

# University of Pretoria Yearbook 2023

## Radiation physics 300 (RPH 300)

<b>Qualification</b>	Undergraduate
<b>Faculty</b>	Faculty of Health Sciences
<b>Module credits</b>	10.00
<b>NQF Level</b>	07
<b>Programmes</b>	Bachelor of Radiography in Diagnostics [BRad in Diagnostics]
<b>Prerequisites</b>	RPH 200, RSC 200, DIR 200, CDR 200
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Physics
<b>Period of presentation</b>	Semester 1

### Module content

**Digital radiography:** data acquisition (equipment, detectors, analogue to digital conversion), image properties, image matrix, bit depth, file formats, data compression. Image processing (filters, frequency, spatial, Fourier transform), contrast adjustment (histogram equalisation, gamma-, linear and logarithmic adjustment), edge enhancement (pixel shifting, subtraction). Image quality (noise, resolution).

**Computed tomography:** technological developments in construction and design. Data acquisition (parameters, field size). Image reconstruction (fundamental equations and algorithms). Image processing (CT number, window width, window height). Image quality (resolution, quantum mottle, spatial uniformity, frequency modulation transfer function).

**Magnetic resonance imaging:** principles (spin angular momentum, torque, precession, magnetic moment, spin orientation, lamor frequency), acquisition (RF pulses, magnetic field gradient, superconductivity, spin echo sequence, weighted images).

**Fluoroscopy:** Imaging chain, image intensifiers, IQ, CCDs & CMOS detectors, flat panel detectors, cine cameras, fluoroscopic modes of operation, digital subtraction angiography (DSA), quality assurance, dose area product, diagnostic reference levels

**Mammography:** X-ray tube and beam filtration, X-ray generator & photo timer (AEC) system, breast compression, magnification techniques, digital mammography, radiation dose, average glandular dose.

**Ultrasound:** Physics of ultrasound, characteristics of sound, US transducers, production and reception of sound, Freznel zone and Fraunhofer zone, interactions between US and matter, US display echo modes, Doppler ultrasound.

### Regulations and rules

The regulations and rules for the degrees published here are subject to change and may be amended after the publication of this information.

The [General Academic Regulations \(G Regulations\)](#) and [General Student Rules](#) apply to all faculties and registered students of the University, as well as all prospective students who have accepted an offer of a place at the University of Pretoria. On registering for a programme, the student bears the responsibility of ensuring that they familiarise themselves with the General Academic Regulations applicable to their registration, as well as the relevant faculty-specific and programme-specific regulations and information as stipulated in the relevant yearbook. Ignorance concerning these regulations will not be accepted as an excuse for any transgression, or basis for an exception to any of the aforementioned regulations.

### University of Pretoria Programme Qualification Mix (PQM) verification project

The higher education sector has undergone an extensive alignment to the Higher Education Qualification Sub-Framework (HEQF) across all institutions in South Africa. In order to comply with the HEQSF, all institutions are legally required to participate in a national initiative led by regulatory bodies such as the Department of Higher Education and Training (DHET), the Council on Higher Education (CHE), and the South African Qualifications Authority (SAQA). The University of Pretoria is presently engaged in an ongoing effort to align its qualifications and programmes with the HEQSF criteria. Current and prospective students should take note that changes to UP qualification and programme names, may occur as a result of the HEQSF initiative. Students are advised to contact their faculties if they have any questions.