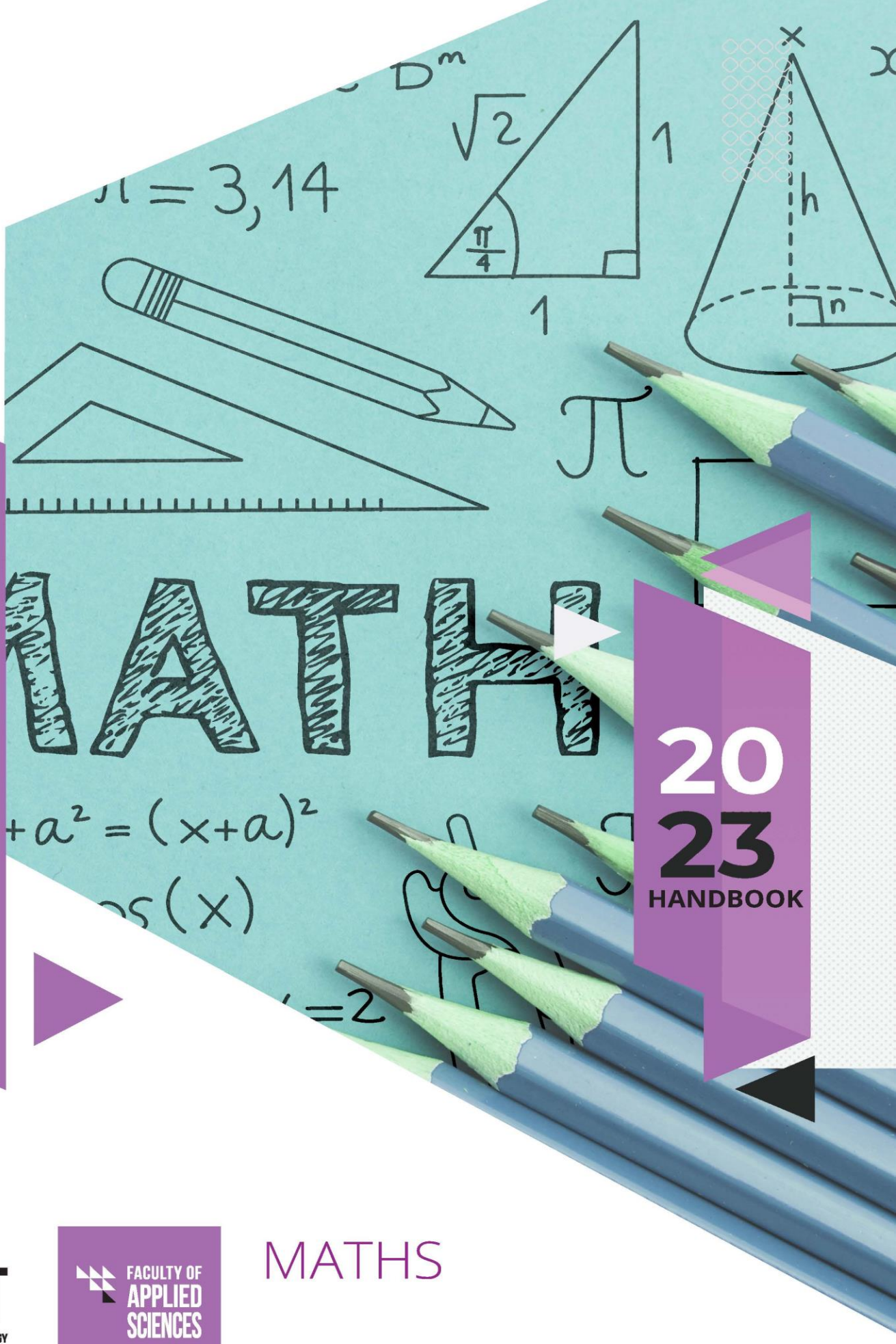


# 2023 HANDBOOK

DUT
DURBAN UNIVERSITY OF TECHNOLOGY
INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

FACULTY OF APPLIED SCIENCES

# MATHS

## IMPORTANT NOTICE FOR 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.

- The rules in this departmental handbook must be read in conjunction with the General Rules (G Rules) contained in the DUT General Handbook for Students as well as the relevant Study Guides.

- Your attention is specifically drawn to Rule G1(8) and G1(9) relating to appeals and to the process of dealing with students issues.

