FACULTY OF
ENGINEERING &
THE BUILT ENVIRONMENT

Postgraduate Programme Booklet

Department of Civil Engineering

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

PREFACE

The Civil Engineering Department offers a wide range of postgraduate studies which are usually linked to the research fields in which the Department is currently active. Master degree programmes are offered which comprise different levels of research versus course work, thus allowing students to educate themselves according to their particular strengths and career choices.

This brochure provides information on postgraduate study within the Department of Civil Engineering, University of Cape Town.

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Terms

	2018 Year pattern	2019 Year pattern
1st quarter	19 February to 29 March 2018	11 February – 12 April 2019
1st vacation	30 March to 08 April 2018	13 April – 22 April 2019
2nd quarter	09 April to 15 June 2018	23 April – 09 June 2019
Mid-year vacation	16 June to 22 July 2018	10 June – 14 July 2019
3rd quarter	23 July to 07 September 2018	15 July – 23 August 2019
Mid-term vacation	08 September to 16 September 2018	24 August – 01 September 2019
4th quarter	17 September to 21 December 2018	02 September – 24 December 2019

STRUCTURE OF POSTGRADUATE STUDIES IN THE DEPARTMENT OF CIVIL ENGINEERING

Postgraduate studies play a vital role in developing the skills necessary for success in a knowledge-driven economy, both locally and internationally.

The Faculty is committed to:

- Making its educational programmes increasingly research-led
- Increasing both the numbers and the relative proportions of postgraduate students
- Continually improving the postgraduate educational experience
- Increasing throughput rates.

Postgraduate education in the Department of Civil Engineering at UCT commonly results in one of three outputs: a Doctor of Philosophy degree (PhD); a Master degree; or a Postgraduate Diploma. Master degrees in the Faculty may be obtained in one of three ways (i) by a 180 credit research dissertation; or (ii) by 60 credits of coursework and a 120 credit research of dissertation; or (iii) by 120 credits of coursework and a 60 credit dissertation. Note that 1 Credit implies 10 notional hours of intensive study (South African Qualifications Authority).

As a matter of clarity, by convention a Master degree is normally awarded following the successful examination of a dissertation, which means a discourse or discussion. A PhD is awarded on the basis of a thesis (an assertion or tenet that has to be proved against critical attack). In practice, however, the two terms are commonly used interchangeably.

This handbook is intended to serve as a guide to postgraduate students in Civil Engineering. It draws on other published University documents and Handbooks, it does not replace them. The rules for the various higher degrees are set out in the Handbook General Rules & Policies (Handbook 3 in the UCT series) and the Faculty Handbook (Handbook 7(b) in the UCT series).

THE DIFFERENCE BETWEEN A MASTERS AND A DOCTORAL DEGREE

At the most fundamental level, the PhD is the higher degree: it requires more effort and time to obtain. However, in practice the difference is more subtle than this.

A Master degree is frequently the first real research students will undertake. Its primary function is thus training in research. It is a clearly circumscribed piece of work that the supervisor feels confident can be undertaken within, or close to, the minimum time period. The process includes posing the research question, undertaking a relevant literature review, engaging rigorously with research methods, drawing valid conclusions and communicating findings in a clear, logical and scholarly way. Importantly, the work does not have to contain original findings - it must simply demonstrate a mastery of the methods of research.

The degree of Doctor of Philosophy, on the other hand, certifies that the candidate is able to conduct independent research on his / her own initiative. Through the thesis the candidate must be able to demonstrate that he / she is at the academic forefront in the topic selected, that the work is original and that it advances knowledge.

Masters degrees are departmental degrees: students are located within departments or within departmentally-related research groups. Most Master degrees are discipline-specific. The Master of Philosophy is interdisciplinary and students are usually located with the department of the primary supervisor. In contrast, the PhD is a University-wide degree (the award of the degree is the responsibility of the Doctoral Degrees Board) and students are academically located with the department of the principal supervisor.

MASTER DEGREES IN ENGINEERING

The Department of Civil Engineering offers a number of Postgraduate Master Degrees, as listed below.

Master of Engineering (MEng)

This is a coursework masters (120 credits of coursework and 60 credits of a minor dissertation). Generally, candidates entering this programme should have a four year engineering degree or its equivalent (based primarily on academic qualifications and work-place experience).

Master of Science in Engineering (MSc Eng)

This is a research-based degree (180 credit dissertation or 120 credit dissertation plus 60 credits coursework). Generally, candidates entering this programme should have an equivalent of an Honours degree or a four year engineering degree.

Master of Philosophy (MPhil)

This is a faculty (not a departmental) degree for candidates engaged in interdisciplinary dissertation and coursework. The MPhil is offered in three options:

a) 120 credits coursework with 60 credit minor dissertation
b) 120 credits dissertation with 60 credit coursework
c) 180 credits research dissertation

Prof Masters (ProfM)

The department offers two Prof Master degrees. The degree is aimed at Professionals with limited time available to concentrate on a dissertation. Candidates are required to complete 140 credits coursework as well as a 45-credit project.

MSc in Engineering specialising in Civil Engineering [CIV01]

The Department prepares candidates for the Master of Science in Engineering in Civil Engineering and for the Doctor of Philosophy. The Department offers a number of special postgraduate courses each year, some of which are scheduled to facilitate attendance by practising engineers from industry. The Master of Science in Engineering can be either by dissertation only [EM023] or by coursework (approved by your supervisor) and dissertation [EM024].

EM023 Research Master's by dissertation [EM023CIV01]

Core Course

Code	Course	NQF Credits	HEQSF Level
CIV5000W	Dissertation Civil Engineering	180	9
END5050X	Master's journal paper	0	9
	Total credits	**180**	

EM024 Research Master's by coursework and dissertation [EM024CIV01]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5000Z	Dissertation Civil Engineering	120	9
	Elective courses approved by supervisor	60	9
CIV5109Z	Dissertation Preparation	0	9
END5050X	Master's journal paper	0	9
	Total credits	**180**	

Civil Infrastructure Management and Maintenance

The primary aim of the MEng and MScEng specialising in Civil Infrastructure Management & Maintenance is to produce graduates with the necessary knowledge and skills to engage effectively in structural and materials engineering with respect to maintenance, rehabilitation and management of civil infrastructure. The broad areas of interest are deterioration science, assessment technologies, and renewal engineering

Convenor: Prof Hans Beushausen (Hans.Beushausen@uct.ac.za)

Deterioration and Condition Assessment of Concrete Structures	CIV5138Z	23 - 25 Apr & 31 May – 01 Jun
Advanced Infrastructure Management	CIV5067Z	04 - 08 June
Repair and Rehabilitation of Concrete Structures	CIV5139Z	12 - 16 November

Master of Engineering specialising in Civil Infrastructure Management & Maintenance [EM017CIV07]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5017Z	Minor Dissertation	60	9
CIV5067Z	Advanced Infrastructure Management	20	9

Code	Course	NQF Credits	HEQSF Level
CIV5138Z	Deterioration and Condition Assessment of Concrete Structures	20	9
CIV5139Z	Repair & Rehabilitation of Concrete Structures	20	9
CIV5140Z	Strengthening and Retrofitting of Concrete Structures	20	9
CON5016Z	Project Planning & Implementation	20	9
	Elective courses from the list below	20	9
	Total credits	**180**	

Elective Courses

Code	Course	NQF Credits	HEQSF Level
CIV5002Z	Structural Concrete Properties & Practice	16	9
CIV5113Z	Structural Dynamics with Applications	16	9
CIV5115Z	Bridge Management & Maintenance	10	9
CIV5118Z	Safety of Special Structures	10	9
CIV5119Z	Structural Performance Assessment & Monitoring	20	9
	Approved elective as an alternative to the above list	20	9

Master of Science in Engineering specialising in Civil Infrastructure Management & Maintenance [EM023CIV07]

Code	Course	NQF Credits	HEQSF Level
CIV5000W	Dissertation	180	9
END5050X	Master's journal paper	0	9
	Total credits	**180**	

Master of Science in Engineering specialising in Civil Infrastructure Management & Maintenance [EM024CIV07]

Code	Course	NQF Credits	HEQSF Level
CIV5000Z	Dissertation	120	9
CIV5109Z	Dissertation Preparation	0	9
CIV5067Z	Advanced Infrastructure Management	20	9
CIV5138Z	Deterioration and Condition Assessment of Concrete Structures	20	9
END5050X	Master's journal paper	0	9
	Elective courses from the list below	20	09
	Total credits	**180**	

Elective Courses (minimum of 20 credits)

Code	Course	NQF Credits	HEQSF Level
CIV5139Z	Repair & Rehabilitation of Concrete Structures	20	09

Code	Course	NQF Credits	HEQSF Level
CIV5140Z	Strengthening and Retrofitting of Concrete Structures	20	9
	Approved elective as an alternative to the above	20	9

Geotechnical Engineering

The master's programme with a specialisation in Geotechnical Engineering is intended to support high level training and enhance both the technical skills of recent graduates or experienced personnel who work in, or aspire to a career in civil engineering construction, consulting, environmental and related industries. The primary purpose of the programme is to provide advanced conceptual understanding, detailed factual geotechnical knowledge and specialist technical skills appropriate for postgraduates who wish to widen their professional scope and work towards a career in the field of geotechnical engineering.

