



**FACULTY OF APPLIED AND COMPUTER SCIENCES**

**DEPARTMENT OF CHEMISTRY**

National Diploma:  
Analytical Chemistry

Guidelines  
for  
Work Integrated Learning

Subject codes: AACNP 1A  
AAPRO 2A

*Your world to a better future*

## **GUIDELINES FOR WORK INTEGRATED LEARNING**

Work Integrated Learning consist of two components, i.e. “Chemical Industry: Practical” and “Chemistry Project”.

### **AIM OF WORK INTEGRATED LEARNING (WIL):**

WIL is an integral part of the training and, together with the University Training, form a co-operative training unit. It is therefore the aim of WIL to compel the student in his/her work situation to be actively engaged in the broadening of his/her knowledge and analytical skills. It is also important that the students be exposed to the industrial world and its occupational ethics.

The outline for WIL has been drawn up in order that the prescribed requirements can, where possible, fit in with the working environment of each student and his employer.

### **DURATION OF COURSE:**

Four semester University training and two semesters applicable work integrate learning for a total minimum duration of three years. Students enroll for WIL by registering for one semester for the subject “Chemical Industry: Practical P1 (AACNP 1A)” and for another semester for the subject “Chemistry Project (AAPRO 2A)”.

Students may register for “Chemistry Industry: Practical P1 (AACNP 1A)” during any semester, even for the semester immediately preceding full-time study. For “Chemistry Project (AAPRO 2A)” all the Level III subjects and Chemical Quality Assurance must have been successfully completed.

### **WHERE IS WORK INTEGRATED LEARNING DONE?**

The student must complete both “Chemical Industry: Practical” and “Chemistry Project” at an accredited employer.

Students, who do not have a suitable employer, may do their “Chemistry Project” at the Department of Chemistry of the Vaal University of Technology.

### **GUIDELINES FOR WORK INTEGRATED LEARNING:**

#### **1. REGISTRATION FOR WORK INTEGRATED LEARNING:**

It is the responsibility of the student to register for work integrated learning. Registration takes place at the same time as registration for full-time and part-time students during January and July each year. Registration takes place by the completion of an application to register that is available at the Head of Department: Chemistry.

2. WHERE IS WORK INTEGRATED LEARNING DONE?

The student must complete Work Integrated Learning at an accredited employer.

3. ASPECTS IN WHICH STUDENT SHOULD RECEIVE TRAINING

SECTION A: GENERAL LABORATORY PRACTICE

Both modules are compulsory

1. General laboratory techniques
  - 1.1 Correct sampling techniques
  - 1.2 Sample preparation
  - 1.3 Preparation of standards
  - 1.4 Safety in the laboratory
2. Laboratory organization and management
  - 2.1 General laboratory organization and management
  - 2.2 Preparation of laboratory reports
  - 2.3 Data handling
  - 2.4 Mathematical treatment of results
  - 2.5 Quality assurance
  - 2.6 Laboratory budget
  - 2.7 Handling of chemical literature
  - 2.8 Meeting procedures

SECTION B: WET CHEMICAL ANALYSIS

Both modules are compulsory

1. Gravimetric analysis
2. Titrimetric analysis

SECTION C: INSTRUMENTAL ANALYSIS

Any ONE of the following.

1. Spectroscopic techniques
2. Chromatography
3. Electroanalytical techniques
4. Thermal analysis

SECTION D: GENERAL CHEMISTRY

Any ONE of the following.

1. Physical tests (viscosity, density, etc.)
2. Physical chemistry (surface studies, kinetics, etc)
3. Organic chemistry (synthesis of compounds)
4. Inorganic Chemistry (synthesis of compounds)
5. Process chemistry and chemical plant
6. Water chemistry

4. REPORTS ON WORK INTEGRATED LEARNING:

The student and his/her employer (training institution) organize his/her work integrated learning according to aspects referred to in his/her logbook. The employer must appoint a mentor for the student. At the end of the training period the student reports to his/her mentor. The mentor completes the evaluation report in the logbook and allocates a mark for the Chemical Industry: Practical P1

5. GENERAL:

University staff will attempt to visit the student during his/her work integrated learning period. Employers are requested to make contact with the department if they experience any problems or if they want to make any changes to the training programme.

GUIDELINES FOR CHEMISTRY PROJECT:

1. INTRODUCTION:

1.1 AIM OF “CHEMISTRY PROJECT”

“Chemistry Project” constitutes the completion of the student’s study and training towards the N. Dip.: Analytical Chemistry. It is therefore expected that he/she be exposed to the more advanced applications of his/her knowledge as well as the principles of entrepreneurship and innovation.

