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## **MASTER OF SCIENCE IN SUSTAINABLE AGRICULTURE**

### **PROGRAMME BROCHURE**

**2015**



**FACULTY OF AGRISCIENCES**

**UNIVERSITY OF STELLENBOSCH**

PROGRAM CODE MSc SUSTAINABLE AGRICULTURE 5981001 AND A104S

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MSc in Sustainable Agriculture - January 2015

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## 1. OVERVIEW OF COURSE STRUCTURE

### WHY A PROGRAMME IN SUSTAINABLE AGRICULTURE?

The purpose of the program is to train researchers in understanding and working within sustainable agriculture. This will be achieved by challenging students to view agriculture as a system through modules like Introduction to Systems Thinking and Systems Analysis and Simulation. This is then followed by teaching concepts in sectoral sustainable agriculture, e.g. sustainable animal production, sustainable plant production, livelihood perspectives, etc. To generate knowledge in sustainable agriculture, courses like Systems Analysis and Simulation, QUALUS and Biometry will help improve the student's quantitative and analytical skills. A work integrated learning opportunity where students are linked to organizations in the industry will give the students real life perspectives and will aid in students becoming more employable.

### PROGRAMME DURATION

This Master of Science in Sustainable Agriculture programme is offered on a full-time basis over a minimum period of two years. Modules are taught in the first year and a research project is completed in the second year.

### CREDITS

This is a 180-credit programme which consists of modules (90 credits) and a research project (90 credits).

<b>Types of learning activities</b>	<b>Credits</b> <i>1 credit = 10 study hours</i>
Modules	90
Research project	90
Total	180

### LANGUAGE OF INSTRUCTION

The language of instruction during tuition, discussions and presentations will be English.

## MODULES

Students need to take all the **11** modules and carry out a research project (**12**).

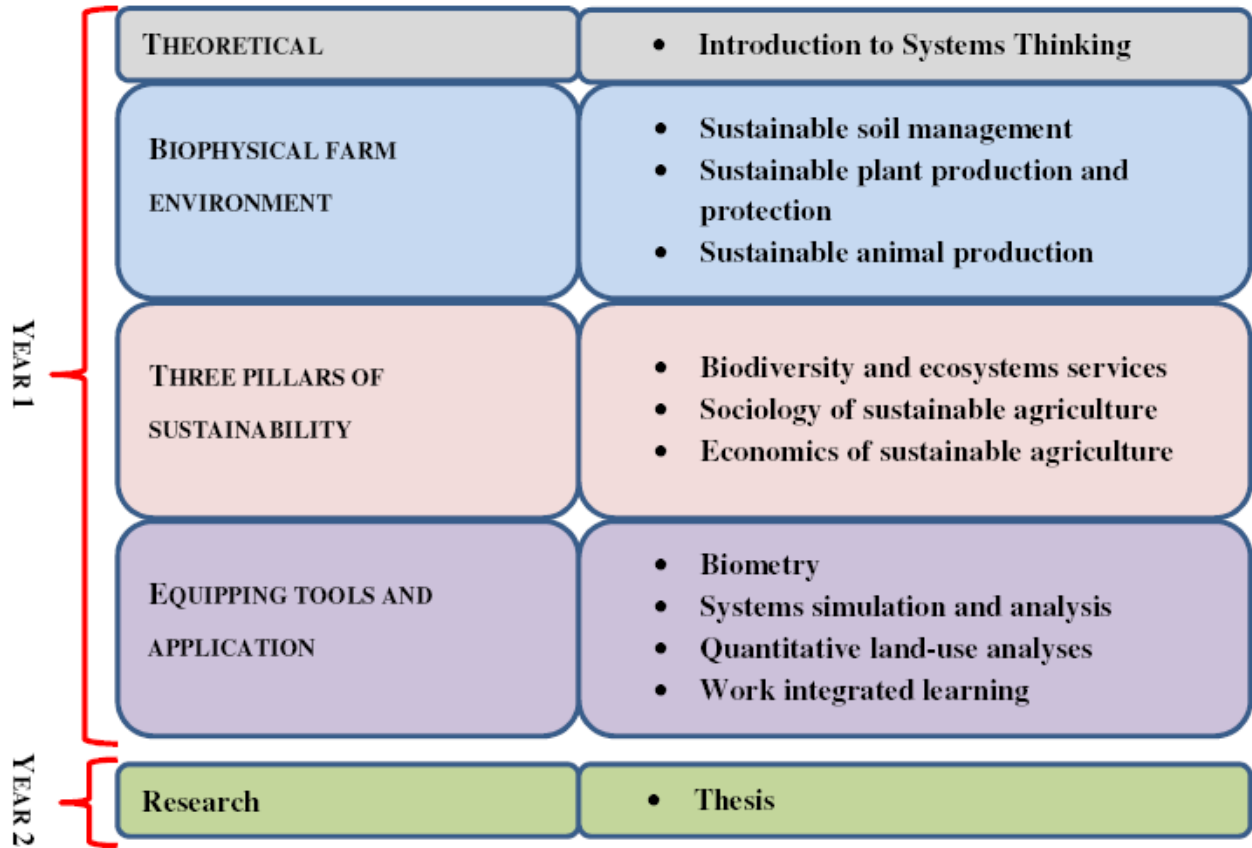
### SUMMARY OF THE MODULES

	Semester 1	Semester 2
Year 1	<ul style="list-style-type: none"> <li>• Introduction to Systems thinking (<i>6 credits</i>)</li> <li>• Sustainable soil management (<i>8 credits</i>)</li> <li>• Sustainable plant production and protection (<i>8 credits</i>)</li> <li>• Sustainable animal production (<i>8 credits</i>)</li> <li>• Biometry (<i>6 credits</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• Biodiversity and ecosystem services (<i>6 credits</i>)</li> <li>• Sociology of sustainable agriculture (<i>6 credits</i>)</li> <li>• Economics of sustainable agriculture (<i>8 credits</i>)</li> <li>• Systems analysis and simulation (<i>6 credits</i>)</li> <li>• Quantitative analysis of land-use systems (<i>8 credits</i>)</li> <li>• Work integrated learning (<i>20 credits</i>)</li> </ul>
Year 2	Proposal writing, conducting research, analysis and writing research thesis ( <i>90 credits</i> )	

