



Mitigation and Adaptation in Theory and Practice

Southern African Master's in Climate Change and Sustainable Development: Core Module 3

This third core module expands the concept of climate compatible development (introduced in Core 1) by focusing on climate mitigation and adaptation. It uses an interdisciplinary approach to promote an understanding of development initiatives that are appropriate for Africa, socially inclusive, environmentally friendly, low-carbon and resilient in the face of changing climatic conditions.

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Important note: This TLA Plan does not provide details of the key resources. Details and guidelines are found in the Courseware Guidelines, designed as an essential complement to the TLA Plan.

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Southern African Master's in Climate Change and Sustainable Development: Core Module 3
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Introduction to the Teaching-Learning-Assessment Plan

The Teaching-Learning-Assessment (TLA) Plan is intended as a guide to the teaching, learning and assessment activities of the module. It aims to be more than merely the syllabus or content of the module. It includes the development of knowledge, skills and competencies, guidelines on teaching methodology, formative feedback and summative assessment – all of which contribute to the learning experience and therefore outcomes of the student. However, it is not a textbook. More detailed guidelines on the use of the resources is found in the module Courseware Spreadsheet.

In order to understand the TLA Plan better, the following points should be noted before reading it:

Assessment and feedback: Assessment is an integral component of the entire teaching and learning process rather than a final adjunct to it, and for this reason, assessment tasks are spread across the module. The curriculum upholds a supportive, proactive approach to the student's continuous development and achievement of the desired outcomes through frequent formative feedback from either the lecturer or the peer group. The student's grades are compiled from the summative tasks across the module.

All assessment and feedback should be based on clear, transparent criteria, provided (or developed by the class) in advance of the assignment. Assessment tasks can be completed by the individual student or a group of students. In the latter case, guidelines for awarding individual marks are provided in the Assessment Guidelines on the ePlatform.

There are two types of assessment: formative and summative.

i) Formative assessment/ feedback:

The student should receive formative feedback, from either the lecturer or peers, ideally for every assignment. This feedback outlines strengths and weaknesses and allows for reflection on areas for improvement, thus supporting the student's progress and development. Effective feedback is prompt, frequent, specific and personalised.

ii) Summative assessment:

The goal of summative assessment is to build up marks that ultimately contribute to the student's grade for the module. Summative assessment measures student achievement by comparing it against standard criteria (i.e. the desired module outcomes). Because summative assessment is for marks, it is 'high stakes' and has a motivational effect on student engagement. To avoid contention, summative tasks should be assessed by the lecturer and an independent

moderator and should be based on clear, explicit and transparent criteria. It is recommended that summative tasks account for about 20% of the student notional hours of a module and do not place too big a burden on the lecturer. Careful consideration must be given to ensuring proactively that plagiarism is avoided.

Additional activities: The TLA Plan provides activities for 200 student notional hours. It also provides additional activities for those universities that require additional hours in the module.

Courseware Guidelines: The TLA Plan gives only abridged references for the prescribed resources. The number in [] links to the associated module Courseware Guidelines, which is a spreadsheet with full references to key and additional resources (see the different tabs). The Courseware Guidelines contains further guidelines for using the resources.

Exam: Should an institution require students to write an exam at the end of the module, the time allocated for the exam would be over and above the 200 notional hours provided by the TLA Plan. It is recommended that the exam questions are broad and integrated across the module, so as to demonstrate achievement of the broader competency outcomes of the module. Examples of exam type questions are provided at the end of the TLA Plan.

Grades: Grades are calculated from summative tasks. These may be weighted according to the institution's requirements. An example of a module grade table is provided in the Overarching Resources on the ePlatform.

Group work: Group work is encouraged as this builds the essential outcome of teamwork, defined as the ability to work flexibly in teams, engage effectively with peers and successfully complete team tasks. There are several ways to award individual scores for group work (see Assessment Guidelines on the ePlatform). It is important that the lecturer plays a key facilitating role in supporting group work to achieve the desired outcomes. We suggest that group process/ participation skills are assessed by students rather than the lecturer and therefore that the assessment of group participation skills is used formatively but not for marks, to avoid contention.

Key concepts: The key concepts detailed under some of the Learning Themes refer to concepts that the student should be familiar with before the first class in the Learning Theme. This means that if the student is not familiar with the term,

s/he should undertake a simple search to get a basic understanding of the term, in advance of the class.