Convenor: A/Prof Denis Kalumba (Denis.Kalumba@uct.ac.za)

Slope Stability	CIV5126Z	19 - 23 February
Lateral Earth Supports	CIV5125Z	26 Feb - 02 March
Geosynthetics Engineering	CIV5124Z	25 - 29 June
Rock Mechanics	CIV5143Z	27 - 31 August

Master of Science in Engineering specialising in Geotechnical Engineering [EM024CIV08]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5000Z	Dissertation	120	9
CIV5109Z	Dissertation Preparation	0	9
CIV5110Z	Laboratory and Field Techniques	16	9
CIV5114Z	Foundation Design	16	9
CIV5122Z	Advanced Soil Mechanics	16	9
END5050X	Master's journal paper	0	9
	Elective courses	12	9
	Minimum total credits	**180**	

Elective Courses (minimum of 12 credits)

Code	Course	NQF Credits	HEQSF Level
CIV5111Z	Ground Improvement Techniques	16	9
CIV5123Z	Contaminated Land and Remediation	16	9
CIV5124Z	Geosynthetics Engineering	16	9
CIV5125Z	Lateral Earth Supports	16	9
CIV5126Z	Slope Stability	16	9
CIV5143Z	Rock Mechanics	16	9

Enrichment courses (compulsory for MScEng)

Code	Course	NQF Credits	HEQSF Level
CHE5055Z	Research Communication and Methodology	16	9

Master of Geotechnical Engineering [EM028CIV08]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5129W	Geotechnical Engineering Project	45	9
CIV5110Z	Laboratory and Field Techniques	16	9
CIV5114Z	Foundation Design	16	9
CIV5125Z	Lateral Earth Supports	16	9
	Elective courses	87	9
	Minimum total credits	**180**	

Elective Courses (minimum of 87 credits)

Code	Course	NQF Credits	HEQSF Level
CIV5111Z	Ground Improvement Techniques	16	9
CIV5122Z	Advanced Soil Mechanics	16	9
CIV5123Z	Contaminated Land and Remediation	16	9
CIV5124Z	Geosynthetics Engineering	16	9
CIV5126Z	Slope Stability	16	9
CIV5143Z	Rock Mechanics	16	9
CHE5055Z	Research Communication and Methodology	16	9

Structural Engineering and Materials

The programme offers high level training in structural design, structural analysis and structural materials by providing sound theoretical background and encouraging critical and innovative thinking. Students benefit from expertise in concrete technology, structural performance and design, computational mechanics, and finite element analysis. The programme is supported by excellent laboratory and computing facilities and draws from cutting edge research outputs.

Convenor: A/Prof Sebastian Skatulla (Sebastian.Skatulla@uct.ac.za)

Advanced Mechanics of Materials	CIV5108Z	18 Feb - 15 June
Bridge Analysis and Design	CIV5041Z	28 Feb - 02 & 14 - 16 March
Structural Dynamics with Applications	CIV5113Z	13 - 15 & 20 - 21 August
Structural Concrete Properties and Practice	CIV5002Z	05 - 07 March & 19 - 20 April
Stability and Design of Steel Structures	CIV5112Z	17 - 21 September
Plate and Shell Structures	CIV5100Z	TBC
Introduction to Finite Elements	CIV5142Z	3 & 6 - 10 August

Master of Engineering specialising in Structural Engineering & Materials
[EM017CIV04]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5017Z	Minor Dissertation	60	9
CIV5113Z	Structural Dynamics with Applications	16	9
CIV5100Z	Plate and Shell Structures	16	9
CIV5142Z	Introduction to Finite Element Modelling in Structural Analysis	16	9
	Elective Courses	72	9
	Total credits	**180**	

Elective courses (minimum of 72 credits)

Code	Course	NQF Credits	HEQSF Level
CIV5002Z	Structural Concrete Properties and Practice	16	9
CIV5006Z	Advanced Structural Concrete Engineering	16	9
CIV5041Z	Bridge Analysis and Design	16	9
CIV5108Z	Advanced Mechanics of Materials	16	9
CIV5112Z	Stability and Design of Steel Structures	16	9
CIV5119Z	Structural Performance Assessment & Monitoring	20	9
CIV5138Z	Deterioration and Condition Assessment of Concrete Structures	20	9
CIV5139Z	Repair and Rehabilitation of Concrete Structures	20	9

Master of Science in Engineering specialising in Structural Engineering & Materials
[EM024CIV04]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5000Z	Dissertation	120	9
CIV5109Z	Dissertation Preparation	0	9

Select at least two of the following courses:

Code	Course	NQF Credits	HEQSF Level
CIV5108Z	Advanced Mechanics of Materials	16	9
MEC5063Z	An introduction to Finite Elements	12	9
CIV5113Z	Structural Dynamics with Applications	16	9

Elective Courses

Code	Course	NQF Credits	HEQSF Level
CIV5006Z	Advanced Structural Concrete Engineering	16	9
CIV5112Z	Stability and Design of Steel Structures	16	9
CIV5002Z	Structural Concrete Properties and Practice	16	9
CIV5100Z	Plate and Shell Structures	16	9
CIV5119Z	Structural Performance Assessment & Monitoring	20	9
MEC5064Z	Finite Element Analysis	12	9
CIV5139Z	Repair and Rehabilitation of Concrete Structures	20	9
CIV5138Z	Deterioration and Condition Assessment of Concrete Structures	20	9
CIV5041Z	Bridge Analysis and Design	16	9

Enrichment Courses

Code	Course	NQF Credits	HEQSF Level
CIV5131Z	Research Design and Methodology	16	9

Transport Studies

The programme offers degrees specialising in transport studies, with a specific focus on the planning and management of urban passenger transport systems. The primary aim is to produce graduates from a range of postgraduate disciplines with the necessary knowledge and skills to engage effectively with the challenge of creating affordable, efficient, sustainable, safe, equitable and environmentally sound urban transport systems, and to contribute to the implementation of new and demanding policy directives. Curriculum content is cross-disciplinary in orientation and exposes students to a broad range of the analytical, evaluative, planning and management issues they are likely to encounter in the field.

Convenor: A/Prof Roger Behrens (Roger.Behrens@uct.ac.za)

Transport Modelling	CIV5133Z	29 January - 05 February
Non-Motorised Transport	CIV5039Z	09 - 16 April
Discrete Choice Modelling & Stated Choice	CIV5127Z	16 - 23 April
Integrated Land use-transport Planning	CIV5038Z	07 - 14 May
Transport Demand Analysis & Project Assess	CIV5132Z	11 - 18 June
Management of Transport Supply & Demand	CIV5035Z	13 - 20 August
Public Transport System Design	CIV5071Z	08 - 15 Oct
Public Transport Policy and Regulation	CIV5070Z	19 - 26 Nov

Master of Engineering specialising in Transport Studies [EM017CIV06]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5017Z	Minor Dissertation	60	9
CIV5132Z	Transport Demand Analysis and Project Assessment	20	9
CIV5133Z	Transport Modelling	20	9
CIV5071Z	Public Transport System Design and Operations Management	20	9
	Approved elective courses	60	9
	Total credits	**180**	

Master of Philosophy specialising in Transport Studies [EM026CIV06]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5134W	Dissertation	120	9
CIV5109Z	Dissertation Preparation	0	9

Select three of the following courses:

Code	Course	NQF Credits	HEQSF Level
CIV5035Z	Management of Transport Supply and Demand	20	9
CIV5038Z	Integrated Land Use Transportation Planning	20	9
CIV5132Z	Transport Demand Analysis and Project Assessment	20	9
CIV5036Z	Local Area Transport Planning Management and Design	20	9
CIV5039Z	Non-motorised Transportation	20	9
CIV5133Z	Transport Modelling	20	9
CIV5070Z	Public Transport Policy and Regulation	20	9
CIV5071Z	Public Transport System Design and Operations Management	20	9
END5127Z	Discrete Choice Modelling and Stated Choice Survey Design	20	9
	Total credits	**180**	

Master of Philosophy specialising in Transport Studies [EM027CIV06]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5037Z	Minor Dissertation	60	9
CIV5035Z	Management of Transport Supply and Demand	20	9
CIV5038Z	Integrated Land Use-Transport Planning	20	9
CIV5132Z	Transport Demand Analysis and Project Assessment	20	9
	Approved elective courses	60	9
	Total credits	**180**	

Elective Courses (minimum of 60 credits)

Code	Course	NQF Credits	HEQSF Level
CIV5036Z	Local Area Transport Planning Management and Design	20	9
CIV5039Z	Non-motorised Transportation	20	9
CIV5133Z	Transport Modelling	20	9
CIV5070Z	Public Transport Policy and Regulation	20	9
CIV5071Z	Public Transport System Design and Operations Management	20	9
CIV5127Z	Discrete Choice Modelling and Stated Choice Survey Design	20	9

Master of Transport Studies [EM029CIV06]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5135W	Research Project 1: Transport planning and engineering Methods	25	9
CIV5073W	Research Project 2: Transport policy and planning case Study	25	9
CIV5035Z	Management of Transport Supply and Demand	20	9
CIV5038Z	Integrated Land Use-Transport Planning	20	9
CIV5132Z	Transport Demand Analysis and Project Assessment	20	9
	Approved elective courses	80	9
	Total credits	**190**	

Elective Courses (minimum of 80 credits)

Code	Course	NQF Credits	HEQSF Level
CIV5036Z	Local Area Transport Planning, Management and Design	20	9
CIV5039Z	Non-motorised Transportation	20	9
CIV5133Z	Transport Modelling	20	9
CIV5070Z	Public Transport Policy and Regulation	20	9
CIV5071Z	Public Transport System Design and Operations Management	20	9
END5127Z	Choice Modelling and Stated Choice Survey Design	20	9

Water Quality Engineering

The primary aim of the MEng and MScEng specialising in Water Quality Engineering is to produce graduates with the necessary knowledge and skills to engage effectively in theory, design, modelling and operation of biological and chemical wastewater and sludge treatment systems.

