

# University of Pretoria Yearbook 2019

## MSc Forest Management and the Environment (Coursework) (02250415)

**Minimum duration of study** 2 years

**Total credits** 180

### Programme information

The Centre for Environmental Studies is a graduate school for multidisciplinary training and research focusing on the environment. Training aims to satisfy the need for environmental professionals for implementing current environmental legislation as well as industry-driven environmental management systems.

This programme is coordinated by the Department of Plant and Soil Science.

The purpose of this option is to equip graduates with a biological and/or agricultural background to specialise further to obtain skills in environmental management and in sustainable forest resource use and management. On completion of the training, candidates should be conversant with the multifunctional nature of the forest resource base and be equipped to render advice concerning forest resource use and management with an understanding of the environmental consequences associated with exploitative use of natural resources. This includes grounding in forest resource use and management, including yield regulations in natural and commercial forest systems, participatory approaches to natural resource management, ecosystem structure, composition and function, ecosystem services, notions of ecosystem health, control of invasive species and community restoration, understanding of local communities, forestry and rural development, participatory planning and monitoring, the forest harvesting schedules and logistics, non-timber forest products, the science of wood and forest wood products utilisation, understanding of the basic economics of natural resources and social development and planning.

The MSc degree is conferred on the grounds of a dissertation and such additional postgraduate coursework as may be prescribed.

### Renewal of registration

As long as progress is satisfactory, renewal of the registration of a master's student will be accepted for the second year of the study. Registration for a third and subsequent years will only take place when the Student Administration of the Faculty receives a written motivation that is supported by the relevant head of department and Postgraduate Studies Committee.

### General

Candidates are required to familiarise themselves with the General Regulations regarding the maximum period of registration and the requirements on the submission of a draft article for publication.

## Admission requirements

- Candidates must have either a three-year BSc and a BScHons or a four-year degree qualification in agricultural forestry or biological sciences. Admission is subject to the approval of the Forestry Chair in consultation with the Director of the Centre for Environmental Studies.
- Candidates must demonstrate proficiency in the English language up to the level required by either the TOEFL test ([www.ets.org/toefl](http://www.ets.org/toefl)) or the IELTS language proficiency test ([www.ielts.org](http://www.ielts.org)).
- Admission is additionally dependent on availability of supervisor/s and/or projects within the department.

## Promotion to next study year

The progress of all master's candidates is monitored biannually by the supervisor and the postgraduate coordinator. A candidate's study may be terminated if the progress is unsatisfactory or if the candidate is unable to finish his/her studies during the prescribed period.

Subject to exceptions approved by the Dean, on recommendation of the relevant head of department, and where applicable, a student may not enter for the master's examination in the same module more than twice.

## Pass with distinction

The MSc degree is conferred with distinction to candidates who obtain a final average mark of at least 75% and a mark of at least 75% for the dissertation/mini-dissertation from each of the members of the examination panel. Where a member of the examination panel awards a mark of less than 75% for the dissertation/mini-dissertation, that member of the examination panel must offer, in writing, support for his/her decision, or indicate in writing that he/she supports the examination committee's decision to confer the degree with distinction.

## Curriculum: Year 1

### Programme information:

Minimum credits: 180

Core credits: 135

Elective credits: 45

## Core modules

### Environmental paradigms 810 (ENV 810)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 5 discussion classes per week

**Language of tuition** Module is presented in English

**Department** Zoology and Entomology

**Period of presentation** Semester 1

#### Module content

Environmental philosophy and ethics, environmental ecology, environment, society and development, environmental economics, environmental management, critical resources management: water utilisation, air quality control, land-use planning: soil characteristics, biodiversity planning, critical resource management: determinism vs co-evolutionary environmental frameworks, research methodology and practice.

