Tshwane University of Technology (TUT)
Programme Accreditation
Euromaster

The self assessment report (SAR) as part of the accreditation process

The preparation of this self assessment report offers the opportunity to use internal quality management systems and self examination processes in order to involve relevant stakeholder groups and to identify possible areas of improvement for the (further) development of a degree programme.

Also, the accreditation process can be utilized by TUT as a quality development project and will not be seen as a formal inspection routine.

This self assessment report is created in two steps:

1. **Self assessment:** TUT uses the self assessment report to analyze in an aggregated manner if and how the degree programme fulfils the accreditation criteria and which particularities have to be taken into account. Variations from the criteria can be explained.

   There is a special focus on evaluation and assessment rather than on mere description, including, strengths and weaknesses, challenges and envisaged solutions.

   The self assessment report is also a guide through the complementary attachments.

   If the accreditation process includes a "cluster" of similar degree programmes, information that is relevant for all degree programmes should be summarized. At the same time, information that is important for specific degree programmes (e.g. intended learning outcomes, curriculum etc.) should be reported separately.

A About the Accreditation Procedure

General Data

Website of the Higher Education Institution	www.tut.ac.za
Faculty/Department offering the Degree Programme	Industrial Engineering Department Faculty of Engineering and the Built Environment

Seals applied for

Name of the degree programme (in original language)	**(Official) English translation of the name**	**Labels applied for** [1]	**Previous accreditation (issuing agency, validity)**	**Involved Technical Committees (TC)**[2] (will be completed by ASIIN)
Engineering Management Masters		ASIIN, GAC, EUR-ACE® Label	**N/A**	

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes;
[2] TC: Technical Committee for the following subject areas: TC 06 - Industrial Engineering; TC 07 - Business Informatics/Information Systems;

B Characteristics of the Degree Programme/s

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Engineering Management	Masters		7	Full time / part time, e-learning	No	2 years	180 This is SA credits. This is same as 120 ECTS. One ECTS is 30 work hours	Each semester

[3] EQF = The European Qualifications Framework for lifelong learning

C Self-assessment for the ASIIN-Seal

1. The Degree Programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

The objective of the programme is to provide the student with a solid understanding of the management fundamentals needed by engineers in an engineering environment. The program was established after feedback from industry indicated a need. Working engineers and their employees wanted a postgraduate program designed for working engineers that provided management skills while building on their engineering background. In particular, inputs from the department's advisory committee and the Faculty committee for postgraduate students led to the development of the selected collection of taught modules. The advisory committee also helped determine the most appropriate learning objectives for the program.

The learning outcomes of the degree are as follows:

→ Students will be able to demonstrate the use of data analysis at an advanced level and apply various techniques involved in venture capital creation.

→ Students will be able to construct complex system dynamic and life cycle models that will reflect real world industry and business practice

→ Students will be able to demonstrate an extensive understanding of of project management or maintenance and quality engineering and be capable of practicing the principles of the subject matter.

→ Students will be able to conduct research, prepare and defend thesis level research. Students will engage in an extensive research project that involves developing clear objectives; research questions; formulation of hypothesis; in depth literature review; conducting experiments or simulations and validation of results. The research report is subject to the review and approval of external examiners.

The FEBE has been engaged in formulating and developing these objectives and learning outcomes. The IE department will lead the process of further developing these objectives and outcomes

The updated module descriptions are available on the TUT website in the prospectus for postgraduate programmes. Course guides for each module are available to students through the Blackboard educational platform unique to TUT – MyTutor.

Z komentarzem [JT1]: first explain why we have the program, why we need it – feedback from Industry; Once we realised we needed program Identified major learning objectives needed by Industry/work place.

Z komentarzem [MF2]: For an SAR a much more detailed description of learning objectives is required: What is the qualification each graduate of the programme will have acquired? What is the professional profile, where are the job opportunities? Based on which information/demand has the porgramme been developed? Which stakeholders have been involved in the process?
Since the programme seems to be a combination of engineering and management qualifications this special profile with ist mixture of qualifications needs to be outlined.

Z komentarzem [MF3]: The learning outcomes you mention are not adequate for a Master level and is not competence oriented: A Master programme needs to convey skills and knowlegde on an advanced/in-depth level, what you describe here sounds very basic. In addition, the wording has to express that students acquire different types of qualifications and are not just „able to". Outcome oriented the graduates should „be able", „know", „understand", „possess the skills to", etc.

Criterion 1.2 Name of the degree programme

Engineering Management.

- The name of the degree programme reflects the intent to provide engineers with the fundamental management skills needed in an engineering environment. The programme and degree name reflect the content of the modules.
- The degree programme name corresponds with the terminology used by the subject-specific community.
- Both students and employers are clear that the name of the degree programme reflects the content of the program and the stated outcomes and objective. Employers were involved in the department Advisory board that gave inputs to the structure and naming of the program. The Advisory Board continues to play a role in the periodic review and assessment of the program. Each incoming class of students is given an introductory orientation where the nature of the program, its name, contents and objectives are explained in detail.

Criterion 1.3 Curriculum

The curriculum allows the students to achieve the intended learning outcomes in order to obtain the degree through the following approaches.

1) Each of the taught modules requires extensive reading and engaging in audio-visual learning material; engages students in student-based learning team experiences; students solving problems, exercises and/or computer-based experiences; and the evaluation of student performance to assure that module objectives are achieved.

2) The research project requires presentation of pre-proposal and full proposal to the Department committee for postgraduate studies (DCPS) for approval to assure a high standard in conducting research that meets the department standard. After approval by DCPS the proposal must be approved by the Faculty committee of postgraduate studies (FCPS) and the Faculty committee of research ethics (FCRE) to assure that the proposal conforms to university standards.

3) The Research project is conducted under the supervision of a professor or senior lecturer at the doctoral level. The project must undergo department approval and presentation of a department colloquium, the review and approval of the full department before beginning sent out for external review and approval by at least two reviewers.

The overall objectives and intended learning outcomes for the degree programme are systematically substantiated and updated in its individual modules on an annual basis. It is clear which knowledge, skills and competences students will acquire in each module.

Z komentarzem [MF4]: Again, the objective of a SAR is to explain in precise analysis how something is obtained or achieved, not simply to manifest that it is so. HOW does the curriculum make sure that the intended learning outcomes are achieved? HOW ist he curriculum developed and coninuously improved?

Module code	Module	Learning outcomes in summary
RRT109M	Research report: Engineering Management	• Apply the fundamentals of research methodology to develop a mini-dissertation that involves an extensive literature review and substantiating the research objectives • Defend the research proposal through the department and faculty committees • Defend the mini-dissertation at the department level and through an external review process.

