Subject information (overview of syllabus)

The syllabus content is subject to change to accommodate industry changes. Please note: A more detailed syllabus is available at the department or in the study guide that is applicable to a particular subject. On 4 September 2014, syllabus content was defined as follows:

A

**AUTOMATION III (ATM301B)**  
*1 X 3-HOUR PAPER*  
*Subject custodian: Department of Industrial Engineering*  

B

**BUSINESS ADMINISTRATION IV A (BAD40AB)**  
*1 X 3-HOUR PAPER*  
*Subject custodian: Business School*  
Basic business administration: accounting cycle function of bookkeeping, bookkeeping model. Trading firm: costs and returns, assets and liabilities, administration of assets. Production firm: cost classification, cost particularisation, marginal cost, results analysis. (Total tuition time: ± 80 hours)

**BUSINESS ADMINISTRATION IVB (BAD40BB)**  
*1 X 3-HOUR PAPER*  
*Subject custodian: Department of Managerial Accounting and Finance*  
Basic business administration: accounting cycle function of bookkeeping, bookkeeping model. Trading firm: costs and returns, assets and liabilities, administration of assets. Production firm: cost classification, cost particularisation, marginal cost, results analysis. (Total tuition time: ± 80 hours)

**BUSINESS LAW V (BNL501T)**  
*CONTINUOUS ASSESSMENT*  
*Subject custodian: Department of Industrial Engineering*  
Labor law, contracts, the law of corporations and other business organisations, securities law, antitrust, secured transactions, commercial paper, income tax, pensions and benefits, trusts and estates, immigration law, employment law and bankruptcy. (Total tuition time: ± 80 hours)

**BUSINESS LOGISTICS IV (BUL401T)**  
*1 X 3-HOUR PAPER*  
*Subject custodian: Department of Industrial Engineering*  
Decision-making models, stock control, prediction methods, logistics performance criteria, client-order-disconnecting-moment, typology of industrial organisations, design factory layout, material management and distribution. Production control: BSC, OPT, MRP, MRPIIIJT, Kanban, queuing, department control, material development, material handling, operational research (overview). (Total tuition time: not available)

C

**COMPUTER-AIDED DRAUGHTING (EXTENDED) I (FPCA01)**  
*1 X 3-HOUR PAPER*  
*Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design*  
Students will be introduced to operating systems (Windows environment), basic word-processing skills (MS-Word), spreadsheets (MS-Excel), presentations tools (PowerPoint), communications, connectivity, the internet and the Web, computer-aided draughting (CAD), various software packages and compound drawings. (Total tuition time: ± 136 hours)

**COMPUTER-AIDED DRAUGHTING I (CAI101T)**  
*CONTINUOUS ASSESSMENT*  
*Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design*  
Introduction to computer-aided design (CAD), various software application packages, component and assembly modeling. Students operate CAD software in order to produce three-dimensional models, providing a basis for more advanced CAD applications and compound drawings. (Total tuition time: ± 80 hours)

**COSTING II (CSG201T)**  
*CONTINUOUS ASSESSMENT*  
*Subject custodian: Department of Managerial Accounting and Finance*  
Basic methods and a group of selected techniques of cost accounting for application in the business environment. The subject consists of two modules. (Total tuition time: ± 68 hours)
ELECTROTECHNOLOGY (EXTENDED) I (FPETT01)  
*Subject custodian: Department of Electrical Engineering*  
1 X 3-HOUR PAPER  
Atom theory, electricity, magnetism and electromagnetism, inductors, capacitors, RLC networks. The correct use of SI units and their applications. Construction and care of batteries. WS theory and different measuring instruments. The influence of magnetic lines, the application and use of magnetic fields, inductance and the factors that influence it. Capacitors and their functioning. (Total tuition time: ± 140 hours)

ELECTROTECHNOLOGY I (ETT101T)  
*Subject custodian: Department of Electrical Engineering*  
1 X 3-HOUR PAPER  
The correct use of SI units and their applications. Construction and care of batteries. WS theory and different measuring instruments. The influence of magnetic lines, the application and use of magnetic fields, inductance and the factors that influence it. Capacitors and their functioning. (Total tuition time: ± 70 hours)