## SUMMARY OF THE MODULES AND COORDINATORS

Module	Code	Name	Email	Building	Office no.	Tel no.
Introduction to Systems Thinking	870	Dr R. Preiser	<a href="mailto:rika@sun.ac.za">rika@sun.ac.za</a>	A.I. Perold Building	2009b	021 808 2704
Sustainable Soil Management	871	Dr E. Lotze	<a href="mailto:elotze@sun.ac.za">elotze@sun.ac.za</a>	Lombardi Building	1005	021 808 2397
Sustainable Plant Production and Protection	872	Dr MR. Le Roux	<a href="mailto:mrl@sun.ac.za">mrl@sun.ac.za</a>	WWK1 1032 (Agronomy Department)		021 808 9487
Sustainable Animal Production	873	Prof K. Dzama	<a href="mailto:kdzama@sun.ac.za">kdzama@sun.ac.za</a>	Mike de Vries Building	1070	021 808 4740
Biodiversity and Ecosystem Services	874	Dr H. Hawkins	<a href="mailto:hhawkins@conservation.org">hhawkins@conservation.org</a>			021 799 8708
Quantitative Analysis of Land-Use Systems	881	Dr WH. Hoffman	<a href="mailto:willemhh@sun.ac.za">willemhh@sun.ac.za</a>	JS Marais Building	1007	021 808 3411
Economics of Sustainable Agriculture	876	Dr WH. Hoffman	<a href="mailto:willemhh@sun.ac.za">willemhh@sun.ac.za</a>	JS Marais Building	1007	021 808 3411
Sociology of Sustainable Agriculture	875	Ms EM. Vink	<a href="mailto:emvink@sun.ac.za">emvink@sun.ac.za</a>	Arts and Social Science Building	424	082 447 9527
Systems Analysis and Simulation	880	Prof F. Nyabadza	<a href="mailto:nyabadzaf@sun.ac.za">nyabadzaf@sun.ac.za</a>	BED 1016A (Mathematics Department)		021 808 3274
Work Integrated Learning	882	Dr B. Dube	<a href="mailto:dubeb@sun.ac.za">dubeb@sun.ac.za</a>	Mike de Vries Building	1066	072 698 3463

**SUSTAINABLE AGRICULTURE COMPONENTS AND THE ASSOCIATED MODULES**



**Please refer to Annex 1 for the 2015 Timetable**

**VENUES**

To enhance student learning, or to expose students to their particular departments, lecturers will arrange venues for their classes. These venues are shown in the timetable (Annexure 1); however if there are venue changes, students will be notified well in advance. Students are responsible for making sure that they know the venues for the different contact sessions.

## MODULE STRUCTURE

Modules are offered using a combination of face-to-face teaching and e-learning using [SUNlearn](#), Stellenbosch University's online learning environment. Students are therefore encouraged to familiarize themselves with [SUNlearn](#) as most of the communication and announcements will be done through [SUNlearn](#). To access the platform visit <http://learn.sun.ac.za> and login using your student number (username) and use your password for your US email account. The modules are offered in blocks, where one week is the block, and are offered in the following format:

Types of Learning activities	% of learning time
Lectures (face to face, limited interaction or technologically mediated)	25 %
Tutorials: individual groups of 30 or less Practicals	15 %
Practical workplace experience (experiential learning/ work-based learning, etc.)	10 %
Independent self-study of standard texts and references (study guides, books, journal articles)	40 %
Independent self-study of specially prepared materials (case studies, multi-media, etc.)	10 %

## MODULE ASSESSMENT

- All modules will make use of continuous assessment: At least four assessment opportunities per module will be created comprising of a final examination and any three of the following: written tests, written assignments, practicals reports, seminars, scientific presentations, group paper,
- All final examinations, be it oral or written, are subjected to internal and external moderation. Moderators are appointed and approved by the Faculty of AgriSciences.
- The work integrated learning report will be marked by the internal supervisor and the industry supervisor.
- The MSc thesis will be examined by internal and external examiners as governed by the Faculty regulations.
- Test papers and assignments will be marked and discussed with individual and/or groups of students on a timeous basis.
- Written seminars and scientific presentations will be graded and feedback from peers and academic staff compiled and discussed with individual and/or groups of students.
- Where appropriate, ICT channels ([SUNlearn](#), etc.) will be used to communicate with students

Please note that we have to *enforce strict deadlines for all assignments*. Assignments handed in after the due date and time will not be marked. University guidelines related to *misconduct and dishonesty* will apply.



## **ATTENDANCE**

Students should inform the module convener if they are going to be absent for more than one session in a block or in the semester.

- Students missing sessions must make their own arrangements to obtain material they have missed.
- Students should ensure that the examination weeks are kept free of any competing engagements.
- Semester timetables should be consulted well in advance.

## **COMMUNICATION & E-LEARNING**

Students should ensure that the programme administrator has all their contact details, including any change of email address. Communication will take place using email and the e-Learning platform [SUNlearn](#) (Moodle). Detailed course descriptions, reading material and podcasts will be placed on [SUNlearn](#).

## **RESEARCH PROJECT**

- Equal to at least one peer-reviewed publication
- The completed research project must be submitted in the prescribed format and will be assessed by both internal and external examiners.
- Do familiarise yourself with the University Ethics and research integrity guidelines and procedures. For further information visit:  
<https://www0.sun.ac.za/research/research-integrity-and-ethics.html>

## **2. ADMISSION REQUIREMENTS AND APPLICATION PROCEDURES**

### **ADMISSION REQUIREMENTS**

- To be accepted into this programme, a student would normally be required to be in possession of an appropriate 4-year BSc Agriculture degree, or a BSc degree + relevant postgraduate qualification (e.g. BSc Hons or postgraduate diploma) in any of the major disciplines related to Agriculture with a pass mark of at least 65%.
- NQF exit-level 8 is the minimum requirement.
- English proficiency is a requirement. Students will be asked to submit a written motivation for acceptance into the course.

### **APPLICATION PROCEDURES**

Closing date for MSc in Sustainable Agriculture applications: 30 September of the year prior to the year for which you are applying.

Any other entry requirements for postgraduate study prescribed by the University of Stellenbosch in its various public documents will apply.

