INDUSTRIAL ENGINEERING

DUT
DURBAN UNIVERSITY OF TECHNOLOGY
INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

FACULTY OF ENGINEERING & THE BUILT ENVIRONMENT

2024 HAND BOOK

ENVISION2030

transparency • honesty • integrity • respect • accountability
fairness • professionalism • commitment • compassion • excellence

HANDBOOK FOR 2024

FACULTY
of
ENGINEERING
AND THE
BUILT ENVIRONMENT

DEPARTMENT OF
INDUSTRIAL ENGINEERING

Programmes on offer:
Bachelor of Engineering Technology in Industrial Engineering
Bachelor of Engineering Technology Honours
Master of Engineering
Doctor of Engineering

Contents

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IMPORTANT NOTICE

The Departmental rules in this handbook must be read in conjunction with the Durban University of Technology's General Rules

NOTE TO ALL REGISTERED STUDENTS

Your registration is in accordance with all current rules of the Institution. If, for whatever reason, you do not register consecutively for every year/semester of your programme, your existing registration contract with the Institution will cease. Your re-registration anytime thereafter will be at the discretion of the Institution and, if permitted, will be in accordance with the rules applicable at that time.

STAFF

Head of Department:	Dr OA Olanrewaju, B Sc. Honours (Electrical Eng.) (UI); M Sc. (Industrial Eng.) (UI); D. Tech: Industrial Eng (TUT)
Senior Lecturers:	Mr R Singh, (PR Tech Eng.); M Tech: Industrial Eng. (DUT); MSAIIE
	Dr M Dewa, (PR Eng); B. Eng: Industrial Eng (NUST); MSc. MSOM (UZ), MSAIIE; DEng. (DUT)
Lecturers:	Mr A K Naicker, (PR Tech Eng.), B Tech: Industrial Eng. (MLST); MBA (UKZN) MSAIIE
	Mrs H Jackson, B Tech: Industrial Eng (MLST); MEng (DUT); MSAIIE
	Dr BT Mncwango, BTech: Industrial Eng. (DUT); M Sc. MOST (Ecole des Mines de Nantes); PhD: Industrial Eng (UNISA)
	Ms M Moso, B Tech: Industrial Eng. (DUT); MEng (DUT)
Secretary:	Mrs K Dhavraj, (B. Tech: Management)
Technician:	Mr M Herelall, National Diploma: Mechanical Engineering

IE1 GENERAL INFORMATION

Modern Industrial Engineering is concerned with the integration of resources and processes into cohesive strategies, structures and systems for the effective and efficient production of quality goods and services in any undertaking.

Industrial Engineering draws upon specialized knowledge and skills in the mathematical, physical, behavioural, economic and management sciences, and fuses with the principles and methods of engineering analysis and design, to find optimal and practical solutions. They contribute to the success and prosperity of an industrial undertaking, thereby making a fundamental contribution to the creation of wealth.

What is a University of Technology?

The objective of a University of Technology such as DUT is "to create, apply and transfer knowledge and technology of an international standard through cooperative and professional career education programmes."

What do Industrial Engineers do?

The planning, design, re-design and implementation of processes that would encompass all aspects of the business

To be able to combine technical with specialised management to improve the business in such a manner that would ensure sustainable growth and prosperity

There is a great need for the knowledge and skills of Industrial Engineers in the South African Economy. The Department of Industrial Engineering strives to fill this need by providing quality education to our students.

Vision

To be a strategic partner that communicates progressive knowledge of organized human activity and socio-technical systems.

Mission

Our mission is to: -

Strengthen partnership with relevant stakeholders

Provide innovative teaching and learning practices

Develop research capacity in Industrial Engineering

Purpose Statements:

Bachelor of Engineering Technology in Industrial Engineering [SAQA NO. 99639]

This is a three-year application-oriented qualification which would provide students with a sound knowledge base in the field of Industrial Engineering and the ability to apply their knowledge and skills within a professional context. The qualification serves to equip graduates with the necessary learning skills, in order for them to pursue degree studies at the higher levels.

The programme has a strong professional career focus and graduates from this programme would be compliant to meeting the graduate attribute requirement as required by the Engineering Council of South Africa.

The purpose of this educational programme is to build the necessary knowledge, skills and attributes required for a graduate to be able to register with ECSA as a candidate Engineering Technologist.

Industrial Engineering Technologists are characterized by the ability to apply established and newly developed engineering technologies to solve broadly- defined problems, develop components, systems, services and processes. Industrial Engineering Technologists have a specialized understanding of systems that would integrate both human and machine processes.

This qualification provides:

1. Preparation for a career in Industrial Engineering and for achieving a level of technological proficiency in order to make a positive contribution to the economy and national development;
2. The educational base required for registration as a Candidate Engineering Technologist;
3. Entry to NQF level 8 programmes e.g. Honours, Post Graduate Diploma and B Eng programmes leading to Masters and Doctoral programmes.
   (Inserted w.e.f. 2017/09)

Bachelor of Engineering Technology Honours in Industrial Engineering [SAQA NO. 117975]

The Bachelor of Engineering Technology Honours Degree in Industrial Engineering is a post graduate specialisation qualification designed to prepare students for postgraduate study and for work in Industry at the higher cognitive levels. This programme is designed specifically to follow the Bachelors of Engineering Technology in Industrial Engineering, as offered at the Durban University of Technology.