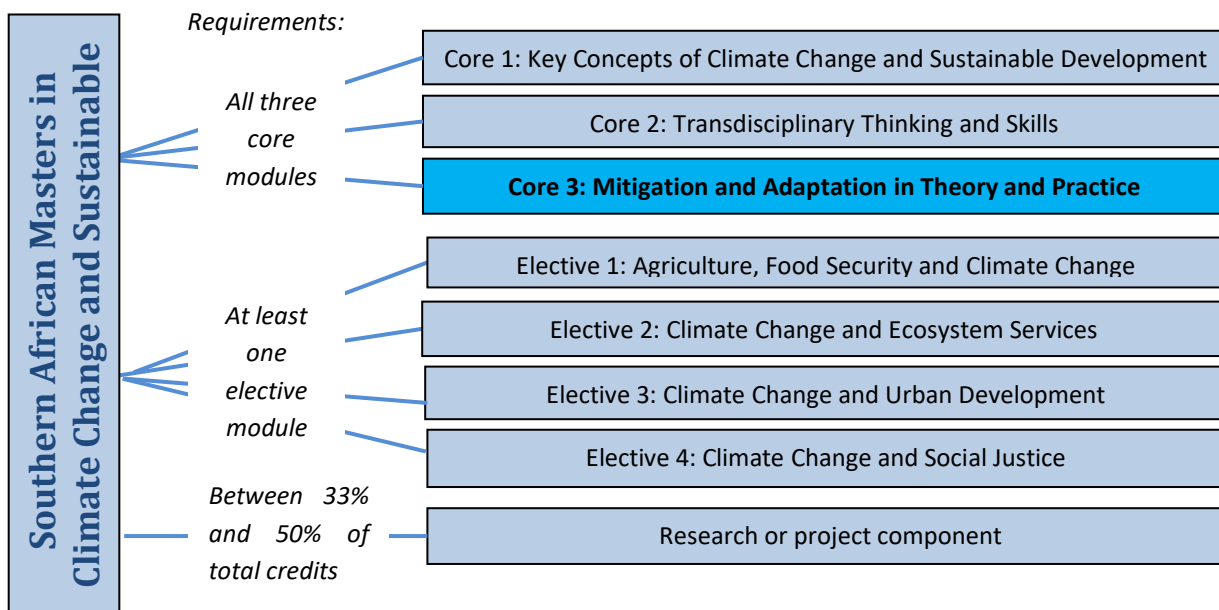
Marking rubrics: An assessment rubric with clear criteria should be provided (or developed by the class as a group) in advance for all student assignments to ensure that assessment is transparent and fair. The student should know, in advance, what is expected of the assignment, how the task links to the outcomes of the module and what is valued in the module. The following standard rubrics are found in the *Assessment Guidelines and Tools* on the ePlatform and can be adapted and weighted as necessary: Presentation, Report, Analytical Essay and Development of Writing Rubric. These are to be adapted to assess the desired outcomes of each task.

Outcomes: The TLA Plan provides topic-level and module-level outcomes that align with the curriculum-level outcomes. The curriculum outcome categories are derived from the South African Qualifications Authority (SAQA) National Qualifications Framework Master's level outcomes (Level 9) and the Critical Cross Field Outcomes, as these are consistent with regional requirements.

Student notional hours: The guidelines for hours in the TLA Plan refer to 'student notional hours'. A student notional hour is the estimated learning time taken by the average student to achieve an average pass rate for a specified task. Student notional hours are suggested for each activity to give an indication of the envisioned effort. The module provides for 200 student notional hours, with additional hours for institutions requiring a longer module.

Introduction to the Module

Mitigation and Adaptation in Theory and Practice is the third core module in the Southern African Master’s in Climate Change and Sustainable Development.



Module rationale

Although many factors can influence development outcomes in Africa, the continent is highly vulnerable to the impacts of climate variability and change, which complicate and potentially threaten the continent’s ability to address its development challenges. Existing development “deficits” can result in higher vulnerability to climate than more developed countries, and climate impacts can feed back to slow down or reverse development gains. Additionally, development in Africa will require a step change in generation and access to energy, which can be derived from either low-carbon or high-carbon sources; the latter will contribute further to global warming and increase climate change risks for Africa, while low-carbon energy development reduces additional climate risks and opens up possibilities for Africa to “leapfrog” to sustainable energy systems.