Full details of the application procedure is available on the University website

<http://www0.sun.ac.za/pgstudies/>

Applications should include:

- Completed on-line application form:  
[http://www0.sun.ac.za/pgstudies/assets/Post-graduate\\_application\\_form\\_English.pdf](http://www0.sun.ac.za/pgstudies/assets/Post-graduate_application_form_English.pdf)
- Letter of motivation
- Academic Record

### **3. STRUCTURED MODULES: OBJECTIVES AND CONTENTS**

#### **INTRODUCTION TO SYSTEMS THINKING (6 CREDITS)**

Course code: 870

Course co-coordinator: Dr Rika Preiser

#### **Expected Outcomes**

After completion of the module the student will:

- distinguish the main components of farming systems and rural livelihoods
- appreciate the complexity of the farming systems and their context
- explain the basic concepts of systems analysis
- describe the importance of the different disciplines for the multiple dimensions of sustainable agriculture with food security as an overarching issue
- use a problem tree to assess sustainability of a farming system

#### **Contents**

- Introduction to systems analysis
- Builds the foundation for the different modules within the MSc curriculum and their cohesion
- Analyzing an existing farm and its environment by using a problem tree
- Do a transect walk, visit a farm, collect information, prepare a resource flow map, and define simple indicators for farm performance
- Assess the ‘sustainability’ of the farming system. This relates to different aspects of sustainable agriculture (crop production, animal production, labour, gender, household economics, markets, energy, biodiversity, landscape)
- Concept of food security is introduced as an overarching issue
- Systems thinking and the associated terminology are introduced, e.g. system boundaries, system components, system structure, internal and external factors

## **SUSTAINABLE SOIL MANAGEMENT (8 CREDITS)**

Course code: 871

Course coordinator: Dr Elmi Lotze

### **Expected Outcomes**

After completion of the module the student will:

- explain production and ecological principles of crop production
- recognize and understand the importance of soil characteristics for crop production and select relevant nutrient and soil management solutions
- appreciate the complexity in the relationship between soil, including soil organisms, plant and cultivation practices
- interpret long-term carbon and nutrient balances of cropping systems
- evaluate cropping systems with respect to sustainability indices (e.g. soil quality, water and nutrient productivity, input-output ratios, biodiversity, landscape)

### **Contents**

- Module includes Integrated Soil Fertility Management (ISFM) within crop production systems.
- Understanding the complex relationships between soil, plants, soil life, cultivation practices and nutrients.
- A systems approach to analyze yield efficiencies, integrating disciplinary knowledge of crop production at various levels (plant, crop and farm).
- Basic physical, chemical and physiological aspects of soils and water
- Agro-ecological determinants of soil that influence cropping systems.
- Analysing balances of water, nutrients and carbon. The resulting emissions and external effects of emission are treated.
- Various methods/approaches to analyze problems with respect to sustainable development of crop-related production.
- The macro and micro-organisms present in soils with specific reference to organisms that are pests or pathogens.
- Assessing indicators of system performance and related to certification opportunities of sustainable agriculture.
- Links to the course on alternative approaches, economics, and livelihoods.

## **SUSTAINABLE PLANT PRODUCTION AND PLANT PROTECTION (8 CREDITS)**

Course code: 872

Course coordinator: Dr Marcellous le Roux

### **Expected Outcomes**

After completion of the module the student will:

- Describe the agro-ecological determinants of cropping systems
- Use a systems approach to farms using basic knowledge of plant production
- Recognise the influence of diverse farming methods on natural resources and on the environment
- Explain insect and pathogen ecology as related to integrated pest management in diverse agricultural systems
- Evaluate the dynamics of biological control of pests and diseases
- Explain the processes related to the influence of climate change on crop production and crop protection

### **Contents**

- Integrated crop management and integrated pest management (IPM) within farming systems.
- Maintaining sustainable agro-ecosystems.
- Understanding of the complex relationships between soil, plants, microbes, growing practices and nutrient kinetics.
- Interactions between the biotic and abiotic factors in agrosystems to facilitate the agricultural demands.
- A systems approach is taken that integrates disciplinary knowledge of plant production at various integration levels (plant, crop and farm) taking farming externalities, such as, effluent and off-farm nutrients, into account.
- Conservation agriculture, including aspects, such as no- and minimum till, rotational- and intercropping, precision agriculture, cover crops, green manuring and alternative crops.
- Analyzing balances of water, nutrients and carbon.
- Organic agriculture and agroforestry.
- Integrated management of available soil, water and biological resources, combined.
- Innovative technological advances in crop production (greenhouse horticulture).
- Protecting crops from losses by integrating plant resistance, cultural practices and biological and chemical control methods.
- Reduction in use of pesticides and fungicides, and the increased the demand for alternative methods of pest and disease control.

## **SUSTAINABLE ANIMAL PRODUCTION (8 CREDITS)**

Course code: 873

Course coordinator: Prof Kennedy Dzama

### **Expected Outcomes**

After completion of the module the student will:

- Explain advanced principles of animal production and how they relate to intensive and extensive animal production systems (small and large scale) in different biomes.
- Calculate environmental indicators of animal production systems and their innovations.
- Explain the potential use of environmental indicators from a farm and life cycle perspective.
- Make a stakeholder analysis making use of a power analysis.
- Interview farmers and other stakeholders to obtain data on, e.g. social sustainability issues such as animal welfare, power relations and gender and analyse it statistically.
- Evaluate the sustainability of innovations in farming systems using a round table discussion and a decision matrix.

### **Contents**

- Increased demand for high quality safe food by consumers, which is satisfied by livestock and also contribute to poverty alleviation of smallholders.
- Produced with minimal environmental losses, under optimal conditions for animal health and welfare.
- Overview of various approaches that can be used to analyze problems with respect to sustainable development of food production and uses of livestock.
- Knowledge of nutrition, breeding and physiology used in the context of a systems approach.
- Tackle problems related to ecological sustainability (i.e. environmental impact of intensive versus extensive rangeland production systems), societal sustainability (i.e. perceptions of animal welfare/ human-wildlife conflict) and economic sustainability.
- Sustainability assessment of innovations in farming systems is performed.

## **BIODIVERSITY AND ECOSYSTEM SERVICES (6 CREDITS)**

Course code: 874

Course Coordinator: Ms Rhoda Malgas

### **Expected Outcomes**

After completion of the module the student will:

- Appreciate the existence value of biodiversity as well as the importance of the different types of ecosystem services.
- Appreciate the complexity of impacts of agricultural practices, and benefits of sustainable farming within a given landscape and biome.
- Analyse the biological values of land-use systems at different levels (species, ecosystems and landscapes) by querying the information system SynBioSys Fynbos.
- Use Geographic Information Systems (GIS) to analyse biodiversity at both temporal and spatial scales.
- Discuss the potential of databases to assess the impact of climate change, invasive species and land degradation on biodiversity.
- Use SynBioSys system to provide biodiversity data and proxies for ecosystem services, which can be used for quantitative and qualitative land use analysis (QUALUS) and thus farm planning and decision-making.