To protect surface water quality and prevent the de-oxygenation and eutrophication, municipal wastewater treatment is required. In South Africa (and many other countries in the world) the preferred technology for this is the biological nutrient (N&P) removal (BNR) activated sludge system. The primary objective of the PGDipl, MEng and MSc (Eng) specialising in Water Quality Engineering is to produce engineers and scientists with high-level and in-depth knowledge and understanding of bioprocess engineering so that they can competently and effectively use steady state and dynamic simulation models for the design and operation of municipal wastewater treatment plants comprising primary treatment, BNR activated sludge, secondary settling tanks, flotation thickening and stabilisation of waste sludge by aerobic and/or anaerobic digestion unit operations in a plant wide integrated way. The steady state and dynamic WWTP unit operation models are based on bioprocess engineering and mathematical modelling principles with supporting information from several scientific disciplines such as chemistry, microbiology and biochemistry. Upon completion of this curriculum the modern approach of modelling and simulation to wastewater treatment plant design and operation can be embraced with deeper insight, advanced knowledge and greater confidence

Convenor: Dr David Ikumi (David.Ikumi@uct.ac.za)

Principles of Waste Water Treatment & Wastewater Characterisation	CIV5032Z	05 - 15 February
Activated Sludge Systems	CIV5045Z	01 - 19 March
Sewage Sludge Treatment	CIV5047Z	09 - 26 April
Separation Processes	CIV5046Z	17 May - 04 June
Steady State BNR Design	CIV5048Z	06 August - 10 September
WWTP Design	CIV5050Z	16 - 26 July

Courses for this specific programme are scheduled in the evenings from 17:00 -19:00

Master of Engineering specialising in Water Quality Engineering [EM017CIV02]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5017Z	Minor Dissertation	60	9
CIV5032Z	Introduction to Wastewater Treatment	4	9
CIV5045Z	The Activated Sludge System	10	9
CIV5046Z	Sedimentation in Water Treatment	8	9
CIV5047Z	Sewage Sludge Treatment	8	9
CIV5048Z	Design of Biological Nutrient Removal Systems	20	9
CIV5050Z	Integrated Wastewater Treatment Plant Design	20	9
	Pre-approved elective credits	50	9
	Total credits	**180**	

Elective Courses (select 50 credits)

Code	Course	NQF Credits	HEQSF Level
CIV5049Z	Modelling & Simulation of Wastewater Treatment	12	9
CIV5051Z	Aquatic Chemistry Part A	14	9
CIV5052Z	Aquatic Chemistry Part B	14	9
CIV5054Z	Advanced Chemical, Physical & Biological Processes Modelling	10	9

Master of Science in Engineering specialising in Water Quality Engineering [EM023CIV02]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5000W	Dissertation	180	9
END5050X	Master's journal paper	0	9
	Total credits	**180**	

Master of Science in Engineering specialising in Water Quality Engineering [EM024CIV02]

Core Courses

Code	Course	NQF Credits	HEQSF Level
CIV5000Z	Dissertation	120	9
CIV5109Z	Dissertation Preparation	0	9
END5050X	Master's journal paper	0	9
CIV5032Z	Introduction to Wastewater Treatment	4	9
CIV5045Z	The Activated Sludge System	10	9
CIV5046Z	Sedimentation in Water Treatment	8	9
CIV5047Z	Sewage Sludge Treatment	8	9
CIV5048Z	Design of Biological Nutrient Removal Systems	20	9
CIV5050Z	Integrated Wastewater Treatment Plant Design	20	9

Elective Courses

Code	Course	NQF Credits	HEQSF Level
CIV5049Z	Modelling & Simulation of Wastewater Treatment	12	9
CIV5051Z	Aquatic Chemistry Part A	14	9
CIV5052Z	Aquatic Chemistry Part B	14	9
CIV5054Z	Advanced Chemical, Physical & Biological Processes Modelling	109	

Urban Infrastructure Design and Management

Convenor: Prof. Pilate Moyo (Pilate.Moyo@uct.ac.za)

Integrated Urban Water Management	CIV5107Z	30 July - 03 August

Civil Engineering in general

Loss & Pressure Management in Water Distribution	CIV5128Z	14 - 18 May
Research Design and Methodology	CIV5131Z	20 - 24 August

Electives can be taken across programmes.

Detailed Course Descriptions

CIV5002Z Structural Concrete Properties and Practice

Provides structural engineers with fundamental and practical knowledge in concrete materials technology, to establish an understanding on modelling and designing concrete properties relevant to structural design, and to create awareness on chemical and physical material characteristics of cementitious construction materials. The topics covered in this course include: constituent materials; desirable properties for concrete; concrete mix design; prediction and modelling of concrete structural properties; concrete failure and fracture; concrete quality control; deterioration mechanisms; special concretes such as high strength concrete, self compacting concrete and fibre reinforced concrete.

CIV5032Z Principles of Wastewater Treatment & Wastewater Characterisation

This advanced course includes: objectives of wastewater treatment; wastewater chemical and physical characterization; measurement of energy, nitrogen and phosphorus in municipal wastewater; effect of settlement and filtration. Also covered are: characterisation of primary sludge for anaerobic digestion, and an overview of unit operations in wastewater treatment.

CIV5035Z Management of Transport Supply and Demand

Develop an advanced understanding of transport systems management. Topics include: the rationale for the management of transport systems through alternatives to large scale infrastructure provision; transport impact assessment and access management as a means of managing the impacts of new land use development on transport systems; 'road space management' as a means of prioritising public transport vehicles; 'transport system management' as a means of managing transport supply; 'travel demand management' as a means of managing travel behaviour; and the use of 'intelligent transport systems' in supply and demand management.

CIV5038Z Integrated Land Use-Transport Planning

Develop an advanced understanding of the integration of land use planning and transport planning process. Topics include: theoretical perspectives on the relationship between transport systems and urban activity systems; co-evolution of transport systems and urban form; sustainable transport and the problem of 'automobile dependent' cities; planning paradigms and rationales for public intervention into land use and transport systems; legislative, institutional and financial frameworks for land use and transport planning in South Africa; conceptual framing and practical application of approaches to integrated land use-transport planning in the South African context and local and international case studies and experiences.

CIV5039Z Non-Motorised Transportation (NMT)

Develop an advanced understanding of planning and design of non-motorised transportation infrastructure. Topics include: current South African realities and the importance of NMT modes; planning frameworks for NMT infrastructure improvements and network management; methods of site and network analysis, and approaches to modelling and simulation; footway and pathway design; the design of pedestrian precincts; low-cost bicycle supply and promotion; cycleway and bicycle parking design and pedestrian and bicycle crossing facilities.

CIV5041Z Bridge Analysis & Design

Develop an advanced understanding of conceptual and structural analysis and design of concrete bridges. Topics include: conceptual design of bridges (design objectives and basis of design, design procedures, examples of good design, load bearing systems); preliminary structural design (load models, normative guidelines, analytical models); modelling of concrete bridges (typical finite element models, movable loads, dynamic loading); construction technology (principles and application of various construction methods); prestressing of concrete bridges (design principles, tendon layouts, methods of prestressing, prestress losses, etc.); concrete technology aspects (suitable concrete types, special design requirements for bridges, durability aspects); structural condition assessment (principles of non-destructive dynamic testing and verification of load- bearing capacity).

CIV5045Z The Activated Sludge System

Develop an advanced understanding of the activated sludge system. Topics include: biological process modelling of the activated sludge system including nitrification; material mass balances; reactor kinetics; biological process kinetic equations of ordinary heterotrophic organism and autotrophic nitrifier organism growth and endogenous respiration; development of the steady state activated sludge model; application to design, selection of sludge age, impact of primary settling, sewage sludge disposal. Aeration is also covered.