**STRATEGIC DIRECTION (ENVISION2030)**
**FACULTY OF APPLIED SCIENCES**
**[Educate. Engage. Innovate.]**

## VISION
Leading innovation through science and technology.

## MISSION STATEMENT
- Educate students
- Generate new scientific knowledge
- Engage communities

## VALUES
1. **Accountability**: We take ownership of all activities, resources and tasks required of us. We deliver on our promises and responsibilities.
2. **Integrity**: We adhere to moral standards and principles. We are transparent and consistent in all our actions, and lead by example.
3. **Dedication**: We are committed to achieving our goals and expectations.
4. **Professionalism**: We operate within clear boundaries with respect to our code of conduct.
5. **People Oriented**: We are committed to sustaining the morale and holistic development of staff and student. We value diversity in all forms.

## DEPARTMENT OF MATHEMATICS

## VISION
Shaping the aspirations of our students by providing a supportive environment for learning mathematics

## MISSON STATEMENT
Making Mathematics Meaningful Through Critical Thinking and Problem Solving $M^3$

## VALUES
1. **Teamwork**: collaboration, have fun, support one other, collegiality
2. **Commitment:** perseverance, conscientiousness and effort
3. **Integrity**: honesty, proud, ethics, best you can even when no one is watching, authentic, trust
4. **Passion:** showing/ passing on a love for knowledge; sharing; love what we do
5. **Discovery**: why, curiosity, critical thinking, cause/ effect

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# 1. DEPARTMENTAL & FACULTY CONTACT DETAILS

**All Departmental queries to:**

| | |
|---|---|
| Head of Department | Prof DB Lortan |
| Secretary: | Mrs DF Day |
| Tel No: | 031 373 2075 |
| Email: | dianad@dut.ac.za |
| Location of Department: | Block S3, Level 1, Steve Biko Campus |

**All Faculty queries to**:

| | |
|---|---|
| Faculty Officer: | Mrs G Shackleford |
| General Enquiries No: | 031 373 2506 |
| Email: | FAS@dut.ac.za |
| Location: | Block S4, Level 3, Steve Biko Campus |

| | |
|---|---|
| Faculty Assistant: | Ms N Ngwazi |
| General Enquiries No: | 031 373 2717 |
| Facsimile No: | 031 373 2175 |
| Email: | nonhlanhlaM3@dut.ac.za |
| Location: | Block S4 Level 3, Steve Biko Campus |

| | |
|---|---|
| **Executive Dean:** | Prof S Singh |
| Executive Dean's Secretary: | Ms N Naidoo |
| Telephone No: | 031 373 2720 |
| Facsimile No: | 031 373 2724 |
| Email: | nirvanan@dut.ac.za |
| Location: | Between Block S6 and S7, Level 4, Steve Biko Campus |

## 2. DEPARTMENTAL STAFF

**Head of Department:** Prof DB Lortan, PhD (Applied Mathematics, UN)

**Lecturers:**

Dr N Ally, PhD (D.Ed, DUT)
Dr N Mewalal, PhD (Applied Mathematics, UKZN)
Dr TG Mkhize, PhD (Applied Mathematics, UKZN)
Dr SA Ngubelanga, PhD (Applied Mathematics, UKZN)
Mr M Ntuli, MSc (Applied Mathematics, UKZN)
Dr V Zitha, PhD (Applied Mathemtics, UKZN)

Indumiso Campus:
Dr P Perumal, PhD (Mathematics, UKZN)
Mr S Mtshali, MSc
Mr M Nene, MSc

**Senior Lecturers:** Dr A Maharaj, PhD (Applied Mathematics, UKZN)

**Associate Professors:** Prof DP Day, PhD (Mathematics, UN)
Prof DB Lortan, PhD (Applied Mathematics, UN)

**Full Professors:** Prof D Brijlall, PhD (Mathematics, UDW)
Prof M Govender, PhD (Physics, UND)

**Secretary:** Mrs DF Day, NCert: Secretarial, (TN)

## 3. QUALIFICATION OFFERED BY THE DEPARTMENT

| Qualification | Qualification Code | Important dates | SAQA NLRD ID |
|---|---|---|---|
| HC: Applied Science | HCIAS1 | 1st Offered January 2021 | 117922 |

## 4. HIGHER CERTIFICATE IN APPLIED SCIENCE

### Purpose of Qualification

Electives offered will allow students to remain eligible for admission in qualifications offered in the Faculties of Applied Sciences and Engineering & the Built Environment.

