MONASH University | MONASH College

Unit Guide

Diploma of Science – Education Specialisation

Monash College

Effective 1 May 2026 for T2 2026 programs

MONASH University | MONASH College

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Overview

The Diploma of Science, Education specialisation, offers specialist preparation for direct entry into the second year of the Monash University double degree in Education and Science.

As well as providing foundational knowledge and experience in education, core subjects introduce students to the fundamentals of the scientific method in both theory and practice, and units are available across a range of science and related disciplines including Chemistry, Physics, Biology, Mathematics, Psychology, Computing and Engineering.

There are two entry points into the Diploma of Science - Part One and Part Two - with the entry point for each applicant determined by their academic background and English language level.

Diploma of Science Course Outcomes

On completion of the Diploma of Science, students should be able to demonstrate the following skills and knowledge and their application:

1. Knowledge of technical and theoretical issues in a variety of science disciplines, underpinned by scientific and mathematical theory.
2. Identify and communicate advice in a variety of science disciplines to address technical problems in accord with management requirements
3. Utilise technical skills to demonstrate understanding and problem solving in relation to science issues involving diverse stakeholders
4. With depth in some areas, critically apply theoretical and technical skills to solve problems in relation to a range of science disciplines
5. Manage work priorities and coordinate the work of others in accord with parameters set by management in a number of science contexts.

Monash College Diplomas Graduate Attributes

All Monash College courses will develop the following graduate attributes:

- Communication - demonstrated by effective communication in a variety of contexts
- Collaboration - demonstrated by working positively with others to achieve common goals
- Social and Cultural Engagement - demonstrated by respect for diversity and recognition of ethical responsibilities, including towards knowledge creation and academic integrity
- Critical Thinking and Problem Solving - demonstrated by the ability to analyse, evaluate and synthesise information to solve problems and innovate
- Independent Learning - demonstrated by the initiative, reflective practice and resilience necessary for self-directed learning, and possession of the foundational discipline knowledge and skills appropriate to commence their destination studies
- Academic Skills - demonstrated by understanding and appropriate application of scholarly practices and standards.

Note on delivery mode

For the duration of disruptions caused by the COVID-19 pandemic, units in this Diploma may be undertaken online, face-to-face or via a hybrid blend of both. Subject to government health restrictions, students who are able to attend scheduled face-to-face classes are expected to do so. Delivery will also support and accommodate students who are unable to attend classes in person.

DIPLOMA PART 1			
Unit Code	**Unit Name**	**Unit EFTSL[1]**	**Credit Point[2]**
MCD1160	Introductory Engineering Computing	0.125	6
MCD1170	Introductory Chemistry	0.125	6
MCD1180	Introductory Physics	0.125	6
MCD1700	Introductory Mathematics	0.125	6
MCD1190	Chemistry A	0.125	6
MCD1200	Physics A	0.125	6
MCD1520	Introduction to Academic Communication	0.125	6
MCD1530	Functions and Their Applications	0.125	6
DIPLOMA PART 2			
Unit Code	**Unit Name**	**Unit EFTSL[1]**	**Credit Point[2]**
MCD2080	Business Statistics	0.125	6
MCD4390	Chemistry 1	0.125	6
MCD4400	Chemistry 2	0.125	6
MCD4410	Blueprints for Life	0.125	6
MCD4420	Life on Earth	0.125	6
MCD8012	English and Literacies 1 - Primary Education	0.125	6
MCD8030	Primary Professional Experience	-	
MCD8040	Secondary Professional Experience	-	
MCD8058	Learn to Learn, Learn to Teach (Primary and Secondary)		
MCD8059	Fostering Classroom Culture (Secondary Education)		
• *Choose one Elective from below:*			
MCD2130	Functions and Their Applications	0.125	6
MCD4500	Engineering Mathematics	0.125	6
MCD4160	Physics for Engineering	0.125	6
MCD6080	Foundations in Psychology	0.125	6

1. *EFTSL: Effective Full-time Student Load. Each part of the Diploma is equivalent to one year of full-time study. Monash College Diplomas are delivered in an accelerated mode, so you can study more than a standard full-time load in a year.*

2. *Most Monash units are 6 credit points. To complete a full Monash College Diploma, you must pass 96 credit points; if you start in Part 2 you must pass 48 credit points. To complete the Education specialisation you will also need to complete the two non-credit Professional Experience units. Credit points in Part 2 units count towards the first year of your Monash University degree.*

MCD1160 – Introductory Engineering Computing

Description

Today's engineers rely heavily on the use of computers. To solve problems of practical significance, you need to apply scientific and technical knowledge, common sense, and experience. This unit will provide you with an understanding of basic computer software and programming concepts, and how it is used within the engineering environment. You will learn how to effectively communicate technical information using modern document editing, spreadsheet and presentation applications, and execute professional oral presentations to share your findings. Further, you will develop skills to solve real-world problems using microcontrollers with a programming language.