CIV5046Z Sedimentation in Water & Wastewater Treatment

This advanced course includes: classes of settling; factors affecting settling tanks; column test for water-treatment solids settling characterization; application to sizing settling tanks (classes 1 and 2 settling); effect of flocculation; flux theory and application to sizing wastewater treatment plant settling tanks (classes 3 and 4); measures of activated sludge settleability and relationships between them; comparison of flux theory with other design procedures; computational fluid dynamics modelling of settling tanks; fundamentals of membrane design and costing.

CIV5047Z Sewage Sludge Treatment

This advanced course includes: an introduction to sewage sludge reuse and disposal guidelines in South Africa; characterization of primary and waste activated sludge in the context of mass balances over the entire wastewater treatment plant; sludge thickening with gravity sedimentation and flotation; development and validation of steady state aerobic digestion model for primary and waste activated sludge stabilisation and application to design and analysis including oxygen transfer and sludge thickening considerations; kinetics, stoichiometry and weak acid/base chemistry of anaerobic digestion; development, validation and application of steady state anaerobic digestion model, generation of sludge treatment liquors and the impact of their recirculation on effluent quality, and nutrient (N and P) reduction in sludge treatment liquors.

CIV5048Z Steady State BNR Design

This advanced course includes: ensuring nitrification; nitrification capacity, kinetics of denitrification, development of the steady state nitrification denitrification (ND) model; effect of ND on reactor volume, effluent alkalinity and oxygen demand; the role of readily biodegradable (RB) and slowly biodegradable (SB) organics; denitrification potential; effect of the influent TKN/COD ratio on unaerated mass fraction, N removal and effluent quality; calculation of inter- reactor recycles ratios for design and analysis accumulating organisms (PAOs); development and use of biological excess phosphorus removal (BEPR) steady state model; design and analysis of NDBEPR of systems, chemical P precipitation and its effect on BEPR; novel applications; the impact of membrane solid/liquid separation and external nitrification on NDBEPR system design.

CIV5050Z WWTP Design

This advanced course includes: calculating daily composite average flow and loads from diurnal data; influent flow balancing; integrated wastewater treatment plant modelling and design; major project brief; economic evaluation of different wastewater treatment plant layouts to achieve different technical, and environmental and economic objectives.

CIV5067Z Advanced Infrastructure Management

The aim of this module is to expose students to the concepts of municipal infrastructure management. These concepts include the context for Infrastructure Management Planning, the process of Infrastructure Management Planning and the techniques required to prepare an Infrastructure Management Plan.

CIV5070Z Public Transport Policy and Regulation

Develop an understanding of public passenger transport system policy analysis and regulation. Topics include: Legislative and planning frameworks: institutional, legislative, financing and planning frameworks for integrated public transport infrastructure provision and service operation. Public transport policy: policy debates on subsidisation and competition regulation; mode alternatives analysis; international case studies of public transport system reform. Paratransit reform: operator consolidation and transition; fleet renewal; service upgrade; integration with scheduled services. Public transport system regulation and competition: industry structures;

approaches to regulation and competition; licensing and contracting. Quality of service: quality- of-service measurement; passenger satisfaction measurement; passenger information systems and wayfinding

CIV5071Z Public Transport System Design and Management

Develop an advanced understanding of public passenger transport system design and operations management. Topics include: Public transport system concepts: basic bus and rail system concepts; alternative technologies and operating characteristics. Public transport system design: route network planning; service planning; road and rail right-of-way design and vehicle prioritisation; signaling systems; station and interchange design; demand estimation; passenger capacity analysis. Public transport system operations management: service quality assessment, scheduling and rostering; train movement control systems; reliability, disruption and incident management; performance assessment; ridership measurement. Integrated fare structures: integrated ticketing systems; fare structures; fare setting. System maintenance: asset management; vehicle fleet and rolling stock maintenance and refurbishment.

CIV5073W Transport Policy and Planning Case-study

The aim of this course is to offer students an opportunity to undertake a case study research project in which they are able to develop or deepen skills in transport policy and planning processes. The research would involve undertaking a critical investigation of the requirement for, the process of preparing and implementing, the content and the impacts of a selected transport policy, plan, strategy or project.

CIV5104S Plates and Shell Structures

Comprehensive treatment of plate and shell theories, and their application to the solution of various problems in structural engineering. Plate and Shell Structures I, will cover plates subjected to bending and twisting (slope, curvature, twist, bending moments, transverse shears and twisting moments); the derivation of the bending equation for transversally loaded plates (rectangular and polar co-ordinates), solutions for rectangular plates and circular plates, practical applications, introduction to shell structures; the membrane hypothesis for shells; the membrane theory of axisymmetrically loaded shells of revolution.

CIV5107Z Integrated Urban Water Management

Introduces students to integrated urban water management (IUWM). This includes: social imperatives; environmental considerations; politics and water service delivery. Planning for water in the CoC; servicing the informal settlements of Cape Town. Water supply: key considerations for water reticulation systems; water supply options; household management of water; water demand management; public health considerations. Sanitation: options; managing sanitation in informal settlements. Stormwater: managing stormwater in the CoC; rehabilitating urban rivers; groundwater issues; Sustainable Drainage Systems (SuDS); catchment litter management. Water Sensitive Urban Design (WSUD); water management systems; sustainability indicators.

CIV5108Z Advanced Mechanics of Materials

Introduces students to the following topics: physical mechanisms of deformation of common construction materials; continuum mechanics and its main mathematical tool, tensor analysis; non-linear continuum material behaviour, including visco-elasticity, plasticity, and modelling; failure and fracture characteristics and modelling of these effects. An introduction to computational mechanics is also included.

CIV5109Z Dissertation Preparation

The aim of this course is to allow a student to undertake preparatory work for the masters dissertation. Work required includes literature searches and reviews; identification of the research problem, objectives and hypothesis; consideration of research methodology; planning for the active research phase; and ensuring that research infrastructure (e.g. apparatus etc.) is or will be in place.

CIV5112Z Stability and Design of Steel Structures

Treats advanced topics in constructional steel work. The topics include elastic and inelastic buckling behaviour; plate buckling; non-linear instability behaviour of thin-walled structures, design for fatigue, design of steel-concrete composites, hybrid steel structures, steel connections plate girders, and the behaviour of steel structures under fire. Applications in industrial buildings and crane supporting structures are also addressed.

CIV5113Z Structural Dynamics with Applications

Introduces the concepts of structural dynamics and its applications in structural engineering. Topics covered include dynamic equilibrium of structures. Response of a single degree of freedom system to dynamic excitation: free vibration, harmonic loads, impulse loading and general loading Response of multi-degree-of-freedom systems. Free vibrations: mass, damping, and stiffness matrices. Rayleigh damping. Forced vibrations: modal superposition and step by step methods. Continuous systems. Applications to seismic design of structures, blast and impact effects on structures and wind engineering.

CIV5124Z Geosynthetics Engineering

Introduces students to geosynthetics and their applications in the built environment and covers important considerations in the use of geosynthetics to solve civil engineering problems. It includes methods of analysis, design, construction and field monitoring of structures constructed with geosynthetics. Topics include the behaviour and interaction of these materials in filtration, drainage, separation, reinforcement, erosion control and barrier functions.

CIV5125Z Lateral Earth Supports

Introduces students to the analysis of lateral earth pressures, various earth retention systems and its applicability, limitations and design. The course provides knowledge and tools for design and analyses of earth structures and earth retention systems. The selection, design and performance of earth retention structures used for support of fills and excavations will be covered as well as theory related to earth pressures and soil reinforcement.

CIV5126Z Slope Stability

Demonstrates the application of concepts, principles and theories of slopes and to understand the different slope stabilization techniques and its applicability and limitations. The course focuses on stability of natural slopes and stability considerations related to man-made cuts and fills. Emphasis will be on the conditions up to and until the slip is initiated. Students will be introduced to different slide mechanisms, the conditions of their occurrence, and the theories and principles governing stability of slopes. The course will also include other important aspects such as: field investigations to obtain input for slope stability analysis; slope stability analysis programmes; slope monitoring techniques and slope stabilization methods.

CIV5127W Discrete Choice Modelling and Stated Choice Survey

Studies the specification, estimation, and application of discrete choice models as well as the design of stated choice experiments. Introduction to choice modelling and multi-nomial logit, data & estimation, analysis of results and specification testing, estimation of logit models. Nested logit & other GEV models, estimation of GEV models, latent class, mixed logit & simulation based estimation, estimation of latent class & mixed logit. Model applications: sampling, forecasting and appraisal, model fitting, alternative models and examples, case studies in South Africa. Stated choice surveys, generating a design, drawbacks of orthogonal designs. Efficient designs, generating efficient designs case studies in South Africa.

CIV5128Z Loss and Pressure Management in Water Distribution Systems

Teaches theory and application of water losses and pressure management in water distribution systems. Topics include: water loss components and methods, pressure and leakage, impact of pressure on other network parameters, soil-leak interaction, pressure management zones, pressure control, night flow analysis and pressure-leakage parameter estimation.