ENGINEERING BUSINESS DYNAMICS V (EBU501T)  
*Subject custodian: Department of Industrial Engineering*  
CONTINUOUS ASSESSMENT  
Fundamentals of system dynamics, system thinking, and utilisation of stock’s, flows and causal loops diagram when drawing a system dynamics module. Stella software is used to draw the module. (Total tuition time: ± 80 hours)

ENGINEERING COMMUNICATION (EXTENDED) I (FPEGN01)  
*Subject custodian: Department of Applied Languages*  
CONTINUOUS ASSESSMENT  
Speaking and communication skills, listening skills, reading for academic understanding, academic vocabulary, learning strategies and information gathering, writing, business and life skills. Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence. (Total tuition time: ± 136 hours)

ENGINEERING COMMUNICATION I (EGN101T)  
*Subject custodian: Department of Applied Languages*  
CONTINUOUS ASSESSMENT  
Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence. (Total tuition time: ± 68 hours)

ENGINEERING DATA ANALYSIS V (EDY501T)  
*Subject custodian: Department of Industrial Engineering*  
CONTINUOUS ASSESSMENT  
Innovation, decision making and engineering data analysis tools are discussed to ensure effective problem solving skills. (Total tuition time: ± 80 hours)

ENGINEERING PROJECT MANAGEMENT V (EPJ501T)  
*Subject custodian: Department of Industrial Engineering*  
CONTINUOUS ASSESSMENT  
Introduction to Engineering Project; Project Management Approaches; Project Management Body of Knowledge (PMBOK); Computer application, systems approach to project management; and implementing a project. (Total tuition time: not available)

ENGINEERING WORK STUDY I (EWK121T)  
*Subject custodian: Department of Operations Management*  
CONTINUOUS ASSESSMENT  

ENGINEERING WORK STUDY II (EWK221T)  
*Subject custodian: Department of Operations Management*  
CONTINUOUS ASSESSMENT  

ENGINEERING WORK STUDY III (EWK321T)  
*Subject custodian: Department of Operations Management*  
CONTINUOUS ASSESSMENT  
Performance improvement programs. Productivity improvement, Objective Matrix, South African Excellence Model. Systems Analyses and Design for management. (Total tuition time: ± 68 hours)
ENTREPRENEURSHIP IV (ENT401B) 1 X 3-HOUR PAPER


EXPERIENTIAL LEARNING I (EXP1IEN)

EXPERIENTIAL LEARNING

Workshop factors: labour machine technology (types and uses), workshop planning and control, inventory control and storage, drawing office practice (design and interpretation), maintenance. Industrial engineering aspects: method study, time studies, labour standards, distribution line analysis, labour schedules. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING II (EXP2IEN)

EXPERIENTIAL LEARNING

Work study. Quality assurance. Production. Systems. Facility layout and materials handling. The following fields could be covered: material-handling analysis, equipment specifications, selection and evaluation, mechanisation and automation, plant layout (analysis and renewal), office layout and planning, productivity (equipment utilisation studies and capacity analysis), form design and control, industrial systems analysis and design. (Total tuition time: 6 months)

F

FACILITY LAYOUT AND MATERIALS HANDLING II (FLM201T) 1 X 3-HOUR PAPER


FINANCE AND COST ACCOUNTING II (FCC201T) CONTINUOUS ASSESSMENT

Cost price calculation, profit, financial forecasting and budgeting, influence of risk on financial decisions, capital budgeting, dividend policy, capital structure, cash management models, international business finance, investment rules. (Total tuition time: not available)

I

INDUSTRIAL ACCOUNTING III (IAC321T) CONTINUOUS ASSESSMENT

Introduction to financial management. Financial analysis, planning and control. Working capital management. Investment decisions. Computer applications. (Total tuition time: ± 68 hours)