### Environmental law 816 (ENV 816)

**Module credits** 15.00

**Service modules** Faculty of Law

**Prerequisites** No prerequisites.

**Contact time** 1 web-based period per week, 1 lecture per week, 2 practicals per week

**Language of tuition** Module is presented in English

**Department** Zoology and Entomology

**Period of presentation** Semester 1 or Semester 2

#### Module content

Legislation for sustainable development within the framework of international agreements, the different acts affecting water quality and water use, the SEMAs within the NEMA framework, the NEMA EIA regulations, legislation pertaining to hazardous substances, interaction between mining development and NEMA, energy law, strategic environmental legislation, marine and coastal management.

### Mini-dissertation 891 (ENV 891)

**Module credits** 90.00

<b>Prerequisites</b>	No prerequisites.
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Zoology and Entomology
<b>Period of presentation</b>	Year

#### Module content

The student needs to conduct a research project under the supervision of an academic member of staff associated with the Centre for Environmental Studies. This project needs to be of a sufficient quality to be publishable in the open scientific literature. The research report is examined as a manuscript for a suitable journal.

### General introduction to forestry 831 (FOR 831)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	20 discussion classes per block, 1 web-based period per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1

#### Module content

What is forestry? Global forest resources. Natural forests and plantations in Southern Africa. Forestry systems (natural, multipurpose forests, plantation forestry, agroforestry). Sustainable forestry development policy and legislation. Silviculture and management of plantations. Forest certification. Effects of site and silviculture on wood quality. Forest harvesting, utilisation and forest wood products. Non-timber forest products of natural and plantation forests. Forests and woodlands management (forest planning; forest mensuration, growth and yield estimates and regulation). Environmental management of natural and plantation forests. Forestry research. Human resource management in forestry. This module will also have a field practical expedition to introduce students to the field experience.

### Elective modules

#### Strategic environmental management 822 (ENS 822)

<b>Module credits</b>	15.00
<b>Service modules</b>	Faculty of Law
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 discussion classes per week, 5 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Year

## Module content

Strategic environmental planning: introduction, objectives and principles; levels; South African overview; guidelines: national and international; strategy and management; structure, strategy and agency; South African guidelines; diagnostic tools; RESP analysis; strategic resource planning; applications, implementation and control; development and policy implementation; South African environmental policy; evaluation frameworks; portfolio analysis; competitive forces; alliances; business benefits; intangibles, survival and catalytic contributions; South African legislation and regulations.

## Environment and land reform 823 (ENS 823)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Language of tuition** Module is presented in English

**Department** Geography Geoinformatics and Meteorology

**Period of presentation** Year

## Module content

The need and purpose of land reform in South Africa and its contribution towards sustainable social-environmental interaction. An overview of the global variety of land tenure systems, and tenure reform programmes in other countries. Overview of previous systems of land tenure in South Africa. Land reform policy in South Africa: restitution, redistribution, and tenure reform. Critical assessment of progress in terms of land reform objectives. Evaluation of the contribution of the South African land reform programme towards creating sustainable environments.

## International environmental management systems 822 (ENV 822)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 20 lectures over a period of 1 week

**Language of tuition** Module is presented in English

**Department** Zoology and Entomology

**Period of presentation** Semester 2

## Module content

The ISO framework, environmental risks and opportunities for companies, global environmental concerns, environmental legislation, identification of environmental impacts, environmental certification and auditing, follow-up activities, the Forestry Stewardship Council framework, chain of custody requirements, production standards, FSC reporting.

(\*\* additional costs involved for international UK certificate)

## Trees in a multifunctional landscape 833 (ENV 833)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 1 web-based period per week, 5 discussion classes per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Quarter 3

#### Module content

Place and role of trees in multifunctional rural landscapes. Trees outside forests. Multipurpose trees. Trees and biodiversity. Trees and environmental services. Trees and sustainable development. Domesticated forests. Agroforestry (definition, classification, challenges and examples). Multiple use of forests and trees. Non-timber tree and forest products. Domestication of multipurpose trees. Forests and people. Trees and agricultural production systems (yield, interactions, synergy, competition, pests and diseases). Case-study examples from sub-Saharan Africa.

