



Who is this programme for?

This programme is targeted at individuals who aspire to advance their career or change direction by gaining specialised knowledge and skills in industrial engineering and sustainability. The programme is also designed for individuals without an appropriate undergraduate qualification in engineering to transition to advanced postgraduate studies in industrial engineering.

Qualification Details

Curriculum: I501P

Qualification: PG Dip Industrial Engineering with Sustainability

Qualification Code: 7DB D02

Delivery Mode: Distance

Modules in the Postgraduate Diplomas will be presented using distance mode. A learning management system will provide a platform for the modules. Each module will consist of a combination of an interactive site, that will enable students to participate in well-structured self-study learning activities, and live and other interactive sessions.

Admission Requirements

A Diploma (NQF 6) and BTech (NQF 7) in Engineering Technology with working experience **OR** Engineering degrees from other fields and institutions (BEng and BSc (Eng) - NQF 7). Recognition of prior learning is considered.

Duration: 2 years



Delivered by North West University - It All Starts Here.

Industrial Engineering Modules

Introduction to Software Engineering

Introduction to Data and Decision Science

Decision Support Systems

Operations Excellence

Business Process Engineering



Socio-technical Systems Thinking & Philosophies

Introduction to Expanded Design Thinking

Sustainable Value Chains

Integrated Planning & Scenario Forecasting

Sustainable Design & Wicked Problem-Solving

Sustainability Modules

Postgraduate Diploma (PG Dip) in Industrial Engineering *with* Sustainability

The PG Dip in Industrial Engineering *with* Sustainability is designed to equip individuals with the necessary skills for an industrial engineering career in industries and institutions that seek to implement the shared blueprint for peace and prosperity, for people and the planet, now and into the future. To do this by designing and improving processes & systems to achieve sustainability goals in diverse industries and disciplines.

Industrial Engineering Modules

Introduction to Software Engineering

Being able to create computer code is a key skill of the Industrial Engineer of the future. This course introduces the student to Software Engineering. Which will serve as the basis for future courses in data science, Simulation and modelling and Decision Support Systems.

Introduction to Data & Decision Science

Evidence based decisions are better decisions. In the abundance of data and the overwhelming amount of information and opinion, gathering suitable data, processing it correctly to build valid evidence is a key skill of modern Engineers. This module equips students with the basic skills to start rigorously analysing data and communicating supported findings.

Decision Support Systems

Making strong, evidence-based decisions is a key competence of Engineers broadly. Basing decisions on strong data and analysis allows engineers to make better decisions, with broad impact. In this module, students are introduced to the key philosophies, tools, software and approaches to building strong evidentiary chains to make good decisions, and to back these up scientifically.

Operations Excellence

Improving organisations makes use of well-developed improvement philosophies, including Lean, Six Sigma, Systems Thinking, and Theory of Constraints. This course introduces students to these philosophies, guides students through selection and execution and loops back to human factors for implementation.

Business Process Engineering

Making businesses better is probably the most central role of the Industrial Engineer. Business Process Reengineering is a loosely collected set of philosophies and techniques that can be used to gain efficiency, productivity, profitability and overall business success. This course equips students with a general set of competencies to achieve this aim.

The programme consists of 10 modules. The programme structure provides students with a good balance between Industrial Engineering principles and Sustainability principles.

PG Dip IE with Sustainability Programme Content

The Industrial Engineering modules offer students a good foundation in data & decision science and operations management concepts. The Sustainability modules provide students with skills to think, plan, design, and improve using a sustainability perspective - to do this in various disciplines and value chains.

Sustainability Modules

Socio-technical Systems Thinking and Philosophies

Engineering is a practice that is concerned with the solution of problems of economic importance and those essential to the progress of society. The inclusion of social factors in technical work is key to ensuring that such solutions are sustainable. This course offers students structured ways to manage the complexity associated with socio-technical systems. Students will be equipped with language to describe socio-technical systems, methods to analyse these systems, and structure to map and measure socio-technical factors across space and over time.

Introduction to Expanded Design Thinking

Sustainability is about change, it requires a shift from singular goals (such as production, profit or consumption) to holistic goals that incorporate economic, environmental and social concepts. Change is created through design. Design Thinking is known for driving co-created human-centred solutions. However, traditional Design Thinking concepts do not intrinsically drive sustainability. Expanded Design Thinking addresses this gap. This course introduces students to sustainability concepts. It also furnishes individuals with Expanded Design Thinking concepts to help them design co-created & human-centred shifts that are sustainable.

Sustainable Value Chains

Industrial Engineering is associated with a scientific conceptualisation of operations & supply chains for the provision of customer value and the improvement/optimisation of systems. This course redefines customer value based on sustainability concepts. It equips students with tools to improve and optimise value chains by analysing, developing and mapping sustainable value streams in various disciplines.

Integrated Planning & Scenario Forecasting

Sustainability involves the optimal management of various goals. This multiplicity requires integration. Sustainability is concerned with the future implication of today's decisions. This concern can be managed through forecasting. This course draws on Operations Research principles associated with Industrial Engineering. In this course, students will explore strategy development concepts, and apply statistical approaches to manage the multiple and futuristic aspects associated with the achievement of sustainability goals.

Sustainable Design & Wicked Problem Solving

This course is the main practical component of this qualification. It will involve a brief introduction to principles associated with sustainable design (circular design, participatory design and wicked problems). After the brief introduction, students will identify a socio-technical system within an organisation/community to apply the concepts learned in this programme. Within this socio-technical system, students will identify and complete a project that is aimed to achieve an objective that aligns with one of the 17 UN sustainability goals.



Who is this programme for?

This programme is targeted at individuals who aspire to advance their career or change direction by gaining specialised knowledge and skills in industrial engineering and sustainable mining. The programme is also designed for individuals without an appropriate undergraduate qualification in engineering to transition to advanced postgraduate studies in industrial engineering.