### **Contents**

- See farming as an integral part of the environment at the scale of landscapes and biomes.
- Develop an understanding of how biodiversity is important for our existence in terms of crops and livestock, pollination of crops, plant protection, food, fuel, water, recreation and other ecosystem services.
- Explore the diversity of plant species, vegetation types and habitats that exist in South Africa in general, and in the Fynbos Biome in particular, by using a tool called SynBioSys Fynbos.
- Query various biodiversity databases to see how various land-uses, e.g. farming, conservation, eco-tourism, impact on the extant biodiversity and ecosystem services.
- Derive biodiversity and ecosystem services data as inputs for qualitative and quantitative land-use analysis.
- SynBioSys together with QUALUS provide the student and prospective farmer or consultant with a powerful tool for analysing and planning land-use as part of a climate-resilient and sustainable farming landscape.

## **SOCIOLOGY OF SUSTAINABLE AGRICULTURE (6 CREDITS)**

Course code: 875

Course coordinator: Ms Emma Vink

### **Expected Outcomes**

After completion of the module the student will

- Appreciate the value of ‘the sociological imagination’ for understanding human action and social relationships in agricultural contexts.
- Explain key sociological concepts, e.g. social structure, human agency, modernisation, power, social stratification, gender and social identity.
- Join key sociological debates on sustainability, livelihoods and the sociology of the environment.
- Describe the social dynamics in the South African countryside, including in relation to land and conservation.
- Apply the concepts and principles of social analysis presented in this module to the broader social context in which sustainable agriculture is defined and practised.
- Apply participatory research methodologies useful for research and practice in the management of natural and agricultural resources.

### **Contents**

- Key sociological concepts and basic principles of sociological thinking, paying particular attention to current debates on sustainability, livelihoods and the sociology of the environment, including in the South African context.
- The sociological imagination.
- Introduction to the sociology of the environment.
- Sociological debates on sustainability, development, and livelihoods.
- Social stratification, gender and diversity.
- Sociological perspectives on land and conservation issues in the South African society.
- Participatory research methodologies.



## **ECONOMICS OF SUSTAINABLE AGRICULTURE (8 CREDITS)**

Course code: 876

Course coordinator: Dr Willem Hoffman

### **Expected Outcomes**

After completion of the module the student will

- Apply basic notions of environmental economics.
- Appreciate the organization of supply chains.
- Explain the basics of price formation process.
- Explain the basics of competitiveness.
- Apply the basics of economic multipliers.
- Appreciate the basics of typical farm modeling as a farming system planning tool.
- Critically assess the potential of certification to value environmental services.
- Recognize market forces governing credit and insurance.
- Evaluate contractual arrangements as to land and labour.

### **Contents**

- An introduction to the economics of the major aspects of sustainable agriculture.
- Market analysis, contractual arrangements, environmental dimension and farm-level decision-making.

## **SYSTEMS ANALYSIS AND SIMULATION (6 CREDITS)**

Course code: 880

Course coordinator: Prof Farai Nyabadza

### **Expected Outcomes**

After completion of the module the student will

- Apply elementary concepts such as feedback, time coefficient, relational diagram, analysis of units and numerical integration methods, following the conventions of the systems analysis approach.
- Analyse systems in terms of states, rates and driving variables.
- Discuss the outcome of basic simulation models.
- Explain how systems approaches can be applied in crop science, soil science and animal science and what their usefulness is for evaluating options for improved systems management.
- Write simple simulation models.

### **Contents**

- Systems approaches are widely used in studies of agro-ecosystems for the purpose of increasing our understanding of their functioning and improving systems management.
- The application domain ranges from the crop- and field-level to the agro-ecosystem level.
- Represent a scientific concept in which the real world is divided into systems.
- Depending on the specific objective, the systems are analysed and captured in quantitative simulation models.
- Studying model behaviour in comparison to real world behaviour.
- Study of the behaviour of complex agro-ecosystems.
- Address system dynamics and simulation of simple systems in practical work.
- Model development, evaluation and exploration of management options will be illustrated by cases.

## **QUANTITATIVE ANALYSIS OF LAND-USE SYSTEMS (8 CREDITS)**

Course code: 881

Course coordinator: Dr Willem Hoffman

### **Expected Outcomes**

After completion of the module the student will

- Give an overview of the qualitative and quantitative methods for (sustainable) regional land-use analysis.
- Give an overview and explain the role of models within land-use design and planning.
- Explain competing claims between various types of land-use, such as agriculture and nature conservation.
- Carry out a qualitative evaluation of sustainable land-use using QUALUS.
- Understand the influence of temporal and spatial scales on the methodology and the results of land-use analysis.
- Carry out data collection (mainly literature) on different aspects of sustainable land-use.

### **Contents**

- Problems associated with food security and depletion of natural resources.
- The need for economically viable and socially acceptable systems.
- Redesign land-use systems at the level of farms, landscapes, or nature parks as well as at a regional level.
- Qualitative land evaluation and overview of quantitative methods for regional land-use analysis and design.
- Identify options for sustainable systems and land-use and provide trade-offs among objectives.
- Disciplinary knowledge about economics, soil, water, climate, animals and plants is integrated at different levels.
- Important aspects of the various methods treated are their aim, spatial and temporal scale under different climate regimes and the use of biological information systems.
- A case study on Fynbos, but other cases will also be used.
- Involvement of stakeholders and resource conservation.

## **WORK INTEGRATED LEARNING (20 CREDITS)**

Course code: 882

Course coordinator: Dr Heidi Hawkins

### **Expected Outcomes**

After completion of the module the student will

- Determine, as a team and in close interaction with a client, the goals of a project and formulate tasks and a project plan on the basis of their disciplinary knowledge and general academic skills and attitude.
- Defend and sell their viewpoints and conclusions in a professional and representative way that is academically correct.
- Contribute at an academic level to the execution of an interdisciplinary project both in terms of process and content related to their own disciplinary training by gathering, selecting and analysing information and integrating this into project deliverables.
- Implement reflective learning by an assessment of their personal functioning in and contribution to a professional team and reflection on this in writing and during an assessment interview.
- Assess the contribution of other team members and other stakeholders on team-functioning and execution of project tasks and appropriately reflect on these and give feedback in writing and verbally.

