assessment, laboratory reports and the end-of-course examination will be used to assess students' ability in the calibration and uncertainty measurement for different types of testing equipment for environmental analysis.
CILO 4	The end-of-course examination and company visit reports will be used to assess students' ability to critically evaluate the implementation of laboratory integrated management systems in new and real-world environmental testing laboratories.

The Assessment Tasks and Activities provided above are indicative of those that students will undertake in this course. Final details of the individual assessment, including tutorial assignments, discussions, case studies, company visit reports, laboratory reports, and end-of-course examination, will be provided in the student course documents distributed at the commencement of the course.

Starting from Semester B, 2002-03, students must satisfy the following "Minimum Passing Requirement" for BCH courses:

"A minimum of 30% in coursework as well as in examination, in addition to a minimum of 40% in coursework and examination taken together".

Grading of Student Achievement

Grading will be based on students' performance in assessment tasks/activities. Allocation of marks will be as follows: Coursework (including laboratory reports, tutorial assignments, company visit reports), 40%; Examination (3 hrs), 60% (see above table under Assessment Tasks/Activities).

Grade descriptions

The following description is indicative of the grading criteria adopted for assessment purposes:

A. Students complete all assessment tasks/activities and can demonstrate excellent synthesis of the principles, processes, methodologies, problems and limitations related to various aspects of quality and environmental management of laboratories in detail. Capable of providing a comprehensive analysis of the implementation of integrated management systems for environmental testing laboratories, with clarity of explanations, logical and advanced justifications, and creative/personal interpretations and view-points. Demonstrate the ability to validate new environmental analytical techniques with originality in thought, argument or application, with effective oral and written communication.

B. Students complete all assessment tasks/activities and can describe and explain principles, processes, methodologies, problems and limitations related to various aspects of quality and environmental management of laboratories with a high degree of accuracy and thoroughness. Capable of providing a detailed, critical analysis of the implementation of integrated management systems for environmental testing laboratories. Show ability in integration of concepts, analysis techniques and applications via clear oral and written communication.

C. Students complete all assessment tasks/activities and can describe and explain some key principles, processes and methodologies related to various aspects of quality and environmental management of laboratories. Provides simple but accurate explanations and basic justifications for the implementation of integrated management systems for environmental testing laboratories. Shows evidence of use of oral and written communication clearly.

D. Students complete all assessment tasks/activities but only can briefly describe isolated principles, processes, methodologies, problems and limitations related to various aspects of quality and environmental management of laboratories. Demonstrates limited ability in the implementation of integrated management systems for environmental testing laboratories, with a lack of integrated understanding of applications of relevant concepts and principles as a whole. Can communicate simple ideas accurately in writing and orally.

F. Students fail to complete all assessment tasks/activities and/or cannot accurately describe and explain relevant principles, processes, methodologies, problems and limitations related to various aspects of quality and environmental management of laboratories. Cannot provide appropriate analysis and satisfactory justifications to the implementation of integrated management systems for environmental testing laboratories, and may show evidence of plagiarism or inability to communicate ideas.

Part III

Keyword Syllabus:

- Commercial laboratory management practice
- ISO9001 & ISO/IEC 17025
- Environmental management in laboratory (ISO14001)
- Safety management in laboratory (OHSAS18001)
- Management/ technical requirements for accreditation
- Calibration practice
- ISO Guide to expression of uncertainty in measurement
- EURACHEM/CITAC Guide of quantifying uncertainty in analytical measurement
- Traceability concept
- ISO 15189 for medical laboratory
- Quality assurance in testing
- Standard operation procedure (SOP) for difference testing methods and Sampling technique
- Internal auditor requirement
- Laboratory assessor requirements

Recommended Reading:

- HKAS 002, HOKLAS 003, HOKLAS 015, HKAS Supplementary Criteria No. 5, and HOKLAS Supplementary Criteria No. 2 & 33.
- Donald C. Singer, "A Laboratory Quality Handbook of Best Practices and Relevant Regulations", ASQ Quality Press, 2001.

Online Resources:

Related Links:
http://www.itc.gov.hk/en/quality/hkas/about.htm

Teaching Pattern:
Duration of course: 1 semester
Suggested lecture/tutorial/laboratory mix:
Lectures: 26H
Tutorials: 13H
Laboratories/Visit: 28H