Prerequisites

Nil

Learning Outcomes

When you have completed this unit, you are expected to be able to:

1. Use the formatting features of a word processor.
2. Use utilities and advanced features provided with a word processor.
3. Create professional technical reports using word processors.
4. Demonstrate competency in academic writing and referencing.
5. Create and format a spreadsheet.
6. Use formulas to perform calculations in a spreadsheet.
7. Use graphics in a spreadsheet to aid data analysis and visualisation.
8. Designing professional presentation slides, incorporating text and graphics.
9. Communicate technical content in effective oral presentations.
10. Construct and test simple microcontroller programs.
11. Apply programming concepts and debug programs.
12. Use prototyping theory to create technical drawings and 3D designed models optimised for 3D printing.
13. Recognise the importance of good practices in programming.
14. Decompose problems into simpler problems.
15. Implement problem solving strategies and understand how real-word problems can be addressed by the digital world
16. Work collaboratively within group project settings.

MCD1160 – Introductory Engineering Computing *CONTINUED*

Assessments

Assessment Task	Weight
A1: Test 1	10%
A2: Assignment 1	20%
A3: Assignment 1 Oral Presentation	5%
A4: Test 2	10%
A5: Assignment 2 Project	28%
A6: Assignment 2 Oral Presentation	7%
A7: Lab Participation	10%
A8: Weekly Quizzes	10%

Requirements to Pass the Unit

In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD1170 – Introductory Chemistry

Description

Chemistry is the science of matter and the transformations it can undergo. It plays a central role in medicine, engineering and many sciences. It helps us understand our surroundings and the way we function. Students will investigate the various analytical techniques that are used to analyse substances depending on their properties. The knowledge and skills gained in this unit will be further extended in MCD1190 Chemistry A.

Prerequisites

Students should have completed an equivalent to Victorian VCE Year 11 Chemistry, Units 1 & 2.

Learning Outcomes

On completion of this unit, students should be able to:

1. Express chemical reactions symbolically, qualitatively and quantitatively.
2. Explain the concepts of bonding between atoms and relate this to the properties of compounds.
3. Explain the factors affecting the rate of a reaction and perform calculations for thermochemical equations
4. Calculate equilibrium constants and explain how the position of equilibrium can be altered, including examples from industry.
5. Explain acids and bases and perform calculations related to pH
6. Explain the structure and naming of simple organic molecules.
7. Explain the gas laws and apply calculations related to these
8. Demonstrate proficiency in communicating scientific results through a range of formats (written and oral).
9. Develop practical, report writing and scientific inquiry skills by the investigation of chemical experiments in the laboratory.

Assessments

Assessment Task	Weight
A1: Test 1	10%
A2: Test 2	20%
A3: In-class Activities and Quizzes	20%
A4: Group Presentation	15%
A5: Laboratory Work	20%
A6: Scientific Communication	15%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD1180 – Introductory Physics

Description

Through the study of physics, we are able to gain a greater understanding of the nature of the universe. Physics strives to reveal nature's underlying simplicity and establish the rules which cause galaxies to form, the toast to burn, or what holds the component parts of a proton together. Physics underlies all of the life and physical sciences, as well as engineering and technology. You will be engaged in practical work to allow you to explore and measure key theories.

Prerequisites

Nil

Learning Outcomes

On completion of this unit, students should be able to:

1. Describe the difference between qualitative and quantitative techniques Record accurate observations and select measuring equipment of appropriate accuracy
2. Recognize the measurement error in selected equipment Identify sources of error in analytical procedures
3. Distinguish between displacement, speed, velocity and acceleration and calculate each of these parameters
4. Demonstrate knowledge of mass, force and their relationship through Newton's laws
5. Identify force and draw free body diagram
6. Differentiate between scalar and vector
7. Differentiate between work, energy, kinetic energy, potential energy and power
8. Define an impulse and its relation to a change of momentum
9. Differentiate between force and torque and apply the laws of equilibrium to practical situations
10. Discuss elastic properties of materials
11. Distinguish between displacement, amplitude, period, frequency and wavelength of a wave
12. Describe behaviour of waves in terms of reflection, refraction, diffraction and interference
13. Calculate properties of standing waves on a string or in a pipe
14. Distinguish between energy, intensity and intensity level in a wave

Assessments

Assessment Task	Weight
A1: Labs	20%
A2: Test 1	15%
A3: Test 2	25%
A4: Weekly In-Class Activities	20%
A5: Projects	20%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD1190 – Chemistry A

Description

Chemistry is an important branch of science which has a direct impact upon our lives. For example, knowledge of chemical concepts will assist us to explore new and cheaper energy sources, improve health and safety standards, and develop 'greener' and environmentally friendly processes, which reduce pollution and wastage in the environment. You will investigate, explore and discuss chemical concepts and issues, and solve quantitative and qualitative problems in class.

