UNISA

UNIVERSITY OF SOUTH AFRICA

150 YEARS

We certify that

VAUGHAN ROYCE KILDAIRE

having complied with the requirements of the Higher Education Act and the Institutional Statute, was admitted to the degree of

BACHELOR OF SCIENCE

at a congregation of the University on 7 June 2025

CUM LAUDE

Vice Chancellor

Executive Dean

University Registrar

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UNISA university of south africa

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Your Reference :

ACADEMIC RECORD
Student number : 1364-175-1
Name : KILDAIRE VAUGHAN ROYCE
Previous Surname :
Date of Birth : 1995-06-18
Identity Number : 9506185112080
Matriculation : NSC DEGREE ADMISSION
Qualification : Bachelor of Science

NQF specification : Exit Level 7, Minimum Credits 360

This document is issued without alteration or erasure and includes all years of registration for the abovementioned qualification.

Year	Month	Code	Name of Study Unit	%	Comment	NQF level	NQF crds
2021	OCT	CHE150-1	General Chemistry IA	87	Passed with Distinction	5	12
2021	OCT	CHE150-2	General Chemistry IB	96	Passed with Distinction	5	12
2021	OCT	CHE150-3	General Chemistry I (Practical)	76	Passed with Distinction	5	12
2021	OCT	MAT150-3	Linear Algebra I	93	Passed with Distinction	5	12
2021	OCT	MAT151-2	Calculus A	98	Passed with Distinction	5	12
2021	OCT	PHY150-3	Physics Practical Work I	87	Passed with Distinction	5	12
2021	OCT	PHY150-5	Mechanics (Physics)	89	Passed with Distinction	5	12
2021	OCT	PHY150-6	Electromagnetism and Heat (Fisika)	90	Passed with Distinction	5	12
2021	OCT	PLS260-7	Philosophy of Science	68	Passed	6	12
2022	OCT	APM261-1	Differential Equations		Supplementary Examination	6	
2023	FEB	APM261-1	Differential Equations	51	Passed	6	12
2022	OCT	CHE261-1	Inorganic Chemistry II (Theory)	67	Passed	6	8
2022	OCT	CHE261-3	Organic Chemistry II (Theory)	66	Passed	6	8
2022	OCT	CHE262-1	Inorganic Chemistry II (Practical)	64	Passed	6	4
2022	OCT	CHE262-3	Organic Chemistry II (Practical)	81	Passed with Distinction	6	4
2022	OCT	MAT161-3	Calculus B	87	Passed with Distinction	6	12
2022	OCT	MAT261-1	Linear Algebra 2	83	Passed with Distinction	6	12
2022	OCT	PHY160-4	Modern Physics	85	Passed with Distinction	6	12
2022	OCT	PHY260-1	Classical Mechanics	90	Passed with Distinction	6	12
2022	OCT	PHY260-2	Electricity and Magnetism (Physics)	61	Passed	6	12
2022	OCT	PHY260-6	Waves (Physics)	72	Passed	6	12
2023	OCT	CHE261-2	Physical Chemistry II (Theory)	36	Supplementary Exam	6	
2024	FEB	CHE261-2	Physical Chemistry II (Theory)	76	Passed with Distinction	6	8
2023	OCT	CHE261-4	Analytical Chemistry II (Theory)	67	Passed	6	8
2023	OCT	CHE262-2	Physical Chemistry II (Practical)	80	Passed with Distinction	6	4
2023	OCT	CHE262-4	Analytical Chemistry II (Practical)	85	Passed with Distinction	6	4
2023	OCT	CHE370-1	Inorganic Chemistry III	71	Passed	7	12
2023	OCT	CHE370-3	Organic Chemistry III	62	Passed	7	12
2023	OCT	PHY370-2	Quantum Physics	78	Passed with Distinction	7	12
2023	OCT	PHY370-3	Statistical and Thermal Physics	80	Passed with Distinction	7	12
2023	OCT	PHY370-7	Solid State Physics	28	Supplementary Exam	7	
2024	FEB	PHY370-7	Solid State Physics	80	Passed with Distinction	7	12
2023	OCT	PHY370-8	Atomic and Nuclear Physics	84	Passed with Distinction	7	12
2023	OCT	PHY370-9	Computational Modeling	92	Passed with Distinction	7	12
2024	OCT	CHE370-2	Physical Chemistry III	69	Passed	7	12
2024	OCT	CHE370-4	Analytical Chemistry III	64	Passed	7	12