INDUSTRIAL ECONOMICS II (IES201T) CONTINUOUS ASSESSMENT

Constructing recycling model, buying motives of consumers, motives of producers, demand for market group, supply of market goods, functioning of the market mechanism, pricing of production factors, role of government and foreign countries in the economic process. (Total tuition time: not available)

INDUSTRIAL ENGINEERING SYSTEMS DESIGN II (IED201T) 1 X 3-HOUR PAPER

Introduction to systems engineering, the systems design process from conceptual to detail design, models for economic evaluations, design for operational feasibility with emphasis on reliability and maintainability. (Total tuition time: ± 68 hours)

INDUSTRIAL LEADERSHIP III (ILE301T) 1 X 3-HOUR PAPER

Leaders and management. Management planning, organising, leading and control. (Total tuition time: ± 68 hours)
INFORMATION SYSTEMS IV (ISY401T) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Industrial Engineering)*  
Structure and strategic organisational role. Computer systems resources. Decision support systems and executive information systems. Development and implementation of information systems. (Total tuition time: ± 40 hours)

INTELLECTUAL PROPERTY MANAGEMENT V (IPM501T) CONTINUOUS ASSESSMENT  
*(Subject custodian: Department of Industrial Engineering)*  
Intellectual property development, protection, marketing and exchange are discussed. These aspects are linked to business success. In order for business to achieve growth plans, business should have a strong IP Portfolio. (Total tuition time: ± 80 hours)

INTERNATIONAL LAW II (INL201T) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Law)*  
International law firms, magistrate’s court, debt collections, high court, solvent deceased estates, conveyancing, secretarial and notarial practice, Stamp Duties Act, companies and close corporations. (Total tuition time: not available)

INTERNATIONAL MARKETING II (INK201T) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Marketing, Logistics and Sport Management)*  
Economic rationale of multi-trade business, the import/export process, international marketing environmental scanning, international monetary system, international finance and accounting. Regional market agreements, economic, cultural, political and legal environment. International marketing research, global marketplace, product/services policy and planning, new product/service development, international pricing strategy, channels of distribution and supply chain management, export/import logistics, advertising, multinational sales management, organisation, control and marketing planning and strategy. (Total tuition time: not available)

LIFE CYCLE MANAGEMENT V (LCY501T) CONTINUOUS ASSESSMENT  
*(Subject custodian: Department of Industrial Engineering)*  
Total quality, asset and environmental management integration in managing the organisation effectively. (Total tuition time: ± 80 hours)

LOGISTICS ENGINEERING IV (LEN401T) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Industrial Engineering)*  
Introduction to logistics. Measurement of logistics. System operational requirements. Logistics in system design. System operation and support. Logistic support management. Projects. (Total tuition time: ± 40 hours)

MAINTENANCE ENGINEERING V (MEN501T) CONTINUOUS ASSESSMENT  
*(Subject custodian: Department of Industrial Engineering)*  
Introduction to maintenance; measures of maintenance’ System maintenance; and Systems design. (Total tuition time: ± 80 hours)

MANUFACTURING RELATIONS II (MFR201T) CONTINUOUS ASSESSMENT  
*(Subject custodian: Department of People Management and Development)*  

MATHEMATICS (EXTENDED) I (FPMAT04) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Mathematics and Statistics)*  
Basic algebra, functions, exponents and logarithm, differential calculus, trigonometry, geometry. Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration. (Total tuition time: ± 120 hours)