Prerequisites

MCD1170 Introductory Chemistry or VCE Year 11 Chemistry, Unit 2.

Learning Outcomes

On completion of this unit, students should be able to:

1. Demonstrate the importance of energy transformations in thermochemical and electrochemical reactions.
2. Discuss factors which give rise to chemical kinetics; differential and integrated rate laws.
3. Explain the structure and naming of simple organic molecules.
4. Distinguish between the different chromatographic types and various spectroscopic techniques in order to understand their use in qualitative and quantitative chemical analysis.
5. Relate organic chemical structures to observed chemical reactions, using examples from those involved in human nutrition and global cycling of nutrients.
6. Demonstrate proficiency in communicating scientific results through a range of formats (written and oral);
7. Develop practical, report writing and scientific inquiry skills by the investigation of chemical experiments in the laboratory.

Assessments

Assessment Task	Weight
A1: In-class Activities	15%
A2: Online Quizzes	10%
A3: Formative Tests	15%
A4: Laboratory	25%
A5: AI Video and Presentation	15%
A6: Final In-class Test	20%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD1200/MCD4600 – Physics A

Description

This unit continues on from MCD1180 Introductory Physics, and considers the analysis of construction materials, and evaluate the effect of forces and loads on structures and materials, basic concepts of practical investigation, rotational motion, gravitational fields, Newton law of universal gravitation, understanding of electric field, charges, simple and complex circuits, magnetic field and magnetism.

Through practical work students relate theory, theoretical knowledge to experimental processes and engage in critical observation and testing of physical phenomena via experimental work

Through Project work students gain communication skills and collaboration skills and soft skills such coordination, time management as it involves group work.

Through a field trip students can experience scientific research on site, bridging the gap between theoretical physics and practical applications.

Prerequisites

MCD1180 Introductory Physics.

Learning Outcomes

- Develop attitudes that include curiosity, open-mindedness, creativity, flexibility, integrity, attention to details and respect for evidence-based study.
- Develop a range of individual and collaborative science inquiry skills through a variety of investigation methodologies in the laboratory and field, refining investigations to improve data quality, analyse and interpret qualitative and quantitative data to provide evidence, recognising patterns, relationships and limitations of data. Demonstrate knowledge of the value of practical work.
- Understand the research, ethical and safety guidelines that govern the study and practice of the discipline and apply these guidelines to generate, collate, analyse and critically evaluate.
- Develop knowledge and understanding of key models, concepts, theories and laws of science to explain scientific processes and phenomena, and apply this understanding in familiar and unfamiliar situations, including personal, sociocultural, environmental and technological contexts
- Communicate clearly and accurately an understanding of the discipline using appropriate terminology, conventions and formats. Communicate effectively through oral and written communication skills
- A field trip for students to experience scientific research first-hand, bridging the gap between theoretical physics and practical applications. SiteVisit plays a vital role in modern science, contributing to breakthroughs in areas such as medical treatments and renewable energy technologies and practical applications of fundamental concepts of Physics.

MCD1200/MCD4600 – Physics A *CONTINUED*

Assessments

Assessment Task	Weight
A1: Test 1	10%
A2: Test 2	20%
A3: Site Visit and Student Interview	10%
A4: Scientific Inquiry	15%
A5: Project Work	20%
A6: Lab work	25%

Requirement to Pass this Unit:

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD1520 – Introduction to Academic Communication

Description

This course develops students' English language proficiency and academic communication skills to support their adaptation to university expectations and conventions. It scaffolds students to build foundations in three focus areas: academic skills, behaviours, and values, while developing academic language skills and knowledge. The unit introduces the language, texts, and conventions specific to Humanities, Business, and Science programs, and emphasises the value of diverse perspectives offered by different disciplines and their contributions to solving contemporary societal issues. Learning and assessment activities are designed to foster both independent and collaborative learning approaches, guiding students to enhance their abilities in reading, listening, writing and speaking as well as critical thinking, and researching in technologically-advancing academic contexts.

This unit will support students in building effective learning strategies using a range of thinking skills, learning approaches and assessment responses.

This is a core unit in the Monash College Diplomas Part 1.