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Student number : 1364-175-1

Year	Month	Code	Name of Study Unit	%	Comment	NQF level	NQF crds
2024	OCT	CHE372-1	Inorganic Chemistry III (Practical)	70	Passed	7	3
2024	OCT	CHE372-2	Physical Chemistry III (Practical)	90	Passed with Distinction	7	3
2024	OCT	CHE372-3	Organic Chemistry III (Practical)	83	Passed with Distinction	7	3
2024	OCT	CHE372-4	Analytical Chemistry III (Practical)	85	Passed with Distinction	7	3

Total number of NQF credits accumulated: 360
Each credit equates 10 notional hours.
The above qualification has been completed with distinction.

Major subject(s):
CHEMISTRY
PHYSICS

The student is currently registered for the 2025 academic year for :

APM370-1	Partial Differential Equations	7	12
MAT261-3	Real Analysis I	6	12

Yours faithfully

Prof MM Sepota
Acting Registrar

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Previous Surname :
Date of Birth : 1995-06-18
Identity Number : 9506185112080
Matriculation : NSC DEGREE ADMISSION
Qualification : NON-DEGREE PURPOSES

NQF specification : Exit Level 0, Minimum Credits 0

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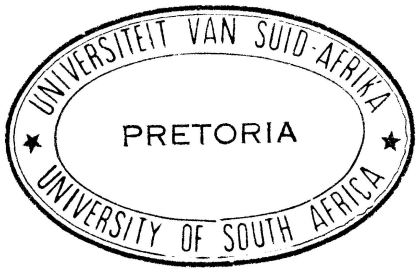
Year	Month	Code	Name of Study Unit	%	Comment	NQF level	NQF crds
2022	OCT	MAT261-5	Calculus in Higher Dimensions	64	Passed	6	12
2023	OCT	PHY260-4	Physics Practical Work II	68	Credit: another program	6	12
2024	OCT	APM371-3	Special Relativity and Riemannian Geometry	90	Passed with Distinction	7	12

The student is currently registered for the 2025 academic year for :

APM370-1	Partial Differential Equations	6	12
MAT261-3	Real Analysis I	6	12

Yours faithfully

Prof MM Sepota
Acting Registrar



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Student number: 1364-175-1
Date: 2025-02-21

Purpose statement of modules passed

This is to certify that the purpose statement of the modules offered comprises the following:

APM2611 - Differential Equations

This module will be useful to students interested in developing the basic skills in solving common types of differential equations (DEs) and partial differential equations (PDEs) which can be applied in the natural sciences, engineering and the modelling of physical processes. Students credited with this module will have an understanding of the basic ideas of solving such DEs and PDEs as well as elementary techniques of using Laplace and Fourier transforms and the manipulation of infinite series for this purpose - although the first two mentioned techniques have far-reaching different applications. Students will also have experience in modelling simple physical phenomena using DEs and by solving them will gain an understanding of the process involved.

CHE1501 - General Chemistry IA

The purpose of this module is to enable the student to demonstrate a basic understanding of classification and properties of matter and atomic theories, atomic structure and quantum numbers, the periodic table and periodicity, chemical bonding, the structure and nomenclature of inorganic compounds and ions, the mole concept and stoichiometry, solutions and concentrations, gases, types of chemical reactions and chemical equilibrium.

CHE1502 - General Chemistry IB

To enable learners to explain and apply chemical bonding and introductory organic chemistry principles such as chemical bonding, physical properties, introduction to stereochemistry and the nature and behaviour of hydrocarbons, hydrocarbon derivatives (alkyl halides, alcohols and ethers), amines and carbonyl compounds (aldehydes, ketones, carboxylic acids, acid halides, esters and amides).

CHE1503 - General Chemistry I (Practical)

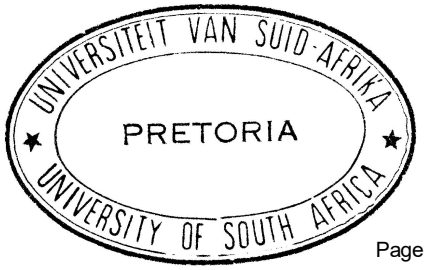
Students accredited with this module can demonstrate basic-hands-on laboratory skills and techniques associated with some of the theoretical concepts covered in General Chemistry, which include types of chemical reactions, titrimetric methods of analysis, basic principles of physical chemistry and elementary organic reactions and techniques. Students will also be able to show theoretical concepts of general chemistry in a virtual chemistry laboratory (computer based). They will appreciate critical issues related to health, safety and the environment as work in the laboratory. The learners will be trained to solve problems individually and critical thinking will be initiated.

