APPROVED

CHEA7004: Analytical Practice & Protocol

Module Details

Module Code:	CHEA7004
Title:	Analytical Practice & Protocol APPROVED
Long Title:	Analytical Practice & Protocol
NFQ Level:	Intermediate
Valid From:	Semester 1 - 2019/20 (September 2019)
Duration:	1 Semester
Credits:	5
Field of Study:	4424 - Analytical Chemistry
Module Delivered in:	3 programme(s)
Module Description:	This module further develops the theory and practice of analytical chemistry, with specific reference to the areas of spectroscopic and chromatographic instruments, protocols and applications.

Learning Outcomes

On successful completion of this module the learner will be able to:

#	Learning Outcome Description
LO1	Solve quantitative analytical problems based on analytical data using established calibration techniques.
LO2	Explain techniques used for sampling, sample pre-treatment and data analysis as part of the total analytical process.
LO3	Discuss (compare and contrast) operation principles and instrumentation of selected spectroscopic and chromatographic methods associated with modern instrumental analysis.
LO4	Appraise the application of spectroscopic and chromatographic analytical practices in pharmaceutical and biopharmaceutical manufacturing.

Dependencies

Module Recommendations

Incompatible Modules

No incompatible modules listed

Co-requisite Modules

No Co-requisite modules listed

Requirements

No requirements listed

Indicative Content

Total analytical process
Sampling, sample pre-treatment and separation techniques. Standard addition and internal standard methods of quantitation. Types of error in analysis. Statistical evaluation of analytical data. Analytical calculations based on spectroscopic or chromatographic data.

Spectroscopy
Holistic evaluation of atomic and molecular abrsorption and emsssion spectroscopy instrumentation: sources of radiation, optical system and detection. Detailed description of thermal and ICP atomic absorption, X-ray and optical fluorescence spectroscopies.

Chromatography
Assessment and optimisation of parameters for LC and GC. LC normal and reverse approaches. Gas chromatography with non-mass dependant and MS detectors (CI and EI). LC hyphenated with magnetic sector-MS. Electrophoresis. Preparative Chromatography.

Analytical practices in pharmaceutical manufacturing
Compare and contrast spectroscopic and chromatographic methods. Best practices, interference and chemical derivatisations used in pharmaceutical analysis. Time, cost, applicability to on-line quality control, limitations.

Module Content & Assessment

Assessment Breakdown	%
Coursework	40.00%
End of Module Formal Examination	60.00%

Assessments

Coursework

Assessment Type	Short Answer Questions	**% of Total Mark**	15
Timing	Week 5	**Learning Outcomes**	1,2

Assessment Description
Theory test including topics such as sampling, pre-treatments, calibration, data analysis.

Assessment Type	Short Answer Questions	**% of Total Mark**	15
Timing	Week 9	**Learning Outcomes**	3

Assessment Description
Theory test including topics such as sources of radiation, optical systems, chromatrography columns and detectors (compare and contrast).

Assessment Type	Presentation	**% of Total Mark**	10
Timing	Week 10	**Learning Outcomes**	4

Assessment Description
Presentation on application of spectroscopy and chromatography methods in pharmaceutical and biopharmaceutical analysis

End of Module Formal Examination

Assessment Type	Formal Exam	**% of Total Mark**	60
Timing	End-of-Semester	**Learning Outcomes**	1,2,3,4

Assessment Description
End-of-Semester Final Examination

Reassessment Requirement

Repeat examination
Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

Module Workload

Workload: Full Time					
Workload Type	*Contact Type*	*Workload Description*	*Frequency*	*Average Weekly Learner Workload*	*Hours*
Lecture	Contact	Module Content delivery	Every Week	4.00	4
Independent & Directed Learning (Non-contact)	Non Contact	Student undertakes independent study	Every Week	3.00	3
				Total Hours	7.00
				Total Weekly Learner Workload	7.00
				Total Weekly Contact Hours	4.00

Workload: Part Time					
Workload Type	*Contact Type*	*Workload Description*	*Frequency*	*Average Weekly Learner Workload*	*Hours*
Lecture	Contact	Module Content delivery	Every Week	4.00	4
Independent & Directed Learning (Non-contact)	Non Contact	Student undertakes independent study	Every Week	3.00	3
				Total Hours	7.00
				Total Weekly Learner Workload	7.00
				Total Weekly Contact Hours	4.00

Module Resources

Recommended Book Resources

Douglas A. Skoog... [et al.]. (2013), Fundamentals of Analytical Chemistry, 9th. Chapters: 6,7,8,27,28, Cengage Learning, Inc, CA, United States, [ISBN: 9780495558286].

Supplementary Book Resources

Anette Muellertz, Yvonne Perrie, Thomas Rades. (2016), Analytical Techniques in the Pharmaceutical Sciences, 1st. Spirnger, [ISBN: 9781493940271].

Elsa Lundanes, Leon Reubsaet, Tyge Greibrokk. (2013), Basic Principles, Sample Preparations and Related Methods, 1. John Wiley & Sons Ltd., United Kingdom, [ISBN: 3527336206].

Recommended Article/Paper Resources

Institute of Validation Technology. Step-by-Step Analytical Methods Validation and Protocol in the Quality System Compliance Industry.

Supplementary Article/Paper Resources

U.S. Department of Health and Human Services Food and Drug Administratio. (2015), Analytical Procedures and Methods Validation for Drugs and Biologics, https://www.fda.gov/downloads/drugs/guid ances/ucm386366.pdf

This module does not have any other resources

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_SCHQA_8	Bachelor of Science (Honours) in Analytical Chemistry with Quality Assurance	-1	Mandatory
CR_SESST_8	Bachelor of Science (Honours) in Environmental Science and Sustainable Technology	-1	Mandatory
CR_SCHEM_7	Bachelor of Science in Analytical and Pharmaceutical Chemistry	-1	Mandatory