Prerequisites

Nil

Learning Outcomes

On completion of this unit, students are expected to be able to:

1. Critically analyse academic texts to identify key arguments, evidence, and methodologies
2. Accurately interpret and critically evaluate spoken academic content and verbal instructions in academic settings
3. Participate in academic discussions, demonstrating active listening, critical thinking, intercultural understanding and the ability to articulate and sustain viewpoints
4. Deliver a clear, well-organised presentation on an academic topic, presenting and justifying arguments using supporting evidence and examples
5. Write a clear, well-structured academic text, following academic conventions, including structure, register, signposting and discipline-specific referencing conventions
6. Demonstrate critical, analytical and evaluative skills via selecting, synthesising and critically analysing a range of academic sources
7. Employ discipline-specific vocabulary and discourse to convey ideas effectively
8. Use digital and generative AI tools critically and responsibly to support academic production and communication
9. Collaborate effectively in academic and group settings by communicating respectfully, actively listening, and contributing relevant ideas to achieve shared academic goals

MCD1520 – Introduction to Academic Communication *CONTINUED*

Assessments

Assessment Task	Weight
A1: Socratic Seminar	25%
A2: Research Task Draft	10%
A3: Research Task Final	25%
A4: 3 Minute Thesis	20%
A5: Collaboration & Communication	20%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD1530 – Functions and Their Applications

Description

The focus of this unit will be on the behaviour of functions and examining some of their applications to the real world. The way that functions will be introduced is by individually describing the characteristics of families of different function types (linear, polynomial, rational, exponential, logarithmic and trigonometric). The composition of functions through possible combinations of different types of functions will also be investigated. Other operations on functions, such as transformations via shifting, scaling and reflection, will be presented, along with the existence and meaning of inverse functions.

This initial part of the course will then be used to provide a foundation for examining the rate of change of a function. Principally, this involves defining the elementary principles of differential calculus and then utilising these with respect to the types of functions mentioned above. As a final topic, an introduction to integral calculus is presented.

Prerequisites

It is assumed that students have studied mathematics to at least Year 11 or equivalent level.

Learning Outcomes

On completion of this unit, students will have acquired knowledge of:

1. The notion of functions and their representation as tables, graphs or mathematical expressions;
2. The basic characteristics of polynomial, rational, exponential, logarithmic and trigonometric functions;
3. The algebra of functions;
4. The concepts of composition functions and inverse functions;
5. The transformation of functions, algebraically and graphically;
6. The concepts of rate of change of a function and derivative of a function
7. The concept of anti-differentiation of a function and its main application: The Fundamental Theorem of Calculus.

And will have developed skills in:

1. Identifying different types of functions behaviour by means of neat sketch-graphs; determining basic properties and behaviour of functions by analytic and by means of neat sketch graphs.
2. Using function algebra.
3. Calculating composition functions and inverse functions; using functions as models of real-life behaviour; calculating simple derivatives and integrals; communicating and interpreting mathematical results.

Assessments

Assessment Task	Weight
A1: In-class Engagement	40%
A2: Knowledge Booster	10%
A3: Test 1	10%
A4: Test 2	20%
A5: Test 3	20%

MCD1530 – Functions and Their Applications *CONTINUED*

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

Mode of study

This unit is taught face-to-face. There is no work placement component.

MCD1700 – Introductory Mathematics

Description

The unit will provide students with the prerequisite knowledge and skills to progress to the higher levels of mathematics in the STEM diplomas and subsequently in the relevant degree programs.

Prerequisites

Nil

Learning Outcomes

On completion of this unit, students should be able to:

1. Utilize set and interval notations to describe and represent number sets and express these sets on the real number line and through Venn diagrams.
2. Perform mathematical operations on complex numbers, including addition, subtraction, multiplication division and represent t then in the argand diagram.
3. Solve linear and simultaneous linear equations using both graphical and algebraic methods and apply these equations to model and solve real-world problems.
4. Apply the factor theorem to factorize polynomial functions and solve polynomial and quadratic equations using various methods, including factorization, the quadratic formula, and completing the square.
5. Sketch and interpret graphs of exponential, logarithmic and circular functions, and use these functions to model application problems.
6. Convert between radians and degrees, and apply trigonometric ratios, the sine rule, and the cosine rule to solve problems in geometric and analytical contexts.
7. Classify vectors and scalars, express vectors using Cartesian coordinates and components, and apply vector algebra to solve problems in geometry

Assessments

Assessment Task	Weight
A1: In-class Assessment	40%
A2: Test 1	10%
A3: Test 2	15%
A4: Oral Presentation	10%
A5: Test 3	25%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD2080 – Business Statistics

Description

This unit is designed to provide skills in data analysis and statistical processes as applied to business and basic business computations and techniques.