The qualification consolidates and deepens the graduate's expertise in a specialised area of Industrial Engineering and develops research capacity in the methodology and techniques of this discipline, while equipping them to undertake more specialised and intensive learning. Programmes leading to this qualification allow students to work independently and responsibly, applying original thought and judgment to technical and risk-based decisions in complex situations. Graduates of this qualification would be prepared to enter niche roles in the labour market with the option of further studies at the Masters level.

The purpose of this programme is to further the necessary knowledge, understanding, abilities and skills required towards becoming a competent practicing Industrial Engineering Technologist. This qualification provides:

1. Preparation for careers in engineering itself and areas that potentially benefit from engineering skills,
2. A pathway for achieving technological proficiency in the discipline of Industrial Engineering
3. A means to contribute positively to the economy and to national development.
4. Entry to NQF level 9 Master Programmes

Master of Engineering (MEng) [SAQA NO. 96827]

This qualification is intended for persons who will make a contribution, through research, to understanding the application and evaluation of existing knowledge in a specialized area of technology. They will also demonstrate a high level of overall knowledge in that area, ranging from fundamental concepts to advanced theoretical or applied knowledge.
(Amended w.e.f. 2015/08)

Doctor of Engineering (DEng) [SAQA NO. 96812]

This qualification is intended for persons who will make a significant and original contribution to knowledge in a specialised area of technology. They will have a high level of overall knowledge in that specialised area ranging from fundamental concepts to advanced theoretical or applied knowledge.
(Amended w.e.f. 2015/08)

IE2 ENTRANCE REQUIREMENTS FOR:

(i) Bachelor of Engineering Technology in Industrial Engineering (SAQA NO: 99639)

In addition to the General Rule G7 – Minimum Admission Requirements, the

following admission requirements will apply to the programme:

Compulsory Subjects	National Senior Certificate	National Certificate, (Vocational)	Senior Certificate	
	Rating	Mark	HG	SG
Mathematics	4	70%	E	C
Physical Science	4	70%	E	C
English, or English (First Additional)	4	60%	E	C
Three additional 20 credit NSC subjects	4			
Life Orientation		60 %		
Two other relevant NCV vocational subjects		70 %		

(i) The exit certificate of the candidate must qualify the candidate for degree study at an institution of higher learning

(ii) Applicants will be ranked according to the sum of their scores for Mathematics and Physical Science subject to a minimum total score of 100 and with a minimum rating of 4 for mathematics and 4 for physical science

Other:
Applicants that qualify for degree study at an institution of higher learning, but do not meet the departmental mathematics and/or physics requirements, may present the following N4 subjects, for consideration for entry to the Bachelors programme.

Mathematics and Engineering Science, plus two of:
Mechanotechnics
Engineering Drawing
Electrotechnics

The 4 subjects must be passed in a single sitting with a pass mark of 50% and above.

The applicants will then be ranked, alongside the NSC candidates, in accordance to rule IE2 (i) (ii)

Applicants may also present a cognate NQF level 6 Diploma for entry into the Bachelors program.

(Amended w.e.f. 2022/11)

(Inserted w.e.f. 2017/09)

(ii) Bachelor of Engineering Technology Honours in Industrial Engineering [SAQA NO. 117975]

The minimum entry requirement will be the Bachelor of Engineering Technology in Industrial Engineering (NQF Level 7) or equivalent. This is in line with the DUT General Rules handbook, for registration for a Bachelor Honours Degree (Rule G23C). Applicants that complete a BEng Tech (Industrial) or equivalent at other institutions (private or public) will be evaluated on an individual basis after fulfilling the following criteria:

1) The undergraduate program must be ECSA accredited.
2) The applicant must show evidence of graduate attribute assessment in the undergraduate qualification as per ECSA guidelines.
3) There must be a minimum of 80% overlap in terms of the knowledge area of Mathematics
4) The applicant must show evidence of a final design/capstone project

Applicants with a B.Tech Industrial Engineering qualification are allowed to apply.
Foreign applications must approach the International Office for guidance on the application process
All applicants must take note of the modality of the program on offer and prepare accordingly.

In instances where the number of applications exceed the planned number on the departmental enrolment plan, the following selection criteria would apply:

1) Order of preference: (1) DUT graduates (BEng Tech (Industrial)); (2) DUT graduates (B Tech Industrial); (3) Other BEng Tech (Industrial); (4) Other (B Tech (Industrial).
2) Ranking criteria: (1) Completion in minimum time; (2) Average pass rate of 65% and above in the final year of study

(iii) MASTER of ENGINEERING [SAQA NO. 96827]

Eligible applicants are required to have completed an appropriate Honours degree or equivalent in the field of Industrial Engineering. Graduates with an appropriate Honours degree or equivalent in any of the engineering disciplines within the engineering profession plus related experience in the field of Industrial Engineering can apply for the qualification using rule G10 – Conferment of Status.