MATHEMATICS I (MAT171T) 1 X 3-HOUR PAPER  
*(Subject custodian: Department of Mathematics and Statistics)*  
Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration. (Total tuition time: ± 60 hours)
| **MATHEMATICS II (MAT271B)** | **CONTINUOUS ASSESSMENT**  
*Subject custodian: Department of Mathematics and Statistics*  
Revision of differentiation. Differentiation of functions with more than one variable. Further integration. Numerical methods. First-order ordinary differential equations. Matrices (Gauss elimination). (Total tuition time: ± 60 hours) |
| **MATHEMATICS III (MAT351T)** | **CONTINUOUS ASSESSMENT**  
*Subject custodian: Department of Mathematics and Statistics*  
| **MECHANICAL ENGINEERING DRAWING (EXTENDED) I (FPMDR01)** | **1 X 3-HOUR PAPER**  
*Subject custodian: Department of Chemical, Metallurgical and Materials Engineering*  
| **MECHANICAL ENGINEERING DRAWING I (MDR101B, MDR101T)** | **CONTINUOUS ASSESSMENT**  
*Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design*  
| **MECHANICAL MANUFACTURING ENGINEERING (EXTENDED) I (FPMME01)** | **1 X 3-HOUR PAPER**  
*Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design*  
| **MECHANICAL MANUFACTURING ENGINEERING I (MME101T)** | **1 X 3-HOUR PAPER**  
*Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design*  
| **MECHANICAL MANUFACTURING ENGINEERING II (MME201T)** | **1 X 3-HOUR PAPER**  
*Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design*  
Measurement. Operative practical testing. Quality and dimensional control. Gauging and measurement. Measuring instruments. Comparators. Surface measurement. (Total tuition time: ± 68 hours) |
| **MECHANICS (EXTENDED) I (FPMHC01)** | **1 X 3-HOUR PAPER**  
*Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design*  
Module 1: Measurements, mechanics, motion in one-dimension kinematics, laws of motion dynamics, kinetic theory of matter and properties of matter. Module 2: Atoms, molecules and ions, chemical formulas and equations, the periodic table, chemical bonding, nomenclature of inorganic compounds, phases of matter, solutions, the rate of chemical reactions, equilibrium in chemical reactions, acids and bases, oxidation, reduction and electrochemical cells. Motion in one dimension. Uniform motion. Instantaneous velocity. Motion with constant acceleration. Free fall. Instantaneous acceleration, scalars, vectors, coordinate systems and vector components, vector algebra, force, Newton's first law, Newton's second law, Newton's third law, ropes and pulleys, motion in a circle. Impulse and momentum. Energy. Work. Fluids and elasticity. Thermodynamics. (Total tuition time: ± 180 hours) |
| **MECHANICS I (MHC101C, MHC101T)** | **1 X 3-HOUR PAPER**  
*Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design*  
Moments, centroids, kinematics, forces and Newton's laws, momentum and impulse, work and energy, circular motion, statics. (Total tuition time: not available) |
OPERATIONAL RESEARCH III (ORS321T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

PRODUCTION ENGINEERING: INDUSTRIAL I (PEI111T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Operations Management)
Introduction to production management. Production management in perspective. The nature of operating systems and operations management. Product service design. Facility planning and layout. Capacity management. (Total tuition time: ± 68 hours)

PRODUCTION ENGINEERING: INDUSTRIAL II (PEI211T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Operations Management)

PRODUCTION TECHNOLOGY IV (PHY401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

PROJECT ENGINEERING IV (PJE401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)
Need for and advantages of project management. Definition of the project. Modern project planning methods. Communication and presentation of information. Feasibility studies (affordability). Project implementation. Support of the operational systems. Case studies, projects and computer applications. (Total tuition time: ± 40 hours)

PROJECT RESEARCH IV (PJR401B) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)
Introduction to business research methods and the research process, designing of research including observation studies, qualitative research, experiments and surveys. Data collection and sources with emphasis on measurement and measurement scales, questionnaires and sampling. Analysis and presentation of data with Hypothesis testing, multivariate analysis and measures of association. (Total tuition time: ± 40 hours)

QUALITATIVE TECHNIQUES I (QTQ101T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Mathematics and Statistics)

