Global demand for skilled people

The Diploma seeks to equip students, along with the necessary practical skills, in Photonics and Nuclear Technology

Photonics

- Photonics is listed as a scarce skill.
- *There is a need* for qualified and skilled people in Photonics and related fields.
- The field of Photonics is a fast growing industry in need of trained technicians.

TUT Department of Physics is the only University in South Africa that is offering this diploma programme to train photonics technicians to meet this high demand.

THE PURPOSE OF THIS COURSE

The Diploma in Industrial Physics seeks to produce competent and skilled physics-related-work technicians for industry, and more so, for the photonics and nuclear industries

Physics-related-work technician

- Can be achieved by classroom theory and hands on experimental practical as well as industry exposure.
- Further articulation to post graduate degrees in Photonics or Nuclear Technology is also possible, after attaining the diploma.

Employment positions

- Optical instrument technician
- Lens coating technician
- Laser application technician
- Vacuum technician
- Non destructive testing technician
- General nuclear technician
- Radiation protection technicians
- Waste management technicians
- Radiation risk technicians
- Radioactive contamination risk technician

Benefits of this course

On successful completion of this course, Diploma in Industrial Physics, it will give the individual access to:

- various other study opportunities, eg. Advanced Diploma, Post Graduate Diploma, M.Tech, D.Tech in Photonics or Nuclear Technology;
- promotional positions in industry;
- national or international research qualifications and bursaries.

WHY IS THIS COURSE SO UNIQUE

- The Diploma in Industrial Physics as a study programme is offered only at TUT and no other university in the country.
- It is a study programme that has been developed from inputs from the Department of Science and Technology (DST), Photonics Initiative of South Africa (PISA), NLC-CSIR, DPSS-CSIR, Goldfields Mining, ESKOM, NECSA, Carl Zeiss, Department of Health and other industries.
- Industries have agreed to assist in the work integrated learning component of the programme.
- Well-equipped laboratories are available for practical experiments.
- Competent and experienced lecturers are involved in the delivery of the learning content.

More information

- Campus where offered: **Arcadia.**
- **Minimum duration: 3 years**
- **Admission intake: only in January.**
- **Presentation: Full time**
- Department of Physics