(Amended w.e.f. 2015/08)

Applications are made directly with the department as follows:

- ☐ Masters applications are accepted from during the months of August and September preceding the year of intended study
- ☐ A four to five-page proposal is required outlining the following: an introduction; the research problem(s) and study objective(s); a brief literature review; an outline of the intended research methodology and research activities inclusive of schedules and timeframes

- ☐ All applications must be accompanied by the relevant certified academic certificates/records and transcripts of all prior qualification(s); a concise CV; certified ID or passport
- ☐ Applicant would receive feedback on their applications once the department has finalised selections
- ☐ Successful applicants must complete their registrations before 31st of March in the intended year of study. No late registrations will be accepted.

All applications can be emailed on industrialadmin@dut.ac.za

(iv) DOCTOR of ENGINEERING [SAQA NO. 96812]

Students are required to have completed a Masters degree in Industrial Engineering. Graduates with an honours degree or equivalent in Industrial Engineering plus a Masters degree relevant to the field of Industrial Engineering can apply for the qualification using rule G10 – Conferment of Status.

Applications are made directly with the department following the same process as with the Master of Engineering.

(Amended w.e.f. 2015/08)

IE3 GRADUATE ATTRIBUTES

(i) Bachelor of Engineering Technology in Industrial Engineering (SAQA NO: 99639)

(a) DUT Graduate Attributes:

Graduates completing this qualification would be deemed to have met the following DUT Graduate Attributes:

DUT 1 Creative thinkers who work within a broadly defined environment with limited or no supervision. They are able to work collaboratively with others on broadly defined tasks

DUT 2 Knowledgeable practitioners who are able to source, evaluate and implement technologies as appropriate to the tasks at hand

DUT 3 Effective communicators within a team and between various levels of management and shop floor personnel.

DUT 4 Culturally, environmentally, and socially aware within a local context with exposure to global technologies

DUT 5 Active learners who can take cognisance of their environment and adapt accordingly

(b) Professional body (ECSA) Graduate Attributes:

Graduates completing this qualification will demonstrate competence in the following Graduate Attributes as prescribed by the Engineering Council of South Africa (ECSA) in the Engineering Standard (E-02-PT_):

Graduate Attribute 1: Problem solving
Apply engineering principles to systematically diagnose and solve broadly-defined engineering problems

Graduate Attribute 2: Application of scientific and engineering knowledge
Apply knowledge of mathematics, natural science and engineering sciences to defined and applied engineering procedures, processes, systems and methodologies to solve broadly-defined engineering problems.

Graduate Attribute 3: Engineering Design
Perform procedural and non-procedural design of broadly defined components, systems, works, products or processes to meet desired needs normally within applicable standards, codes of practice and legislation.

Graduate Attribute 4: Investigations, experiments and data analysis
Conduct investigations of broadly-defined problems through locating, searching and selecting relevant data from codes, data bases and literature, designing and conducting experiments, analysing and interpreting results to provide valid conclusions.

Graduate Attribute 5: Engineering methods, skills, tools, including Information Technology
Use appropriate techniques, resources, and modern engineering tools, including information technology, prediction and modelling, for the solution of broadly-defined engineering problems, with an understanding of the limitations, restrictions, premises, assumptions and constraints.

Graduate Attribute 6: Professional and Technical Communication
Communicate effectively, both orally and in writing, with engineering audiences and the affected parties.

Graduate Attribute 7: Sustainability and Impact of Engineering Activity
Demonstrate knowledge and understanding of the impact of engineering activity on the society, economy, industrial and physical environment, and address issues by analysis and evaluation.

Graduate Attribute 8: Individual, Team and Multidisciplinary Working
Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects.

Graduate Attribute 9: Independent Learning
Engage in independent and life-long learning through well-developed learning skills.

Graduate Attribute 10: Engineering Professionalism
Comprehend and apply ethical principles and commit to professional ethics, responsibilities and norms of engineering technology practice.

Graduate Attribute 11: Engineering Management
Demonstrates knowledge and understanding of engineering management principles and economic decision-making.

(c) Graduate Attribute mapping for the qualification for Bachelor of Engineering Technology in Industrial Engineering :

	Module Name	Semester	Problem Solving	Scientific & Eng Knowledge	Engineering Design	Investigation	Eng Methods, Skills, Tools & IT	Professional & Technical Communication	Impact of Engineering Activity	Individual & Teamwork	Independent Learning	Engineering Professionalism	Management
			GA 1	GA 2	GA 3	GA 4	GA 5	GA 6	GA 7	GA 8	GA 9	GA 10	GA 11
FIRST YEAR	Engineering Mathematics 1A	1											
	Engineering Physics 1A	1											
	Statistics 1	1				B							
	Industrial Drawing and CAD	1			B								
	Cornerstone 101	1											
	Technical Literacy	1						B					B
	Engineering Mathematics 1B	2											
	Engineering Physics 1B	2											
	Financial Accounting for Engineers	2											
	Sociology of Work	2											I
	Computing & IT	2											
	Electrical Principles 1	2											
SECOND YEAR	Engineering Mathematics 2A	1											
	Strengths of Materials 1	1											
	Mechanics of Machines 1	1											
	Computer programming & IT	1											
	Management Accounting for Engineers	1							B		B		
	Industrial Design 1	1	B							B			
	Engineering Mathematics 2B	2											
	Engineering Work Systems 1	2					B					B	
	Production Engineering 1	2		B									
	Principles of Management	2										I	A
	Manufacturing Engineering 1	2						I					
	Industrial Design 2	2	I										
THIRD YEAR	Facilities Planning	1							I	I			
	Engineering Work Systems 2	1					I				I		
	Production Engineering 2	1		I									
	Operations Research	1				I							
	Project Management	1										A	
	Design Project Part 1	1			I			A					
	Engineering Work Systems 3	1							A				
	Production Engineering 3	1		A									
	Simulation Modelling	1				A							
	Information System Design	1									A		
	Quality Engineering	1								A			
	Design Project Part 2	1	A		A		A						