Prerequisites

MCD1550 Introduction Mathematics for Business or equivalent (For Business stream only. For

Part 2 students, Part 1 pre-requisites are not applicable)

Learning Outcomes

In this unit you will learn to use basic statistical techniques and apply them to problems across a range of areas in business.

On completion of this unit, students should be able to:

- Interpret business data using descriptive statistics techniques, including the use of Excel spreadsheet functions
- Apply simple concepts of probability and probability distributions to problems in business decision-making
- Describe the role of statistical inference and apply inference methods to single population means and proportions
- Interpret and evaluate the relationships between variables for business decision-making, using the concepts of correlation and multiple linear regression
- Develop skills in spreadsheet modelling and understand how simulation is used to address business problems.

These outcomes are important to a successful career in Business.

Assessments

Assessment Task	Weight
A1: Practical lecture activities	15%
A2: Group Assignment	25%
A3: Workshop activities including FATs	30%
A4: Final Examination	30%

* Approved calculators will be allowed for tests and the final exam. Assignment should be done using Excel.

MCD2080 – Business Statistics *CONTINUED*

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

Mode of study

This unit is taught face-to-face.There are no work placement components.

MCD2130 – Functions and Their Applications

Description

The focus of this unit will be on the behaviour of functions and examining some of their applications to the real world. The way that functions will be introduced is by individually describing the characteristics of families of different function types (linear, polynomial, rational, exponential, logarithmic and trigonometric). The composition of functions through possible combinations of different types of functions will also be investigated. Other operations on functions, such as transformations via shifting, scaling and reflection, will be presented, along with the existence and meaning of inverse functions.

This initial part of the course will then be used to provide a foundation for examining the rate of change of a function. Principally, this involves defining the elementary principles of differential calculus and then utilising these with respect to the types of functions mentioned above. As a final topic, an introduction to integral calculus is presented.

Prerequisites

It is assumed that students have studied mathematics to at least Year 11 or equivalent level.

Learning Outcomes

On completion of this unit, students will have acquired knowledge of:

1. The notion of functions and their representation as tables, graphs or mathematical expressions;
2. The basic characteristics of polynomial, rational, exponential, logarithmic and trigonometric functions;
3. The algebra of functions;
4. The concepts of composition functions and inverse functions;
5. The transformation of functions, algebraically and graphically;
6. The concepts of rate of change of a function and derivative of a function
7. The concept of anti-differentiation of a function and its main application: The Fundamental Theorem of Calculus.

And will have developed skills in:

1. Identifying different types of functions behaviour by means of neat sketch-graphs; determining basic properties and behaviour of functions by analytic and by means of neat sketch graphs.
2. Using function algebra.
3. Calculating composition functions and inverse functions; using functions as models of real-life behaviour; calculating simple derivatives and integrals; communicating and interpreting mathematical results.

Assessments

Assessment Task	Weight
A1: In-class Engagement	40%
A2: Knowledge Booster	10%
A3: Test 1	10%
A4: Test 2	20%
A5: Test 3	20%

MCD2130 – Functions and Their Applications *CONTINUED*

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

Mode of study

This unit is taught face-to-face. There is no work placement component.

MCD4160 – Physics for Engineering

Description

Engineers apply their technical expertise to an enormous variety of situations. In particular, an engineer will develop solutions to problems, design new technologies or utilize existing technologies that require knowledge of both the macro world, wherein classical physics principles prevail and of the quantum underpinnings of the physical world. This unit acquaints students with physics concepts and related engineering applications that bridge all scales of inquiry.

The practical component develops measurement, analysis and communication skills.

Prerequisites

MCD1200 Physics A (For Part 2 entry students, Part 1 pre-requisites are not applicable).

Learning Outcomes

On completion of this unit, students should be able to:

1. Apply energy and momentum methods to analyse motion of systems.
2. Explain behaviours involving oscillations and waves and do appropriate analysis and calculations.
3. Explain, and apply basic quantum principles to, situations which are relevant in engineering and technology contexts; do appropriate analysis and calculations.
4. Demonstrate an ability to describe and explain advanced techniques used in relevant engineering or physics contexts.
5. Make reliable measurements, estimate uncertainties, analyse, evaluate and interpret data in cases appropriate to engineering and related to the theory studied.
6. Show an improved ability to work in teams and to communicate and discuss physics concepts, measurements and applications related to engineering and developments in technologies.
7. Approach new problems and find solutions on the basis of general principles, and evaluate the appropriateness of their proposed models or solutions.