### **Contents**

Teams of students with a different disciplinary and preferably cultural background will carry out a design type project for a client. This client may be a company with activities related to agriculture in its widest sense (e.g. seed, fertilizer, machinery, food processing), a (research) institute, an NGO, or a consultancy firm. The project must have a direct relationship with the theme “sustainable agriculture”; the suitability of projects to be determined by the SU course coordinator. It could be design of new technologies, but it could also be a policy paper, a business plan, a communication plan or the draft of a plan for an integrated research programme. These project plans must address a realistic, existing problem or area of interest for the commissioner; plans should not be developed as a teaching exercise.

The ultimate goal is for teams to reach an interdisciplinary synthesis of the information they have compiled and translate this into an advice on future actions for their client.

## **RESEARCH PROJECT (90 CREDITS)**

The research project must be conducted on a relevant research question using a quantitative or qualitative research design. Each student must have a supervisor who is affiliated with Stellenbosch University and can, in addition, have an external or internal co-supervisor.

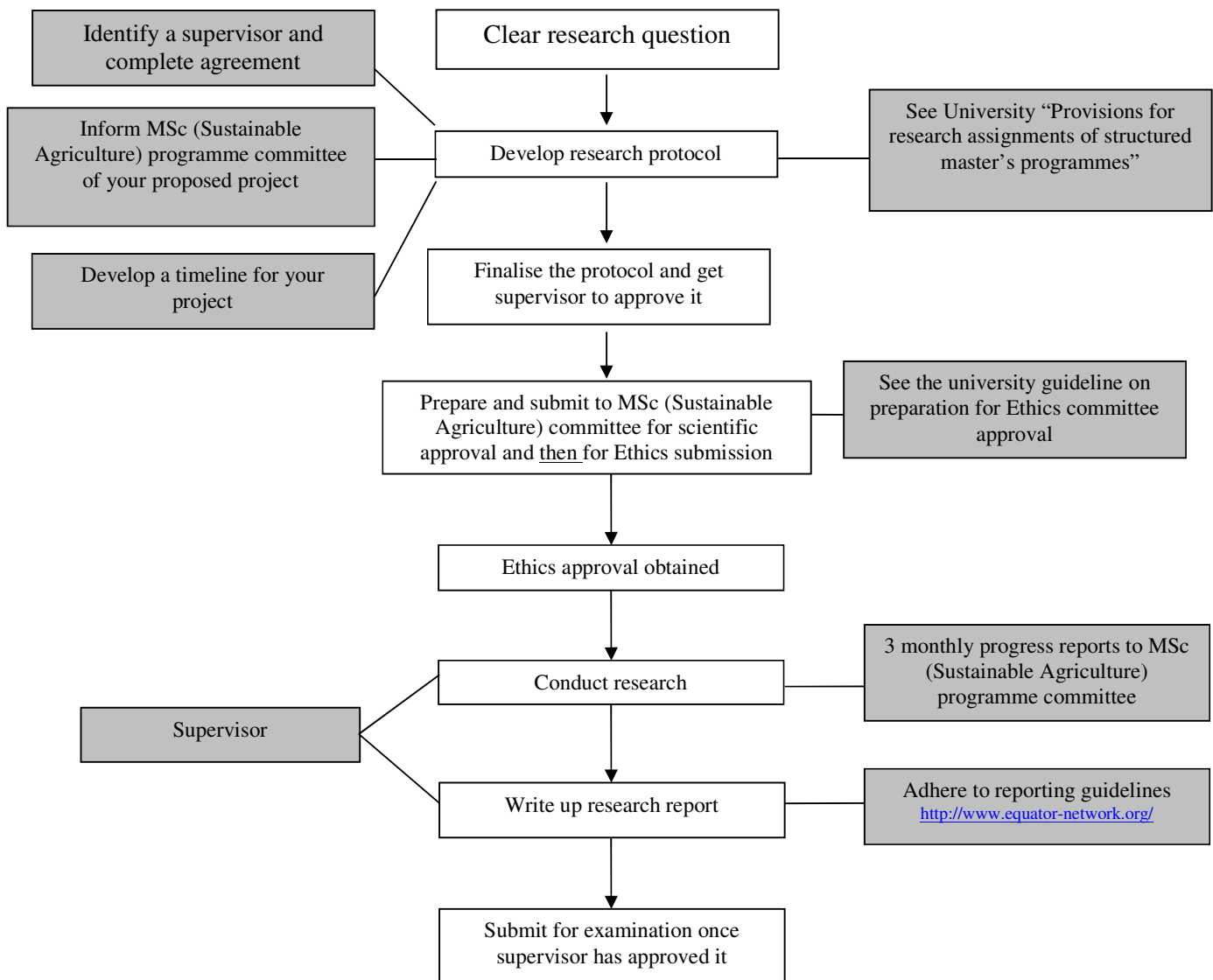
### **Expected Outcomes**

Prepare a research proposal, conduct a literature review on selected research topics, perform experiments according to statistical designs, collect data, process and interpret data, write a research report and provide feedback on the above via oral presentations to peers, academic staff and relevant industry partners.

### **Contents**

Students will identify a problem in sustainable agriculture and they will write a research proposal on how the research on the problem will be conducted. The research will be multidisciplinary in nature and a systems approach will be employed. Topics that span the spheres of social-ecological systems that are of interest and that are relevant to the development of sustainable agricultural sectors are welcomed. These may include natural, social or ecological systems or combinations of these where appropriate.

## MSc IN SUSTAINABLE AGRICULTURE RESEARCH PROJECT FLOW DIAGRAM



The conduct of the research needs to adhere to research integrity and ethical principles of Stellenbosch University. Students should be familiar with these policies:

- SU Policy on Academic Integrity: The Prevention and Handling of Plagiarism.
- Framework Policy for the Assurance and Promotion of Ethically Accountable Research at Stellenbosch University.

### USEFUL RESOURCES:

<http://publicationethics.org/international-standards-editors-and-authors>

The research project must be submitted as a completed manuscript for a (preferably subsidy-bearing) peer-reviewed scientific journal (i.e. that appears on the list of the approved scientific journals of the Department of Higher Education and Training) with the candidate as first author. This must comply with requirements as set out in the *Instructions for authors* of the relevant scientific journal including word count and referencing style.

The final submission should include the following

#### **DECLARATION**

See “*Provisions for research assignments of structured masters programmes*” for the format.

#### **PART A: COMPLETED MANUSCRIPT**

The completed manuscript must comply with requirements as set out in the *Instructions for authors* of the relevant scientific journal including word count and referencing style. The word count is typically 3000-4000. Supervisors will assist candidates to identify an appropriate journal. The article does *not* have to be submitted to the journal in order to meet the academic requirements.