EBU118M	Engineering business dynamics	• Apply the fundamentals of system dynamics and system thinking, • Demonstrate the utilisation of stock's, flows and causal loops diagram. • Demonstrate knowledge of simulation software in constructing and analysing problems.
RMD118M	Research methodology	• Demonstrate an understanding of research methodology. • Identify Research topic; Research problem and objectives. • Identify the technical structure of research proposal and mini-dissertation.
EPJ119M	Engineering project Management	• Identify the fundamentals of an engineering project. • Demonstrate an understanding of Project Management approaches. • Identify computer applications and the systems approach to project management through implementing a project
LCY119M	Life Cycle Management	• Identify the fundamentals of total quality, • Demonstrate an understanding of asset and environmental management integration in managing the organisation effectively.
MEN119M	Maintenance Engineering	• Demonstrate an understanding of the concept of maintenance; • Identify measures of system maintenance and types of systems design.
QUE119M	Quality Engineering	• Demonstrate an understanding of the concept of quality.

		• Identify the fundamentals of Quality management systems, Quality improvement Strategies and Quality assurance practices.
SPP119M	Supply chain Management	• Identify the theoretical basis of design, strategy and performance of supply chains • Demonstrate how to solve problems related to supply chain management using numerical and computational tools to address supply chain management (SCM) issues • Interpret research finding is SCM • Link various aspects of SCM problem solving
EDY118M	Engineering Data analysis	• Demonstrate an understanding of Innovation, • Apply decision-making and engineering data analysis tools as discussed to affirm effective problem solving skills.
TVC119M	Technology Venture Creation	• Explain the translation of ideas into commercially viable high technology ventures. • Develop simple business plan and funding strategies as discussed. • Elucidate the role of creativity, entrepreneurial and innovative business activities, and their management, within a global environment, and also of gender and ethnic diversity
	Systems Modelling	• Demonstrate an in depth understanding of models and their simulation options. • Construct agent based, discrete simulation and continuous simulation models • Demonstrate in depth knowledge of a simulation language

Module Code:	SPP 119M	Module Name:	Supply Chain Management
Academic Lead:	Prof. John Trimble		

1. Module Topics

The following topics will be covered in this module over 7 weeks:

Week 1. Understanding the Supply Chain and Supply Chain Performance: Achieving Strategic Fit and Scope
Week 2. Supply Chain Drivers and Metrics and Designing Distribution Networks
Week 3. Network Design in the Supply Chain
Week 4. Designing Global Supply Chain Networks
Week 5. Demand Forecasting in a Supply Chain
Week 6. Aggregate Planning in a supply chain and Sales and Operations Planning
Week 7. Coordination in the Supply Chain and global Value chain

2. Module outcomes

Upon completion of this module, you (the student) will be able to:

1. Identify the theoretical basis of design, strategy and performance of supply chains
2. Demonstrate how to solve problems related to supply chain management using numerical and computational tools to address SCM issues
3. Interpret research finding is SCM
4. Link various aspects of SCM problem solving

Table of Assessments

Quiz 1 = 6 marks	Quiz 2 = 6 marks	Quiz 3 = 6 marks	Quiz 4 = 5 marks	Quiz 5 = 5marks	Quiz 6 = 5 marks	Quiz 7 = 5 marks
Discussion 1 *(Examples of SC)* = 2 marks Discussion 2 *(SC performance)* = 2 marks	Discussion 3 *(SC drivers)* = 2 marks Discussion 4 *(SC metrics)* = 2 marks	Discussion 5 *(different distribution systems)* = 2 marks Discussion 6 *(impact of online sales for different products)* = 2 marks	Assignment 1 *(network design homework)* = 5 marks Discussion 7 *(network design)* = 3 marks Discussion 8 *(global sourcing)* = 3 marks	Discussion 9 *(SC drivers)* = 2 marks Discussion 10 *(SC metrics)* = 3 marks	Assignment 2 *(Aggregate planning problems homework)* = 5 marks Discussion 11 *(aggregate planning)* = 3 marks Discussion 12 *(SC metrics)* = 3 marks	Discussion 13 *(SC drivers)* = 2 marks Group assignment 1 (group project) = 33 marks
10 %	**10%**	**10 %**	**10 %**	**10%**	**10%**	**40%**

Module Code:	EBU118M	Module Name:	Engineering Business Dynamics
Academic Lead:	Prof. John Trimble		

1. Module Topics

The following topics will be covered in this module over 7 weeks:

Week 1. Introduction to system dynamics: its history, fundamental concepts and system equilibrium using the Human Resources model. Also an introduction to AnyLogic

Week 2. System thinking & critical thinking: In depth coverage of the relationship between system dynamics, system thinking and critical thinking and an introduction to causal loop diagrams. Also an introduction to Vensim

Week 3. Steps in the system dynamics process: In depth coverage of the steps in system dynamics modelling and the role of boundaries and iteration

Week 4. Conceptual models: In depth coverage of conceptual models – such as stock and flow, causal loop diagrams, bulls-eye diagram with a focus on ageing chains and co-flow models

Week 5. Constructing complex models: Constructing various models to reflect different dynamic hypotheses with particular emphasis on – predator-prey systems, epidemic models, population growth and climate change

Week 6. Supply chain problems: Examination and construction of system dynamics models to address problems in supply chain management

Week 7. The decision process: An in depth examination of modelling of the decision processes and how to include this in AnyLogic and Vensim models. Working on team projects to construct and validate models addressing particular problems. This will emphasise – teamwork, data collection, problem construction, model iteration and model validation

2. Module Outcomes:

Upon completion of this module, you (the student) will be able to:

1. Identify the theoretical connection between system dynamics, system thinking and critical thinking
2. Describe the steps in system dynamics modelling
3. Describe various structures used in system dynamics by implementing models that address various problems
4. Apply system dynamics to solve problems through the use of Vensim and Anylogic
5. Apply the system dynamics validation techniques to operating models.

Table of Assessments

Week 1	**Week 2**	**Week 3**	**Week 4**	**Week 5**	**Week 6**	**Week 7**
Quiz 1 = 100 marks 5%	Quiz 2 = 100 marks 5%	Quiz 3 = 100 marks 5%	Quiz 4 = 100 marks 5%	Quiz 5 = 100 marks 4%	Quiz 6 = 100 marks 4%	Quiz 7 = 100 marks 4%
Discussion 1 (*system equilibrium*) = 100 marks 2%	Discussion 2 *(critical thinking and validation)* = 100 marks 2%	Discussion 3 *(modelling process)* = 100 marks 2% Discussion 4 *(boundaries and iteration)* = 100 marks 2%	Discussion 5 *(model constructs)* = 100 marks 2%	Discussion 6 (predator-prey models*)* = 100 marks 2% Discussion 7 (S-shaped growth*)* = 100 marks 2% Assignment 1 *(group project overview)* = 100 marks 10%	Discussion 8 (supply chain models*)* = 100 marks 2% Project part #1 *(group project part 1)* = 100 marks 20%	Discussion 9 *(validating final project)* = 100 marks 2% Project part #2 *(group project part 2)* = 100 marks 20%
200	200	300	200	400	300	300
7%	**7 %**	**9%**	**7 %**	**18%**	**26%**	**26%**

Module Code:	EDY118M	Module name:	Engineering Data Analysis
Academic Lead:	Prof. Anish Kurien		