CHE2611 - Inorganic Chemistry II (Theory)

This module is aimed at introducing learners to the fundamental concepts of inorganic chemistry, valence bond and molecular orbital theory, theory of acids and bases, properties of metallic and ionic solids and a limited introduction to coordination chemistry and transition metal complexes

CHE2612 - Physical Chemistry II (Theory)

To enable students to explain and apply concepts of physical chemistry and demonstrate their understanding of the laws of thermodynamics and changes of state. These concepts include properties of gases, the first law of thermodynamics, thermochemistry, state functions and exact differentials, adiabatic changes, the second and third laws of thermodynamics, energies of a system, the physical transformations of pure substances and simple mixtures.



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CHE2613 - Organic Chemistry II (Theory)

To enable students to apply fundamental organic chemistry principles and basic mechanistic theory as well as stereochemistry to predict the outcome of addition, elimination and substitution reactions; aromaticity and electrophilic and nucleophilic aromatic substitution reactions of benzene derivatives; reactions of carbonyl, carboxylic acids and carboxylic acid derivatives.

CHE2614 - Analytical Chemistry II (Theory)

To provide students with knowledge and understanding of the fundamental concepts of analytical chemistry, which include analytical measurement, statistical evaluation of data and quantitative analysis.

CHE2621 - Inorganic Chemistry II (Practical)

The acquisition and demonstration of laboratory skills and techniques associated with the theoretical concepts covered in module CHE2611.

CHE2622 - Physical Chemistry II (Practical)

The acquisition and demonstration of laboratory skills and techniques associated with the theoretical concepts covered in module CHE2612.

CHE2623 - Organic Chemistry II (Practical)

The acquisition and demonstration of laboratory skills and techniques associated with the theoretical concepts covered in module CHE2613.

CHE2624 - Analytical Chemistry II (Practical)

Students accredited with this module should be able to acquire and demonstrate laboratory skills and techniques associated with the theoretical concepts covered in module CHE2614, titrimetric, gravimetric, potentiometric, coulometric and spectrochemical methods, do analytical measurements, apply quantitative analysis to generate data and use statistical tools to evaluate the quality of data.

CHE3701 - Inorganic Chemistry III

To enable students to gain insight into spectroscopy, advanced coordination chemistry, organometallic chemistry and bioinorganic chemistry.

CHE3702 - Physical Chemistry III

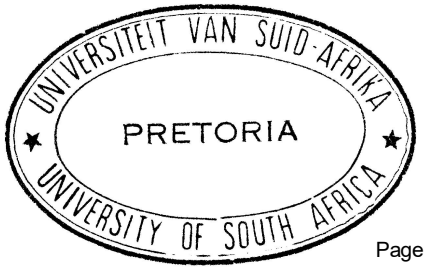
To enable students to gain insight into changes of state, equilibria, electrochemistry, kinetic theory of gases, transport and diffusion and molecular reaction dynamics.

CHE3703 - Organic Chemistry III

To enable students to gain insight into and demonstrate an understanding of stereochemistry and conformational analysis, reaction mechanisms, applications of spectroscopic methods, carbanions, polyfunctional compounds, orbital symmetry and synthesis.

CHE3704 - Analytical Chemistry III

To enable students to demonstrate their understanding of electroanalytical methods, molecular and atomic absorption spectrophotometry, atomic emission and absorption spectrophotometry, chromatography and extraction methods.



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CHE3721 - Inorganic Chemistry III (Practical)

The purpose of this course is to motivate student to understand the fundamental concepts of electronic structure and spectra in the metal complexes and coordination compounds and organometallic Chemistry.

CHE3722 - Physical Chemistry III (Practical)

The purpose of the Physical Chemistry practical course is to facilitate and improve the understanding of the theory covered in Module CHE3702, and to direct you, the student, towards the awareness that the theory which you are studying is based on reality and is applicable to experimentation and measurements:

CHE3723 - Organic Chemistry III (Practical)

The purpose of the module is to enable learners to gain and demonstrate Organic Chemistry laboratory skills and techniques, process and present data in a scientific way and make meaningful conclusions based on theory and practical knowledge.