#### **PART B: APPENDICES**

These will vary with the study but should typically include:

- a. Relevant journal *Instructions to Authors*.
- b. Questionnaire/data capture instrument(s) (as prepared originally for protocol).
- c. Ethics consent form(s) (as prepared originally for protocol).
- d. Selected tables or figures, with brief explanatory text, that would be useful for the examiner to see as part of the analyses, but which could not be included in the article due to word restrictions. This should not simply be a collection of analysis printouts but should be readable as an addendum with reference to the article.
- e. Any technical appendices needed – for example, laboratory techniques, statistical formulae.
- f. Acknowledgements.

#### **SUBMISSION PROCESS**

Two copies of the dissertation must be submitted, in temporary binding to the MSc in Sustainable Agriculture Programme Coordinator.

- The submission deadline for December graduation is 1 September, and for March graduation is 1 December.

*NOTE:* The programme coordinator must be informed 3 months in advance of the intention to hand in the research project.

#### 4. FEES

Tuition fee (Sustainable Agriculture)	R 14 190.00
Tuition fee (Biometry)	R 1 867.00
Student card	R 80.00
<hr/>	
Total study fees only	R 16 137.00
Service fees	R 5 900.00
International student Registration Fee (IRF)	
IRF SADC countries (Angola, Botswana, DR Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, Swaziland, Tanzania, Zambia, Zimbabwe)	R 3 170.00
IRF Non SADC countries	R 6 070.00

It is thus advisable that you aim to finish your studies within the allocated 2 years in order to save costs.

The University, as represented by the duly authorised decision-making body, reserves the right to amend all fees payable to the University. As a result, the above quoted fees may change by the time registration takes place in February 2015. The staff associated with the management of this program cannot be held accountable if for any reason the above quoted fees are changed by a duly authorised University decision-making body.

#### MINIMUM AMOUNT PAYABLE AT REGISTRATION:

In order to register for the degree, all students should register by the 14<sup>th</sup> of February and pay the first installment of **R 7700.00** by the 14<sup>th</sup> of February.

This first installment serves as the registration fee. Students will be registered for the degree only once proof of payment has been received.

Registration can only take place on campus for first-time post-graduate students. For this purpose it would be best if you could plan to register in the week of 3-7 February 2015, which will be your first contact session on campus.

#### SCHEDULE OF PAYMENT

The first compulsory instalment of both study fees and, where applicable, accommodation fee is payable by the date of registration. If the total study fees for the module(s) you wish to take constitute a smaller amount than the first instalment of the study fees given above, you are required to pay the total study fees for the year during registration.

The following instalments have to be paid on or before the dates as set out:

31 MAY - At least 75% of the total account, taking into consideration the fees that you paid at registration.

30 SEPTEMBER - The outstanding balance on your student fees account.

This mode of payment in two further instalments applies by default if you do not opt to pay your student fees account in full at the start of the year or offer payment through the debit order system.



For information about payment options please refer to the *Calendar, Part 3, Student Fees* at: <http://www.sun.ac.za/university/jaarboek/>, or to: <http://www.maties.com/bursaries-loans-andfees/what-will-it-cost/payment-options.html>.

Students that are granted a bursary or study loan, please refer to the *Calendar, Part 3, Student Fees*, with regard to a possible concession regarding the first compulsory payment.

All outstanding amounts on student accounts for previous year(s) must be paid before a student will be allowed to register for a subsequent year. The total amount and the first instalment payable at registration quoted above do not include possible arrears.

Please note that the following formal provision applies: "The Council reserves the right to amend without notice all fees payable to the University, as circumstances may dictate."

The University reserves the right to make amendments of the content of this information at any time. The Council and Senate of the University accept no liability in regard to inaccuracies, if any that may occur in the content of this provisional statement. Every reasonable care has been taken, however, to ensure that the relevant information to hand is represented on this provisional certificate, accurately and in full.

Above figures are given for budgeting purposes only and therefore not binding Stellenbosch University thereto.

#### **PAYMENT OF FEES TO THE UNIVERSITY**

Payment directly into bank account:

Account Name:	Stellenbosch University
Bank:	ABSA, Stellenbosch
Branch code:	632005
Account number:	0410 204 789
SWIFT code (for transfers from abroad)	ABSAZAJCCT
Reference:	Student number

Please Fax/email slip to +27 21 808 3739, or email to [susanv@sun.ac.za](mailto:susanv@sun.ac.za) / [amerika@sun.ac.za](mailto:amerika@sun.ac.za). Please quote your student number in all correspondence and bring proof of payment with when you arrive on campus to register. Enquiries can be directed to: [studenterekening@sun.ac.za](mailto:studenterekening@sun.ac.za).

For more information on payment options and fees, please see the postgraduate student website here: <http://www0.sun.ac.za/international/postgraduate/postgraduate-fees>

## 5. BURSARIES

Students are responsible for securing their own study fees, as positions for bursaries are highly competitive. You are encouraged to secure funds independently, and to make use of internal and external sources to secure funding.

Generally, you will require funds for:

- Student fees.
- Accommodation and living expenses.
- Operational costs for your research (transport, logistics, stationery, books, lab chemical, etc.). Discuss these with your supervisor(s) as they may be in a position to support some of these costs from research grants.
- Conferences (registration, travel, subsistence, accommodation, production and printing of a poster, etc.)

For more information on postgraduate student funding at Stellenbosch University, visit:

<http://www0.sun.ac.za/international/postgraduate-student-funding>

## **6. CONTACT DETAILS**

### **PROGRAMME COORDINATORS**

Prof. Kennedy Dzama  
Department of Animal Sciences  
Faculty of AgriSciences  
Stellenbosch University  
Tel: 021 808 4740  
Email: [kdzama@sun.ac.za](mailto:kdzama@sun.ac.za)

Ms Rhoda Malgas  
Department of Conservation Ecology and Entomology  
Faculty of AgriSciences  
Stellenbosch University  
Tel: 021 808 3299  
Email: [rmalgas@sun.ac.za](mailto:rmalgas@sun.ac.za)

### **COURSE COORDINATOR**

Dr. Bekezela Dube  
Department of Animal Sciences  
Faculty of AgriSciences  
Stellenbosch University  
Tel: 072 698 3463  
Email: [dubeb@sun.ac.za](mailto:dubeb@sun.ac.za)

### **INTERNATIONAL OFFICE**

Coordinator: Postgraduate International Students  
Mrs Rachel Pullen  
Tel: +27 21 938 9086  
E-mail: [crp@sun.ac.za](mailto:crp@sun.ac.za)

### **POSTGRADUATE & INTERNATIONAL OFFICE**

Coordinator: PG Degree Enrolments  
Ms Cindy De Doncker  
Tel: 021 808 9111  
E-mail: [pginfo@sun.ac.za](mailto:pginfo@sun.ac.za)

### **POSTGRADUATE ACCOMMODATION**

Coordinator: Accommodation  
Grant Leukes  
Tel: +27 (0)21 808 9111  
[interhouse@sun.ac.za](mailto:interhouse@sun.ac.za)

Please note that all students are responsible for arranging their own transport and accommodation to campus for the contact sessions.