## 4.1 PROGRAMME STRUCTURE (1 YEAR) (HCIAS1)

### 4.1.1 Programme Duration: 1 Year Full Time

| Module Code | Name of Modules | Study Level# | NQF Level | Module Credits | HEMIS Credits | C/E* | Pre-Req | Co-Req | Assess-ment |
|---|---|---|---|---|---|---|---|---|---|
| **COMPULSORY MODULES** | | | | | | | | | |
| **SEMESTER 1 : COMPULSORY** | | | | | | | | | |
| COSC101 | Communications for Sciences | 1a | 5 | 8 | 0.063 | C | Nil | Nil | EX |
| EDDT101 | Elementary Didactics for Tutoring | 1a | 5 | 8 | 0.063 | C | Nil | Nil | CA |
| MTTA101 | Mathematics A | 1a | 5 | 16 | 0.125 | C | Nil | Nil | CA |
| PSSA101 | Physics A | 1a | 5 | 16 | 0.125 | C | Nil | Nil | EX |
| **SEMESTER 2: COMPULSORY** | | | | | | | | | |
| CSTN101 | Cornerstone 101 | 1b | 5 | 12 | 0.094 | C | Nil | Nil | CA |
| MTTB102 | Mathematics B | 1b | 5 | 16 | 0.125 | C | Nil | Nil | CA |
| PSSB102 | Physics B | 1b | 5 | 16 | 0.125 | C | Nil | Nil | EX |
| **ELECTIVE MODULES** | | | | | | | | | |
| **Select ALL THREE SUBJECTS FROM ONLY ONE of the following options:** | | | | | | | | | |
| **Option 1: Applied Sciences** | | | | | | | | | |
| ISTS101 | Introduction to Statistics | 1a | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| STAS102 | Statistics for the Applied Sciences | 1b | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| NSOP102 | Introduction to Shipboard Operations | 1b | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| **Option 2: Chemistry** | | | | | | | | | |
| CHST101 | Chemistry A | 1a | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| CHST102 | Chemistry B | 1b | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| ISOP102 | Introduction to Shipboard Operations | 1b | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| **Option 3A: Nautical Science A** | | | | | | | | | |
| ISTA101 | Introduction to Statistics | 1a | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| TSOP102 | Introduction to Shipboard Operations | 1b | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| NENS102 | Navigation – Electronic Navigation Systems | 1b | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| **Option 3B: Nautical Science B** | | | | | | | | | |
| CHSA101 | Chemistry A | 1a | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| TSOP102 | Introduction to Shipboard Operations | 1b | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| NENS102 | Navigation – Electronic Navigation Systems | 1b | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| **Option 4: Engineering and The Built Environment** | | | | | | | | | |
| STSI101 | Introduction to Statistics | 1a | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| CADD102 | Computer Aided Drawing and Design | 1b | 5 | 12 | 0.094 | E | Nil | Nil | CA |
| IEBE102 | Introduction to Engineering and the Built Environment | 1b | 5 | 12 | 0.094 | E | Nil | Nil | EX |

1A= First Semester; 1B = Second Semester; C= compulsory; E = Elective; CA = Continuous Assessment; EX = Examination,
# Study Level: 1A = Year 1, Semester 1 and 1B = Year 1, Semester 2.

## 4.2 PROGRAMME INFORMATION

All lectures for the HC: Applied Science will be conducted on a full-time basis over a period of one year.

The MAXIMUM number of credits a student may register for in one year (including electives and extra credits) is 128 credits.

Referring to the table above, students must do all modules listed as compulsory.

### 4.2.1 Programme Options **

Upon application, a student must select from one of the following Specific Electives offered, namely:-

**Option 1: Applied Science**

- Introduction to Statistics
- Statistics for the Applied Sciences
- Introduction to Shipboard Operations

**OR**

**Option 2: Chemistry**

- Chemistry A
- Chemistry B
- Introduction to Shipboard Operations

**OR**

**Option 3: Nautical Science A or B**

- Intoduction to Statistics (Option A) / Chemistry A (Option B)
- Introduction to Shipboard Operations (Both Options)
- Navigation – Electronic Navigation Systems (Both Options)

*Students taking the sea-going option must, on registration, provide the Department with the result of a SAMSA (South African Maritime Safety Authority) eye test from a SAMSA-approved medical practitioner. The SAMSA office is situated on 17th floor of Durban Bay House, 333 Anton Lembede (formerly Smith) Street, Durban (Tel: 031 307 1501). A SAMSA regional office may also be consulted. Failure in this assessment will mean that a sea-going career will not be possible.*

**OR**

**Option 4: Engineering & the Built Environment**

- Introduction to Statistics
- Introduction to Engineering and the Built Environment
- Computer Aided Drawing and Design

** The choice would be contingent upon the degree or diploma that the student wishes to pursue beyond the Higher Certificate in the Faculty of Applied Sciences. An elective will only be offered for a minimum of 10 students.