  Industrial Physics
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- e-mail: asantejko@tut.ac.za
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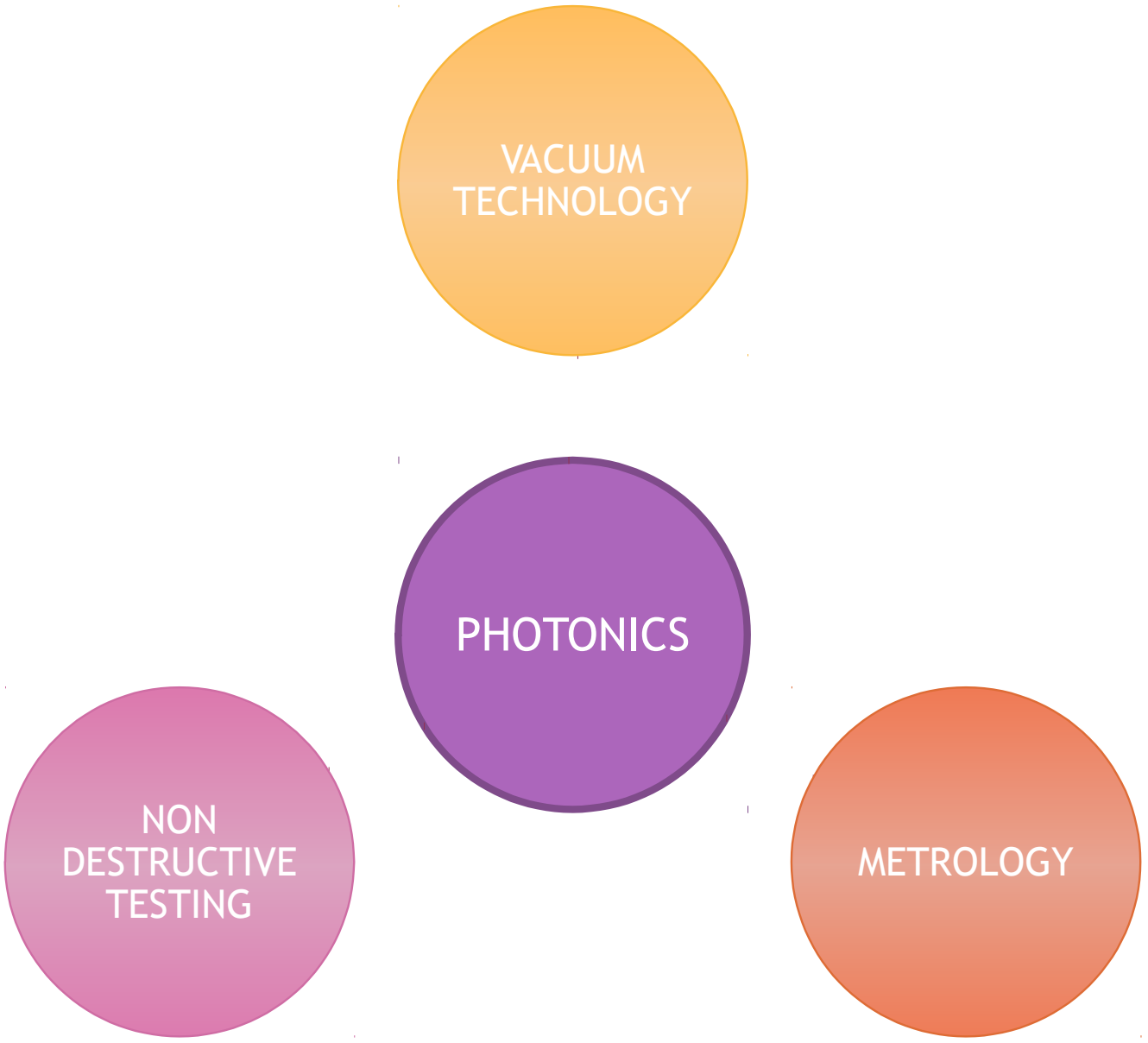

VACUUM TECHNOLOGY
PHOTONICS
NON DESTRUCTIVE TESTING
METROLOGY

PHOTONICS

- Photonics is a hi-tech subject that evolved as a result of the fusion of optical technology with electronics.
- It is the use of light to obtain, convey or process information.
- It is the science of mastering the techniques involved in the emission, detection, transmission and modulation of light.
- This sub-discipline of physics deals with the study of photons, the elementary particles of light.
- It also deals with the instruments required such as laser guns, optical fibers and optometric instruments.

Photonic system

- Information signals are conveyed as pulses of light and these optical signals are transmitted through optical fibres. Optical fibres are strands of special glass around 10 micron (100μm) in diameter (i.e about the thickness of a human hair) which can carry thousands of times more information than electrical wires.
- Photonic devices that are used to convert electrical signals into optical signal and back where necessary, can be made up from a variety of materials including semi-conductors and even optical fibers. These devices are also used to manipulate and process optical signals directly, without the need for conversion.

High tech surfacing, coating, edging, & inspection

Lens coating technician

Optical instrument technician

Vacuum technologist

Vacuum pumps

- **Mechanical pumps**
  - Rotary vane Pumps
  - Roots Pumps
  - Dry Pumps
  - Turbo molecular Pumps
- **Diffusion Pumps**
- **Entrainment Pumps**
  - Ion Pumps
  - Sublimation Pumps
  - Sorption Pumps
  - Cryogenic Pumps