CIV5131Z Research Design and Methodology for Civil Engineers

Develops conceptual skills for conducting research at the master's level. Topics include: the scientific method, induction and deduction, inference, statistical thinking and ethics, as well as technical skills which include technical writing, searching and interpretation of scientific literature, proper use of citations, and communication of research outputs.

CIV5132Z Transport Demand Analysis and Project Assessment

Develops an understanding of transport demand analysis and project assessment. Topics include: travel data collection and survey design; data processing and analysis; the link between methodological approaches to transport analysis and the analytical questions raised by different policy environments; theoretical and philosophical backgrounds of assessment and evaluation methods; and techniques for the assessment and evaluation of urban transport proposals.

CIV5133Z Transport Modelling

Develops an advanced understanding of transport modelling principles and skills in working with these models. Topics include: transport modelling types and scales; theory of travel demand modelling, including the four-step transport model (i.e. trip generation, trip distribution, mode choice and traffic assignment); output analysis; land use – transport interaction models, as well as theory of traffic flow dynamics, including capacity assessment, LOS assessment, shockwave analysis, dynamic traffic management and elementary traffic control design. The course ends with a discussion about the link between models and the analytical questions raised by different policy environments.

CIV5135W Transport Planning and Engineering Methods Project

Students are able to develop and enhance skills in a selected area of professional practice. The research would involve undertaking a critical investigation of the origins, rationale, and debates surrounding the particular professional practice, and the necessary activities associated with applying the practice and reflecting on how it might be improved.

CIV5138Z Deterioration and Condition Assessment of Concrete Structures

Develops an understanding of durability aspects, service life design, and non-destructive testing of concrete structures. Topics include: concrete deterioration mechanisms (physical, mechanical and chemical deterioration); reinforcement corrosion (principles, mechanisms, modelling, assessment, prevention); Alkali Silica Reaction (ASR); chemical attack; cracking of concrete structures; fire damage to structures; prevention of concrete deterioration thorough material selection, mix design and construction; service-life modelling (principles, deterioration models, service life models, normative guidelines); impact of loads on concrete structures; on-site evaluation techniques; visual assessment of concrete structures; principles, planning and execution of assessments; test methods (types, application and limitations, interpretation of results, case studies); non-destructive test methods (NDT): classical NDT (rebound hammer, cover depth, half-cell potential), advanced NDT (radar, sonic methods, impact echo), imaging and interpretation of results; diagnostic investigations and laboratory testing.

CIV5139Z Repair and Rehabilitation of Concrete Structures

This course covers the following topics: introduction to the assessment of deterioration of concrete structures; repair materials and strategies; compatibility aspects; durability and repair audits; service life predictions; economics of repair and life-cycle costing; practical and contractual aspects; repair methods and materials; reinforcement corrosion repair; repair of ASR-damaged structures; crack injection; bonded overlays and patch repairs; electrochemical repair techniques; surface coatings and durability extension; repair of fire damaged structures; repair materials for chemical resistance against acid and sulphate attack; maintenance planning.

CIV5143Z Rock Mechanics

Provides an introduction to the theory of rock mechanics and its applications in construction and mine operations. Students are presented with the fundamental concepts of stress and strain in isotropic and anisotropic rocks and conduct stress analyses using data collected in the laboratory and the field. Rock mass structures and classification schemes are introduced, and students learn how these govern rock slope stability and underground rock excavation methods in a given stress environment. Rock control and support systems utilized in underground and surface excavations and their related safety requirements are discussed. Rock mechanics topics surrounding blasting and the stability of impoundment dams and tailings dumps are also presented.

GENERAL STUDENT INFORMATION

➢ APPLICATIONS

Prospective applicants can apply online https://www.uct.ac.za/apply/applications/forms/ or submit a printed application form to the Admissions office on campus.

QUALIFICATION AND SPECIALISATION CODES REQUIRED WHEN COMPLETING APPLICATIONS

Qualification	Specialisation	Code	CV incl. work exp	100 Word	Supervisor	letter of motivatio	Start Date
MASTER DEGREE PROGRAMMES							
Master of Engineering (*60 research 120 coursework*)	Civil Infrastructure Management & Maintenance	EM017CIV07	Y	N	N	N	N
	Structural Engineering & Materials	EM017CIV04	Y	N	N	N	N
	Transport Studies	EM017CIV06	Y	N	N	N	N
	Water Quality Engineering	EM017CIV02	Y	N	N	N	N
Master of Science in Engineering (*180 credits research*)	Civil Engineering	EM023CIV01	Y	Y	Y	Y	Y
	Civil Infrastructure Management & Maintenance	EM023CIV07	Y	Y	Y	Y	Y
	Water Quality Engineering	EM023CIV02	Y	Y	Y	Y	Y
Master of Science in Engineering (*120 credits research, 60 credits coursework*)	Civil Engineering	EM024CIV01	Y	Y	Y	Y	Y
	Civil Infrastructure Management & Maintenance	EM024CIV07	Y	Y	Y	Y	Y
	Geotechnical Engineering	EM024CIV08	Y	Y	Y	Y	Y
	Water Quality Engineering	EM024CIV02	Y	Y	Y	Y	Y
Master of Philosophy (*180 credits research*)	Civil Engineering	EM025CIV01	Y	Y	Y	Y	Y
Master of Philosophy (*120 credits research, 60 credits coursework*)	Civil Engineering	EM026CIV01	Y	Y	Y	Y	Y
	Transport Studies	EM026CIV06	Y	Y	Y	Y	Y
Professional Masters	Geotechnical Engineering	EM028CIV08	Y	Y	Y	Y	Y
	Transport Studies	EM029CIV09	Y	Y	Y	Y	Y
Master of Philosophy (*60 credits research, 120 credits coursework*)	Transport Studies	EM027CIV06	Y	Y	Y	Y	Y
DOCTORAL PROGRAMME							
Doctor of Philosophy	Civil Engineering	ED001CIV01	Y	Y	Y	Y	Y
OCCASIONAL STUDY PROGRAMME							
Occasional EBE Postgraduate	Civil Engineering	EZ002CIV01	Y	N	N	Y	N

The following additional information will be required to accompany your application: detailed curriculum vitae including referee names and contact details; degree transcripts and certificates. Faxed or scanned copies of the application form or any other form are **NOT** accepted. You may need to submit specified documents with your application form. Please send copies and NOT originals. Copies must be certified by a Commissioner of Oaths. Any postmaster, police officer, advocate or attorney will certify copies for you. The Faculty will retain these copies. Please note that the university will not hesitate to prosecute anyone who submits forged documents.

➢ APPLICATION FEES

Applicants will be required to pay a non-refundable application fee.

- UCT students/graduates: nil
- Postgraduate applicants (SA and SADC region): R100
- Postgraduate applicants (outside SADC region): R300

The application fee may be paid by cheque, postal order, EFT or credit card. Cash payments may only be made to the Cashiers Office, Kramer Building, Middle Campus, UCT.

EFT Payments can be made into the following bank account:

Beneficiary:	University of Cape Town – No.1 Sundries Account
Bank:	Standard Bank SA Ltd
Branch:	Rondebosch, Western Cape
Branch Code:	025009
Account:	071053854
Swift Code:	SBZAZAJJ
Reference:	11196, applicant's name and surname e.g. *1196 Adam Eva Smith*

➢ INTERNATIONAL STUDENT FEES

International students from outside the SADC region must pay the full international term fee before registration. The International Academic Programmes Office (IAPO) will send you a fee invoice on request detailing the cost of your study for the duration of your stay. If you are a student from the SADC member countries*, you pay the local/South African fee. All non-South African students who qualify for local fee rates must pay the minimum initial payment of academic, residence and administrative service fee.

*The SADC countries are: Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Swaziland, Seychelles, South Africa, Tanzania, Zambia, and Zimbabwe.

➢ APPLICATION DEADLINES

31 October 2018 is the closing date for all programmes.

THE APPLICATION PROCESS

Applications cannot be amended once submitted. Should you wish to change your programme of study, or any other details, you will be required to contact the UCT Admissions Office on email: admissions@uct.ac.za

***Online applications*:** The following correspondence will be received within 48 hours:

- an application number which should be used in all future correspondence with UCT
- your unique log-in details to monitor your application through our self-service facilities
- further instructions which you will be required to follow carefully.

Application forms: The following correspondence will be posted to you within 7 days:

- an application number which should be used in all future correspondence with UCT
- your unique log-in details to monitor your application through our self-service facilities
- a data sheet, which contains the details of your application.

➢ INTERNATIONAL APPLICANTS

English language proficiency

The medium of instruction and examination at UCT is English. You must have attained proficiency in English. Visit toefl@ets.org or www.toefl.org for detailed information on requirements.

➢ STUDY VISAS

UCT's International Academic Programmes Office (IAPO) co-ordinates and facilitates internationally-related initiatives and activities at UCT. IAPO supports international students and facilitates your integration into the UCT environment. IAPO helps international students with queries relating to application procedures, application deadlines, visa requirements and international tuition fees.

