

ADVANCED DIPLOMA IN ANALYTICAL CHEMISTRY

AdvDip (Analytical Chemistry) - NQF Level 7 (120 credits)

Qualification code: ADAC20

SAQA ID: 111822, CHE NUMBER: H/H16/E069CAN

Campus where offered: Arcadia Campus

REMARKS

- a. *Admission requirement(s):*
A Diploma in Analytical Chemistry, **or** a National Diploma: Analytical Chemistry, **or** a Bachelor of Science in Chemistry, **or** an equivalent qualification at NQF Level 6 with a minimum of 360 credits.
- Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations.
- b. *Selection criteria:*
Admission is subject to selection. Prospective students will be evaluated based on the marks obtained in the previous qualification and/or work experience.
- Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP). Applicants will be informed of their status per official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.
- c. *Recognition of Prior Learning (RPL), equivalence and status:*
See Chapter 30 of Students' Rules and Regulations.
- d. *Intake for the qualification:*
January only.
- e. *Presentation:*
Day classes.
- f. *Minimum duration:*
One year.
- g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations.

CURRICULUM

ATTENDANCE

CODE	MODULE	NQF-L	CREDIT
ACY107V	Analytical Chemistry Practice	(7)	(30)

FIRST SEMESTER

ASP117V	Atomic Spectroscopy	(7)	(12)
SSP117V	Sampling and Sample Preparation	(7)	(12)
THM117V	Thermal Analysis and Kinetic Methods	(7)	(12)

SECOND SEMESTER

CTG117V	Chromatography	(7)	(12)
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EED117V	Electro-Analytical Techniques	(7)	(12)
MSP117V	Molecular Spectroscopy	(7)	(15)
SCH117V	Synthetic Chemistry	(7)	(15)

TOTAL CREDITS FOR THE QUALIFICATION: **120**

MODULE INFORMATION (OVERVIEW OF SYLLABUS)

The syllabus content is subject to change to accommodate industry changes. Please note that a more detailed syllabus is available at the Department or in the study guide that is applicable to a particular module. At time of publication, the syllabus content was defined as follows:

A

ANALYTICAL CHEMISTRY PRACTICE (ACY107V) (Module custodian: Department of Chemistry)

PROJECT ASSESSMENT

Mini Project: Apply theoretical knowledge of chromatography, molecular spectroscopy, atomic spectrometry, electro-analytical techniques, synthetic chemistry, thermal analytical and kinetic methods to perform quantitative and qualitative analysis of real samples. Data analysis, data interpretation and report writing. (Total notional time: 300 hours)

ATOMIC SPECTROSCOPY (ASP117V) (Module custodian: Department of Chemistry)

1 X 3-HOUR PAPER

Overview of syllabus: Electrothermal atomic absorption and High-resolution continuum atomic absorption spectrometry: Atomisation, advanced sample introduction techniques, interferences and application of ETAAS and HRCAAS. Inductively Coupled Plasma Atomic Emission Spectrometry: Ionization, advanced sample introduction techniques, interferences and application of ICP-AES. Atomic X-ray Fluorescence Spectrometry: X-ray sources, absorption of X-rays, emission of fluorescence radiation, WDXRF and EDXRF instruments, sample preparation, matrix effects and application of XRF. (Total notional time: 120 hours)

C

CHROMATOGRAPHY (CTG117V) (Module custodian: Department of Chemistry)

1 X 3-HOUR PAPER

Principles of gas, liquid and planar chromatography. Kinetic variables and parameters affecting efficient chromatographic separations. Selecting the most appropriate experimental conditions and parameters for separation and identification of compounds. Applications of liquid, high performance thin layer and gas chromatography. (Total notional time: 120 hours)

E

ELECTRO-ANALYTICAL TECHNIQUES (EED117V) (Module custodian: Department of Chemistry)

1 X 3-HOUR PAPER

Principles of electrochemistry, electrogravimetry and coulometry. Electrochemical cells and electrodes for potentiometric determinations. Predict ohmic potential, concentration and kinetic polarisations. Instrumentation and applications. (Total notional time: 120 hours)

M

MOLECULAR SPECTROSCOPY (MSP117V) (Module custodian: Department of Chemistry)

1 X 3-HOUR PAPER

Principles of Molecular Spectroscopy (IR, Raman, NMR and MS). Wave and particle properties of electromagnetic radiation, its interaction with matter and the spectroscopic techniques associated with the spectrum obtained. Interpretation of Spectra. Spectral Analysis of Organic and Polymer Molecules. Spectral Analysis of Inorganic Compounds and Minerals. Industrial and Environmental Applications. (Total notional time: 150 hours)

S**SAMPLING AND SAMPLE PREPARATION (SSP117V)****1 X 3-HOUR PAPER***(Module custodian: Department of Chemistry)*

Handling and processing of real samples. Sampling of liquids, solids, gases, volatiles and particulate matter. Sample preparation, analyte extraction and pre-concentration; and sample preservation techniques. Validating the extraction efficiency of an extraction method and analyte recovery. Advanced sample preparation techniques: microwave digestion, decomposition by fusion. (Total notional time: 120 hours)

SYNTHETIC CHEMISTRY (SCH117V)**1 X 3-HOUR PAPER***(Module custodian: Department of Chemistry)*

Substitution reactions and mechanisms. Elimination reactions and mechanisms. Addition reactions and mechanisms. Organometallic Chemistry and Coordination Chemistry. (Total notional time: 150 hours)

T**THERMAL ANALYSIS AND KINETIC METHODS (THM117V)****1 X 3-HOUR PAPER***(Module custodian: Department of Chemistry)*

Principles of phase transformation and thermal analysis of solids. Polymorphism, allotropy, superheating, supercooling, metastable and equilibrium states. Thermodynamics and kinetics of phase transformation. Thermogravimetric analysis (TGA), Differential Thermal Analysis (DTA) and Differential Scanning Calorimetry (DSC). Kinetic variables and parameters affecting efficient TGA, DTA and DSC techniques for the determination of endotherms, exotherms and weight loss on heating or cooling of materials and quantitative analysis. (Total notional time: 120 hours)