B - Basic Level
I - Intermediate Level
A - Assessed at the Exit Level

(d) Graduate Attribute mapping for the qualification for Bachelor of Engineering Technology Honours in Industrial Engineering:

Module Name	Compulsory / Elective	Sem	Problem Solving	Scientific & Eng Knowledge	Engineering Design	Investigation	Eng Methods, Skills, Tools & IT	Professional & Technical Communication	Impact of Engineering Activity	Individual & Teamwork	Independent Learning	Engineering Professionalism	Engineering Management
			GA 1	GA 2	GA 3	GA 4	GA 5	GA 6	GA 7	GA 8	GA 9	GA 10	GA 11
Engineering Work Systems 4	C	1								A	A		
Cleaner Production Technologies	C	1		A									
Advanced Engineering Statistics	C	1											
Production Engineering 4	C	2					A						
Selected Topics in Industrial Engineering	C	2							A			A	
Quality Assurance for Engineers	C	2											A
Industrial Engineering Dissertation	C	Annual	A		A	A		A					

IE4 ASSESSMENT

In addition to the Rule Book for Students the following specific rules apply to all modules for the programmes on offer: -

(1) The method of evaluation and compilation of the semester/progress mark in all modules would be indicated in the learner guide for the module.

(2) In conjunction with rule G13 (3)(a) of the student handbook, any student who for any reason is absent from a particular assessment, must provide proof of their reason for the absence to the lecturer concerned upon their immediate return to class. Any makeup assessment will be determined at the discretion of the lecturer concerned. Refusal to accept this will result in a zero mark for the particular assessment.

(3) Supplementary examinations are offered as per the General handbook (Rule G13).

(4) In modules where **Graduate Attributes** (GAs) are assessed:

(i) The assessment for the GAs is compulsory i.e. every student must attempt the assessment and achieve a pass mark in order to pass the module else the module would need to be repeated. In cases where more than one GA is being assessed, all GAs being assessed must be passed in order for the student to pass the module. This would also apply in instances where a student is repeating a module.

(ii) At the exit level the module would be externally moderated.

IE5 PROMOTION:

(i) Bachelor of Engineering Technology in Industrial Engineering (SAQA NO: 99639)

In addition to rule G16 no student shall be allowed to register for a higher level unless they meet the following criteria:

(1) All modules would have a minimum pass mark of 50%. In certain modules, where applicable, the student would need to pass both the practical component (minimum 50%) and theoretical component (minimum 50%) of the module in order to achieve a pass for that module.

(2) In modules where Exit Level Outcomes (GAs) are assessed, the student must meet both the academic and the ELO requirements, as specified in the relevant study guide, in order to pass the module.

(3) In addition to the prerequisite, co-requisite and exposure requirements of the individual modules, a student needs to:

(a) pass all 1st Year – 1st semester modules to progress to 2nd Year – 2nd semester
(b) pass all 1st Year – 2nd semester modules to progress to 3rd Year – 1st semester
(c) pass all 2nd Year - 1st semester modules to progress to 3rd Year – 2nd semester

(4) To be promoted from one year of study to the next, a student must accumulate a minimum of 23 SAQA credits or 0.5 HEMIS credits per year.

(Inserted w.e.f. 2017/09)

(ii) Bachelor of Engineering Technology Honours in Industrial Engineering [SAQA NO. 117975]

1. All modules would have a minimum pass mark of 50%. In certain modules, where applicable, the student would need to pass both the practical component and theoretical component of the module with a minimum of 50%.

2. In modules where Graduate attributes are assessed, the student would need to achieve a minimum pass mark of 50% as well as be deemed competent in achieving the attribute. Opportunities for re-assessment would be available however failure to achieve a 50% pass mark and be deemed competent would result in the student having to repeat the course.

3. Any student failing all modules registered for in their 1st semester of study would be deemed to have made unsatisfactory academic progress and will be excluded as per rule G17 of the General Student Handbook. Students can appeal as per rule G17 (3)

   - This gives the student two years to complete the one-year qualification without intervention.
   - At the end of the first year, when the student appeals, the HoD would evaluate the student's progress to see if there is a reasonable chance of the student completing in the maximum time and use this to make a decision. This is in line with the requirements of rule G 17.