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Module Topics

The following 7 topics:

1. Introduction to Business Analytics
   THEME 1: Exploring Data
2. Describing the Distribution of a Simple Variable
3. Finding Relationships amongst variables
   THEME 2: Probability & Decision making under uncertainty
4. Probability & Probability distribution
5. Normal, Binomial, Poisson and Exponential Distributions
   THEME 3: Statistical Inference
6. Sampling and Sampling Distributions
7. Confidence Interval Estimation

Module Outcomes:

Upon completion of this module, you (the student) will be able to:

1. Explain the basic principles of developing models and typical modelling approaches.
2. Describe the ***distribution of a single variable*** by using appropriate summary measures, tables & graphs.
3. Describe the ***distributions of at least two variables at a time*** by using numerical summary measures, graphs, and tables.
4. Discuss random variables and its association with ***probability*** and ***probability distributions***.
5. List and discuss ***specific distributions*** that commonly occur in a variety of business applications such as *normal*, *binomial*, *poisson* and *exponential* distributions.
6. Discuss the principles of ***sampling schemes*** and ***sampling distributions***, which forms the basis for statistical inferencing.
7. Conduct ***confidence interval estimation*** on data by obtaining a point estimate and a confidence interval around the point estimate.

ASSESSMENT WEIGHTS	WEIGHT OF SUMMUTIVE ASSESSMENT DURING THE SEMESTER		
	AS	WR	PJ
ASSESSMENT 1	100%		
ASSESSMENT 2		100%	
ASSESSMENT 3			100%
TOTAL	30%	40%	30%

AS: Assignments; PJ: Projects; WR: Written Tests

Module Code:	SYMBP51	Module name:	SYSTEMS MODELING
Academic Lead:	PROF. ANDREI KOLESNIKOV		

Module Topics

The following 7 topics (you can add more if needed, but a topic per week works well) will be covered in this module:

(Note: these will be used as weekly titles on the LMS)

1. Models as reflection of the world
2. Introduction to System Dynamics modeling (SD)
3. Dynamic patterns in complex systems
4. Introduction to Agent-Based Modeling (ABM)
5. Agents interaction in complex systems
6. Multi-method modeling
7. Current and future benefits of simulation modeling

Module Outcomes:

Upon completion of this module, you (the student) will be able to:

1. Select and describe appropriate modeling method (System Dynamics or Agent-Based modeling) on the basis of simulation goals.
2. Develop a simulation model of a complex system using ANYLOGIC software
3. Perform simulations of complex system behavior using simulation model
4. Analyse simulation results
5. Evaluate system performance on the basis of simulation results analysis.
6. Propose recommendations on system performance improvement
7. The final mark will be calculated as follows:

ASSESSMENT WEIGHTS	WEIGHT OF SUMMUTIVE ASSESSMENT DURING THE SEMESTER		
	AS	WR	PJ
ASSESSMENT 1	100%		
ASSESSMENT 2		100%	
ASSESSMENT 3			100%
TOTAL	30%	40%	30%

AS: Assignments; PJ: Projects; WR: Written Tests

Module Code:	LCY119N	Module name:	Life Cycle Management
Academic Lead:	Dr. B.I. Ramatsetse		

Module Topics

The following topics will be covered in this module over 7 weeks:

Week 1. Introduction to Life-Cycle Management
Week 2. Introduction to Life-Cycle Management continue
Week 3. Quantitative & Qualitative methods supporting Life Cycle Assessment
Week 4. Quantitative & Qualitative methods supporting Life Cycle Assessment cont
Week 5. Productivity oriented method for sustainability analysis
Week 6. Productivity oriented method for sustainability analysis continued
Week 7. Life Cycle Costing models

Module Outcomes:

Upon completion of this module, you (the student) will be able to:

i. Understand Life-cycle assessment concepts and Life-cycle costing principles as part of engineering essentials
ii. Select a product or project, from alternatives based on life cycle cost
iii. Apply principle of characterization to various products and optional elements
iv. Solve real world problems related to engineering

Assessments

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Asnwer multiple choice Question (Quiz) (15 mark rubric) = 2,5%	Answer and submit tutorial questions (10 mark rubric) = 2,5%	N/A	Answer and submit end of the chapter questions (10 mark rubric) = 2,5%	N/A	Answer and submit end of the chapter questions (10 mark rubric) = 2,5%	Compulsory online Quiz 1 (35mark rubric) = 12.5% Compulsory online Quiz 2 (35 mark rubric) = 12.5%
Submit essay of 500 words outlining what life cycle is (20 mark rubric) = 2,5%	Calculate the environmental impact of a product using tables (30 mark rubric) = 5%	Answer and submit end of the chapter questions (10 mark rubric) = 2,5%	Submit Assignment 1: Life Cycle Models (50 mark rubric) = 20%	Answer and submit end of the chapter questions (10 mark rubric) = 2,5%	Submit Group Project 1: Life Cycle Models (50 mark rubric) = 22.5%	Answer & submit tutorial calculations (20 mark rubric) = 5%
Discussion	Discussion Develop and submit a layout for report	Self-Assessment quiz Discussion	Self-assessment quiz	Discussion Self-assessment quiz Calculate and submit Life Cycle Assessment using Excel sheet	Self-assessment quiz	Module participation (10 mark rubric) = 5%
5%	**7.5%**	**2.5%**	**22.5%**	**2.5%**	**25%**	**35%**

Module Code:	QUE119M	Module name:	Quality Management
Academic Lead:			

Module Topics

- Understanding quality concepts
  - Differing perspectives on quality
  - Global supply chain quality
  - Quality standards
- Designing and Assuring quality
  - Strategic quality planning
  - The voice of the customer
  - Voice of the market
  - Designing quality in the product
  - Designing quality in the services
  - Managing supplier quality in the supply chain
- Implementing quality
  - The tools of quality
  - Six sigma and lean tools
- Forever improving quality
  - Implementing and validating the quality system
  - Quality standards
- **Module Outcomes:**

1. Explain the difference between quality in production and services so that the theory may be applied effectively in the workplace
2. List and describe the different theoretical models governing quality and how they can help improve quality in the workplace
3. Describe the global aspects of quality that can be applied to the local setting, by understanding international quality models
4. Explain the impact of building-in quality in an organisation's strategy
5. Determine the voice of the customer and the market and explain the concepts of customer focus and satisfaction as key to a company's success
6. Describe the dimensions of quality and the alignment with customer perception
7. Differentiate the different tools used to manage quality and explain how these can be used effectively in the workplace to improve quality
8. Explain the theory in the audit process that allows top management to stimulate support by enhancing the system for improvement, which is aligned to the concept of continuous improvement
9. Explain the ISO standards and their role in Quality management

Assessments

There will be two compulsory individual assignments to be undertaken by each student and must be submitted on time. Each is work 50% toward the final assessment mark.

The online quiz provided each week is voluntary and does not contribute toward the final assessment mark. Students are urged to attempt all quizzes. They provide an indication of the student's level of understanding of that week's material.