Students will be notified prior to the commencement of the programme if the elective will be offered.

Students registered for an elective that will not be offered, will be registered for another elective – such students will only be registered for the Engineering & Built Environment if they meet the minimum requirements for this Option.

### 4.2.2 Academic Integrity

Refer to the DUT General Rules pertaining to academic integrity G13(1)(o) -covering falsification of academic records, plagiarism and cheating. These will be enforced wherever necessary to safeguard the worthiness of our qualifications, and the integrity of the Faculty of Applied Sciences at DUT.

### 4.2.3 Code of Conduct for Students

A professional code of conduct pertaining to behaviour, appearance, personal hygiene and dress shall apply to all students registered with the Faculty of Applied Sciences, at all times.

### 4.2.4 Attendance

Students are expected to attend all planned academic activities as these are designed to provide optimal support for the required competency. Students are expected to be punctual for all academic activities. Penalties may be applied for late or poor attendance. Refer to Programme Rule 4.2.9 below.

### 4.2.5 Work Integrated Learning (WIL)

This programme does not include a WIL component.

### 4.2.6 Health and Safety

Students must adhere to all Health and Safety regulations. Failure to do so will be treated as a breach of discipline. Refer to the appropriate Health and Safety policies.

### 4.2.7 General Education Modules

Students must comply with the University's General Education requirement. (Cornerstone)

## 4.3 PROGRAMME RULES

### 4.3.1 Minimum Admission Requirements

In addition to DUT Rule G7, the following minimum entrance requirements and the selection criteria outlined in Rule 2.2 will apply for applicants with reference to:-

#### 4.3.1.1 Academic Achievement

In line with the above, the applicants' school leaving academic achievement must comply with one of the following at the stated minimum ratings as outlined in the table below:

(i) A National Senior Certificate (NSC) with endorsement for a Higher Certificate:
(ii) A Senior Certificate with matriculation pass and the following subjects at the stated minimum ratings:
(iii) A National Certificate (Vocational) Level 4 with statutory requirements for Higher Certificate entrance and the following subjects at the stated ratings:

| Compulsory Subject | NSC Rating | SC | | NCV |
|---|---|---|---|---|
| | | HG | SG | |
| English (Home) OR English (1st Additional) | 3 | E | C | 50% |
| Mathematics | 3 | E | C | 50% |
| Physical Sciences (or recognized equivalent) | 3 | E | C | 50% |

**or**

(iv) A recognised equivalent

### 4.3.2 Selection Criteria

In addition to the Admission Requirements referred to above, the following selection process will be applied for placement in the qualification:

- Selection into the qualification is based on the number of places in the programme
- Students will be ranked on academic performance
- Students must meet all the Admission Requirements (except Mathematics and Physical Science) for the Diplomas and Degrees that they wish to be Transferred into.

### 4.3.3 Duration of Programme

The DUT Rules G20B (2) and (3) apply.

### 4.3.4 Promotion to a Higher Level/ Progression Rule

The DUT Rule G16 applies.

### 4.3.5 Exclusion Rules

The DUT Rules G17 and G20B (3) shall apply to this qualification.

### 4.3.6 Assessment and Moderation

Students are expected to work steadily through the period of registration in order to achieve the highest results possible.

- Assessment Plans are listed under each Module at the back of this handbook.
- A student shall comply with the assignment submission dates contained in the relevant study guides
- Assessments could include a variety of testing methods including, but not limited to, written tests, oral tests, theoretical and/or practical examinations, group work and assignments.
- A student who for any valid reason, is absent from a class test or who does not submit an assignment, must provide written proof of the reason for the absence or failure to submit to the lecturer concerned within five (5) working days to be considered for a special assessment. In these cases, the department will determine the validity of the student's reason and the nature of the special assessment.
- A student must refer to the Study Guides for details relating to the number and type and weighting of assessments, and the calculation of course and final marks.
- Assignments must be handed personally to the lecturer who will record their receipt. Late submission will be penalized.
- In the case of a continuous assessment subject (a subject which has no final examination/s or supplementary examination/s) opportunities for reassessment are provided for students who fail assessments. These are stipulated in the relevant study guide.
- Moderation follows the DUT Assessment Policy stipulations.