### Forest resource use planning and management 832 (FOR 832)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 20 discussion classes per block, 1 web-based period per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

#### Module content

Forest planning. Forest mensuration. Growth and yield models and its application in growth and yield simulators. Quantitative silviculture. Yield regulation and forest economics. GIS and spatial analysis in forestry.

### Forest engineering 833 (FOR 833)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 20 discussion classes per block, 1 web-based period per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 2

#### Module content

Forest road engineering. Forest road system management. Forest operations analysis. Production planning. Strategic and tactical planning techniques. Forest operations design. Forest transportation systems. Harvesting management. Logging mechanics.

### Wood science and forest products 834 (FOR 834)

**Module credits** 15.00

<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	20 discussion classes per block, 1 web-based period per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

#### Module content

Common characteristics of wood. Properties controlling the technical performance of wood. Natural growth phenomena affecting wood quality. Effect of site and silviculture on wood quality. The genetics of wood. Sawmilling and wood drying. Composite wood products. Deterioration of wood and wood products and methods of protection.

### Forest ecology and management 835 (FOR 835)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	20 discussion classes per block, 1 web-based period per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

#### Module content

Structure and function of natural forests, species composition and diversity, disturbance processes and regimes, recovery (succession) concepts and theory, biodiversity in forest ecosystems, energy and nutrient flux in natural forest ecosystems. Resource assessment and planning. Silvicultural systems and management of natural forests (and woodlands), natural regeneration and forest rehabilitation management for sustainability of natural forest ecosystems: multiple use for timber and non-timber forest products, forest rehabilitation (invader plants, mining, degraded forests).

### Silviculture 836 (FOR 836)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	20 discussion classes per week, 1 web-based period per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1

## Module content

Understand the development of modern plantation forestry. Commercial plantation species. Forest pests and diseases. Forestry site classification. Basis of forestry rotation length (economics, biological, wood quality). Effect of silvicultural practices on wood quality (managing wood quality). Forestry management regimes for different species and end products. Pros and cons of plantation forestry on the environment. Fire management. Propagation techniques for forestry systems and bio-renewable resources, ecological basis of silviculture and fire management systems.

## Forest resource economics and policy 831 (LEK 831)

<b>Module credits</b>	20.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 lectures per week, 1 discussion class per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

## Module content

The economics of optimal management of cultivated and natural forests. Optimal rotation age and harvesting in timber production. Managing forest for their non-timber services. The multiple ecosystem services of forest and their contributions to human wellbeing. Economic valuation of the services of forest ecosystems. Forest resource rents and their capture and distribution under different property rights regimes. Regulation and taxation of forest users. Designing logging concessions and forest exploitation policies. Forest resource accounting and optimal management of the resource rents. Communities and forests. Case study examples from Sub-Saharan Africa.

## Environmental change 881 (OMS 881)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	No prerequisites.
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Year

## Module content

This module involves the study of the causes and consequences of environmental change from multidisciplinary perspectives. A focus of this course is human environmental interactions. Past processes leading to environmental change will also be discussed. In a given period, the following will be investigated: principles of environmental change, causes and consequences of environmental change, Global warming and climate change: causes and impacts of climate change on natural resources; water, forests, biodiversity, land use and land cover change, environmental/Climate change and infectious disease, human dimensions of global change and Climate change political responses including the Kyoto protocol. Mitigation and adaptation strategies to climate change and effects of Climate change on sustainable development.



## Curriculum: Final year

### Core modules

#### Environmental paradigms 810 (ENV 810)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	5 discussion classes per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Zoology and Entomology
<b>Period of presentation</b>	Semester 1

##### Module content

Environmental philosophy and ethics, environmental ecology, environment, society and development, environmental economics, environmental management, critical resources management: water utilisation, air quality control, land-use planning: soil characteristics, biodiversity planning, critical resource management: determinism vs co-evolutionary environmental frameworks, research methodology and practice.