Module Code:	EPJ119M	Module name:	Engineering Project Management
Academic Lead:	Dr. JA Swanepoel		

Module Topics

1. Week 1: Project Management Concepts & Identifying and Selecting Projects.
2. Week 2: Developing Project Proposals & Defining scope, Quality, Responsibility and activity.
3. Week 3: Developing the schedule
4. Week 4: Resource Utilisation & Determining Costs, Budget and Earned Value
5. Week 5: Managing Risk & Closing the Project
6. Week 6: Project Manager & The Project Team
7. Week 7: Project Communication, Documentation & Project Management

Module Outcomes

1. Describe the benefits of using project management techniques in order to develop a baseline plan.
2. Give examples on how businesses go about selecting specific projects, whilst acquiring approval for such selected projects.
3. Identify two methods for measuring effectiveness in separate proposals, before contracts are awarded to service providers.
4. Illustrate a work breakdown structure by drawing a network diagram that represents a typical development task list.
5. Explain what an activity estimated duration is and how it is determined during the schedule control phase of a project
6. Give examples of resource constraints during resource levelling of a project.
7. Describe the process of project budgeting and how a reserve amount affects a project proposal.
8. Analyze how the risk level of a certain activity changes during a project within three risk types
9. Explain why some projects are terminated before they are completed and how customer feedback played an important role in the completion or termination.
10. Describe the leadership skills possessed by project managers.
11. Describe the characteristics associated with effective project teams.
12. Explain the importance of controlling changes made to project documents and how communication plays a role in these changes.
13. Explain the importance of the project management office within a specific autonomous project organisation structure.

Assessments

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Quiz 1: 10 marks	Quiz 2: 10 marks	Quiz 3: 10 marks	Quiz 4: 10 marks	Quiz 5: 10 marks	Quiz 6: 10 marks	Quiz 7: 10 marks
Assign-ment 1 (short) 10 marks	Assign-ment 2 (short) 10 marks	Assign-ment 3 (short) 10 marks	Assign-ment 4 (short) 10 marks	Assign-ment 5 (short) 10 marks	Assign-ment 6 (short) 10 marks	Assign-ment 7 (short) 10 marks Assign-ment (large) 100 marks
11%	**11%**	**11%**	**11%**	**11%**	**11%**	**34%**

Module Code:	TVC119M	Module name:	Technology Venture Creation
Academic Lead:	Prof. M. Muchie		

Module topics:

1. Creativity and Innovation and Entrepreneurship
2. Creativity, Innovation and Venture Creation
3. The Role of Innovation and Entrepreneurship in Economic Theories
4. The Role of Innovation and Entrepreneurship and Economic Systems
5. Financing Innovation for Entrepreneurship Innovation for social entrepreneurship
6. The Role of Gender entrepreneurship
7. The African Youth and Social entrepreneurship
8. Incubators and Small and Medium Sized Entrepreneurship Business Plan start up for real venture and entrepreneur

Module Outcomes

1. The purpose of this course is to create an innovative startup track where learners become daring risk takers.
2. Students will be expected to do literature review, a real-life venture case exploration and investigation, and group work to learn how to develop real ventures by presenting real business plans to create new ventures.

Assessments

There are 6 Assignments and percent of the final grade is indicated

1. Analytical assessment of a Real Entrepreneur = 15%
2. Ideas for entrepreneurship you have or know about that is worth reflecting upon = 15%
3. Literature review = 15%
4. Business plan for new venture & Finding practical ways as groups to create real venture for now or the future = 15%
5. Case study of venture = 20%
6. One final examination = 20%

Module Code:	MEN119M	Module name:	Maintenance Engineering
Academic Lead:	Dr. B.I. Ramatsetse		

Module Topics

The following topics will be covered in this module over **3 Blocks** accross 7 weeks:

Block 1: Introduction to Maintenance Engineering

- Definition of key terms and concepts in reliability centred maintenance
- Risk based inspection
- Mathematical tools in maintenance engineering; set theory; Boolean algebra and probability distribution of continuous variables; Laplace transforms
- Quality and reliability in maintenance
- How to create a maintenance strategy
- Auditing a maintenance strategy and Maintenance strategy checklist

Block 2: Maintenance Management and Control

- Maintenance management by objectives
- Maintenance policy, Material control,Work order system
- Performance measurement; Maintenance project control methods
- Critical path method (CPM); Activity Expected Duration Time Estimation
- Maintenance management control methods: Broad and specific indicators

Block 3: Quantitative & Qualitative methods supporting Life Cycle Assessment

- Rationale for maintenance costing
- Factors influencing maintenance costing
- Maintenance budget: preparation, steps, and components
- Material and labour cost estimation
- Maintenance cost estimation models
- Maintenance cost related indices; Maintenance cost data collection

Module Outcomes:

Upon completion of this module, you (the student) will be able to:

i. Understand maintenance engineering principles as part of engineering essentials
ii. Create a maintenance strategy
iii. Construct maintenance cost estimation models
iv. Solve real world problems related to engineering

The final mark will be calculated as follows:

ASSESSMENT WEIGHTS	WEIGHT OF SUMMUTIVE ASSESSMENT DURING THE SEMESTER		
	AS	WR	PJ
ASSESSMENT 1	100%		
ASSESSMENT 2		100%	
ASSESSMENT 3			100%
TOTAL	30%	40%	30%

AS: Assignments; PJ: Projects; WR: Written Tests

Module Code:	RMD118M	Module Name: Research Methodology
Academic Lead:	PROF. Gerald Steyn	

Module Topics

1. **Critical aspects of postgraduate research**
2. **Communicating research**
3. **Ethics, professionalism and legal constraints in research**
4. **An overview of the textbook**
5. **The research objective and research framework**
6. **Research questions and defining concepts**
7. **Research strategies and research material**
8. **Literature surveys**
9. **Research planning**
10. **Article writing**

Module Learning Outcomes (MLO):

Upon completion of this module, you (the student) will be able to:

1. **Define** critical aspects and characteristics of postgraduate research
2. **Produce** a range of documents intended to communicate research
3. **Apply** ethics, professionalism, honesty and integrity in research
4. **Design** the conceptual aspects of a research project proposal
5. **Design** the technical aspects of a research project proposal
6. **Develop** a consolidated research proposal
7. **Write** a scholarly article

The final mark will be calculated as follows:

ASSESSMENT WEIGHTS	WEIGHT OF SUMMUTIVE ASSESSMENT DURING THE SEMESTER		
	AS	WR	PJ
ASSESSMENT 1	100%		
ASSESSMENT 2		100%	
ASSESSMENT 3			100%
TOTAL	30%	40%	30%

AS: Assignments; PJ: Projects; WR: Written Tests

Possible Evidence

Z komentarzem [MF5]: As part of the project results the curricular overview an the Objectives-Module-Matrix at least have to be provided along with the SAR.