Assessments

Assessment Task	Weight
A1: Tutorial Activities	10%
A2: Post Tutorial Quizzes	10%
A3: Test 1	25%
A4: Test 2	20%
A5: Test 3	10%
A6: Laboratory Work	25%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD4390 – Chemistry 1

Description

This unit has been designed to provide a fundamental understanding, as well as the ability to gain knowledge in different aspects of chemistry including physical chemistry principles, theoretical and practical tasks that are relevant to the university level of learning.

Prerequisites

MCD1190 Chemistry A or VCE year 12 Chemistry

Learning Outcomes

On completion of this unit, students should be able to:

1. Discuss the features of atomic structure and the construction of the periodic table of elements.
2. Interpret relationships between electronic structure and bonding.
3. Explore a wide range of molecular structures and investigate aspects of stereochemistry such as isomerism and chirality.
4. Distinguish between ideal gasses and real glasses.
5. Recognise factors which give rise to polarity and its relationship to intermolecular bonding.
6. Define the first and second laws of thermodynamics and apply enthalpy and entropy.
7. Discuss factors which give rise to chemical kinetics.
8. Apply acid-base chemistry in the understanding of dynamic equilibria.
9. Foster the acquisition of practical skills by exploiting an inquiry-based approach to the chemistry laboratory experience.
10. Communicate chemistry and discuss the social and environmental responsibility of chemists in the global community.

Assessments

Assessment Task	Weight
A1: Online Tutorial Tests	10%
A2: Labs	30%
A3: Online Quizzes	10%
A4: Final Examination	50%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.
- Achieve a minimum mark of 45% in the lab component

MCD4400 – Chemistry 2

Description

You will explore the behaviour and characteristics of chemicals through a number of interesting case studies incorporating a range of significant biological and synthetic molecules. Along the way, students will discuss the formation of inorganic coordination complexes and investigate their role in colour and magnetism, and metals in biological systems. The concepts developed within the workshops and tutorials are complemented through a laboratory program where you will have the opportunity to use a variety of analytical techniques to solve a range of chemical problems.

Prerequisites

MCD4390 Chemistry I

Learning Outcomes

On completion of this unit, students should be able to:

1. Demonstrate a basic understanding of chemical nomenclature.
2. Describe the classification, structure and properties of a wide range of organic compounds according to the functional groups they contain.
3. Discuss the properties of transition elements.
4. Describe a wide range of coordination compounds and their structures, reactions and applications in both synthetic materials and biological materials.
5. Employ spectroscopy analysis to investigate molecular structure.
6. Foster practical skills by exploiting an inquiry-based approach to the chemistry laboratory experience.
7. Communicate chemistry, discuss the social and environmental responsibility of chemists in the global community.

Assessments

Assessment Task	Weight
A1: Laboratory component (Prelabs / Reports)	30%
A2: Online Quizzes	10%
A3: Tutorial Participation & Class Assessments	10%
A4: Examination	50%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.
- Achieve a minimum mark of 45% in the lab component

MCD4410 – Blueprints for Life

Description

This unit will explore the fundamental processes and patterns common to all life on Earth. It will examine how living organisms grow, develop diverse and complex structures, harness and utilize energy and transmit their life blueprints to the next generation. In this unit, students will progress through fundamental themes in cellular biology, biochemistry, genetics, genomics and microbiology. They will examine contemporary issues in biological sciences and the societal impact that biology has by learning from world-class researchers and industry experts.

Prerequisites

Nil

Learning Outcomes

On completion of this unit, students should be able to:

1. Identify and describe the concepts, processes and practical applications of cell biology, biochemistry, genetics, molecular biology and microbiology in society and everyday human life
2. Demonstrate proficiency in communicating scientific information through a range of formats (written and oral)
3. Formulate hypotheses, collect experimental data and demonstrate proficiency in interpreting their results
4. Demonstrate competence and precision in the use of common life sciences equipment and techniques
5. Utilize research skills including database searches to synthesise and interpret information related to scientific research, using appropriate conventions for scientific attribution
6. Work effectively, responsibly, safely and ethically, both individually and in peer or team contexts

Assessments

Assessment Task	Weight
A1: Content Quizzes	25%
A2: Laboratory Assessments	15%
A3: Tests	20%
A4: Major Assessments	40%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD4420 – Life on Earth

Description

This unit views the extraordinary diversity of life on Earth through the prism of evolutionary theory and in the context of human and environmental health. Students will examine how animals and plants, through the agents of gene mutation and natural selection, are able to adapt to new and changing environments. Diverse physiological, reproductive and behavioural solutions to life's challenges will be used to illustrate how evolutionary forces and constraints shape us and the world around us. We will then examine how interactions within and between species and with the non-living environment generate the immense ecological variety seen on Earth. Contemporary issues and the societal impact of biology will be explored by learning from world-class researchers and industry experts.

