INTRODUCTION

• Coastline 3400 km bordering two vast oceans

• Operation Phakisa
  • Ocean Economy > R190 billion
  • >800 million jobs

• BUT no current hydrographic degree courses or programmes
INTRODUCTION

Defining the extent and ownership of marine real estate for development in Africa

**Property** — all things with associated rights

**Cadastral system** — all rights-holders, properties, rights, authorities (administration/management), institutions (rules), processes, valuation, and planning/use
INTRODUCTION

- BSc Geomatics @UCT:
  - Hydrographic surveying
  - Property law and cadastral boundaries
  - limits?
  - improvements?
  - further research/development?
focus on numeracy and spatial literacy

introduction to measurement, instruments, interpretation of plans/maps

Python Programming for Engineers

Geology

Environmental processes

Developmental processes

Mathematics 1A and B for Engineers

Statistics 1
SECOND YEAR

Geomatics
- orbits, coordinate systems 2D, 3D
- least squares

GIS
- Intro to GIS
- Camp

Surveying
- Plane surveying
- Camp

Maths
- Vector Calculus
- Linear Algebra
- Differential equations

Physics
- A and B

Practical training
FOURTH YEAR

Geomatics
- Photogrammetry
- Remote sensing
- Geoinformatics Camp

Research
- Individual project

Planning
- Land use planning
- Township Design

Profession
- Professional Communication Studies
  - Geomatics Management & Professionalism

Surveying
- Engineering Surveying and Adjustment

Geodesy
Numeracy
- Calculations, application of checks, statistical processes and interpretation, problem solving

Literacy
- Interpretation of written work, report writing, presentation

Spatial Skills
- Interpretation of units, spatial dimensions, estimation

Numeracy
- Calculations, application of checks, statistical processes and interpretation, problem solving

2D vs 3D
- Interpretation of written work, report writing, presentation
CONCEPT MAPPING

Crystal clear optics!
body of knowledge in:
land and marine property, RRRs, boundaries, diagrams, titles, administration

body of knowledge and skill in:
surveying, positioning and mapping

body of relevant knowledge and skills

Hydrographic/offshore and coastal zone surveying as a discipline/professional competency

serves

Industry
**Hydrographic/offshore and coastal zone surveying as a discipline/professional competency**

- **Industry**
  - **Private property rights-holders**
    - to deliver property tenure and facilitate valuation
    - legal mapping of rights - diagrams in the coastal zone including on land, littoral zone and offshore
  - **State as the custodian of coastal state property and offshore property and resources**
    - to protect the interests of the public, the state, to conserve the environment and to manage resources
  - **State property in the coastal zone**
    - the sea shore
    - mineral and petroleum resources
    - cultural heritage
    - natural resources e.g. fish and plant life

- **body of relevant knowledge and skills**
  - body of knowledge and skill in: surveying, positioning and mapping

- **body of knowledge in:** land and marine property, RRRs, boundaries, diagrams, titles, administration
Industry

whose interest is

offshore surveying, positioning and mapping industry

surveying, positioning and mapping industry in the littoral zone, harbours, estuaries, internal waters

to determine and map the location of objects and positioning of objects

surveying and mapping of position of objects in offshore waters, on the bed of the sea, under the sea bed, in estuaries and on land in the coastal zone and continental shelf

private property rights-holders

to deliver property tenure and facilitate valuation

legal mapping of rights - diagrams in the coastal zone including on land, littoral zone and offshore

the sea shore

cultural heritage

natural resources e.g. fish and plant life

State as the custodian of coastal state property and offshore property and resources

to protect the interests of the public, the state, to conserve the environment and to manage resources

State property in the coastal zone

mineral and petroleum resources
Hydrographic/offshore and coastal zone surveying as a discipline/professional competency

serves

Industry
total stations, levels

data collection and processing theory

GNSS

satellite imagery, photography from the air (plane/UAV)

Land-based surveying

Satellite-based surveying

Remote sensing

single and multi beam echosounder

LiDAR

for positioning above water

for positioning on land and in shallow water

for positioning under water

Surveying theory and practice - positioning

positioning

object features

GIS for representation, modelling and analysis

Nature of features

for knowledge of features above water

for knowledge of features below water

body of knowledge and skill in: surveying, positioning and mapping

mapping
Hydrographic/offshore and coastal zone surveying as a discipline/professional competency
KEY LEGISLATION FOR LAND AND MARINE PROPERTY

- MPRDA
- MZA
- MTAA
- MTRA
- LSA
- GPA
- ICMA
- UNCLOS
- LOSC
coastal land administration

property units on land

property units in littoral zone

landed property administration

Mineral and Petroleum Resources Administration

a subset of

offshore property administration

Administration of other RRRs

location of RRRs

how they administer RRRs

Roman-Dutch property law
Statutes, Case Law
International law of the sea

Land survey Act

Maritime Zones Act

ICMA Amendment Act

informs and governs

Coastal and offshore/marine property law

Coastal and offshore/marine and coastal cadastral theory

Environmental management theory and law

body of knowledge in:
land and marine property, RRRs, boundaries, diagrams, titles, administration
CONCLUSIONS

• BSc Geomatics relevant to the hydrographic surveying industry
• Some areas of property law and surveying, positioning and mapping need improvement
• Partnership with industry is critical
• Online courses have a role
• PLS may be operating outside of legal framework perforce
• Hydrographic surveying courses worldwide fail to include the offshore property rights aspects of surveying
• SA could learn from Canada, Australia and Scotland in legislative frameworks that operate offshore
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