- Curricular overview/study plan that informs about the student workload for each module in every semester (possibly with location of publication like homepage, student guides, study and examination regulations). On MyTUTor (the BlackBoard based instructional platform) the detailed study guides; module objectives; weekly objectives and assessments for each taught module is available to lecturers, teaching assistants, technical support and all students enrolled in each module.
- Objectives-Module-Matrix (see attached matrix below)
- Module descriptions as they are available to students and the teaching staff (the following is the summary information on each taught module. This is available directly on the TUT website)

- ENGINEERING BUSINESS DYNAMICS (EBU118M) CONTINUOUS ASSESSMENT (Module custodian: Department of Industrial Engineering) 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 DATA ANALYSIS (EDY118N) CONTINUOUS ASSESSMENT (Module custodian: Department of Industrial Engineering) Innovation, decision-making and engineering data analysis tools are discussed to ensure effective problem solving skills. (Total tuition time: ± 80 hours)
- ENGINEERING PROJECT MANAGEMENT (EPJ119M) CONTINUOUS ASSESSMENT (Module custodian: Department of Industrial Engineering) 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)
- LIFE CYCLE MANAGEMENT (LCY119N) CONTINUOUS ASSESSMENT (Module custodian: Department of Industrial Engineering) Total quality, asset and environmental management integration in managing the organisation effectively. (Total tuition time: ± 80 hours)
- MAINTENANCE ENGINEERING (MEN119M) CONTINUOUS ASSESSMENT (Module custodian: Department of Industrial Engineering) Introduction to maintenance; measures of maintenance system maintenance; and Systems design. (Total tuition time: ± 80 hours)
- QUALITY ENGINEERING (QUE119M) CONTINUOUS ASSESSMENT (Module custodian: Department of Industrial Engineering) Introduction to quality. Quality management systems. Quality improvement. Strategies. Quality assurance. (Total tuition time: ± 80 hours)
- RESEARCH METHODOLOGY (RMD118N) CONTINUOUS ASSESSMENT (Module custodian: Department of Industrial Engineering) Research Methodology. Administrative procedures. Research topic. Research problem and objectives. Research proposal. Technical structure of dissertation. Application for funding. Article training. (Total tuition time: ± 80 hours)
- SUPPLY CHAIN MANAGEMENT (SPP119N) CONTINUOUS ASSESSMENT (Module custodian: Department of Industrial Engineering) 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)
- TECHNOLOGY VENTURE CREATION (TVC119M) CONTINUOUS ASSESSMENT (Module 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)

Modules Learning-Outcomes Matrix	Research Methodology	Engineering Business Dynamics	Engineering Data Analysis	Engineering Project Management	Life Cycle Management	Maintenance Engineering	Quality Engineering	Supply Chain Management	Technology Venture Creation	Systems Modelling	mini-dissertation	Asset Management *	Financial Management *	Appropriate Technology *
EUR-ACE LEARNING														
Knowledge and Understanding	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Engineering Analysis	X		X	X	X	X	X		X	X	X			
Engineering Design	X				X				X	X	X			
Investigations	X	X	X					X	X	X	X		X	X
Engineering Practice			X	X	X	X	X		X		X	X		X
Making Judgements	X	X				X	X	X	X		X			X
Communication and Team-working		X		X				X	X					X
Lifelong Learning	X	X	X	X	X	X	X	X	X	X	X	X	X	X
* potential electives														

Evidence

- Objectives-Module-Matrix (*refer to criterion 1.1*)
- Module descriptions as are available to students and the teaching staff in the Postgraduate prospectus, TUT website and myTutor.
- Documents where the courses of studies and their organization are regulated
- Student progression statistics are generated for all programs in the Faculty and reported through the Dean's office.
- Documents that inform about the effective regulations about (outgoing) mobility, working practice intervals and the recognition of externally acquired credits are available through the Dean's office.

Criterion 1.4 Admission requirements

In terms of admission, the requirements and procedures are binding, transparent and the same for all applicants.

The admission requirements are structured in a way that supports the students in achieving the learning outcomes.

- Admission requirements are listed in the Postgraduate Prospectus and on the TUT website

a. Admission requirements:

Any Baccalaureus Technologiae in Engineering, or a Bachelor Honours in Engineering Technology in Engineering, or a Bachelor of Engineering or a Bachelor of Science in Engineering, or a NQF Level 8 qualification in Engineering (or related field), obtained from an accredited South African university, with an aggregate of 60% for the final-year of study.

Candidates with a baccalaureus technologiae, will be required to complete bridging modules at NQF Level 8 before registration (through an online mode: BPEMO8). Full time candidates may apply to complete these bridging modules concurrnetly with the registered Master's degree on approval from the Head of Department (HOD). The modules are: Engineering Project Management (EPJ51BN), Quality Engineering (QUE51BN and Systems Modelling (SYM51BN (or their equivalents). Holders of any other equivalent South African or international qualification may also be considered.

b. Selection criteria:

Admission will be subject to approval of a research topic by the Departmental Research Committee (DRC). Candidates who do not meet the 60% minimum academic requirements, might be invited to a Departmental Selection Committee for consideration. Acceptance is subject to available capacity according to the Student Enrolment Plan (SEP) as well as supervisory capacity. Applicants will be informed of their status per official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. Recognition of Prior Learning (RPL), equivalence and status: See Chapter 30 of Students' Rules and Regulations.

d. **Intake for the qualification:** January and July.

e. **Presentation:** Research and block-mode classes presented in the day, evening or online mode. Online modules and their assessments are presented via the myTutor platform. Classes and assessments may take place on Friday afternoons and/or Saturdays. Learner-centred instruction is emphasised across all modules with group activities and projects to foster critical thinking and active hands on participation.

f. **Duration:** A minimum of two years and a maximum of four years.

Evidence

- Study and examination regulations or specific admission regulations are listed on the website and provided in the Student handbook.
- Information about the admission requirements for the degree programme are listed on the website and postgraduate prospectus.
- Information about the profiles of the applicants and the admitted students are listed on the website and postgraduate prospectus.

2. The Degree Programme: Structures, Methods & Implementation

Criterion 2.1 Structure and modules

The degree programmes is divided into modules. Each module is a sum of teaching and learning whose contents are listed in the course guide provided on MyTutor to all students in advance of the taught module.

Research methodology and Engineering business dynamics are the two required taught modules in semester one. Engineering data analysis and Technology venture creation are the two required modules for semester two. In addition to the four required modules, students must take three electives during their first three semesters. They can currently select from the following modules: Engineering project management; Maintenance engineering; Quality engineering; and Supply chain management.

There is no required internship or working practice required in this program. However, the majority of the students are working in industry or for the government. The program has a particular appeal to working students because all taught modules are either taught online, in the evening or weekend or in a blended mode.

The university plans to take the whole program online by 2022. This will open up options for international enrolment where students in other African countries and Europe can enrol in the program without having to relocate to Pretoria.

With its choice of modules, the structure ensures that the learning outcomes can be reached and allows students to define an individual focus and course of study through the selection of electives and the selection of a unique topic for their mini-dissertation.

The curriculum is structured in a way to allow students to complete the degree without exceeding the regular course duration.