To avoid disciplinary proceedings against them, a student must be fully acquainted and shall comply with DUT Rule 13 (1) (p) at each test/examination session.

## 5. MODULE CONTENT

## 5.1 MATHEMATICS A (MTTA101)

### SYLLABUS

**Numbers and Algebra:**

- Algebra
- Partial Fractions
- Logarithms
- Exponents

**Areas and Volumes:**

- The Circle and its Properties
- Volumes and Surface Areas of Common Solids

**Trigonometry:**

- Introduction to Trigonometry
- Trigonometric Waveforms
- Cartesian and Polar Coordinates
- Trigonometric Identities & Equations

**Functions:**

- Functions & their curves

**Complex Numbers:**

- Complex Numbers
- Euler's and De Moivre's Formulas and Theorems

**Series:**

Binomial Series

### ASSESSMENT PLAN

The Final Mark will be calculated from three assessments during the semester and assignments.

Final Mark:
FM: (100%) = Test1 (20%) + Test2 (30%) +Test3 (40%) + Assignments (10%)

A final mark of 50% and above would constitute a pass for this module.

## 5.2 PHYSICS A (PSSA101)

## SYLLABUS

### Units, Physical Quantities, Vectors
Standards and Units
Unit Consistency and Conversions
Precision and Significant Figures
Vectors and Vector Addition
Components of vectors

### Equilibrium of a particle
Force
Equilibrium
Newton's first law
Newton's third law of motion
Idealized models
Equilibrium of a particle
Friction

### Newton's Second Law, Gravitation
Newton's second law
Newton's law of gravitation
Mass and weight

### Work and Energy
Work and kinetic energy
Gravitational and potential energy
Elastic potential energy
Conservation of energy
Internal work
Internal potential energy
Power
Power and velocity
Mass and energy

### Impulse and Momentum
Conservation of momentum
Collisions
Recoil
Centre of mass
Rocket propulsion

### Torque
Moments

## ASSESSMENT PLAN

Semester Mark (SM) = The semester mark will be three assessments during the semester taking either the form of class tests, oral presentation, assignment, poster presentation and/ or case studies. This will form 40% of the final mark.

Examination Mark (EM) = The examination will be three hours closed book paper which will form 60% of the final mark.

Final Mark (FM: 100%) = SM (40%) + EM (60%)

A final mark of 50% and above would constitute a pass for this module.

All assessments and moderation will be conducted in accordance with the DUT policies and procedures for assessment.

## 5.3 INTRODUCTION TO STATISTICS (ISTS101)

## SYLLABUS

- Quantitative data, qualitative data, population, sample
- Frequency distributions, histograms, bar charts, pie graphs
- Mean, median, variance, standard deviation, percentiles, box plot.
- Basic probability concepts, addition rule, multiplication rule, independence, conditional probability.
- Random variables, discrete probability distribution, Binomial and Poisson distribution.

## ASSESSMENT PLAN

The Final Mark will be calculated from three assessments during the semester and assignments.

Final Mark:
FM: (100%) = Test1 (20%) + Test2 (30%) +Test3 (40%) +Assignments (10%)

A final mark of 50% and above would constitute a pass for this module.

All assessments and moderation will be conducted in accordance with the DUT policies and procedures for assessment.

## 5.4 COMMUNICATIONS FOR SCIENCE (COSC101)

## SYLLABUS

Non-verbal and verbal communication
- Identity forms of non-verbal communication
- Suggest ways to solve identified language problems
- Critically evaluate your own communication
- Assess the importance of appropriate non-verbal skills
- Explain how non-verbal communication influences our behaviour
- Discuss the various forms of non-verbal behaviour in relation to the work environment

Oral presentation
- Use non-verbal communication principles to deliver the message effectively
- Structure the presentation logically
- Use the appropriate tone and register
- Demonstrate an ability to communicate clearly, without being vague

Report Writing
- Understand and apply ethical values to protect copyright and personal information
- Type of Reports
- Understand different types of reports
- Preparation of a formal, technical report related to field of study

## ASSESSMENT PLAN

This is an examination module.

Semester Mark (SM) = The semester mark will be three assessments during the semester taking either the form of class tests, oral presentation, assignment, poster presentation and/ or case studies. This will form 40% of the final mark.

Examination Mark (EM) = The examination will be three hours closed book paper which will form 60% of the final mark.