In terms of the Immigration Act No 13 of 2002, if you are resident outside of South Africa and are not a South African citizen or do not have permanent residence, you are required to obtain a study visa to enter the Republic for the purpose of attending the University. The offer of a study place by the University does not bind the Department of Home Affairs in any way to allow you to study in South Africa, nor does it remove the need for you to obtain permission to enter the country. If you are offered a study place please apply immediately for a study visa. Your application must be made to the nearest South African Embassy, Consulate or High Commission. This procedure could take up to 8 weeks.

Please obtain further information and application guidelines from IAPO.

➢ FEES FOR 2018

Fee information can be accessed through the University of Cape Town's website: www.uct.ac.za/apply/fees/

Alternatively, contact the Fees Office on Tel: 021 -650 1704 or email: fnd-feeenq@uct.ac.za

Requests for pro-forma invoices are sent to the Fees Office. The following link can be used to access the form: www.uct.ac.za/downloads/uct.ac.za/apply/fees/proforma_invoice.pdf

➢ STUDENTS FROM SOUTH AFRICA AND SADC COUNTRIES

SADC Countries: Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Swaziland, South Africa, Tanzania, Zambia and Zimbabwe.

First year postgraduate students starting their studies in February/March must pay the initial instalment for tuition by 06 February 2018, unless they can provide the Fees Office with proof that they have

secured financial assistance from the UCT's Postgraduate Funding Office, or have a firm written commitment of a scholarship or bursary from a sponsor.

➢ INTERNATIONAL STUDENTS FROM NON-SADC COUNTRIES

Fees are to be settled in full prior to registration. An international academic fee will be charged to international students from non-SADC countries. For further details please refer to the Fees Handbook which can be access at www.uct.ac.za/apply/fees/

For further information and pro-forma invoices, please contact the International Academic Programmes Office:

Tel: 021 – 2822 or email: int-iapo@uct.ac.za

➢ STUDENT CARDS

New postgraduate students need to produce their Identity document to obtain an official student card bearing the student's details, student number and photograph from Campus Protection Services. Students must keep this card in order that it can be revalidated for use I the following year. A charge is levied for replacement of cards. Returning postgraduate student cards will be automatically reactivated once the registrations are processed.

➢ HANDBOOKS AND RULES

Candidates for postgraduate degrees must carefully read the appropriate degree/diploma rules set out in the Engineering Faculty Postgraduate Handbook as well as the General Rules and Policies (*Book 3*). These handbooks, including the Student Support and Services Handbook can be accessed at http://www.uct.ac.za/apply/handbooks/

➢ RENEWAL OF REGISTRATION

Each candidate is responsible for maintaining the continuity of his/her registration. Registration and curriculum forms for returning candidates are distributed by the Departments in January. Registration must be completed by end February each year, or if a candidate is taking first semester courses, by no later than the date the first course begins. A penalty fee of R2000 is charged for late registration. Candidates who for some reason do not receive their forms by end January are expected to follow up with the administrators in their departments.

➢ REGISTRATION FOR MASTER STUDENTS

Newly entering candidates who will be taking coursework as part of their programmes must register not later than the date on which their first course begins (there is a R2000 penalty for late registration). However, there is no specific date for first registration of newly entering postgraduates who are registering for a thesis, dissertation / project – commencement is by mutual arrangement with the supervisor.

Masters and PhD students who need to have the year of first registration counted as an academic year for their minimum period of registration must have been registered for the degree concerned by 30 April. Registration follows formal acceptance by the Faculty of an application for admission. Registration / provisional registration involves completion of 2 forms – a curriculum form and a registration form.

In the case of Master degrees, the Head of Department and supervisor must be satisfied that the student is equipped for Master degree study and has a suitable research topic before he/she is accepted and registered. Candidates should submit, via the proposed supervisor, a written proposal (as a guideline 6-10 pages) which outlines, *inter alia*

- The topic to be investigated
- familiarity with the central literature within the broad field of study
- Clarity on the research methods.

In terms of best practice, it is recommended that the proposal should be delivered to a departmental research seminar before the field or laboratory research process begins. Normally this would occur within 3 months after registration.

Wherever possible the supervisor should make every effort to ensure that all postgraduate students attend a formal research methods course. In the case of 120/60 credits research Masters degrees the above requirement should be covered in at least a 4-credit theory course which deals with generic research methods. This should form part of the necessary 60 theory credits.

If you are a new Master's student in 2018 taking the 120 credits dissertation option, it is compulsory that you register for the dissertation preparation (CIV5109Z) course plus your coursework. In 2019 you will register for the 120 credit dissertation course.

➢ REGISTRATION FOR PhD STUDENTS

The procedure with regard to PhD students is that initially they register provisionally until their research proposals have been formally approved by the Doctoral Degrees Board. The approval procedure requires the candidate to present a seminar, based on a written research proposal, to departmental staff, other postgraduate students and others with specialist knowledge in the field of study, which demonstrates, *interalia*, that:

- The candidate is familiar with the main literature in the field
- There is sufficient scope in the topic for a PhD and there is a clear definition of the hypotheses proposed
- The candidate has the ability to undertake the work
- The potential contribution to knowledge has been identified and there is a clear definition of the key questions to be addressed in the context of the proposed hypotheses
- The method of research is sound and achievable and there is a clear knowledge of the experimental procedures to be used and the methodology to be pursued in analysing the results.

This should be done within 6 (six) months of first registration. The Head of Department then convenes a panel to confirm or reject the candidature and to confirm that:

- The supervisor has the knowledge to undertake the supervisory task (the unwavering rule must be that if there is not sufficient specialist knowledge within the department in that field, the candidate should not be accepted)
- The supervisor has sufficient time to undertake the supervisory role adequately (the Head must specifically address issues of equity and balance in teaching loads at this point).

If the panel is satisfied on these issues, the Head recommends acceptance to the Faculty's Committee of Assessors (COA) and then to the Doctoral Degrees Board (DDB) for final approval. In the event of a

seminar being impossible, for logistical or other good reasons, the candidate must produce a major paper which can then be evaluated in the same way.

➢ UPGRADING TO PhD

It is possible to change the status of registration during the process of study. Thus, it is possible for a Master degree to be upgraded to a PhD if the supervisor believes there is potential in the process to lead to a higher qualification. This would normally occur in the second year of the research process. It is not possible to backdate registration to the first year. However, it must occur well before the dissertation is examined: it is not possible to use the work of the Master degree towards a PhD after the examination process. Similarly, it is possible to downgrade from a PhD to a Master degree. Again, however, this must occur before examination. It is not possible for a Master degree to result from a failed PhD. It is the responsibility of the supervisor, with the endorsement by the Head of Department, to motivate the upgrade in writing.

➢ PROCEDURE FOR CHANGING CURRICULUM

If, after registration as a postgraduate, a candidate wishes to add any courses to his/her curriculum or withdraw from any courses it is essential that the prescribed change of curriculum form be completed and submitted to the Head of Department before the specified closing date. The closing dates for curriculum changes are published in the handbook *General Rules and Policies,* a copy of which is obtainable from the Faculty Office or the Department, on request or in the *Fees Handbook*.

Candidates are responsible for regularly checking their curricula and reporting any anomalies to the Faculty Office (Postgraduate Officer on Tel No. 650 5860 or email: Kawai.Ho@uct.ac.za

➢ LEAVE OF ABSENCE OR CANCELLATION/DISCONTINUATION OF STUDIES

If you are a registered student at UCT and it is impossible for you to continue with your studies/research in the current year but you intend continuing in the following year, you must apply for leave of absence, by completing the Leave of Absence form which must be submitted to Faculty of Engineering & the Built Environment, sent via email to Kawai.Ho@uct.ac.za.

An additional letter of motivation should include: your address, name, surname, student no., your reasons, the period for the leave of absence (i.e. whole year, 1st semester. (Jan – Jun) or 2nd semester (Jul – Dec), the name of your supervisor and what your intentions are when you return from the leave of absence. However, you should note it is the policy of the Faculty that leave of absence is not granted for more than two years. Applications for the grant of leave of absence retrospectively will not be accepted. For a candidate to be considered, if eligible, for a refund of fees already paid, application for leave of absence must be made before the deadline dates specified in the Fees Handbook (obtainable at www.uct.ac.za/apply/fees/

➢ CANCELLATION/DISCONTINUATION OF STUDIES

A candidate who wishes to discontinue his/her studies and not return, must complete a Cancellation of Registration form obtainable from http://www.uct.ac.za/downloads/uct.ac.za/currentstud/undergrad/cancelregistration.pdf before the set deadline date (refer to the Fees Handbook for information on these dates and on eligibility for refunds). This form must be completed and submitted to the Faculty Office with his/her student card. This is of

critical importance because if a candidate leaves without cancelling he/she will still be liable for fees that are payable. Applications for retrospective cancellation of registration will not be accepted. There are specified dates after which a cancellation cannot be accepted or any fees refunded (details are in the Fees Handbook).

