



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Denkleiers • Leading Minds • Dikgopolo tša Dihlalefi

DEPARTMENT OF CHEMICAL ENGINEERING

WATER UTILISATION ENGINEERING

POSTGRADUATE PROGRAMME

INFORMATION BROCHURE

2009

PROGRAMME PHILOSOPHY

The University of Pretoria has a long tradition of excellence in education, training and research in the water field. The Water Utilisation Division was established in the Department of Chemical Engineering in 1969 and has delivered a large number of highly-trained graduates to the water industry. The Division aims to provide balanced training to students in the fields of water quality management and the treatment of water and wastewater.

POST-GRADUATE PROGRAMMES

Programme structure: The Division has five main focus areas:

- Drinking water quality and treatment processes.
- Biological wastewater treatment.
- Water quality management
- Industrial water and wastewater treatment.
- Management, treatment and disposal of sludge and industrial waste.

Prescribed modules:

In order to obtain the Honours degree, four modules of 32 credits each (a total of 128 credits) must be completed. An additional 128 credits are required for the Masters degree. Three modules are compulsory for the Honours degree in Water Utilisation while the fourth is an elective module. Prescribed modules for B.Eng. (Hons) and for B.Sc. (Hons) (Applied Science) are:

WQB 780 – Water Quality Management
WCW 780/7 – Chemical Water Treatment, and
WBW 780/7 – Biological Water Treatment

Possible elective modules include Waste Management WAI 780/787, Environmental Management CEM 780/787 or any other approved module. The modules with 780 or 787 codes can be taken by students registered for Honours degrees, while those with the 800 or 807 code can only be taken by students registered for the Masters degree. The following is a description of each module presented in the Water Utilisation Division:

Modules presented on a lectured basis:

WQB 780 Water Quality Management (32 credits) (1st semester)

Water quality parameters: physical, chemical, biological, microbiological. Units of expression. Evaluation of parameters. Methods of analysis and practical laboratory analyses; Water quality interpretation, evaluation and assessment, water quality guidelines and requirements for domestic, industrial, agricultural, ecological, recreational requirements; Limnology and water quality in rivers and lakes; Surface water modelling; Ground water quality and assessment; Regulatory aspects including all relevant legislation; Integrated environmental management, integrated pollution control; Procedures to assess effluent discharge impacts; and Water quality management, policies and procedures, role of catchment management agencies, and catchment management plans. **Handbooks:** Water Quality Assessments (1987). D Chapman. Chapman & Hall., Principles of Surface Water Quality Modelling and Control (1987). R.V. Thomann and J.A. Mueller. HarperCollinsPublisher Inc., and Chemistry for Environmental Engineering (2003). CN Sawyer, PL McCarthy & GF Parkin. McGraw-Hill.

WCW 780/787 Chemical Water Treatment (32 credits) (1st semester)

Basic water chemistry: Acid-base and solubility equilibrium chemistry; Chemistry of the carbonate system
Conventional drinking water treatment: coagulation-flocculation; sedimentation, flotation; sand filtration; chlorination; chemical stabilisation
Advanced drinking water treatment: activated carbon adsorption; ozone and ultra-violet disinfection; enhanced coagulation; membrane processes; softening; iron and manganese removal
Industrial water treatment: chemical precipitation; neutralisation; oxidation-reduction; desalination processes; ion exchange.

Handbooks: Chemistry for Environmental Engineering and Science (2003) CN Sawyer, PL McCarthy & GF Perkin, Fifth Ed, McGraw-Hill
Water Quality and Treatment (1999) FW Pontius Ed, AWWA, Fifth Edition, McGraw-Hill
Unit Operations in Environmental Engineering; 2nd Ed. (1996) TD Reynolds & PA Richards, PSW Publishing Co.

WBW 780/787 Biological Water Treatment **(32 credits)** (2nd semester)

Composition and characterisation of sewage; Basic design principles of: Simple sewage treatment systems – night soil, pit latrines, septic tanks; Small scale sewage works – oxidation dams, biological filters and reed beds; Suspended – and Attached growth processes; Sludge handling and treatment; Compulsory site visit. **Handbooks:** Wastewater Engineering (2003) Fourth Edition. Metcalfe & Eddy. McGraw-Hill. Unit Operations in Environmental Engineering; 2nd Ed. (1996) TD Reynolds & PA Richards, PSW Publishing Co.