## Annexure 1: Timetable

### First Semester

1. Introduction to Systems Analysis (Code 870; 6 credits)
2. Sustainable Soil Management (Code 871; 8 credits)
3. Sustainable Plant Production and Protection (Code 872; 8 credits)
4. Sustainable Animal Production (Code 873; 8 credits)
5. Biometry (Code 771; 6 credits)

Block	Module	Contact person	Email	Tel	Venue	
Week 1	02 Feb – 06 Feb	Introduction to Systems Thinking	Dr R. Preiser	<a href="mailto:rika@sun.ac.za">rika@sun.ac.za</a>	021 938 9440	Room 1005 (Wintergrain Block 4) OR Room 2011 (Wintergrain Block 6). Welgevallen Experimental farm
Week 2	09 Feb – 13 Feb	Sustainable Soil Management	Dr E. Lotze	<a href="mailto:elotze@sun.ac.za">elotze@sun.ac.za</a>	021 808 3263	Lombardi Building Room 1005
Week 3	16 Feb – 20 Feb	Introduction to Systems Thinking		<a href="mailto:rika@sun.ac.za">rika@sun.ac.za</a>	021 938 9440	Room 1005 (Wintergrain Block 4) OR Room 2011 (Wintergrain Block 6). Welgevallen Experimental farm
Week 4	23 Feb – 27 Feb	Sustainable Plant Production and Protection	Dr MR. Le Roux	<a href="mailto:mrl@sun.ac.za">mrl@sun.ac.za</a>	021 808 9487	Room 1005 (Wintergrain Block 4) OR Room 2011 (Wintergrain Block 6). Welgevallen Experimental farm
Week 5	02 Mar – 06 Mar	Sustainable Animal Production	Prof K. Dzama	<a href="mailto:kdzama@sun.ac.za">kdzama@sun.ac.za</a>	021 808 4740	Mike de Vries Room 1066
Week 6	09 Mar – 13 Mar	Sustainable Soil Management	Dr E. Lotze	<a href="mailto:elotze@sun.ac.za">elotze@sun.ac.za</a>	021 808 3263	Lombardi Building Room 1005
Week 7	16 Mar – 20 Mar	Sustainable Plant Production and Protection	Dr MR. Le Roux	<a href="mailto:mrl@sun.ac.za">mrl@sun.ac.za</a>	021 808 9487	Room 1005 (Wintergrain Block 4) OR Room 2011 (Wintergrain Block 6). Welgevallen Experimental farm

<b>Week 8</b>	23 Mar – 27 Mar	Sustainable Animal Production	Prof K. Dzama	<a href="mailto:kdzama@sun.ac.za">kdzama@sun.ac.za</a>	021 808 4740	Mike de Vries Room 1066
<b>Week 9</b>	30 Mar – 03 Apr	Sustainable Soil Management	Dr E. Lotze	<a href="mailto:elotze@sun.ac.za">elotze@sun.ac.za</a>	021 808 3263	Lombardi Building Room 1005
<b>Week 10</b>	06 Apr – 10 Apr					
<b>Week 11</b>	13 Apr – 17 Apr	Sustainable Plant Production and Protection	Dr MR. Le Roux	<a href="mailto:mrl@sun.ac.za">mrl@sun.ac.za</a>	021 808 9487	Room 1005 (Wintergrain Block 4) OR Room 2011 (Wintergrain Block 6). Welgevallen Experimental farm
<b>Week 12</b>	20 Apr – 24 Apr	Sustainable Animal Production	Prof K. Dzama	<a href="mailto:kdzama@sun.ac.za">kdzama@sun.ac.za</a>	021 808 4740	Mike de Vries Room 1066
<b>Week 13</b>	27 Apr – 01 May					
<b>Week 14</b>	04 May – 08 May	Sustainable Soil Management	Dr E. Lotze	<a href="mailto:elotze@sun.ac.za">elotze@sun.ac.za</a>		Lombardi Building Room 1005
<b>Week 15</b>	11 May – 15 May	Sustainable Plant Production and Protection	Dr MR. Le Roux	<a href="mailto:mrl@sun.ac.za">mrl@sun.ac.za</a>	021 808 9487	Room 1005 (Wintergrain Block 4) OR Room 2011 (Wintergrain Block 6). Welgevallen Experimental farm
<b>Week 16</b>	18 May – 22 May	Sustainable Animal Production	Prof K. Dzama	<a href="mailto:kdzama@sun.ac.za">kdzama@sun.ac.za</a>	021 808 4740	Mike de Vries Building Room 1066
<b>Week 17</b>	25 May – 29 May	Proposal writing	Dr B. Dube Ms E. Vink	<a href="mailto:dubeb@sun.ac.za">dubeb@sun.ac.za</a> <a href="mailto:emvink@sun.ac.za">emvink@sun.ac.za</a>	072 698 3463 082 447 9527	Mike de Vries Building Room 1066

## Second Semester

6. Biodiversity and Ecosystem Services in Agrilandscapes (Code 874; 6 credits)
7. Sociology of Sustainable Agriculture (Code 875; 6 credits)
8. Economics of Sustainable Agriculture (Code 876; 8 credits)
9. Systems Analysis and Simulation (Code 880; 6 credits)
10. Analysis of Land-Use Systems (Code 881; 8 credits)
- 11.