➢ SELECTING A SUPERVISOR

Once students have decided on the broad research area in which they wish to work, it is necessary to identify a supervisor. Save in exceptional circumstances, the principal supervisor must be a full-time member of the academic staff or a person who has been accredited by the Faculty's Postgraduate Planning & Administration Committee for supervisory purposes. Co-supervision by persons within or without the University is a possibility, but a person employed outside of the University may not act as principal supervisor. Student-supervisor relationships are normally established through one of four processes:

- The prospective student directly approaches a staff member
- The prospective student approaches the Head of Department who will suggest a supervisor
- The prospective student approaches the head of a research unit working in the broad field of interest who will suggest a supervisor
- A staff member (usually with access to research funding) will approach the student, in order to encourage the student to undertake research in the staff member's area of research interest.

In the final instance, however, the Department allocates supervisors to students: the students do not select their own supervisor. It is an important function of the Head of Department to satisfy him/herself that the proposed supervisor has adequate knowledge and time to do the job properly. In the case of Doctoral candidates, the Doctoral Degrees Board is also charged with satisfying itself about the adequacy of the supervisor. Academic staff who do not have a PhD, will not normally supervise PhD degrees. In some cases, people who are experts in their fields and who do not have a PhD are suitable for supervision. In these cases, the Department must secure formal accreditation to act as a PhD supervisor from the Faculty's Postgraduate Planning and Administration Committee.

Staff members should not accept the responsibility of supervision unless they have knowledge in the direct research area or if their workload is too heavy for them to discharge their supervisory duties satisfactorily. As a general guideline, no member of staff should supervise more than 8 postgraduate students at any point in time. Heads of Departments should review workloads annually to ensure a balance is maintained. For information on research areas offered in the various departments, please go to www.ebe.uct.ac.za

➢ SELECTING A TOPIC

The selection of a topic for research may occur in two ways. Particularly in cases where the supervisor is part of an active research group, students may be invited to work on a topic identified by the supervisor. In other cases, the topic will be identified by the candidate. In all cases, however, it is the responsibility of the candidate to select the final topic. This identification and selection is seen as an important part of the research process.

➢ MoU BETWEEN POSTGRADUATE STUDENTS AND SUPERVISOR

In the case of PhD registration the University has introduced a Memorandum of Understanding (MoU) to be signed in the first year of registration by both supervisor and candidate, clarifying issues relating

to relative roles and responsibilities, timing, funding (if appropriate) and intellectual property. The University has produced a generic model of the agreement, but faculty-specific versions are allowed, with the approval of the University.

Before the start of the second and subsequent years of registration, a supplement to the MOU, consisting of two schedules (candidates' plan of work for the year (schedule 2) and budgets and outputs (schedule 3) should be signed by both the candidate and supervisor. This process represents an annual review of progress and should preferably be undertaken at the end of each academic year. If in the opinion of the supervisor, adequate progress is not being made, the MOU should clearly lay down criteria (such as submission dates and milestones) against which further progress shall be measured). If progress continues to be unsatisfactory, the Doctoral Degrees Board may refuse re-registration. In the case of a Masters degree, an MoU will also be required. A lack of progress should be formally documented and milestones set.

➢ FACULTY BEST PRACTICE WITH RESPECT TO ROLES AND RESPONSIBILITIES

Responsibility of the student:

- To accept that the primary responsibility for his/her education rests with the student.
- To demonstrate a reasonable work ethic and to make every effort to meet the normal throughput rate (2 years for a Masters student, 4 years for a PhD student).
- To share ideas and to work collegially.
- To participate in and to contribute to the life of the department.
- To assist in the mentoring and orientation of fellow students from outside Cape Town.
- To commit to co-publication with the supervisor.
- To commit to constructive feedback at the end of the process.
- To familiarise him/herself with the University rules, particularly with regard to plagiarism, and to commit to respecting those rules.

Responsibility of the Supervisor:

- To provide quality supervision on a regular basis (as a guideline, a minimum of one hour per week).
- To respond timeously to the submission of written work requiring feedback.
- To arrange for a suitable replacement if the supervisor has to be absent for a lengthy period of time (more than three weeks).
- To refrain from any form of sexual harassment.
- To treat the student with unfailing respect and politeness.
- To integrate the student into the academic life of the department. This should include the following:

    - Whenever possible, providing an opportunity for the student to teach undergraduate students in the candidate's area of growing expertise.
    - To organise a seminar by the student, involving staff and senior students in the Department. As a guideline each student should give one seminar a year with the first seminar to be delivered once the student's research proposal has been developed to the satisfaction of the supervisor. A seminar should also be delivered within 4 months of the final write up of the thesis / dissertation. These sessions should be used by the head or postgraduate programme convenor to monitor the progress of each student.

- To facilitate postgraduate students, on a voluntary basis, playing a mentoring role to undergraduate students - part of this function could include the early identification of serious stress and referral to appropriate forms of assistance.
- To assist in the incorporation of the student into the social life of the department.

➢ APPEALS

The relationship between supervisor and postgraduate student is an important one: if it is unsatisfactory it can significantly and negatively impact on the educational experience. If serious problems develop in this relationship, the student should normally:

- Raise the matter with the supervisor and seek to resolve the matter personally.
- If this does not resolve the matter, the problem should be referred to the Head of Department. If the supervisor is the Head, it should be referred directly to the Deputy-Dean charged with Postgraduate Affairs.
- If the supervisor is the Dean or a Deputy Dean, the matter should be referred to the Deputy Vice-Chancellor with the research portfolio.

➢ SUPERVISION AND ATTENDANCE AT THE UNIVERSITY

During the period of his /her registration, a higher degree candidate will be expected to be available to attend at the University for discussion with his/her supervisor. For persons who are not on Campus or who are based outside Cape Town the general rule for PhD candidates for many years has been that a supervisor may require one year of attendance during the total period of registration for the degree. For Master candidates the guideline has been one month per annum of attendance while registered for the degree. Nowadays, given the ease of communication by means of fax or email, a supervisor may at his/her discretion modify the attendance requirement. However, a candidate must be prepared to make him/herself available for discussion at the University if required.

➢ ETHICS

The issues of ethics and intellectual honesty are vital to university life. The Faculty takes the issue of ethics in research very seriously and to this end has established a Faculty Ethics Committee. Students are required to apply for ethics approval through the following link: https://universityofcapetown.submittable.com

The terms of reference of this Ethics Committee are to:

- take steps to ensure the highest ethical standards in research by members of the Faculty;
- raise the consciousness of members of the Faculty (staff and students) regarding ethical standards in research;
- review, in terms of ethical considerations, research applications submitted by members of the Faculty, student research, contract research and research activities undertaken by individual staff members. (details of how this will be done were under consideration at the time this booklet was sent to the printers);
- raise the consciousness of the Faculty student body regarding plagiarism;
- promote the education of the Faculty student body regarding proper and appropriate styles of referencing cited work;
- provide assistance, upon request, to Heads of Department within the Faculty on matters relating to ethics in research;

- further the aims and objectives of the University Ethics in Research Committee insofar as they are applicable to research undertaken within the Faculty.

The EBE Research Based Education Handbook can be accessed via the following link: http://www.ebe.uct.ac.za/sites/default/files/image_tool/images/50/2014%20EBE%20RESEARCH-BASED%20EDUCATION%20HANDBOOK_0.pdf

The Ethics in Research Handbook can be accessed via the following link: http://www.ebe.uct.ac.za/sites/default/files/image_tool/images/50/ethics%20handbook.pdf

➢ PLAGIARISM

In academic work, researchers build on the ideas of others. This is a legitimate and accepted way of doing research. Plagiarism is using someone else's ideas or words and presenting them as if they are your own. It is therefore a form of academic cheating, stealing or deception. Because plagiarism is an offence, all universities take a very serious view of anyone who is found cheating. Those who are suspected of having plagiarised, will be referred to the Vice-Chancellor or nominee for possible disciplinary action in terms of the rules on disciplinary jurisdiction and procedures (DJP1.1).

Not all plagiarism is deliberate, but even inadvertent plagiarism will be severely penalized. It is therefore your responsibility to know what will be regarded as plagiarism and to know how to avoid it.

A particular (and unfortunately growing) ethical issue is that of plagiarism. Plagiarism, in essence, is passing off someone else's work as your own: it results from inadequately acknowledging sources of data, analyses and ideas. It is dishonest and it has no place at a university. If students are in any doubt on issues relating to plagiarism, they must consult their supervisor or the Ethics Committee. Instances of plagiarism will be taken to the University Court and may have very serious consequences, including rustication or even expulsion.

All Master candidates, at the same time of submission, are required to make a declaration, which should be included in the dissertation stating: "I know the meaning of plagiarism and declare that all of the work in the document, save for that which is properly acknowledged, is my own".

If in any doubt regarding ethical issues relating to research, seek advice from your supervisor or Head of Department.

➢ PRESENTATION AND SUBMISSION OF DISSERTATION

At the conclusion of research, the candidate shall submit a dissertation or thesis for examination. This normally occurs after receiving an indication from the supervisor that the product is in a form which is acceptable for submission. However, a candidate is not debarred from submission without the supervisor's approval.