CHE3724 - Analytical Chemistry III (Practical)

This module is to equip learners with a sound understanding of further concepts on the sample pre-treatment and instrumental analysis techniques and how they could be applied in solving real life problems. Students accredited with this module should be able to prepare real samples for analysis, select suitable sample pre-treatment and instrumental methods of analysis to generate quality creditable data to address the fundamental question of how much and what is it.

MAT1503 - Linear Algebra I

This module will be useful to students interested in developing the basic skills in linear algebra which can be applied in the natural sciences and social sciences. Students credited with this module will have an understanding of the basic ideas of linear algebra and be able to apply the basic techniques for handling systems of linear equations, matrices, determinants and vectors as well as complex numbers.

MAT1512 - Calculus A

This module will be useful to students interested in developing the basic skills in differential and integral calculus which are essential for the physical, life and economic sciences. Students credited with this module will have a firm conceptual grasp of the limit, continuity, differentiation and integration, together with a background in the basic techniques and application of Calculus.

MAT1613 - Calculus B

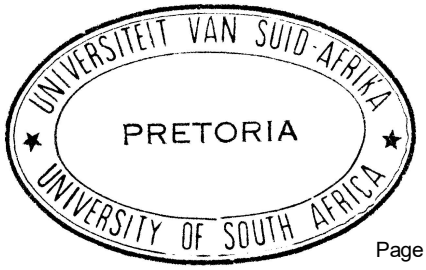
Qualifying students in this module will have mastered the techniques of integral and differential calculus. The techniques developed are fundamental to graph sketching, optimization, related rates, minimum and maximum value problems, definite and indefinite integrals, area and solids of revolution calculations.These techniques and skills support further studies and applications in the sector of applied mathematics, in the field of mathematical sciences, as part of a degree in mathematics, applied mathematics or physics These competencies contribute to the development of scientific knowledge and mathematical understanding in Southern Africa, Africa or globally. Enrolled students in this blended mode are connected to the myUnisa platform on a regular basis throughout the semester.

MAT2611 - Linear Algebra 2

This module is a continuation of MAT1503 and will be useful to students interested in developing basic skills in the theory and use of linear algebra. Linear algebra is widely used in scientific environments to model and solve problems.

PHY1503 - Physics Practical Work I

The purpose of this module is to obtain experience in doing Physics experiments and to gain anunderstanding of the basic principles involved in the experimental foundations of Physics. At the sametime, this Practical Physics module will also deepen the student’s understanding of the physical principles taught in other first year modules.



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PHY1505 - Mechanics (Physics)

The purpose of this module is to equip the student with principles, laws and methods of mechanics and to assist the student in learning to identify and interpret situations related to or requiring application of the principles, laws and methods of mechanics.

PHY1506 - Electromagnetism and Heat (Fisika)

The purpose of this module is to acquire the knowledge and skills which enable students to employ the various concepts and methods contained in the fields of electromagnetism and heat to deepen his/her understanding of physics and also to solve problems in the domain of electromagnetism and heat.

PHY1604 - Modern Physics

The purpose of this module is to introduce students to foundational concepts, laws and principles of modern physics. These concepts include: wave theory, properties of sound waves, properties of light waves, mirrors and lenses, Special Relativity, the Wave-Particle Duality, interaction of radiation with matter, quantum mechanics, atomic structure, and nuclear physics. The students will also learn to solve problems in modern physics using the concepts, laws and principles.

PHY2601 - Classical Mechanics

This module will be useful to students interested in developing the basic skills in solving common types of classical mechanics problems. To present the modern treatment of classical mechanical systems in such a way that the transition to quantum theory of Physics can be made with the least possible difficulty. To acquaint the student with new mathematical techniques wherever possible and to give him/her sufficient practice in solving problems so that the student may become reasonably proficient in their use. After a firm foundation in vector methods, student could develop further mathematical methods to solve the physics problems.

PHY2602 - Electricity and Magnetism (Physics)

The purpose of this module is to teach the student the concepts of Electricity and Magnetism, using vector calculus. The primary goal of this module is to help the student develop a conceptual understanding of these concepts continuing from the work done in the first year Electromagnetism course. The introduction to vector analysis and some of its useful theorems provide the mathematical foundation to be able to describe electric and magnetic fields comprehensively, both in vacuum and matter.