Block	Module	Contact person	Email	Contact No	Venue	
Week 1	22 Jun – 26 Jun	Biodiversity and Ecosystem Services	Dr H. Hawkins	<a href="mailto:hhawkins@conservation.org">hhawkins@conservation.org</a>	021 799 8708	JS Marais Building Room 3028 or 2002
Week 1	29 Jun – 03 Jul	Sociology of Sustainable Agriculture	Ms E. Vink	<a href="mailto:emmavink@gmail.com">emmavink@gmail.com</a> <a href="mailto:emvink@sun.ac.za">emvink@sun.ac.za</a>	082 447 9527	Arts and Social Sciences Building Room 401
Week 2	06 Jul – 10 Jul	Economics of Sustainable Agriculture	Dr WH. Hoffmann	<a href="mailto:willemhh@sun.ac.za">willemhh@sun.ac.za</a>	021 808 3411	J.S. Marais Room 1006 or 1017
Week 3	13 Jul – 17 Jul	Analysis of Land-Use Systems	Dr WH. Hoffmann	<a href="mailto:willemhh@sun.ac.za">willemhh@sun.ac.za</a>	021 808 3411	J.S. Marais Room 1006 or 1017
Week 4	20 Jul – 24 Jul	Biodiversity and Ecosystem Services	Dr H. Hawkins	<a href="mailto:hhawkins@conservation.org">hhawkins@conservation.org</a>	021 799 8708	JS Marais Building Room 3028 or 2002
Week 5	27 Jul – 31 Jul	Sociology of Sustainable Agriculture	Ms E. Vink	<a href="mailto:emmavink@gmail.com">emmavink@gmail.com</a> <a href="mailto:emvink@sun.ac.za">emvink@sun.ac.za</a>	082 447 9527	Arts and Social Sciences Building Room 401
Week 6	03 Aug - 07 Aug	Analysis of Land-Use Systems	Dr WH. Hoffmann	<a href="mailto:willemhh@sun.ac.za">willemhh@sun.ac.za</a>	021 808 3411	J.S. Marais Room 1006 or 1017

<b>Week 7</b>	10 Aug – 14 Aug	Economics of Sustainable Agriculture	Dr WH. Hoffmann	<a href="mailto:willemh@sun.ac.za">willemh@sun.ac.za</a>	021 808 3411	J.S. Marais Room 1006 or 1017
<b>Week 8</b>	17 Aug – 21 Aug					
<b>Week 9</b>	24 Aug – 28 Aug	Biodiversity and Ecosystem Services	Dr H. Hawkins	<a href="mailto:hhawkins@conservation.org">hhawkins@conservation.org</a>	021 799 8708	JS Marais Building Room 3028 or 2002
<b>Week 10</b>	31 Aug – 04 Sep	Sociology of Sustainable Agriculture	Ms E. Vink	<a href="mailto:emmavink@gmail.com">emmavink@gmail.com</a> <a href="mailto:emvink@sun.ac.za">emvink@sun.ac.za</a>	082 447 9527	Arts and Social Sciences Building Room 401
<b>Week 11</b>	07 Sep – 11 Sep	Systems Analysis and Simulation	Prof N. Nyabadza Dr G. van de Ven	<a href="mailto:nyabadzaf@sun.ac.za">nyabadzaf@sun.ac.za</a> <a href="mailto:gerrie.vandeven@wur.nl">gerrie.vandeven@wur.nl</a>	021 808 3274	Mike de Vries Room 1066
<b>Week 12</b>	14 Sep – 18 Sep	Systems Analysis and Simulation	Prof N. Nyabadza Dr G. van de Ven	<a href="mailto:nyabadzaf@sun.ac.za">nyabadzaf@sun.ac.za</a> <a href="mailto:gerrie.vandeven@wur.nl">gerrie.vandeven@wur.nl</a>	021 808 3274	Mike de Vries Room 1066
<b>Week 13</b>	21 Sep – 25 Sep	Analysis of Land-Use Systems	Dr WH. Hoffmann	<a href="mailto:willemh@sun.ac.za">willemh@sun.ac.za</a>	021 808 3411	J.S. Marais Room 1006 or 1017
<b>Week 14</b>	28 Sep – 02 Oct	Economics of Sustainable Agriculture	Dr WH. Hoffmann	<a href="mailto:willemh@sun.ac.za">willemh@sun.ac.za</a>	021 808 3411	J.S. Marais Room 1006 or 1017
<b>Week 15</b>	05 Oct – 09 Oct	Systems Analysis and Simulation	Prof N. Nyabadza Dr G. van de Ven	<a href="mailto:nyabadzaf@sun.ac.za">nyabadzaf@sun.ac.za</a> <a href="mailto:gerrie.vandeven@wur.nl">gerrie.vandeven@wur.nl</a>	021 808 3274	Mike de Vries Room 1066
<b>Week 16</b>	12 Oct – 16 Oct	Analysis of Land-Use Systems	Dr WH. Hoffmann	<a href="mailto:willemh@sun.ac.za">willemh@sun.ac.za</a>	021 808 3411	J.S. Marais Room 1006 or 1017

<b>Week 17</b>	19 Oct – 23 Oct	Economics of Sustainable Agriculture	Dr WH. Hoffmann	<a href="mailto:willemhh@sun.ac.za">willemhh@sun.ac.za</a>	021 808 3411	J.S. Marais Room 1006 or 1017
<b>Week 18</b>	26 Oct – 30 Oct					
<b>Week 19</b>	02 Nov – 06 Nov	EXAMINATION WEEK				
<b>Week 20</b>	09 Nov - 13 Nov	Work integrated learning	Prof W. Hoogmoed Dr H. Hawkins	<a href="mailto:willem.hoogmoed@wur.nl">willem.hoogmoed@wur.nl</a> <a href="mailto:hhawkins@conservation.org">hhawkins@conservation.org</a>	021 799 8708	Mike de Vries Room 1066
<b>Week 21</b>	16 Nov - 20 Nov	Work integrated learning	Prof W. Hoogmoed Dr H. Hawkins	<a href="mailto:willem.hoogmoed@wur.nl">willem.hoogmoed@wur.nl</a> <a href="mailto:hhawkins@conservation.org">hhawkins@conservation.org</a>	021 799 8708	Mike de Vries Room 1066
<b>Week 22</b>	23 Nov – 27 Nov	Work integrated learning	Prof W. Hoogmoed Dr H. Hawkins	<a href="mailto:willem.hoogmoed@wur.nl">willem.hoogmoed@wur.nl</a> <a href="mailto:hhawkins@conservation.org">hhawkins@conservation.org</a>	021 799 8708	Mike de Vries Room 1066
<b>Week 23</b>	30 Nov – 04 Dec	Work integrated learning	Prof W. Hoogmoed Dr H. Hawkins	<a href="mailto:willem.hoogmoed@wur.nl">willem.hoogmoed@wur.nl</a> <a href="mailto:hhawkins@conservation.org">hhawkins@conservation.org</a>	021 799 8708	Mike de Vries Room 1066
<b>Week 24</b>	07 Dec – 11 Dec					