Mechanical Gauges

- Diaphragm
- Bourdon

Thermal Conductivity Gauges

- Pirani
- Thermocouple
- Thermistor

Ionization Gauges

- Hot-cathode
- Cold-cathode

Viscosity Gauges

Residual Gas Analyzers

Sealing Techniques in Vacuum

Permanent seals

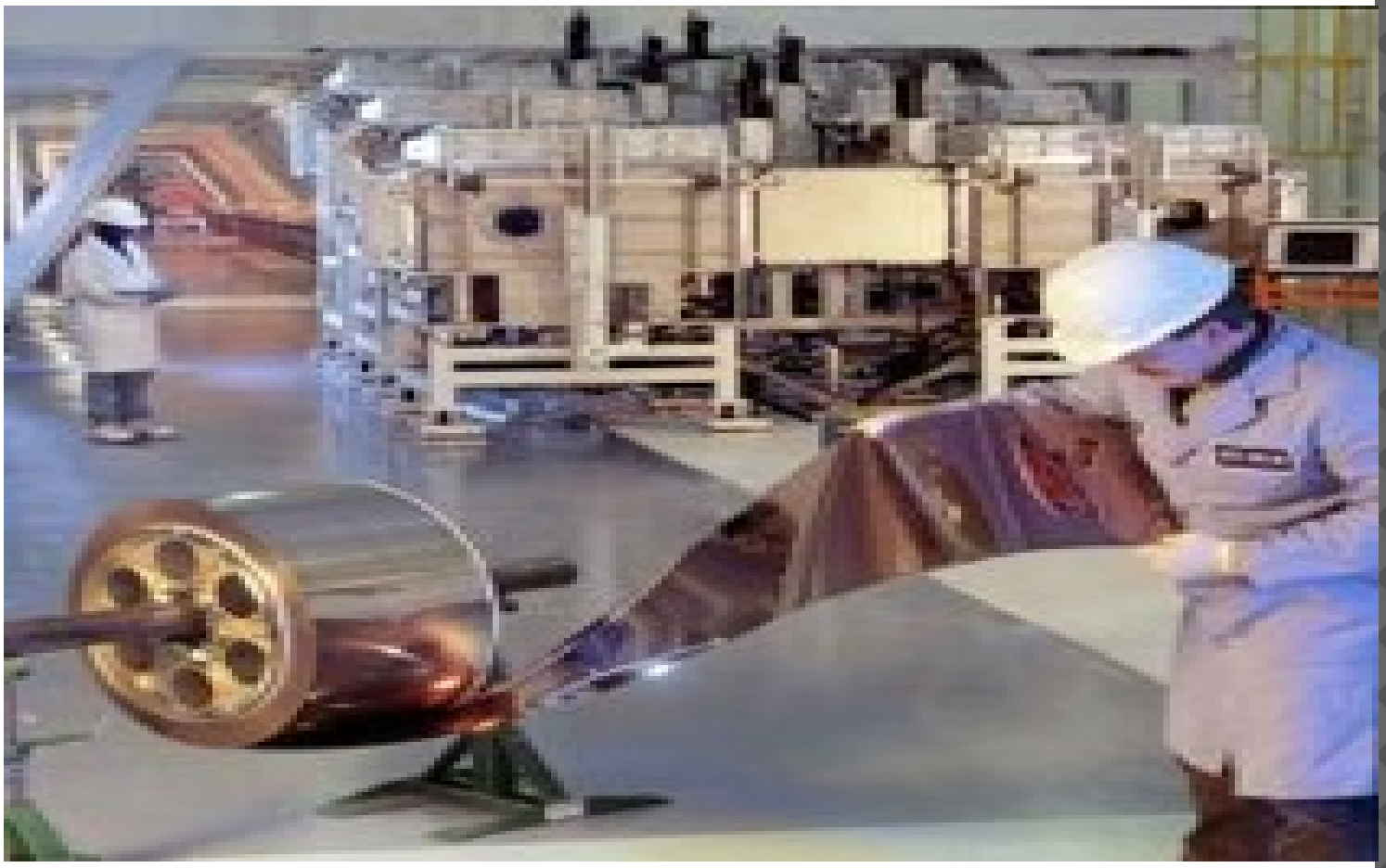
- Semi-permanent and demountable seals
- Gasket seals
- Electrical lead- through
- Motion transmission
- Material transfer into vacuum systems

Vacuum Systems

- Components
- Design consideration
- Construction
- System operation
- Operating concerns

Optical instrument technician

Thin Film and coating



Laser and measurements