#### Environmental law 816 (ENV 816)

<b>Module credits</b>	15.00
<b>Service modules</b>	Faculty of Law
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 web-based period per week, 1 lecture per week, 2 practicals per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Zoology and Entomology
<b>Period of presentation</b>	Semester 1 or Semester 2

##### Module content

Legislation for sustainable development within the framework of international agreements, the different acts affecting water quality and water use, the SEMAs within the NEMA framework, the NEMA EIA regulations, legislation pertaining to hazardous substances, interaction between mining development and NEMA, energy law, strategic environmental legislation, marine and coastal management.

#### Mini-dissertation 891 (ENV 891)

<b>Module credits</b>	90.00
<b>Prerequisites</b>	No prerequisites.
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Zoology and Entomology
<b>Period of presentation</b>	Year

## Module content

The student needs to conduct a research project under the supervision of an academic member of staff associated with the Centre for Environmental Studies. This project needs to be of a sufficient quality to be publishable in the open scientific literature. The research report is examined as a manuscript for a suitable journal.

## General introduction to forestry 831 (FOR 831)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 20 discussion classes per block, 1 web-based period per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

## Module content

What is forestry? Global forest resources. Natural forests and plantations in Southern Africa. Forestry systems (natural, multipurpose forests, plantation forestry, agroforestry). Sustainable forestry development policy and legislation. Silviculture and management of plantations. Forest certification. Effects of site and silviculture on wood quality. Forest harvesting, utilisation and forest wood products. Non-timber forest products of natural and plantation forests. Forests and woodlands management (forest planning; forest mensuration, growth and yield estimates and regulation). Environmental management of natural and plantation forests. Forestry research. Human resource management in forestry. This module will also have a field practical expedition to introduce students to the field experience.

## Elective modules

### Strategic environmental management 822 (ENS 822)

**Module credits** 15.00

**Service modules** Faculty of Law

**Prerequisites** No prerequisites.

**Contact time** 2 discussion classes per week, 5 lectures per week

**Language of tuition** Module is presented in English

**Department** Geography Geoinformatics and Meteorology

**Period of presentation** Year

## Module content

Strategic environmental planning: introduction, objectives and principles; levels; South African overview; guidelines: national and international; strategy and management; structure, strategy and agency; South African guidelines; diagnostic tools; RESP analysis; strategic resource planning; applications, implementation and control; development and policy implementation; South African environmental policy; evaluation frameworks; portfolio analysis; competitive forces; alliances; business benefits; intangibles, survival and catalytic contributions; South African legislation and regulations.

## Environment and land reform 823 (ENS 823)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	No prerequisites.
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Year

### Module content

The need and purpose of land reform in South Africa and its contribution towards sustainable social-environmental interaction. An overview of the global variety of land tenure systems, and tenure reform programmes in other countries. Overview of previous systems of land tenure in South Africa. Land reform policy in South Africa: restitution, redistribution, and tenure reform. Critical assessment of progress in terms of land reform objectives. Evaluation of the contribution of the South African land reform programme towards creating sustainable environments.

## International environmental management systems 822 (ENV 822)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	20 lectures over a period of 1 week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Zoology and Entomology
<b>Period of presentation</b>	Semester 2

### Module content

The ISO framework, environmental risks and opportunities for companies, global environmental concerns, environmental legislation, identification of environmental impacts, environmental certification and auditing, follow-up activities, the Forestry Stewardship Council framework, chain of custody requirements, production standards, FSC reporting.

(\*\* additional costs involved for international UK certificate)

## Trees in a multifunctional landscape 833 (ENV 833)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 web-based period per week, 5 discussion classes per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Quarter 3

## Module content

Place and role of trees in multifunctional rural landscapes. Trees outside forests. Multipurpose trees. Trees and biodiversity. Trees and environmental services. Trees and sustainable development. Domesticated forests. Agroforestry (definition, classification, challenges and examples). Multiple use of forests and trees. Non-timber tree and forest products. Domestication of multipurpose trees. Forests and people. Trees and agricultural production systems (yield, interactions, synergy, competition, pests and diseases). Case-study examples from sub-Saharan Africa.