PHY2606 - Waves (Physics)

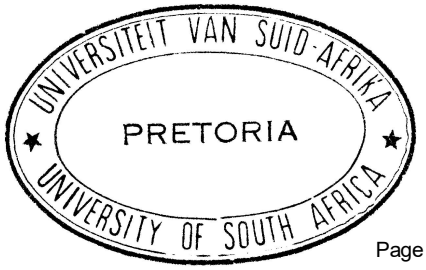
To be familiarized with behaviour of vibrating systems and wave motion in many different physical systems.

PHY3702 - Quantum Physics

This module will be useful to students interested in developing the basic skills in solving common types of quantum mechanics problems. To present the modern treatment of quantum mechanical systems in such a way that the transition to quantum theory of Physics can be made with the least possible difficulty. To acquaint the student with new mathematical techniques wherever possible and to give him/her sufficient practice in solving problems so that the student may become reasonably proficient in their use. After a firm foundation in vector methods, student could develop further mathematical methods to solve the physics problems.

PHY3703 - Statistical and Thermal Physics

This module will be useful to students interested in developing the basic skills in solving common types of statistical and thermal physics problems. To present the mathematical and computational treatment of statistical and thermal systems. To acquaint the student with new mathematical techniques wherever possible and to give him/her sufficient practice in solving problems so that the student may become reasonably proficient in their use.



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PHY3707 - Solid State Physics

Crystalline state, Atomic cohesion and crystal binding, Reciprocal lattice, Determination of crystal structure, Lattice vibrations, Thermal properties of solids, Free electron theory of metals, Electron energy bands, Mobile electrons and Fermi surfaces.

PHY3708 - Atomic and Nuclear Physics

The primary goal of this module is to help students develop a conceptual understanding of how physical concepts fit together to provide a coherent description of the physical world. It also helps students to develop a solid logical thinking in solving various physical and mathematical problems, which have various applications in real life.

PHY3709 - Computational Modeling

This module gives a thorough introduction to the important discipline of computational physics. Students who complete this module successfully will be able to: Understand the computational tasks required by the problem at hand, Find a suitable algorithm to apply to the problem at hand both from a set of common numerical methods that the students are exposed to as well as from other resources, Write programs in Python 3 that implement solutions to problems appearing both in the analysis of experimental results and the solution of theoretical problems, Complete a suitable computational project and present their results in the form or a report, typeset in LaTeX .

PLS2607 - Philosophy of Science

To acquaint students with the nature of scientific reasoning, the status of scientific theories in terms of their relation(s) to reality, and connections between the theories and practice of science.

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Purpose statement of modules passed

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APM3713 - Special Relativity and Riemannian Geometry

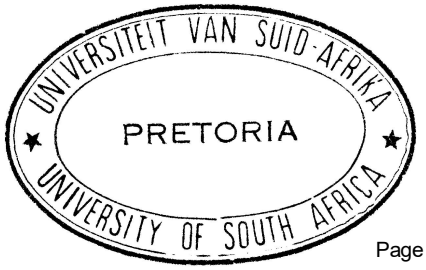
To introduce students to special relativity and the basics of general relativity. Introductory geometry in non-Euclidian spaces and tensor algebra will also be covered.

MAT2615 - Calculus in Higher Dimensions

The main purpose of this module is to extend concepts such as limits, continuity, differentiation and integration, studied in first year calculus, to functions of several variables. Furthermore, the purpose extends to improve the problem-solving skills of students and to form a basis of knowledge that is necessary for further studies in Mathematics and application in Physics.Also, the purpose is to gain clear knowledge and an understanding of vectors in n-space, functions from n-space to m-space, various types of derivatives (grad, div, curl, directional derivatives), higher-order partial derivatives, inverse and implicit functions, double integrals, triple integrals, line integrals and surface integrals, theorems of Green, Gauss and Stokes.

PHY2604 - Physics Practical Work II

The purpose of this module is to help students to develop experimental physics skills. This module serves to enable students to understand the concepts, laws and principles related to the theoretical and experimental aspects of each experiment. Qualifying students will be equipped with laboratory skills, data recording and analysis, balance between team work and independent work, graphical representation, scientific report writing skills, technology and problem-solving skills. The acquired skills can contribute to meaningful contributions to the development of South Africa, Africa or the whole universe.



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