Final Mark (FM: 100%) = SM (40%) + EM (60%)

A final mark of 50% and above would constitute a pass for this module.

All assessments and moderation will be conducted in accordance with the DUT policies and procedures for assessment.

## 5.5 ELEMENTARY DIDACTICS FOR TUTORING (EDDT101)

## SYLLABUS

A selection from:
Constructivism and APOS theory
Problem-centred, realistic mathematics education
Direct instruction
Conceptual-procedural
Learning theories and their interpretations in mathematics education
Misconceptions: their nature, their causes, their effects, and their role in learning,
Progression in mathematical learning in selected topics such as algebra, geometry, or calculus
Nature & purpose of axioms & definitions
Difference and role of induction & deduction in mathematics
Different philosophical perspectives in mathematics
Different roles of proof and its implications for curriculum design & teaching.
The design curriculum materials in mathematics which considers the various philosophical and psychological aspects of mathematics teaching and learning.

## ASSESSMENT PLAN

This is an examination module.

Semester Mark (SM) = The semester mark will be two assessments during the semester taking either the form of class tests, oral presentation, assignment, poster presentation and/ or case studies. This will form 50% of the final mark.

Tutor Practice Examination Mark (TP) = The examination will be an assessment of the student's delivery of two lessons. The first one will be an advisory one and the second will contribute a mark that will constitute 50% of the final mark.

Final Mark (FM: 100%) = SM (50%) + TP (50%)

A final mark of 50% and above would constitute a pass for this module.

All assessments and moderation will be conducted in accordance with the DUT policies and procedures for assessment.

## 5.6 CORNERSTONE 101 (CSTN101)

## SYLLABUS

The module content will be developed around the concept of journeys, across time, across space, and across human relationships; the first use of the concept 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.

The module will start with the analysis of a particular issue or metaphor (one critical event or development will be and analysed; the event in focus will be selected on the basis of its connections to the theme of journeys and its relevance to the issues of ethics, diversity and critical citizenry).

The final section of the module will identify and integrate learning from earlier sections, and examine implications for further learning. At each stage of the module, students will be required to engage in activities that involve reflection and build communicative practices. There will be a concluding section in which students will identify their learning and examine the implications for their roles as students and as citizens.

## ASSESSMENT PLAN

**Course Mark**

| | |
|---|---|
| Weekly Reflections: | 20% |
| Tutorial Attendance: (forfeited if student attends less than 80% of tutorials) | 10% |
| Visual Artefact: | 15% |
| Written Report: | 30% |
| Oral presentation: | 15% |
| Peer Assessment : | 10% |

**Final Mark**

No Examination - Continuous Assessment: 100% year mark

## 5.7 MATHEMATICS B (MTTB102)

## SYLLABUS

**Calculus – Differentiation:**

- Introduction to Differentiation
- Methods of Differentiation
- Differentiation of Implicit Functions
- Logarithmic Differentiation
- Parametric Differentiation
- Applications of Differentiation

**Calculus – Integration:**

- Standard Integration
- Applications of Integration

**Linear Algebra:**

- The Theory of Matrices and Determinants
- Solution of Simultaneous Equations by Matrices and Determinants

**Statistics**

- Presentation of Statistical Data
  Measures of Central Tendency

## ASSESSMENT PLAN

The Final Mark will be calculated from three assessments during the semester and assignments.

Final Mark:
FM: (100%) = Test1 (20%) + Test2 (30%) +Test3 (40%) + Assignments (10%)

A final mark of 50% and above would constitute a pass for this module.

All assessments and moderation will be conducted in accordance with the DUT policies and procedures for assessment.

## 5.8 PHYSICS B (PSSB102)

## SYLLABUS

**Thermodynamics**
Thermal processes and effects
The first and second laws

**Mechanical Waves**
Periodic waves
Mathematical description of a wave
Speed of a transverse wave
Speed of a longitudinal wave
Water waves

**Vibrating Bodies**
Superposition and standing waves
Longitudinal standing waves
Vibration of string
Rods and plates
Interference of longitudinal waves
Resonance

**Acoustic Phenomena**
Sound waves
Intensity
Loudness
Pitch
The Dopplereffect

**Coulomb's Law**
Electric charges
Conductors and insulators
Charging by induction
Coulomb's law

**Current, Resistance and Capacitance**
Electric Current
Ohm's Law: Resistance and Resistors
Resistivity
Electric Power
Power in Household circuits
Alternating Current

## ASSESSMENT PLAN

Both formative and summative assessments will be used to assess student's knowledge of the course.