Students will undertake self-directed learning through the online environment. These online activities, readings and instructional videos will be complemented by face-to-face workshops where they will collaborate with peers and teaching staff to deepen their understanding of the biological concepts introduced each week. Students will gain hands-on experience and develop experimental and analytical skills in the laboratory environment.

Prerequisites

MCD4410 Blueprints for Life

Learning Outcomes

On completion of this unit, students should be able to:

1. Identify and describe the role of biological concepts and processes of evolution, plant and animal physiology, reproduction and life history strategies and core ecological concepts in society and everyday human life.
2. Demonstrate proficiency in communicating scientific results through a range of formats (written and oral).
3. Formulate hypotheses, collect experimental data and demonstrate proficiency in interpreting their results.
4. Demonstrate understanding of the use of common life sciences equipment and techniques.
5. Utilise research skills including database searches to synthesise and interpret information related to scientific research, using appropriate conventions for scientific attribution.
6. Work effectively, responsibly, safely and ethically, both individually and in peer or team contexts.

Assessments

Assessment Task	Weight
A1: Fortnightly Assessment Quizzes	25%
A2: Laboratory Assessments	15%
A3: Tests	20%
A4: Major Assessments	40%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD4500 – Engineering Mathematics

Description

Vector algebra and geometry: equations of lines and planes. Linear algebra: matrix operations, up to 3x3 systems of linear equations, eigenvalues and eigenvectors. Calculus: improper integrals, integration by parts. Sequences and series: fundamentals of convergence, Taylor series: single and multivariable series. Use in error analysis. Ordinary differential equations: first order, second order and higher order ODE with constant and non-constant coefficients, repeated roots, simple non-homogeneous cases. Various techniques of solving ODEs. Variation of parameters. Systems of differential equations. Engineering Applications. Multivariable calculus: partial derivatives, gradient and directional derivatives, maxima and minima.

This is a core unit in the Monash College Diploma of Engineering, Part 2.

Learning Outcomes

On completion of this unit, students should be able to:

1. Perform matrix algebra, solving systems of linear equations using Gaussian elimination with back substitution.
2. Determine eigenvalues and eigenvectors. Perform matrix algebra and comprehend how matrices represent spatial transformations.
3. Evaluate the cross products of vectors and use them to represent lines and planes. Calculate cross products and triple products.
4. Find contours of functions of two variables. Calculate partial derivatives, use the gradient vector to find directional derivatives, and determine extreme values of multivariable functions. Calculate tangent planes.
5. Calculate higher derivatives of functions of several variables. Identify and characterise critical points. Use Lagrange multipliers to find local maxima and minima of a function subject to an equality constraint.
6. Perform basic manipulations of sequences and series. Appreciate the convergence of the numeric and power series. Construct Taylor series and use truncated Taylor series to approximate functions. Estimate errors in numerical approximations for single-variable functions.
7. Solve first-order ordinary differential equations, including those with separable variables and integrating factors. Evaluate and apply integration by parts.
8. Solve second-order linear differential equations with constant coefficients. Categorise ODEs as linear or nonlinear and identify their order. Solve the first-order linear ODEs.
9. Use differential equations to model simple engineering problems.
10. Solve homogeneous and non-homogeneous ordinary differential equations. Use variation of parameters to solve linear ODEs. Understand linear dependence and independence of a set of functions. Use the Wronskian to determine linear dependence or independence.
11. Find Taylor series for multivariable functions and. Taylor series as finite-order polynomials. Use l'Hôpital's rule to find limits and find Taylor series for given multivariable functions.
12. Express and explain mathematical techniques and arguments clearly in words.

MCD4500 – Engineering Mathematics *CONTINUED*

Assessments

Assessment Task	Weight
A1: Test	20%
A2: Lecture Quiz and Attendance	10%
A3: Tutorial Participation	20%
A4: Examination	50%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD6080 – Foundations in Psychology

Description

This unit provides students with an introduction to the broad foundations of psychology as a scientific discipline. It begins with an exploration of psychology's historical origins. Then, a series of core psychological topics will be introduced: concepts of health, stress and coping will be considered along with the distinguishing features of abnormal psychology and the biological basis of behaviour.

The unit also introduces theories of learning, memory and development and familiarizes students with key aspects of Indigenous and cross-cultural psychology. Students will also be introduced to academic writing by reporting findings through reading journal articles.