IE6 STUDENTS AT RISK:

Students that are incapable of achieving the minimum credit requirements as indicated in the table below, would be identified as students that are at risk i.e. students that may not complete their qualification in the maximum time as prescribed.

END OF YEAR	MINIMUM SAQA CREDITS	HEMIS CREDITS
1	84	0.6
2	168	1.2
3	252	1.8
4	336	2.4
5	420	3

Students that fall into this category will be monitored by the department for academic performance and interventions may be suggested as deemed necessary. Students that fail to maintain or improve their academic progress run the risk of contravening rule G17 as per the General Handbook. Students have the right to appeal as per rule G1 (8) of the General Handbook

(Inserted w.e.f. 2017/09)

IE7 LATE REGISTRATION

(1) No student will be permitted to register for any programme offered by the Department later than one week after the commencement of lectures unless the student has written authority from the HOD (Application for Late Registration forms) to attend lectures and participate in assessments.

(2) Executive Dean's approval is required for all late registrations and the department reserves the right not to allow a registration if the student has not been attending or participating in class.

(3) No student will be permitted to register or make changes to their curriculum after the dates specified in the General Handbook calendar.

IE8 PROGRAMME STRUCTURE:

(i) Bachelor of Engineering Technology in Industrial Engineering [SAQA NO: 99639]

The programme comprises a minimum of:
(1) three (3) years' full time duration of study
(2) three (3) HEMIS credits formal time
(3) four hundred and twenty (420) SAQA credits
All modules for the qualification are offered once per annum and are compulsory apart from the electives as shown.

Module Title	Course Code	NQF level	SAQA Credit	HEMIS Credits	Semester offered (S)	Pre-requisite module/s	Exposure Modules/s
Year 1 (Y1) Year of implementation 2018							
Engineering Mathematics 1A	EMTA101	5	12	0.088	1	-	-
Engineering Physics 1A	EPHA101	5	12	0.088	1	-	-
Statistics 1	STST101	6	12	0.088	1	-	-
Industrial Drawing and CAD	ICAD101	6	16	0.148	1	-	-
Cornerstone 101	CSTN101	5	12	0.094	1	-	-
Technical Literacy	TLTY101	6	8	0.067	1	-	-
Engineering Mathematics 1B	EMTB101	5	12	0.088	2	-	EMTA101
Engineering Physics 1B	EPHB101	5	12	0.088	2	-	EPHA101
Financial Accounting for Engineers	FAEN101	6	8	0.046	2	-	-
Sociology of Work 101	SCWK101	6	8	0.067	2	-	-
Computing & IT	CMIN101	6	8	0.05	2	-	-
Electrical Principles 1	ELEP101	5	12	0.088	2	-	EPHA101
YEAR 2 (Y2) Year of implementation 2019							
Engineering Mathematics 2A	EMTA201	6	12	0.088	1	EMTA101	EMTB101
Strengths of Materials 1	STMT102	5	12	0.088	1	-	EMTA101 EPHA101
Mechanics of Machines 1	MCHM102	6	12	0.088	1	-	EMTA101 EPHA101
Computer Programming & IT	CPRI101	6	8	0..59	1	-	CMIN101
Management Accounting for Engineers	MACE101	6	8	0.058	1	-	-
Industrial Design 1	IDES101	5	16	0.104	1	-	-
Engineering Mathematics 2B	EMTB201	6	12	0.088	2	All Y1 – S1 Modules EMTB101	EMTA201

Engineering Work Systems 1	EWSY101	5	12	0.088	2	All Y1 – S1 Modules	-
Production Engineering 1	PENG101	5	12	0.088	2	All Y1 – S1 Modules	-
Principles of Management	PMGM102	6	8	0.067	2	All Y1 – S1 modules	-
Manufacturing Engineering 1	MNFE101	7	8	0.059	2	All Y1 – S1 Modules	-
Industrial Design 2	IDES201	6	12	0.088	2	All Y1 – S1 Modules IDES101	
YEAR 3 (Y3) Year of implementation 2020							
Facilities Planning	FCLP101	7	12	0.082	1	All Y1 – S2 modules	-
Engineering Work Systems 2	EWSY201	6	12	0.088	1	All Y1 – S2 modules EWSY101	-
Production Engineering 2	PENG201	6	12	0.088	1	All Y1 – S2 modules PENG101	-
Operations Research	OPRS101	7	12	0.083	1	All Y1 – S2 modules	-
Project Management	PMAN102	6	8	0.067	1	All Y1 – S2 modules	-
Design Project Part 1	DPJT111	7	12	0.088	1	All Y1 – S2 modules IDES210	
Engineering Work Systems 3	EWSY301	7	16	0.089	2	All Y2 – S1 modules EWSY201	-
Production Engineering 3	PENG301	7	16	0.089	2	All Y2 – S1 modules PENG201	-
Simulation Modelling	SMMD101	7	16	0.089	2	All Y2 – S1 modules	-
Information System Design	ISYD101	7	16	0.104	2	All Y2 – S1 Modules CPIT101	-
Quality Engineering	QLTE101	7	12	0.082	2	All Y2 – S1 modules	-
Design Project Part 2	DPJT121	7	12	0.088	2	All Y2 – S1 modules DPJT111	-

(ii) Bachelor of Engineering Technology Honours in Industrial Engineering [SAQA NO. 117975]

The programme comprises a minimum of:
(1) one (1) year full time duration of study
(2) one hundred and forty (140) SAQA credits
All modules for the qualification are offered once per annum, according to the semester to be offered and are compulsory apart from the electives as shown.