If a candidate intends submitting a Masters dissertation for examination he/she must inform the Faculty Office by submitting the completed 'intention to submit' form. The supervisor will then be asked by the Faculty Office to fill in an 'appointment of examiners' form on which recommendations on external examiners are made. If submitting a PhD thesis, the candidate must inform the Doctoral Degrees Board Officer (Bremner Building) by submitting the completed intention to submit form.

The final dates for submission of the 'Intention to Submit' for the purpose of graduation are:

- for Master candidates: 16 July for persons hoping to graduate in December
- for PhD candidates: 20 June for persons hoping to graduate in December.

The dates for submission of Dissertations and Theses are;

- for Masters candidates: 16 February for persons hoping to graduate in April; 31 August for persons hoping to graduate in December
- for PhD candidates: 15 August hoping to graduate in December.

All candidates submitting a thesis/dissertation, including candidates who submit a dissertation or a thesis before the beginning of the academic year or during the first quarter, must complete registration forms. If the thesis/dissertation is submitted before the first day of the academic year no fee is payable. If submitted after the first day of the first quarter or after the first day of the second quarter (up to the beginning of the second semester) a pro-rata fee may be rebated, depending on the date of submission, and at the request of the student. However, this will result in the termination of access to the UCT network and other infrastructure. In most cases a full year will be payable.

Please note that where a student is required to revise and resubmit a dissertation/thesis the student is required to re-register at the date of the letter of notification of the result, and the appropriate academic fee will apply. Further information can be found at:
http://www.uct.ac.za/students/postgraduates/fees/handbook/

➢ MASTER PAPER REQUIREMENT

This applies to students registered in his/her final year who will be submitting a 120cr/180cr dissertation. It is most important that candidates refer to the EBE Faculty Handbook, the Research Based Education for Masters and PhD booklet and consult their supervisors regarding this requirement. Deadline is 30 April (June graduation) and 30 September (December graduation).

➢ POSTGRADUATE FUNDING OFFICE

Postgraduate funding applications should be completed as part of the application for admission to UCT. Funding applications can be found on the Postgraduate Funding Office Website:
http://www.uct.ac.za/apply/funding/postgraduate/applications/

The closing date for South African applications is **31 October 2018**

A limited number of scholarships are available for international and refugee students. UCT international and refugee students' scholarships are not full cost awards. Before applying to the Postgraduate Funding Office for funding, the UCT application form needs to be submitted. Application form 10C needs to completed and returned to the Postgraduate Centre and Funding Office by 31 July 2015.

➢ EBE FACULTY INTERNATIONAL POSTGRADUATE ACADEMIC SCHOLARSHIPS

The Faculty offers a generous system of international scholarships to encourage student diversity. The scholarships are awarded to first time registering postgraduates on the basis of academic merit. The award is granted for one academic year at a time. Application forms are available from the PG Officer in the EBE Faculty Office. All applications must be accompanied by recommendation from the head of

the recipient's host department and the supervisor. Applications are considered by a panel of senior Faculty academics who make a recommendation to the Dean for final decision. Applications for renewal must be submitted by letter from the student together with a progress report signed by the Supervisor by not later than 30th November of each year.

➢ EBE FACULTY INTERNATIONAL STUDENT BURSARIES

Applications may be made to have the International registration fee reduced to the level of local fees, on the grounds of proven financial hardship. Application must be made through the EBE Faculty Office to the Deputy Dean charged with this portfolio. The forms are available from the Faculty Office as well as the departments. The following students are exempt from paying the international fee and would therefore not be eligible to apply for this bursary:

- Students from SADC countries
- Research Masters students (180 credit dissertations)
- Doctoral Students

Please note that all international students are required to pay an administrative service fee that is not covered by the bursary. Please consult the Student Fees handbook (Book 12 in the University series of handbooks).

SUPPORT STRUCTURES AND SERVICES AT UCT

Student Support and Services handbook can be downloaded at: http://www.uct.ac.za/downloads/uct.ac.za/apply/handbooks/Handbook5StudentSupportServices2014.pdf

➢ FINANCIAL ASSISTANCE AND STUDENT ACCOMMODATION

Limited financial support is available I the form of scholarships, bursaries and student loans. Certain awards are granted exclusively on academic merit, while others take financial need into account. For information on various forms of postgraduate financial assistance offered, please contact the Postgraduate Funding Office, Otto Beit Building, Upper Campus, Tel: 021- 650 2206 or email: pgfunding@uct.ac.za

➢ STUDENT HOUSING OFFICE (UCT RESIDENCE ACCOMMODATION)

Please refer to the link below with regards to the Student housing policy:
https://www.uct.ac.za/downloads/uct.ac.za/about/policies/student_housing_policy_2015.pdf

Many students who fail to secure student accommodation or are in their second or subsequent years of study stay in leased or private accommodation close to UCT. UCT has Off Campus Student Accommodation Services (OCSAS) that advertises vacancies in private accommodation. For more information go to the OCSAS website: http://www.accommodation.uct.ac.za/ocsas/about/

➢ LIBRARIES

UCT Libraries offer state-of-the-art technology, vast collections of reading and research material, and the specialized services of friendly, efficient, and helpful staff.

In keeping with its central role in the academic life of the university, the Chancellor Oppenheimer Library lies at the heart of Upper Campus, while its eight branch libraries are set in locations convenient to the faculties. The Libraries house more than 1.2 million print volumes, while their "virtual" presence—consisting of bibliographic and full-text databases, electronic books and journals, and a growing institutional digital repository—may be accessed via the Libraries' web site, both on and off campus. For more detailed information, and access to the Libraries' resources, visit http://www.lib.uct.ac.za/

➢ UCT WRITING CENTRE

The UCT Writing Centre supports postgraduate students from all faculties of the university with their writing of research. The Centre focuses on the structures and processes of academic writing. Its four interventions include:

- One on one consultations
- Writers circles
- Taught Masters courses
- Seminars and workshops

The Writing Centre is located in the Hlanganani Building, Level 6, Upper Campus. Visit the website for more information: http://www.writingcentre.uct.ac.za

➢ CAMPUS PROTECTION SERVICES (CPS)

Campus Protection Services (CPS) provides a 24-hour security service for students.

Telephones of satellite offices:

- 021 650-2222/3 – Main Office
- 021 650-2121/4080 – Upper Campus
- 021 650-3022/5759 – Kramer Building
- 021 650-2120 – Bremner Building
- 021 406-6100/6109 – Medical School
- 021 480-7101 – Hiddingh Campus
- 021 650-3856 – Forest Hill
- 021 650-3996/4357 – Access Control
- 021 650-4429 (Crime Reporting Hotline)

➢ JAMMIE SHUTTLE

Timetables and route maps are available on the UCT website at:
http://www.uct.ac.za/students/services/jammie/maps/

The Jammie Shuttle service is only available to the UCT Community, therefore passengers are assured of safe, friendly, clean and comfortable transport at all times. The buses are environmentally friendly and equipped to cater for sight and hearing-impaired students.

➢ PARKING

Location: P&S Building (off Ring Road) *Phone: Administration Office:* 021 3640/3312

Students, from their second year onwards, may park on campus in unmarked bays for students. Bays for disabled students can be obtained through the Disability Unit. (*A valid doctor's certificate is required*.) The parking areas that you are allowed to use are indicated on the parking disc, which is purchased from the Traffic
Administration Office after you have registered. Cash, credit card and debit card may purchase parking discs only. Information on set of student traffic rules is available at the Traffic Administration Office.

➢ STUDENT WELLNESS

Location: Ivan Toms Building, 28 Rhodes Avenue, Mowbray

Telephone: (021) 650-1020 (health appointments); (021) 650-1017 (counselling appointments)

Clinic Hours: Mon – Wed; 08h30 – 16h30 Thurs 09h30 – 16h30 Fri 08h30 – 16h30

Fulltime students are entitled to use the University's facilities for medical consultations. Students not receiving financial aid pay medical aid rates for consultations, but certain services are free.

➢ STUDENT DOCUMENT CENTRE (PHOTOCOPYING AND PRINTING)

Location: Chancellor Oppenheimer Building, Upper Campus *Phone:* 021 650-3372/3124

Hours: Term:
08h00 - 18h30 Mondays – Fridays
09h00 - 17h00 Saturdays
Hours: UCT Student Holidays:
08h00 - 16h00 Mondays – Friday;
Closed Saturdays

Services provided include desktop editing, digital printing, Litho printing, colour copying, course readers, One Step mailing, punching/drill, business cards, letterheads and complement slips, specialised printing, laminating, book binding, scanning, collating, stapling and much more. Money is credited to the student card
which can then be used at photocopying machines at any library on campus. Binding of books, theses, etc. can also be done through the Chancellor Oppenheimer Student Document Centre, Upper Campus.

For more information or details, visit our website or contact us.

Department of Civil Engineering
civil.uct.ac.za/postgraduate-programmes
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