Qualification Details

Curriculum: I501P

Qualification: PG Dip Industrial Engineering with Sustainable Mining

Qualification Code: 7DB D03

Delivery Mode: Distance

Modules in the Postgraduate Diplomas will be presented using distance mode. A learning management system will provide a platform for the modules. Each module will consist of a combination of an interactive site, that will enable students to participate in well-structured self-study learning activities, and live and other interactive sessions.

Admission Requirements

A Diploma (NQF 6) and BTech (NQF 7) in Engineering Technology with working experience **OR** Engineering degrees from other fields and institutions (BEng and BSc (Eng) - NQF 7). Recognition of prior learning is considered.

Duration: 2 years



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Industrial Engineering Modules

Introduction to Software Engineering

Introduction to Data and Decision Science

Decision Support Systems

Operations Excellence

Business Process Engineering



Socio-technical Systems Thinking & Philosophies

Sustainable Mine Planning & Design

Sustainable Mining Practices & Production Practices

Ecological Resilience & Rehabilitation

Sustainable Design & Wicked Problem-Solving

Sustainable Mining Modules

Postgraduate Diploma (PG Dip) in Industrial Engineering *with* Sustainable Mining

The PG Dip in Industrial Engineering *with* Sustainable Mining is designed to equip individuals with the necessary skills for an Industrial Engineering career in industries and institutions that seek to implement the shared blueprint for peace and prosperity, for people and the planet, now and into the future. To do this by designing and improving processes & systems to achieve sustainability goals in the mining industry.

Industrial Engineering Modules

Introduction to Software Engineering

Being able to create computer code is a key skill of the Industrial Engineer of the future. This course introduces the student to Software Engineering, which will serve as the basis for future courses in data science, Simulation and modelling and Decision Support Systems.

Introduction to Data & Decision Science

Evidence based decisions are better decisions. In the abundance of data and the overwhelming amount of information and opinion, gathering suitable data, processing it correctly to build valid evidence is a key skill of modern Engineers. This module equips students with the basic skills to start rigorously analysing data and communicating supported findings.

Decision Support Systems

Making strong, evidence-based decisions is a key competence of Engineers broadly. Basing decisions on strong data and analysis allows engineers to make better decisions, with broad impact. In this module, students are introduced to the key philosophies, tools, software and approaches to building strong evidentiary chains to make good decisions, and to back these up scientifically.

Operations Excellence

Improving organisations makes use of well-developed improvement philosophies, including Lean, Six Sigma, Systems Thinking, and Theory of Constraints. This course introduces students to these philosophies, guides students through selection and execution and loops back to human factors for implementation.

Business Process Engineering

Making businesses better is probably the most central role of the Industrial Engineer. Business Process Reengineering is a loosely collected set of philosophies and techniques that can be used to gain efficiency, productivity, profitability and overall business success. This course equips students with a general set of competencies to achieve this aim.

The programme consists of 10 modules. The programme structure provides students with a good balance between Industrial Engineering principles and Sustainable Mining principles.

PG Dip IE with Sustainable Mining Programme Content

The Industrial Engineering modules offer students a good foundation in data & decision science and operations management concepts. The Sustainable Mining modules provide students with skills to think, plan, design, and improve using a sustainability perspective - to do this within mining value chains and ecosystems.

Sustainable Mining Modules

Socio-technical Systems Thinking and Philosophies

Engineering is a practice that is concerned with the solution of problems of economic importance and those essential to the progress of society. The inclusion of social factors in technical work is key to ensuring that such solutions are sustainable. This course offers students structured ways to manage the complexity associated with socio-technical systems. Students will be equipped with language to describe socio-technical systems, methods to analyse these systems, and structure to map and measure socio-technical factors across space and over time.

Sustainable Mine Planning & Design

Sustainability requires a shift from singular goals (such as production, profit or consumption) to holistic goals that incorporate economic, environmental and social concepts. Traditional Mine Planning & Design goals do not centralise sustainability goals. This course introduces students to sustainability concepts. It also presents an overview of the 6 dimensions of Expanded Design Thinking (Time, Proximity, Life, Value, Dimensions, Sectors) to enable the creation of sustainable mine plans/designs that achieve more comprehensive goals.

Sustainable Mining Practices & Production Patterns

The inclusion of sustainability principles in day-to-day mining practices requires a change in the way short term plans are managed. The disposal of tailings is often identified as a major environmental impact within mining operations making optimal tailings management key to achieving sustainability goals through production patterns. This course equips students with principles and methods for managing production plans, production inputs and production waste to drive sustainability in day-to-day practices and production patterns.

Ecological Resilience & Rehabilitation

The mining life cycle (exploration, construction, operation, maintenance, closure/abandonment) results in disturbances within the natural environment or ecosystem. Ecosystems react differently to these disturbances. This course defines ecosystem resilience and the ecosystem recovery gap to equip students with a method to assess and categorise the different ways in which the natural environment responds to disturbances. It provides students with principles and appropriate approaches (whether restorative or rehabilitation) for minimising the negative impacts of mining practices to align with sustainability goals.

Sustainable Design & Wicked Problem Solving

This course is the main practical component of this qualification. It will involve a brief introduction to principles associated with sustainable design (circular design, participatory design and wicked problems). After the brief introduction, students will identify a socio-technical system within an organisation/community to apply the concepts learned in this programme. Within this socio-technical system, students will identify and complete a project that is aimed to achieve an objective that aligns with one of the 17 UN sustainability goals.

North West University is:

One of a few universities with **strong contact and distance delivery modes**

Internationally recognised - student body from at least **68 countries**

The **3rd largest university** in South Africa with more than 54000 students

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