## Forest resource use planning and management 832 (FOR 832)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 20 discussion classes per block, 1 web-based period per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

## Module content

Forest planning. Forest mensuration. Growth and yield models and its application in growth and yield simulators. Quantitative silviculture. Yield regulation and forest economics. GIS and spatial analysis in forestry.

## Forest engineering 833 (FOR 833)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 20 discussion classes per block, 1 web-based period per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 2

## Module content

Forest road engineering. Forest road system management. Forest operations analysis. Production planning. Strategic and tactical planning techniques. Forest operations design. Forest transportation systems. Harvesting management. Logging mechanics.

## Wood science and forest products 834 (FOR 834)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 20 discussion classes per block, 1 web-based period per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 2

### Module content

Common characteristics of wood. Properties controlling the technical performance of wood. Natural growth phenomena affecting wood quality. Effect of site and silviculture on wood quality. The genetics of wood. Sawmilling and wood drying. Composite wood products. Deterioration of wood and wood products and methods of protection.

## Forest ecology and management 835 (FOR 835)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 20 discussion classes per block, 1 web-based period per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 2

### Module content

Structure and function of natural forests, species composition and diversity, disturbance processes and regimes, recovery (succession) concepts and theory, biodiversity in forest ecosystems, energy and nutrient flux in natural forest ecosystems. Resource assessment and planning. Silvicultural systems and management of natural forests (and woodlands), natural regeneration and forest rehabilitation management for sustainability of natural forest ecosystems: multiple use for timber and non-timber forest products, forest rehabilitation (invader plants, mining, degraded forests).

## Silviculture 836 (FOR 836)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 20 discussion classes per week, 1 web-based period per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

### Module content

Understand the development of modern plantation forestry. Commercial plantation species. Forest pests and diseases. Forestry site classification. Basis of forestry rotation length (economics, biological, wood quality). Effect of silvicultural practices on wood quality (managing wood quality). Forestry management regimes for different species and end products. Pros and cons of plantation forestry on the environment. Fire management. Propagation techniques for forestry systems and bio-renewable resources, ecological basis of silviculture and fire management systems.

## Forest resource economics and policy 831 (LEK 831)

**Module credits** 20.00

<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 lectures per week, 1 discussion class per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

#### Module content

The economics of optimal management of cultivated and natural forests. Optimal rotation age and harvesting in timber production. Managing forest for their non-timber services. The multiple ecosystem services of forest and their contributions to human wellbeing. Economic valuation of the services of forest ecosystems. Forest resource rents and their capture and distribution under different property rights regimes. Regulation and taxation of forest users. Designing logging concessions and forest exploitation policies. Forest resource accounting and optimal management of the resource rents. Communities and forests. Case study examples from Sub-Saharan Africa.

### Environmental change 881 (OMS 881)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	No prerequisites.
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Year

#### Module content

This module involves the study of the causes and consequences of environmental change from multidisciplinary perspectives. A focus of this course is human environmental interactions. Past processes leading to environmental change will also be discussed. In a given period, the following will be investigated: principles of environmental change, causes and consequences of environmental change, Global warming and climate change: causes and impacts of climate change on natural resources; water, forests, biodiversity, land use and land cover change, environmental/Climate change and infectious disease, human dimensions of global change and Climate change political responses including the Kyoto protocol. Mitigation and adaptation strategies to climate change and effects of Climate change on sustainable development.

The information published here is subject to change and may be amended after the publication of this information. The [General Regulations \(G Regulations\)](#) apply to all faculties of the University of Pretoria. It is expected of students to familiarise themselves well with these regulations as well as with the information contained in the [General Rules](#) section. Ignorance concerning these regulations and rules will not be accepted as an excuse for any transgression.