QUALITY ASSURANCE II (QAS201T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)
Essentials of a quality management system. Statistical process control: introduction to quality improvement. The quality life cycle, introduction to statistical process control, basic statistical calculations, analyses and interpretation of control charts, control of attribute control charts, design of experiments, principles of statistical design and analysis, experiments. (Total tuition time: ± 90 hours)
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<th>Subject</th>
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<tr>
<td>QUALITY ASSURANCE IV (QAS401T)</td>
<td>1 X 3-HOUR PAPER</td>
<td>(Subject custodian: Department of Industrial Engineering)</td>
<td>Introduction: quality assurance in perspective. Philosophies of Crosby, Deming, Juran, etc. Advanced quality techniques. Quality audit (SABS 0157/ISO 9000). Total quality management. Case studies and projects. (Total tuition time: ± 40 hours)</td>
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<td>QUALITY ENGINEERING V (QUE501T)</td>
<td>CONTINUOUS ASSESSMENT</td>
<td>(Subject custodian: Department of Industrial Engineering)</td>
<td>Introduction to quality; Quality management systems; Quality improvement; Strategies; and quality assurance. (Total tuition time: ± 80 hours)</td>
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<td>RESEARCH METHODOLOGY V (RMD501E)</td>
<td>CONTINUOUS ASSESSMENT</td>
<td>(Subject custodian: Department of Industrial Engineering)</td>
<td>Research Methodology; Administrative procedures; Research topic; Research problem and objectives; Research proposal; Technical structure of dissertation; Application for funding; and article training. (Total tuition time: ± 80 hours)</td>
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<td>RESEARCH METHODOLOGY (RMD100N)</td>
<td>PROJECT</td>
<td>(Subject custodian: Department of Industrial Engineering)</td>
<td>Introduction to research, the methodology of research and research strategies. The ability to undertake a research assignment independently in a unique speciality area. The physical gathering of data and analysing data statistically and otherwise. (Total tuition time: not available)</td>
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<td>SUPPLY CHAIN MANAGEMENT V (SPP501T)</td>
<td>CONTINUOUS ASSESSMENT</td>
<td>(Subject custodian: Department of Industrial Engineering)</td>
<td>This is about engineering inventory planning and control, linking materials requirement planning and entity resource planning with increasing customer service excellence. Integrating just in time, warehousing and technology with supplier management to optimise logistics engineering and taking care of risks. (Total tuition time: ± 80 hours)</td>
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<td>SUSTAINABILITY DEVELOPMENT V (SUV501T)</td>
<td>CONTINUOUS ASSESSMENT</td>
<td>(Subject custodian: Department of Industrial Engineering)</td>
<td>Introduction of sustainability in the engineering environment, matching of finance and technology to sustainability, profitable and environmentally friendly technologies and alternative energy systems, incorporating ethical dimensions and social awareness. Efficient design of products and services, with case studies and exercises. (Total tuition time: ± 80 hours)</td>
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<td>SYSTEMS DYNAMICS IV (SDN411T)</td>
<td>1 X 3-HOUR PAPER</td>
<td>(Subject custodian: Department of Industrial Engineering)</td>
<td>Introduction to and fundamentals of modelling, system definitions and model formulation, model validation and analysis, interpretation of simulation outputs. Station submodels and entity transfer. Animation of simulation model with the help of cinema. Additional discrete modelling concepts, advanced manufacturing features. Coupling to user subprograms. Continuous and combined models. Variant reduction techniques. (Total tuition time: not available)</td>
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<td>TECHNOLOGY MANAGEMENT (A) IV (THY401T)</td>
<td>1 X 3-HOUR PAPER</td>
<td>(Subject custodian: Department of Industrial Engineering)</td>
<td>Communicative structures, mechanisms of behaviour, teamwork (leadership and membership), selection techniques, negotiating, problem-solving and decision-making, presentations. (Total tuition time: not available)</td>
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<td>TECHNOLOGY MANAGEMENT (B) IV (THY411T)</td>
<td>1 X 3-HOUR PAPER</td>
<td>(Subject custodian: Department of Industrial Engineering)</td>
<td>Operations management: research, investment, production marketing, finance and accounting. Strategic management: innovating, renewing or discontinuing productions, mergers, closing, buying or selling companies. (Total tuition time: not available)</td>
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TECHNOLOGY VENTURE CREATION V (TVC501T)
(Subject custodian: Department of Industrial Engineering)
Translation of ideas into commercially viable high technology venture. Development of business plan and funding strategies are discussed. To elucidate the role of creativity, entrepreneurial and innovative business activities, and their management, within a global environment, and also of gender and ethnic diversity. (Total tuition time: ± 80 hours)