Prerequisites

Nil

Learning Outcomes

On completion of this unit, students are expected to be able to:

1. Identify key historical and philosophical developments which have resulted in the modern discipline of psychology;
2. Identify and describe key concepts underlying biological, learning, developmental and cross-cultural psychology, stress and coping and abnormal psychology;
3. Apply the knowledge and concepts of biological, learning, developmental and cross-cultural psychology, stress and coping and abnormal psychology to assessable quizzes and critical thinking assignment;
4. Outline the need for an objective understanding of human behaviour;
5. Prepare written technical and scientific documentations and present key findings.

Assessments

Assessment Task	Weight
A1: Group Debate Presentation	30%
A2: Argumentative Essay	40%
A3: Online Weekly Tests	30%

Requirements to Pass the Unit

- In order to achieve a pass in this unit, you must achieve 50% or higher for your overall mark. If you receive a 49N grade, you will automatically be awarded a 48N result.

MCD8012 – English and Literacies 1 - Primary Education

Description

This unit explores young children's language and literacy learning in the early years. You will develop an understanding of how to build children's communicative intentions, confidence and capacity in literacy as a foundational skill for successful learning. In particular the influence of family and community contexts on children's language and literacy development is examined including learners with English as an additional language. Topics covered in this unit include: adult interactions supporting young children's communication and language development, practices to support reading and writing acquisition, and processes including a focus on phonological awareness, phonemic awareness and phonics. Digital technologies as a tool to support language and literacy learning will also be discussed. This unit introduces you to evidenced-based pedagogies to build rich language and literacy programmes in early childhood settings that support the continuity of children's literacy learning from preschool to school.

Learning Outcomes

On completion of this unit, students should be able to:

1. Demonstrate an understanding of what literacy is and what it means to be literate.
2. Apply knowledge that supports the continuous development of your own personal English and literacy skills.
3. Demonstrate an understanding of how early literacy is enacted in various cultural and social settings, particularly homes (inclusive of homes where English is an additional language) and school.
4. Apply knowledge of effective pedagogies for early years literacy learning, including building children's communicative intentions, confidence and capacity in literacy.
5. Exhibit an understanding of the continuities and transitions in literacy learning from home to school.

Assessments

Assessment Task	Weight
A1: Home Literacy Learning	30%
A2: Reading to Children	30%
A3: Children's Literature	40%

Requirements to Pass the Unit

- Students must attempt A2 and achieve an overall mark of 50% or higher in order to pass this unit. This unit is only offered in T2

MCD8030 – Primary Professional Experience

Description

This unit assesses the students' primary professional experience in the second trimester. Students complete the required number of days and the activities specified in the unit guide. Students' learning is supported by relevant academic staff in Monash College, and by teacher mentors in the education setting in which they are placed.

Prerequisites

Nil

Learning Outcomes

On completion of this unit, students should be able to:

1. Complete the required number of days of professional experience and the activities specified in the unit guide.
2. Document their professional learning through means such as a professional experience folder which records lesson planning, self-reflections and an evaluation on developing practice.
3. Achieve a satisfactory level of progress in their development as teachers in line with the requirements outlined in the unit guide and the placement report.

Requirements

Pre-service teachers are required to undertake 10 days in their second trimester.

Year	Trimester	Unit	Placement	Number of days	Dates
1	1	MCD8030	Primary School Setting	10 days over one week	T2

Pre-service students must satisfactorily complete the number of days set out in the placement time table (see table above).

Assessments and Submission Requirements

1. PE Report (via MCD8030 Survey Campaign link).
2. Placement Diary and Observation Handbook.

MCD8040 – Secondary Professional Experience

Description

This unit assesses the students' secondary professional experience in the second trimester. Students complete the required number of days and the activities specified in the unit guide. Students' learning is supported by relevant academic staff in Monash College, and by teacher mentors in the education setting in which they are placed.

Prerequisites

Nil

Learning Outcomes

On completion of this unit, students should be able to:

1. Complete the required number of days of professional experience and the activities specified in the unit guide.
2. Document their professional learning through means such as a professional experience folder which records lesson planning, self-reflections and an evaluation on developing practice.
3. Achieve a satisfactory level of progress in their development as teachers in line with the requirements outlined in the unit guide and the placement report.

Requirements

Pre-service teachers are required to undertake 5 days in their second trimester.

Year	Trimester	Unit	Placement	Number of days	Dates
1	1	MCD8040	Secondary School Setting	10 days over one week	T2

Pre-service students must satisfactorily complete the number of days set out in the placement time table (see table above).

Assessments and Submission Requirements

1. PE Report (via MCD8040 Survey Campaign link).
2. Placement Diary and Observation Handbook.