### Formative assessment

- Two class tests and one practical test will be written based on lectures, laboratory work, self-studies and tutorials.
- Three quizzes/tutorial tests will be written on lectures, laboratory work, self-studies and tutorials.

Feedback on tests and quizzes/tutorial tests will be given verbally in class and the review of test and quizzes/ tutorial tests will be done when scripts or quizzes/ tutorial tests are returned.

### Summative assessment

The final summative assessment will be an examination in order to assessment independent knowledge within a specified time period. Examination: focuses on the integration of knowledge, skills and will consist of:

- 1 x 3 hour theoretical paper

**YEAR MARK = 60%**
**EXAM MARK = 40%**

## 5.9 STATISTICS FOR THE APPLIED SCIENCES (STAS102)

## SYLLABUS

- Estimate a population mean and proportion
- Apply confidence intervals for a mean and population
- Understand the principles of hypothesis testing.
- Conduct a test for a mean and a proportion
- Test for the equality of 2 means and 2 proportions for independent populations
- Apply the paired sample t-test for dependent samples
- Find Pearson's correlation coefficient
- Fit a simple linear regression model and make predictions
  Test for association between categorical variables using the Chi-square test

## ASSESSMENT PLAN

The Final Mark will be calculated from three assessments during the semester and assignments.

Final Mark:
FM: (100%) = Test1 (20%) + Test2 (30%) +Test3 (40%)+Assignments (10%)

A final mark of 50% and above would constitute a pass for this module.

All assessments and moderation will be conducted in accordance with the DUT policies and procedures for assessment.

## 5.10 INTRODUCTION TO ENGINEERING AND THE BUILT ENVIRONMENT (IEBE102)

## SYLLABUS

EBE in relation to society
The EBE disciplines (What does an EBE professional do?)
Problem solving
The scientific method
Decision making tools
Intro to design
Concept generations
Concept selection and testing
Codes of ethics
Personal and organisational values

## ASSESSMENT PLAN

Semester Mark (SM) = The semester mark will be three assessments during the semester taking either the form of class tests, oral presentation, assignment, poster presentation and/ or case studies. This will form 40% of the final mark.

Examination Mark (EM) = The examination will be three hours closed book paper which will form 60% of the final mark.

Final Mark (FM: 100%) = SM (40%) + EM (60%)

A final mark of 50% and above would constitute a pass for this module.

All assessments and moderation will be conducted in accordance with the DUT policies and procedures for assessment.

## 5.11 COMPUTER AIDED DRAWING AND DESIGN (CADD102)

## SYLLABUS

**Drawing introduction:**
Basic fundamentals of Orthographic Drawing and Isometric Drawing and Freehand Drawing techniques – all using SABS Drawing Standards.

**Use of Computer Aided Drawing Program:**
All basic Profile and Extrusion commands.
2D (Draft) drawings from 3D (Part) drawings.
Assembly Drawing from saved Part drawings.

## ASSESSMENT PLAN

Assessment according to respective marking memorandums or rubrics.

Final Mark (Minimum 50%) calculated as follows:-

| | |
|---|---|
| Multiple Choice test on Basic Principles of Drawing | 10% |
| Class work | 10% |
| Practical Test | 20% |
| Assignment | 60% |

## 5.13 CHEMISTRY A (CHST101)

## SYLLABUS

1. Types of reactions with appropriate examples
2. chemical equations – write chemical equations with the correct molecular formulae
3. empirical and molecular formula –determine the formulae by calculation
4. balancing of equations by inspection
5. Redox reactions using ion –ion method, acid or base medium
6. Mole concept – calculation of moles and Avagadro's number
7. stoichiometry – perform calculations using balanced chemical equations
8. Limiting reagents – calculate the limiting reagent in a balanced chemical equation
9. properties of s and p block elements – types of reactions
10. periodic trends – ionization energy, atomic radii

## ASSESSMENT PLAN

Year mark = 100% weigting = Final Mark
Continuous Assessment

Assessments to comprise the year mark will be as follows:

- Two theory tests (2 x 30%)
- One practical test (40%)
- Year mark total: 100%

All assessments and moderation will be conducted in accordance with the DUT policies and procedures for assessment.