The modules have been adapted to the requirements of the degree programme. They ensure that each module objectives helps to reach both the qualification level and the overall intended learning outcomes.

Z komentarzem [MF6]: Again, much background information is missing; you have to consider that the report is read by peer reviewers who have no background at your University and system and need to understand how everything is working.
What size do the modules have, are there electives or is the curriculum completely mandatory, is working practice part of the programme or internships? Does the programme conclude with a Master thesis and in which dimension and timeframe? Does the curriculum provide a mobility window for international mobility? You mention that professional experience can be recognized which is interesting but the rules and conditions for this recognition process have to be described.

Z komentarzem [JT7]: How the programworks, components of module, practical work, how the research organised, supervision, approval of dissertation, also address international mobility. International teaching components, Study abroad for students is not part of program; international students are engaged in the program.

This programme caters to working engineers, therefore rules are in place for recognising achievements and competences acquired outside the higher education institution. These work competences are considered in the admission process. This allows students with significant work experience, but without the normal undergraduate grade requirement to be considered for admission. TUT works closely with other universities in South Africa through our Ministry of Higher Education to assure continuity between similar programs at our different institutions. They render the transition between higher education institutions easier and ensure that the learning outcomes are reached at the level aimed for.

Criterion 2.2 Workload and credits

The estimated time budgets are realistic enough to enable students to complete the degree without exceeding the regular course duration. Structure-related peaks in the workload have been avoided.

A credit point system oriented on the amount of work required from students has been devised that conforms to the accreditation standards in South Africa. It is also consistent with international standards. The workload comprises both attendance-based learning and self-study. This includes all compulsory elements of the degree.

Z komentarzem [MF8]: And again, you only say that this is so: How do you make sure that the workload calculation actually meets the working reality of the students? First of all you have to explain how the credit calculation in South Africa works and then a process has to be described how you review and adapt the workload on a regular basis.

Module code	Module	Credits	Notional hours
RRT109M	Research report: Engineering Management	90	900
RRT109R	Research report: Engineering Management (re-registration)	0	0
RRT119R	Research report: Engineering Management (re-registration) (semester option)	0	0
EBU118M	Engineering business dynamics *	15	150
RMD118M	Research methodology *	15	150
EPJ119M	Engineering project Management *	10	100
LCY119M	Life Cycle Management	10	100
MEN119M	Maintenance Engineering	10	100
QUE119M	Quality Engineering	10	100
SPP119M	Supply chain Management *	10	100
EDY118M	Engineering Data analysis *	15	150
TVC119M	Technology Venture Creation	15	150
	Systems Modelling (bridging module)	15	150
Total		180	1800

*** currently available in online mode**

Guiding Questions

- On what basis (of calculation) are credit points allocated to single modules?
- How do those responsible for the degree programme and other stakeholders - including the students - rate the student workload? What problems do occur? What is done to solve them?
- Are all mandatory parts of the degree programme (including working practice intervals) awarded with credits? If not, why?

Possible Evidence

- Module descriptions as are available to students and the teaching staff
- Documents where the courses of studies and their organization are regulated
- Student progression statistics are provided on a weekly basis for each module through the university's muTutor instructional online system.
- Documents that regulate the awarding of credit points for the degree programme are available on the university website and through the Dean's office
- Relevant results from internal surveys and evaluations – possibly statistical data about the student workload

Criterion 2.3 Teaching methodology

The teaching methods and instruments used support the students in achieving the learning outcomes. The focus on learner-centred teaching has increased inline with the understanding that students learn better from practice than lectures. An example is the Supply chain management module used student interaction discussion groups and group projects for 62% of the course work and marking while the remaining 38% was individual weekly quizzes.

The degree programme is designed to be well-balanced between attendance-based learning and self-study. Currently three of the core required courses have been structured to go online, as have two of the elective taught modules. The current plan is to have all the taught modules available online by 2021.

Familiarising the students with independent academic research and writing plays a vital role in the programme. The mini-dissertation is half of the student workload. The student receives close guidance from a supervisor and co-supervisor. This requires regular meetings and month reports to assure the student is progressing on schedule.

Z komentarzem [MF9]: This is a good start, also as an example fort he other chapters because you briefly state your intention concerning student-centered learning and give some examples how this is implemented. Nevertheless, much more could be said here: How do you make sure that teachers are acquainted with modern teaching methodologies? Is online and blended learning an option and if yo where and how does is work?

Z komentarzem [JT10]: More info hear on online efforts

Evidence

- Module descriptions as are available to students and the teaching staff on the website and in the printed Postgraduate prospectus

Criterion 2.4 Support and assistance

At the beginning of each semester both the Faculty (FEBE) and the department (IE) host orientation sessions to provide individual assistance, advice and support for all students. Students meet the lecturers and support staff that will work with them during their stay at TUT. They are provided an overview of the program, the module prospectus and the student handbook. All taught modules use the university electronic teaching environment – MyTUTor (currently based on Blackboard). Student support services provides assistance to all students to assist in using MyTUTor. Also a range of tutorials are available online to assist students. All online courses take use either Collaborator, Zoom, Skype or other meeting tools to provide students assistance without having to travel to campus. All lecturers are required to post office hours associated with each taught module.

All students are assigned mentors at their initial orientation. A mentor may be a professor, lecturer, post-doctoral researcher, or doctoral student. The mentor advises and guides the student in progressing through the taught modules and preparing a pre-proposal. After the student's pre-proposal is approved by the department, she/he is a assigned a supervisor and co-supervisor to advise and guide (both technical and general) in preparation of the full proposal and completion of the mini-dissertation (research project).

Z komentarzem [MF11]: This is okay but I am sure you offer your students much more support than just an orientation meeting at the beginnig of the semester. How can students access help and assistence if they have questions concerning their subject, concerning personal matters, health issues or professional opportunities and international mobility?

Z komentarzem [JT12]: Mention – MyTutor assistance, office hours, online hours, Zoom online meeting,

Evidence

- Students and supervisors are required to document the student's progress through monthly reports.
- Student evaluation of modules and instruction is conducted for every module through the myTutor instructional site. The results are reported to the lecturer and the HOD so that best practices can be reinforced and improvements in modules can be made
- Students are required to present their pre-proposals to the department at DCPS meetings. These meetings are recorded and feedback provided to students.
- Students are required to present their full proposals to the department at DCPS meetings. These meetings are recorded and feedback provided to students.
- Students are required to present their completed mini-dissertations to the department at DCPS meetings. These meetings are recorded and feedback provided to students.
- All mini-dissertations are run through TurnitIn to assure originality.
- All mini-dissertations are reviewed by two independent external assessors that are qualified with doctoral degrees and experience in the area related to the research. All external assessors have to be approved by the Faculty committee for Postgraduate studies (FCPS).