Module Title	Course Code	NQF level	SAQA Credit	HEMIS Credits	Semester offered (S)	Pre-requisite module/s
Industrial Engineering Dissertation	IDED800	8	44	0.34	11	-
Cleaner Production Technologies	CLPT801	8	16	0.11	1	-
Engineering Work System IV	EGWS801	8	16	0.11	1	Engineering Work System III
Advanced Engineering Statistics	AVES801	8	16	0.11	1	Statistics I
Quality Assurance for Engineers	QAFE802	8	16	0.11	2	-
Production Engineering IV	PREN802	8	16	0.11	2	Production Engineering III
Selected Topics in Industrial Engineering	STIE802	8	16	0.11	2	-

(iii) Master of Engineering [SAQA NO. 96827]

This is a research-based qualification requiring advanced studies on behalf of the student in any subject/s related to the specific field of study. Students are required to undertake research under the guidance of a supervisor.
MEng. studies may be undertaken on a part-time or full-time basis.
(Amended w.e.f. 2015/08)

(iv) Doctor of Engineering [SAQA NO. 96812]

This is a research based qualification requiring advanced studies on behalf of the student in any subject/s related to the specific field of study. Students are required to undertake research under the guidance of a supervisor.
DEng. studies may be undertaken on a part-time or full-time basis
(Amended w.e.f. 2015/08)

IE9 TIMETABLE/LECTURE CLASHES

1) As all registrations are done using the online registration system, students are advised to consult the respective timetables for any module clashes prior to registration.
2) Timetable clashes have inherent risks relating to attendance and assessments and the onus falls upon the student to mitigate this risk by not registering modules where potential clashes could exist.
3) If the student knowingly registers modules where clashes exist, the onus

is on the student to bring this to the attention of the relevant subject lecturer concerned for advice on how to proceed.

4) Timetable clashes also affects the examination timetable where it could happen that both subjects are scheduled on the same day. The student by virtue of their registration assumes this risk.

IE I0 SYLLABUS STRUCTURES:

The curriculum reflected in all the courses below is an indicative guideline. Changes may occur through periodic module review. For the latest curriculum on offer kindly refer to the relevant module learner guide obtainable from the department

(i) Bachelor of Engineering Technology in Industrial Engineering (SAQA NO: 99639)

Year 1:

Subject: Indicative Content:	**Engineering Physics 1A (EPHA101)** Units, Physical Quantities, Vectors, Equilibrium of a particle, Newton's Second Law, Gravitation, Work and Energy, Impulse and Momentum, Torque, Elasticity, Periodic Motion, Mechanical Waves, Acoustic Phenomena, Vibrating Bodies
Subject: Indicative Content:	**Engineering Mathematics 1A (EMTA101)** Numbers and Algebra, Areas and Volumes, Trigonometry, Graphs, Complex Numbers, Calculus – Differentiation, Calculus – Integration
Subject: GA being developed: Indicative Content:	**Statistics for Engineers (STST101)** Investigation Sampling and data, Descriptive statistics, Probability topics, Discrete random variables, Continuous random variables, The normal distribution, The central limit theorem (Practical work only), Point estimates and confidence intervals, Hypothesis testing with one sample, Hypothesis testing with two samples, Linear regression and correlation (Practical work only), Nonlinear and multiple regression (Practical work only).
Subject: GA being developed: Indicative Content:	**Industrial Drawing & CAD (ICAD101)** Engineering Design Professional and Technical communication, Independent Learning Freehand drawing & sketching, SABS drawing standards and conventions, Orthographic and isometric drawings, Developments and assemblies, Conceptualise and generate 3D drawings on appropriate design software
Subject: Indicative Content:	**Cornerstone 101 (CSTN101)** The module content is developed around the concept of journeys, across time, across space, and across human relationships. It will take the journey of the uMngeni River (which is close to all DUT campuses) as a metaphor. The module will bring different disciplinary perspectives to this content – environmental, historical and sociological in particular. The metaphor of the journey will be sustained across the module and will be applied to personal journeys, historical, political and environmental journeys, and social journeys, with a specific focus on gender. Sections will draw on issues of ethics, diversity and critical citizenry.