1.2 PREREQUISITES

Minimum requirements are successful completion of all the level III subjects, Chemical Quality Assurance as well as “Chemistry Industry: Practical P1”. It is, however, preferred that the entire part four of the course as well as “Chemistry Industry: Practical P1” be completed successfully.

2. REQUIREMENTS FOR CHEMISTRY PROJECT:

To register for “Chemistry Project” a student must be working for an accredited employer. Students who do not have a suitable employer must contact the head of Department: Chemistry for guidance.

After registration the student must discuss this guidelines with his/her employer. The employer, in conjunction with the head of department, will appoint a mentor for the student. This mentor will provide the student with the necessary assignments and guidance during the training period. The student and the mentor must provide the necessary information as soon as possible to the head of department. The University will also appoint a member of its staff to monitor the progress of the student.

### 3. SILLABUS:

At least one assignment on one of the following analytical techniques:

Spectroscopy

Chromatography

Electro-analyses

Thermometric Analysis

Fire Assay

Must be applied on one of the following industries:

Pharmaceutical

Soap and detergents

Pulp and paper

Sugar and starch

Dyestuffs

Cement, calcium and magnesium

Surface coating

Fermentation

Petroleum and petrochemicals

Agrochemical

Chemicals and chemical processes in ore processing

Mining

Iron and steel

Water and sewage treatment

Chlor-alkali products

### 4. EVALUATION:

#### 4.1 GENERAL

At the end of the semester (six months) the student will report in writing to his mentor on a format determined by the University (in conjunction with the employer).

The mentor will evaluate the report, allocate a percentage mark, complete the evaluation form, and send it, together with a copy of the students report, to the head of department for approval before the return date.

(The **return date** is the first day of the official examination period for that particular semester).

## 4.2 FORMAT OF REPORT

Reports must be typed on one side of A4 paper, 1.5 spacing 12 point font size.

Graphs, curves and tables must be attached at the end of the report. Tables must be provided with headings at the top and figures at the bottom.

Each page of the report must be numbered.

Every section should start with a fresh page.

Pages of reports must be bound or stapled together.

Reports must, as far as possible, be set out as follows:

- (a) Title page  
Name of student, student number, title of project, the date and the following words: *“Report submitted in completion of the requirements for the Chemistry Project (150420603) as instructional offering for the National Diploma: Analytical Chemistry (3215054) in the Department of Chemistry at the Vaal University of Technology.”*
- (b) Table of contents  
List the different sections with page references.
- (c) Introduction  
Short summary on the background and origin of the work as well as the purpose of the work. It must be clearly stated what the scope of the project will be, why it is undertaken (rationale), and how it is to be done (strategy).
- (d) Literature survey (or theoretical background)  
Must be concise (brief). Must use references and acknowledge it. Use at least 4 references.
- (e) Experimental  
A brief description of the apparatus and reagents as well as the methods (procedures) that were used. Optimization of apparatus.
- (f) Results and discussion  
Tables with results. Discussion of results. Statistical treatment of results.
- (g) Conclusions  
Where applicable.

- (h) Literature references  
Listed according to the method prescribed by the University: Bibliographic referencing.  
The book “Bibliographic Referencing for Theses, Dissertations and Project Reports” is available at Van Schaik’s book shop.
- (i) Addendum  
Tables, graphs, spectra, chromatogrammes, etc.

Deviations from this format to suit the employer is possible. **Special arrangements will be made for reports that are confidential.**

**STUDENT'S INITIALS AND SURNAME:.....**

**STUDENT NUMBER:.....**

**ALLOCATION OF MARKS FOR AAPRO 2A**

Evaluation (marking) will be done in the following way:

Rating scale:	0	Unacceptable
	1	Extremely bad
	2	Bad
	3	Satisfactory
	4	Good
	5	Excellent

Face value:

**General impression**

	Weight	Maximum	Marks obtained
Title page	1	5	
Contents	1	5	
Abstract	1	5	
Layout	1	5	
Total:	20		

**Language and technical correctness**

	Weight	Maximum	Marks obtained
Language	2	10	
Technical correctness	2	10	
Sketches	1	5	
Bibliography	1	5	
Appendix	1	5	
Total:		35	

**Handling of problem:**

	Weight	Maximum	Marks obtained
Statement of problem	1	5	
Literature study	2	10	
Reference to literature	1	5	
Experimental method	2	10	
Results and calculations	2	10	
Recommendations	1	5	
Total:		45	

---

Grand total: 100

**OFFICIAL STAMP OF COMPANY**

**DATE:**

**SIGNATURE OF SUPERVISER:**

.....