WAI 780 Waste Management (32 credits) (2nd semester)

Identify source materials, physical and chemical properties of waste; Release and transport mechanisms from source to air, groundwater, soil; Primary pathways of contaminants including sorption, volatilisation, biotic and abiotic transformations; Toxicology: absorption, distribution, biochemical transformation, and secretion of chemicals; Acute and chronic toxicity quantification and evaluation of risk; Hazard identification, exposure assessment, toxicity assessment, risk assessment and approaches to hazardous waste minimisation, treatment and disposal; The handling, classification and disposal of hazardous waste; Disposal of waste by landfill; Water monitoring at waste management facilities; Recycling and resource management; Waste prevention, minimisation and optimisation. **Handbook:** RJ Watts (1997) Hazardous Wastes: Sources, Pathways, Receptors.

MASTERS DEGREE MODULES

The Masters degree is obtained by completion of a 128 credit research dissertation CVD 800/807.

As of January 2009, the half-dissertation 64 credit project module CSC 800 and the accompanying 800 level modules - WDO 880 and WRO 880 will be discontinued.

ONLY the full dissertation masters degree option will be offered in 2009.

ENROLMENT

Admission: All prospective postgraduate students must in the first instance obtain admission to the School of Engineering. Application forms are available at the Client Services Centre (CSC) or on the UP web.

Registration requirements: Please refer to the Faculty yearbook and the Post-graduate information on the website of the the Water Utilisation Division in the Department of Chemical Engineering and at:

<http://www.up.ac.za/chemeng>

Registration: All students must register every year.

Registration will take place on Monday 26th January 2009
10:00 – 15:00, Building 2 South Campus

Other qualifications: Students with qualifications from other South-African universities must take note of General Regulation G.62. Students with qualifications from foreign universities will be judged on merit.

Selection: The Department reserves the right to select prospective students. Selection will be done on the basis of the student's academic record and the available opportunities for postgraduate study in the group.

COURSE FEES & FINANCIAL SUPPORT

Information on course fees should be obtained from faculty administration. The University of Pretoria website has all the information regarding bursaries, loans, information for foreign students, etc. Prospective students are encouraged to visit this website & download the relevant information from: <http://www.up.ac.za>

Please contact student administration:
Honours: Mrs Mofulatsi 012-420-2142
eunice.mofulatsi@up.ac.za.
Masters and doctoral: Ms Steenberg 012-420-5315
stefanie.steenberg@up.ac.za.

MORE INFORMATION

To obtain more information on post-graduate study opportunities in Water Utilisation Engineering, kindly contact:

Prof. Evans Chirwa, Department of Chemical Engineering,
University of Pretoria, Pretoria 0001
Tel: (012) 420 5894, Fax: (012) 362 5089
E-mail: evans.chirwa@up.ac.za

BLOCK WEEKS FOR 2009

Water Utilisation Engineering: Post Graduate Programme 2009 www.up.ac.za/academic/water/study2009 Lecture room 2-4, Building 2, South Campus			
SEMESTER 1			
Block 1	Jan. 26	Orientation, registration, library session	10:00-15:00
	Jan. 27	WCW 780/7	8:00-16:00
	Jan. 28	WCW 780/7	8:00-16:00
	Jan. 29	WQB 780	8:00-16:00
	Jan. 30	WQB 780	8:00-16:00
Block 2	April 20	WCW 780/7	8:00-16:00
	April 21	WCW 780/7 (Morning)	8:00-12:00
	April 23	WQB 780	8:00-16:00
	April 24	WQB 780	8:00-16:00
Exam	June 22	WCW 780/7	8:30-12:30
	June 26	WQB 780	8:30-12:30
SEMESTER 2			
Block 3	July 13	WBW 780/7	8:00-16:00
	July 14	WBW 780/7	8:00-16:00
	July 15	Site visit	8:00-16:00
	July 16	WAI 780	8:00-16:00
	July 17	WAI 780	8:00-16:00
Block 4	Sept. 28	WBW 780/7	8:00-16:00
	Sept. 29	WBW 780/7	8:00-16:00
	Sept. 30	WAI 780	8:00-16:00
	Oct. 1	WAI 780	8:00-16:00
Exam	Nov. 11	WBW 780/7	8:30-12:30
	Nov. 12	WAI 780	8:30-12:30