



**Nelson Mandela
Metropolitan
University**

for tomorrow

Faculty of Science

Discovering tomorrow

POLYMER TECHNOLOGY

WHAT IS A POLYMER TECHNOLOGIST

Polymer Technology can be described as the manufacture, processing, analysis and application of long chain molecules. Materials that are typically classified as polymers include: plastics, paints, rubber, foams, adhesives, sealants, varnishes and many more. These materials, today, fully control the high technology era we live in. This is happening to such an extent that it has become impossible to live life as we know now, without these polymeric products.

Industries that are totally dependent on polymers include information technology, aerospace, music, clothing, medical, motor manufacturing, building, packaging, and many more.

As a study field, Polymer Technology is not well known among prospective students, but has vast employment potential. It therefore often happens that students enter the polymer field from areas such as Analytical Chemistry or Engineering and have to undergo retraining to function effectively in the Polymer environment. Chemistry forms the basis and starting point of Polymer Technology but it also leans on other scientific study-areas such as engineering and manufacturing.



WHAT DOES A POLYMER TECHNOLOGIST DO?

A Polymer Technologist is an applied scientist in the true sense of the word and the study field offers a diverse scope of opportunities under its umbrella. There are opportunities in production management of manufactured articles such as tyres, moulded plastic products, paints, etc. Polymer Technologists are also found in the technical divisions of companies where design of manufactured products and the polymer mixtures to produce them (e.g. motor tyres and paint formulations) are done.

Quality control in manufacturing of above-mentioned articles is another direction that offers a very rewarding career in the Polymer industry.

Apart from career opportunities in existing industries, there is also big potential for entrepreneurial activities, the setting up of an own business, manufacturing polymeric goods such as moulded plastic or rubber articles etc.



QUALITIES OF A POLYMER TECHNOLOGIST

The Polymer Technologist needs to be self-motivated, have an enquiring and logical mind. The ability to work with other people is important. Leadership potential can lead to rapid advance into managerial positions.

EMPLOYMENT OPPORTUNITIES

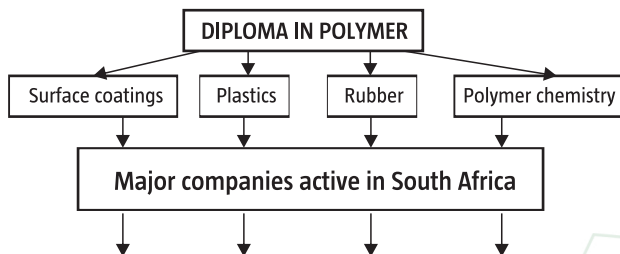
With this training as background, the motor-manufacturing and related supply-and-service-industries of the Eastern Cape and greater South Africa, such as the paint, tyre and plastic-component industries offer a wide scope of employment opportunities in the areas as mentioned above.

WHAT SCHOOL SUBJECTS ARE REQUIRED

Compulsory: Mathematics & Physical Sciences



JOB OPPORTUNITIES



Plascon
ICI (Dulux)
Woodoc
Chemserve
VWSA
GM
Mercedes Benz
Carst & Walker
Du Pont
BASF

Plastamid
Sasol
Chemserve
Bayer
Nampak
Protea Polymers
VWSA
Mercedes
GM
Aberdare

Goodyear
Bridgestone
Continental
Dunlop
Bayer
Karbocem
Carst & Walker

Sasol
CSIR
Protea Chem
Karbocem
BASF
Du Pont
Bayer

THE TRAINING PROGRAMME

Admission requirements:

Senior Certificate or equivalent qualification

Duration of course:

Two years full time study followed by one year in-service training in industry.

Curriculum:

NOTE: Semester 1 of the first year is shared and common with the National Diploma: Analytical Chemistry.

First Year

Semester 1:

Mathematics 1
Physics 1
Computer Skills
Chemistry 1
Analytical Chemistry 1

Semester 2:

Organic Chemistry II
Polymer Technology II
Paint Technology II
Polymer Raw Materials II

Second Year

Semester 1 and 2:

Polymer Science II
Polymer Raw Materials III
Paint Technology III
Polymer Technology III
Analytical Techniques III
Polymer Science III
Process Chemistry II

Third Year

Semester 1 and 2:

In-service training

NATIONAL DIPLOMA POLYMER TECHNOLOGY CORE SYLLABUS

Level I

General Chemistry
Analytical Chemistry
Physics
Mathematics
Computer skills



Level II and III

Polymer Technology II

Rubber section

History of the industry
Basic rubber compounds and the function of ingredients
Brief overview of all rubber processing processes and the equipment utilized
Basic process control testing
Flow behaviour
Mixing
Extrusion

Plastic section

Overview of all plastic techniques processing and equipment utilized.

Polymer Technology III

Rubber section

Callendering
Moulding
Properties
Engineering applications of rubber

Plastics section

Extrusion and extrusion base processes
Injection moulding
Callendering
Blow moulding
Rotational moulding
Mould making and design

Organic Chemistry II

The carbon atom
Hybridisation
Isomerism
Functional groups (nomenclature, physical properties, synthesis and reactions)
IUPAC Nomenclature

Polymer Raw Materials II

Polymers (rubber and Plastics)
Compounding
Testing

Polymer Raw Materials III

Polyurethanes (including foams)
Thermoplastics elastomers
Textiles
GPR

Paint Technology II

Common properties of paint and inks
Material properties and test methods
Paint and Ink manufacture
Paint application
Basic testing
Substrate preparation
Pretreatment
Application
Drying and curing

Paint Technology III

Solvents
Convertible/Non convertible media
Colour principles
Colour description and measurement
Rheology
Pigments – production and testing
Pigmentation of coatings
Dispersion – principles, equipment and practice
Testing
Mechanical properties
Resistance of coatings
Test specifications



ENQUIRIES

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Polymer Science II

Raw materials
Polymerization chemistry
Polymerization systems
Polymer properties
Testing

Polymer Science III

Viscoelasticity
Time- Temp effects
Rubber elasticity
Reinforcement

Analytical Techniques III

Spectroscopic analytical techniques
Chromatographic techniques
Thermal analysis

Process Chemistry

Material balancing
Energy balancing
Heat transfer
Liquid flow
Separation techniques

Polymer Production Practice

Students perform one year of in-service-training at companies active in the polymer field to gain practical experience.