Subject: GA being developed: Indicative Content:	**Technical Literacy (TLTY101)** Professional and Technical Communication, Management The differences between language usage in academic, technical and common environments, Experimental methods and the scientific method, Planning and documenting experiments, Technical Report writing, Referencing practice, Utilising spreadsheets for graphical presentation of information Standards (ISO, SABS, etc.)
Subject: Indicative Content:	**Electrical Principles I (ELEP101)** Established electrical principles and laws, Network theorems, conversions and applications, Passive components in DC circuits.
Subject: Indicative Content:	**Engineering Mathematics 1B (EMTB101)** Linear Algebra, Trigonometry, Series, Advanced Calculus - Differentiation Advances Calculus - Integration, Differential Equations, Statistics and Probability
Subject: Indicative Content:	**Engineering Physics 1B (EPHB101)** Atomic and Molecular Structure, Coulomb's Law, Current, Resistance and Capacitance, The Magnetic Field, Inductance, Maxwell's Equations, Electromagnetic Waves, The Nature and Propagation of Light, Thermodynamics
Subject: GA being developed Indicative Content:	**Sociology of Work (SCWK101)** Engineering Management Themes: What is Work, Industrialisation and post industrialisation, The capitalist workplace, Trade unionism, Women and Work, Precarious Labour
Subject: Indicative Content:	**Financial Accounting for Engineers (FAEN101)** The conceptual overview of financial accounting, The accounting process, The elements and analysis of financial statements, Entity formations in business, Sundry topics
Subject: Indicative Content:	**Computing & IT (CMIN101)** Introduction to programming, Overview of the .net platform, Problem solving and programming, Program Development cycle, Structured Programming Techniques, Application areas: Variables; Data Types; Operators

Year 2:

Subject: Indicative Content:	**Strengths of Materials I (STMT102)** Introduction to Strength of Materials, Equilibrium of deformable body, Stress, Axially loaded members, Average shear stress, Allowable stress, Thin-walled pressure vessels (cylindrical and spherical), Design of simple connections, Deformation (strain), The tension and compression test, The stress-strain diagram, Stress-strain behaviour of ductile and brittle materials, Hooke's law, Poisson's ratio, The shear stress-strain diagram, Principle of superposition, Torsional deformation of a circular shaft.
Subject: Indicative Content:	**Engineering Mathematics 2A (EMTA201)** Partial Differential Equations: Statistics and Probability, Differential Equations, Laplace Transforms, Fourier Series.
Subject: Indicative Content:	**Mechanics of Machines I (MCHM102)** Problem Solving, Application of scientific and engineering knowledge, Investigation, Professional and Technical Communication, Individual and Teamwork. Statistics – Bodies in Equilibrium, Dynamics – Bodies in Motion.
Subject: Indicative Content:	**Computer Programming & IT (CPRI101)** Know the key concepts of Top Down design to design a simple application, understand key programming concepts, use an IDE to create and debug a working application, demonstrate proficiency in the use of a programming language used in engineering to solve an engineering problem, have an understanding of visual programming, design a User Interface using contemporary methods.
Subject: GA being developed: Indicative Content:	**Management Accounting for Engineers (MACE101)** Impact of Engineering Activity Independent learning Introduction to Cost and Management Accounting Cost concepts, Classification and Behaviour. Material and inventory control Labour costs Classification of overheads Cost Volume Profit analysis Budgeting
Subject: GAs being developed:	**Industrial Engineering Design I (IDES101)** Problem Solving

Indicative Content:	Introduction to Engineering Design, Purpose of design for Engineers, Tools used for design, Working in design teams, Dealing with design constraints, Documentation of design and report
Subject: Indicative Content:	**Engineering Mathematics 2B (EMTB201)** Analysis and Calculus, Linear Algebra, Complex Analysis, Partial Differential Equations, Transforms.
Subject: GAs being developed: Indicative Content:	**Engineering Work Systems 1 (EWSY101)** Engineering methods, skills, tools, including Information technology, Productivity, work study and the human factor, Introduction to Methods Engineering and Operation Analysis, Charting and Diagramming Techniques for Operation Analysis, Motion Study and Work Design, Introduction to Work Measurement, Direct Time Study, Manual Work Systems and Worker-Machine Systems.
Subject: GA being developed: Indicative Content:	**Production Engineering 1 (PENG101)** Scientific and Engineering Knowledge Field of operations management, Operations strategy and competitiveness Process analysis, Product design and process selection, Waiting line management, Electronic commerce and E-operations, Supply chain strategy, Strategic capacity management.
Subject: GA being develop: Indicative Content:	**Principles of Management (PMGM102)** Engineering Professionalism. The Environment in which People Work, Key concepts of Management, Human Resource Management, The Labour Relations Act, Managing People and Teams.
Subject: GA being developed: Indicative Content:	**Manufacturing Engineering 1 (MNFE101)** Professional & Technical communication Overview of manufacturing, Theory of metal machining, Hand tools, Machine tools, Fasteners & joining of components, Welding & Fabrication – Fundamentals & Processes.
Subject: GA being developed: Indicative Content:	**Industrial Engineering Design 2 (IDES201)** Problem solving Detailed Engineering Design, Application of design Tools and practices, Design prototyping and testing, Align process to ISO standards, Documenting and reporting.