3. Exams: System, Concept & Organisation

Criterion 3 Exams: System, concept and organisation

Exams[4] are devised to individually measure to which extent students have reached the learning outcomes defined. All taught modules use continuous assessment and do not conduct extensive end of module examinations. Continuous assessments are structured to cover all of the intended learning outcomes (knowledge, skills and competences). Projects (individual and group) are a primary form of assessing the student's progress. Any student that does not successfully complete a taught module has one opportunity to retake the module. The student must enrol and retake the full module. If a student does not succeed in the second attempt, they cannot proceed in the program.

The degree programme comprises a mini-dissertation, which ensures that students work on a set task independently and at the level aimed for. First, the supervisor and co-supervisor must review and approve the mini-dissertation. Upon approval, it is presented to the full department for approval. After departmental approval, it must be assessed and approved by two independent external reviewers.

For each taught module, a form of assessment (including suitable alternatives, if any) has been defined. There are mechanisms in place which ensure that all students learn the details of what is required in order to pass the module (pre-examination elements, assignments etc.) no later than at the start of the module. Rules have been defined for re-sits, disability compensation measures, illness and other mitigating circumstances etc.

All exams are marked using transparent criteria. These criteria are available to students through the myTutor system for each taught module. There are mechanisms in place, which ensure that exams marked by different examiners are comparable. These mechanisms include peer review and review by the department committee for teaching and learning (DCTL). Tshwane University of Technology vouches for the quality in terms of relevance, content and structure of all student assignments completed outside the institution.

Z komentarzem [JT13]: explain tests and quizes; process of repeating modules;

Z komentarzem [MF14]: Generally okay, but concerning the rules and regulations for re-sits, exam organization and scheduling of exams you have to describe in short form how this is done. It is not enough just to say that there are rules in place. A self-analysis should take place: Why do you think that the exam system of your programme is adequate for achieving the programme objectives?

[4] Exams are all methods of ascertaining to which extent the learning outcomes have been reached as well as any pre-examination elements, assignments etc., as set forth by the higher education institution in question.

Possible Evidence

- Module descriptions are available to students and the teaching staff in the Post-graduate prospectus and on the university website.
- Regulations for exams are available in the course guide for each module
- Module schedules (including the date of the exams and project due dates) are available through the department in advance and on myTutor for each module.
- Statistical data about the progress of studies, e.g. average grade, failure rate, amount of re-sits are calculated and organised at the Faculty level through the Dean's Office.

4. Resources

Criterion 4.1 Staff

The composition, scientific orientation and qualification of the teaching staff team are suitable for sustaining the degree. All lecturers and primary supervisors had doctoral degrees in Industrial engineering, Mechanical engineering or closely related and relevant fields. Currently, the program is supported by three full professors, one senior lecturer and one lecturer. All staff teaching postgraduate programs have to be approved the Faculty committee of postgraduate studies (FCPS). In addition to full time staff, there are three professors in other departments of our Faculty that teach taught modules. The department is currently, supported by seven post-doctoral researchers that assist as mentor and collaborate on research related to the mini-dissertations. Currently we have approximately 100 students in the program. The plan is to allow 60 intakes a year and maintain an enrolment of 120 students. With a full-time equivalent of department staff equal to six, this will give us a 20 to 1 student lecturer ratio. Staff available to supervisor mini-dissertations includes adjunct staff and lecturers and professors in other departments of the Faculty as well as research staff in the Operations Management department in the Management Faculty. In addition to the five full-time staff in the department of Industrial engineering, there are currently ten additional researchers supervising students on their mini-dissertations.

There are sufficient staff resources available for:

→ providing assistance and advice to students

→ administrative tasks

The research and development activities carried out by the teaching staff are in line with and support the level of academic qualification aimed at.

Z komentarzem [MF15]: It hast o be described how many staff members are involved in the programme, how are they selected, how many full professors are involved, what are the general qualification of staff members in the programme, etc.? Then, the sufficiency of the staff has to be proven, giving a student-teacher-ratio.

Evidence

- Description of the teaching staff - The department full time teaching staff consist of three professors, one senior lecturer and one new lecturer. All have doctoral degrees. Adjunct and part time lecturers teach some modules. Some, modules are taught by staff from other engineering departments. This is currently the case for the System Modelling, Engineering Data Analysis and Research methodology modules.
- Student numbers – each semester enrolment varies from 20-50 students. Annual enrolment has been set to 60 students.

Criterion 4.2 Staff development

There are offers and support mechanisms available for teaching staff who wish to further develop their professional and teaching skills. Currently three department staff members without doctoral degrees are enrolled and progressing on their doctoral degrees. A series of workshops and training using AnyLogic has been provided to staff. This is a major software tool used on a number of mini-dissertations.

The Industrial engineering department organises visiting professorships, seminars, conferences and workshops to assist the development of staff members on a regular basis. The Faculty of Engineering and the Built Environment (FEBE) also offers professional development in the form of conferences, workshop and special training. The Directorate of Research and Innovation is the third level at TUT that offers opportunities in staff development. They support research related conferences, training and workshops.

Criterion 4.3 Funds and equipment

The program is supported by the university through funding nationally through the Department of Higher Education. The program receives support through the tuition and fees paid by students enrolled in the program. Much of the research conducted by students is supported through the research grants of the department staff. Currently two of the professsors are SArchi Chairs and are funded through the South African National Research Foundation (NRF). This provides equipment, post-doctoral researchers and funding for postgraduate students. The third professor is coordinator of the Operations and Engineering Management Niche Research area at TUT and receives research support for students from TUT. Additionally many of our students qualify for direct bursaries from the NRF. The department has been successful in bringing in additional funding from both government sources and private industry that have been used for equipment and student support. There are several proposals in the pipeline and projects developing. Based on past work and current plans there will be no problem in maintaining the funding of the program. The available funds, processes and equipment form a sound and solid basis for the degree programme including:

Z komentarzem [MF16]: This is not sufficient: You have to explain where your funds are coming from, how much funds are raised from third parties, how money is distributed within the University and the programme, what equipment is provided by the University, maybe also an analysis of what could be improved, etc.

→ funding of laboratory environments

→ funding for software, including simulation software such as AnyLogic and Stella

→ funding to support the laboratory, software and associated training

→ solid, binding rules for all internal and external cooperation.

5. Transparency and Documentation

Criterion 5.1 Module descriptions

The module descriptions are accessible to all students and teaching staff and research supervisors on the website and through the Postgraduate prospectus and contain the (located at https://www.tut.ac.za/ProspectusDocuments/2020/MEng_Industrial_Structured_2020.pdf) following :

→ module identification code

→ person(s) responsible for each module

→ teaching method(s) and work load

→ credit points

→ intended learning outcomes

→ module content

→ planned use/applicability

→ admission and examination requirements

→ form(s) of assessment and details explaining how the module mark is calculated

→ required literature and textbooks

→ recommended literature

→ date of last amendment made

Z komentarzem [MF17]: How to be provided along with the SAR!

Z komentarzem [JT18]: Add links to prospestus on website

Criterion 5.2 Diploma and Diploma Supplement

Shortly after graduation, a diploma indicating a Masters in Engineering Management is issued together with a Diploma Supplement printed in English.