## 5.14 CHEMISTRY B (CHST102)

## SYLLABUS

1. Composition of matter
2. Measurement
3. Energy
4. Atomic structure
5. The Periodic table
6. Chemical bonding
7. Compounds
8. Acids
9. Bases

## ASSESSMENT

Year Mark = 100% weighting = Final Mark

Assessments to comprise the year mark will be as follows:

- Two theory tests (2 x 30%)
- One practical test (40%)
- Year mark total: 100%

All assessments and moderation will comply with the DUT policies

## 5.15 INTRODUCTION TO SHIPBOARD OPERATIONS (ISOP102)

## SYLLABUS

Maritime terminology, acronyms and abbreviations
Ship types – general cargo, dry bulk carriers, tankers and specialised vessels
Cargo types – general, dry bulk, liquid and specialised cargoes
South African legal system
Criminal and civil law including examples and procedures
Law of contract, tort (delict) and agency
Law of the sea
The formation of international law and how it becomes applicable to nationals of a country /flagged vessels
Flag and port state legislation and implementation of standards
Legal and non-legal regulations and compliance
Safety and quality legislation, including Maritime Occupational Safety Regulations and Code of Safe Working Practices for Merchant Seamen
Operational procedures and practices
Crew training and qualifications
Record keeping and providing evidence on occurrence of incidents
Company management structures
Shipboard management structures
Management techniques in the workplace
Shipboard safety culture
Safe access
Organisations concerned with shipping, including IMO, ILO and P & I Clubs

## ASSESSMENT PLAN

This is a non-examination module. There will be three assessments during the semester taking either the form of class tests, oral presentation, assignment, poster presentation and/ or case studies.

## 5.16 NAVIGATION – ELECTRONIC NAVIGATION SYSTEMS (NENS102)

## SYLLABUS

Principles of electromagnetic propagation
Echo-sounder
Speed logs
Satellite navigation equipment
Hyperbolic navigation equipment
Automatic identification system
ECDIS
Advantages of electronic navigation equipment
Disadvantages of electronic navigation equipment

## ASSESSMENT PLAN

This is a non-examination module. There will be three assessments during the semester taking either the form of class tests, oral presentation, assignment, poster presentation and/ or case studies.

A final mark of 50% and above would constitute a pass for this module

## 6. BOOKLIST

| Module | Title | Author | Prescribed/ Recommended |
|---|---|---|---|
| Communication for Sciences | The Communication Handbook. Cape Town: Juta & Company (Ed.). 2015 | Cleary, Sandra | Recommended |
| Introduction to Statistics | Essentials of Statistics. Global Edition.. 5th Edition. (2015) Pearson Education Limited. | Mario F. Triola | Recommended |
| Statistics for the Applied Sciences | Essentials of Statistics. Global Edition.. 5th Edition. (2015) Pearson Education Limited. | Mario F. Triola | Recommended |
| Elementary Didactics for Mathematics | Didactics of Mathematics and the Professional Knowledge of Teachers. In: International Handbook of Mathematics Education. Kluwer International Handbooks of Education, vol 4. Springer, Dordrecht | Boero P., Dapueto C., Parenti L. (1996) Bishop A.J., Clements K., Keitel C., Kilpatrick J., Laborde C. (eds) | Recommended |
| Physics A<br>Physics B | Physics: Principles with Applications, Global Edition 7th edition<br>Publisher: Pearson | Douglas C. Giancoli, | Prescribed |
| Introduction to Engineering and the Built Environment | Engineering: A Very Short Introduction (Paperback, New) | David Blockley<br>978-0-19-957869-6 | Prescribed |
| Computer Aided Design | CAD-CAM & Rapid prototyping Application Evaluation | Dr. Miltiadis A. Boboulos<br>ISBN: 978-87-7681-676-6 | Recommended |
| Introduction to Shipboard Operations | Introduction to Shipping (Maritime Economics) 1st Edition<br>Publisher: More Maxima Media | Mrs MB Masuku | Recommended |
| Electronic Navigation Systems | Electronic and Acoustic Navigationsystems for Maritime Studies.<br>1st Edition | Norvald Kjerstad | Recommended |
| Maths A<br>Maths B | Engineering Mathematics<br>8th Edition | John Bird | Recommended |
| Chemistry A<br><br>Chemistry B | CK 12 Chemistry – eBook 2012, 2nd Ed.<br>Concise inorganic Chemistry, 4th Ed. | Authors: S Bewick, L Edge, T Forsythe & R Parsons<br>J D Lee, Chapman & Hall | Recommended<br><br>Recommended |
| Cornerstone | No recommended or prescribed text. Worksheet and weekly tutorial handouts collectively constitute the body of work from which students will draw information for independent study | | None |