Year 3

Subject: GAs being developed: Indicative Content:	**Facilities Planning (FCLP101)** Impact of engineering activity, Individual and Teamwork Introduction to facilities layout, Product design and schedule design, Flow space and activity relationships, Personnel requirements, Material handling equipment and systems, Layout planning models and design algorithms.
Subject: GAs being developed: Indicative Content:	**Engineering Work Systems 2 (EWSY201)** Engineering methods, skills, tools, including Information technology, Advanced Work Design, Manual work and worker-machine systems, Physical ergonomics, Work environment ergonomics, Advanced Work Measurement, Predetermined motion time systems, Standard data systems, Work sampling, Service operations and office work, Standard work and other lean methods.
Subject: GAs being developed: Indicative Content:	**Production Engineering 2 (PENG201)** Engineering and Scientific Knowledge, Independent Learning Just-In-Time and Lean systems, Enterprise resource planning, Forecasting, Aggregate and sales operations planning, Inventory control, Material requirements planning, Operations scheduling, Synchronous manufacturing and theory of constraints.
Subject: GA being developed: Indicative Content:	**Operations Research (OPRS101)** Investigation Introduction to Quantitative Analysis, Decision Analysis, Linear Programming – Graphical method, Linear Programming – Simplex method, Transportation and Assignment modelling, Integer Programming, Network Modelling, Waiting lines and Queuing theory, Simulation Modelling, Total Productive Maintenance.
Subject: GA being assessed Indicative Content:	**Project Management (PMAN102)** Engineering Professional Modern Project planning methods, tool, analysis and computer applications Oral and written communication of project planning Project Implementation Support of the operational systems
Subject: GA being developed: GA being assessed: Indicative Content:	**Design Project Part 1 (DPJT111)** Investigation, Engineering Design, Individual and Teamwork Engineering Methods, skills, tools and IT Detailed Engineering Design, costing and documentation.
Subject: GA being assessed: Indicative Content:	**Engineering Work Systems 3 (EWSY301)** Impact of Engineering Activity. Systems thinking methodology, systems analysis / system interrogation, systems engineering. Ethics / Social responsibility

	Green technologies / Carbon imprint / Respecting the environment / Sustainable designs, Performance Measurement And Improvement, Performance improvement programs, Introduction to productivity measurement, change in real terms, contribution & calculation of price recovery and productivity to profit., data specification, productivity measurement in service functions, the creation and distribution of wealth formula, Partial productivity measurement, operator's performance, departmental performance, overall performance, Compensation systems..
Subject: GA being assessed: Indicative Content:	**Production Engineering 3 (PENG301)** Scientific and Engineering Knowledge. Introduction to manufacturing systems, Additive manufacturing and rapid prototyping technologies, Single station manufacturing cells, Manual assembly lines, Automated production lines, Automated assembly systems, Cellular manufacturing systems, Flexible manufacturing systems.
Subject: GA being assessed: Indicative Content:	**Simulation Modelling (SMMD101)** Investigation. Introduction to simulation and systems modelling, Simulation and flowcharting algorithms, Probability and statistics in simulation, steps in building a simulation model, Simulation modelling using Simul8, Introduction to systems thinking.
Subject: GA being assessed: Indicative Content:	**Information System Design (ISYD101)** Independent Learning Introductory concepts – information and the organization, Developing information systems in an object orientated environment, System analysis and design, Database concepts and structures, Object orientation paradigms and teams, Database administration, Object orientated databases, Knowledge based expert systems.
Subject: GA being assessed: Indicative Content:	**Quality Engineering (QLTE101)** Individual and Teamwork Introduction to Quality, Importance of quality in the workplace, TQM tools and techniques, Control charts for variables, Control charts for attributes, Use of quality software.
Subject: GAs being assessed: Indicative Content:	**Industrial Engineering Project Part 2 (DPJT121)** Problem Solving, Engineering Design, Investigation, Engineering Methods, skills, tools and IT, Professional and Technical Communication and Engineering Professionalism Design prototyping and testing and legal issues, Detail Standard

(ii) Bachelor of Engineering Technology Honours in Industrial Engineering [SAQA NO: 117975]

INDUSTRIAL ENGINEERING DISSERTATION (IDED800)

This is a research and design module that is intended for the student to be able to produce knowledge and understanding of a phenomenon in the real world situation. From this the student should be able to show understanding, integration and application of learnt Industrial Engineering and research techniques in order to analyse, evaluate and recommend a course of action.

PRODUCTION ENGINEERING IV (PREN801)

The purpose of this module is to prepare the student to understand the basic principles and basic concepts of green design, identify ways of saving energy, develop strategies for energy efficiency and implement an energy management system.

ENGINEERING WORK SYSTEM IV (EGWS801)

The purpose of this module is to equip learners with the knowledge to apply advanced approaches and technologies to work systems design

ADVANCED ENGINEERING STATISTICS (AVES801)

The purpose of this module is to equip the graduate with a background in higher level statistics and data analysis to support them in the following:

-The application of higher-level statistics and data analysis to industrial engineering problems.

-To meaningfully analyse and interpret research data when doing post-graduate research.

QUALITY ASSURANCE FOR ENGINEERS (QAFE802)

The purpose of this module is to equip learners with the necessary knowledge and skills associated with quality practices within the engineering environment.

CLEANER PRODUCTION TECHNOLOGIES (CLPT802)

The purpose of this module is to introduce the students to clean production technologies that are available in order to promote green manufacturing and a cleaner work environment

SELECTED TOPICS IN INDUSTRIAL ENGINEERING (STIE802)

The purpose of this module is to supplement the students' knowledge in the field of Industrial Engineering not covered elsewhere in the program.