These documents provide information on the student's qualifications profile and individual performance as well as the classification of the degree programme with regard to its applicable education system.

The individual modules and the grading procedure on which the final mark is based are explained in a way that is clear for third parties.

Z komentarzem [JT19]: Scanned version of transcript and diploma

Criterion 5.3 Relevant rules

The rights and duties of both Tshwane University of Technology and our students are clearly defined and binding. The objectives of the university can be found at - https://www.tut.ac.za/ProspectusDocuments/2020/Objectives_of_TUT_2020.pdf; The link - https://www.tut.ac.za/ProspectusDocuments/2020/Chapter_15_2020.pdf provides information on the student disciplinary code .

All relevant course-related information is available in English and accessible for anyone involved.

Z komentarzem [JT20]: Link to location on website

6. Quality Management: Quality Assessment and Development

Z komentarzem [JT21]: Outline how feedback from students is used. How do students find out impact of their inputs on program. Feedback loop will be added. Also feedback from industry, graduates, lecturers. Also, stats on grad rate; success rate.

Criterion 6 Quality management: quality assessment and development

Z komentarzem [MF22]: This chapter should document in detail by which mechamism you gather feedback about the programme and through which procedures the continuous improvement oft he programme is ensured.
In addition, data and numbers should be presented and analyzed, outlining the general feasibility of the programme (i fit is already running). At least you have to make sure that the regular study duration and success rate is evaluated on a regular basis. The results of student questionnaires should be briefly summarized and analyzed insofar as that you comment on occasional deviances.

The programme is subject to regular internal quality assessment procedures aiming at continuous improvement. All responsibilities and mechanisms defined for the purposes of continued development are binding. Assessment is coordinated at the Faculty level. The department engages in assessment on a regular basis through the Department committee on teaching and learning (DCTL) at meets on a monthly basis. This committee overseas all taught modules for both undergraduate and postgraduate departments and reports on a monthly basis to the Faculty committee on teaching and learning (FCTL). The research component of the program is coordinated through the department committee for postgraduate studies and research (DCPS & DCRI). The department meets on a monthly basic and reports to the Faculty committee for postgraduate research (FCPS) and the Faculty committee for research and innovation (FCRI). Both of these committees meet on a monthly basic. Any issues regarding the ethics of the research projects are first addressed by the DCPS and then by the Faculty committee for research ethics (FCRE). Any research project that highly sensitive ethical issues is referred to the University committee on Ethics (REC) and evaluated by a team of researchers before approval to commence with re-

search is granted. The success rate of the program is evaluated by the FCPS on an annual basis. Any bottlenecks to success must be identified by the department and presented to the FCPS with recommendations for resolving the problems.

Students and other stakeholders take part in the quality assurance process. The department has student representation on the DCTL and the DCPS that assures their inputs to evaluation of the program and recommendations for improvement. The department has and external advisory committee consisting of representatives from industry and government agencies that have employed our students and/or have an interest in collaborating with the department on research efforts. This advisory committee provides assessments of the program and recommendations for improvement. The Head of department and chair of the DCRI & DCPS are also on the advisory committee. The outcomes and all measures derived are made known to all academic staff and students in the department. All methods employed and data analysed are suitable for the purpose and used to continue improving the degree programme, especially with a view to identifying and resolving weaknesses. To this end, the information they provide includes:

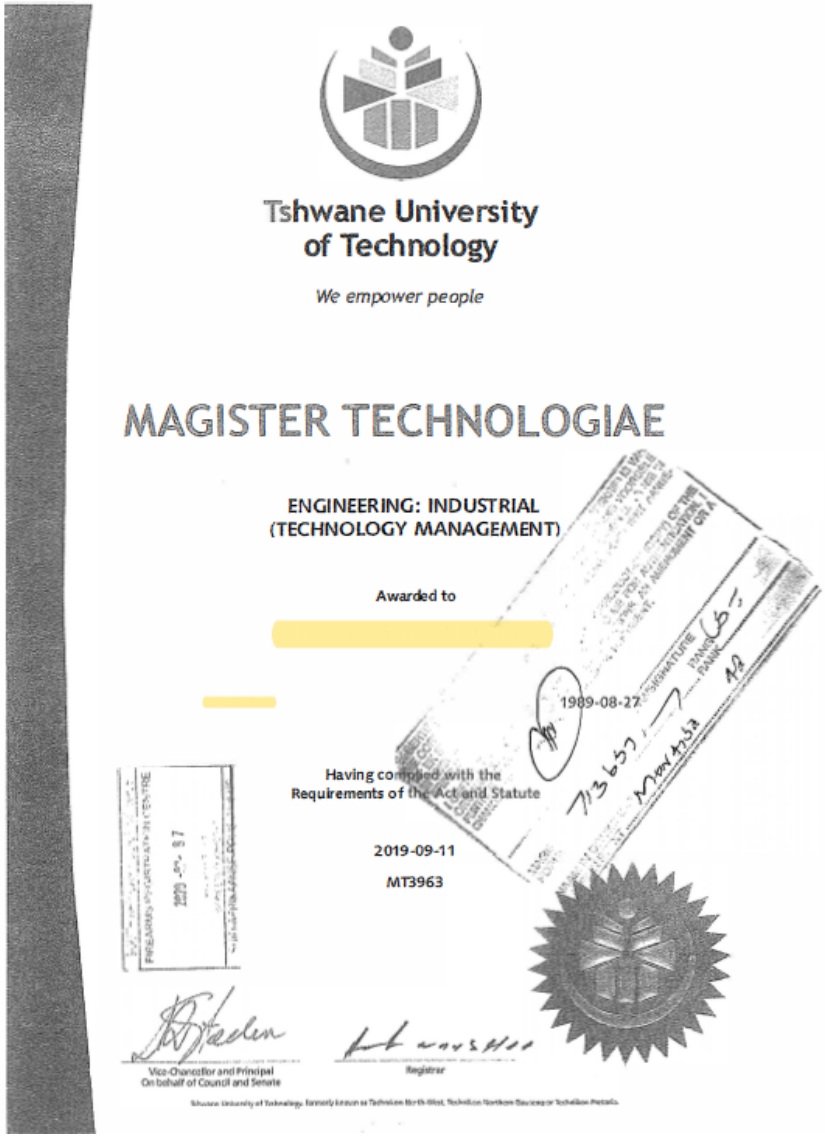
- whether the intended learning outcomes required to obtain the degree have been achieved;

- the academic feasibility of the degree programme;

- student mobility (within the country and);

- how the qualifications profile is accepted on the labour market;

- the effect of measures in use to avoid unequal treatment at the higher education institution (if any).



Tshwane University
of Technology

We empower people

MAGISTER TECHNOLOGIAE

ENGINEERING: INDUSTRIAL
(TECHNOLOGY MANAGEMENT)

Awarded to

[redacted]

1989-08-27

Having complied with the
Requirements of the Act and Statute

2019-09-11

MT3963

Vice-Chancellor and Principal
On behalf of Council and Senate

Registrar