Climate compatible development (CCD) is the widely suggested response to these challenges and opportunities: low-carbon, climate resilient development that focuses on mitigation as well as adaptation while aiming to reduce poverty. Researchers and practitioners engaged in climate and development therefore

need, first, to have a critical understanding of the case for CCD along with critiques and challenges from different political-economic and environmental perspectives (provided in Module 1), and second, to have a theoretical and practical knowledge of mitigation, and vulnerability, impacts and adaptation (VIA), in the African context. Additionally, students need to understand how mitigation and vulnerability, impacts and adaptation intersect with each other in different development contexts.

Overview of Module

This core module uses an interdisciplinary approach to promote an understanding of development approaches that are appropriate for different African contexts, socially inclusive, environmentally friendly, low-carbon and resilient in the face of changing climatic conditions. It examines the concepts of climate risks, impacts and vulnerability, as well as mitigation and adaptation.

The module provides students with theoretical understanding and practical skills for mitigation and vulnerability, impacts and adaptation (VIA). Additionally, the module explores how mitigation and VIA intersect with each other in the African and different development contexts. The module uses illustrative and practical case studies to explore these issues at regional, national and sub-national scales.

The module is structured to have frequent formative feedback tasks across the learning themes, preparing the student for the main summative assessments.

Module Learning Outcomes

The module aims, firstly, to build knowledge and understanding of low-carbon development and other opportunities for mitigation, as well as an understanding of vulnerability, impacts and adaptation (VIA) and how these link to resilient development. Secondly, the module aims to develop the skills to apply this knowledge in a transdisciplinary, systemic manner, using both academic and applied perspectives, in order for the prospective graduate either to continue with further research or to be able to engage in practice in the field of climate change and sustainable development in Africa.

By the end of this module, the student should be able to understand the systemic relationships between both mitigation and VIA on development, as well as the major impacts of climate change on development and of development on climate change. Additionally, the student will have a deepened understanding of the mitigation and VIA issues, both technical and applied, though in-depth critical exploration of selected key issues in both mitigation and VIA. The student should also be able to assess the potential impacts and effectiveness of different policy

responses to climate change, particularly with regard to their impacts on development. The student should be able to apply transdisciplinary thinking to complex climate and development problems.

Knowledge Outcomes

- **Specialist Knowledge:** The student is able to engage with and critique current research and practices in the following specialist fields: Energy systems and GHG emissions (LT1); Mitigation of climate change (LT2); Climate Risk, Impacts and Vulnerability (LT3); Adaptation to climate change (LT4).
- **Knowledge of applications:** Student is able to assess key approaches to: measurement, reporting and verification of emissions (LT1); energy modelling tools (LT2); risk assessment tools (LT3) and adaptation assessment tools (LT4).
- **Knowledge Literacies:** The student is able to access, process and manage different sources and types of information (academic journal articles, data, national policies and plans) relating to mitigation and adaptation in southern African contexts
- **Research Literacies:** The student is able to: choose appropriate processes of enquiry to capture and collate appropriate information (data and theory) and to draw conclusions from these; conduct a review of leading and current research in the area of Climate Compatible Development

Skill Outcomes

- **Method and procedure:** The student is able to evaluate and apply methods and techniques to real world problems, such as being able to develop narrative scenarios for drivers of emissions.
- **Producing and communicating information:** The student is able to use academic and practitioner discourses to communicate and defend ideas about mitigation and adaptation through different media such as: report; presentation; debate; literature review; analytical essay; policy document
- **Accountable and independent learning:** Student is able to operate independently and take responsibility for own work, and, where appropriate, to lead and initiate processes.
- **Teamwork:** The student is able to work flexibly and effectively with peers on group assignments to deliver on time; and to listen to, consider and respond fairly to peer contributions in class discussions and debates.

Competency Outcomes

- **Stakeholder engagement:** The student is able to take into account the different interests, mandates and levels of knowledge or expertise of audiences and communicate their work appropriately.
- **Problem solving:** Student is able to use specialised skills in identifying and implementing methods of enquiry to address complex and challenging problems within the field of CCD; Student understands the consequences of mitigation and adaptation policies. Student is able to analyse climate response and development policies and understands the principles of good planning for effective implementation
- **Context and systems thinking:** The student is able to use the specialist knowledge in context, and understands the systemic trade-offs and linkages between mitigation, adaptation and development. The student understands the hierarchical relations within systems.
- **Transdisciplinary thinking:** The student is able to apply transdisciplinary thinking to complex climate and development problems.

Assumptions about students' prior knowledge and skills upon module entry

Students should have developed the following critical knowledge and skills covered previously in Core module 1 and Core module 2.

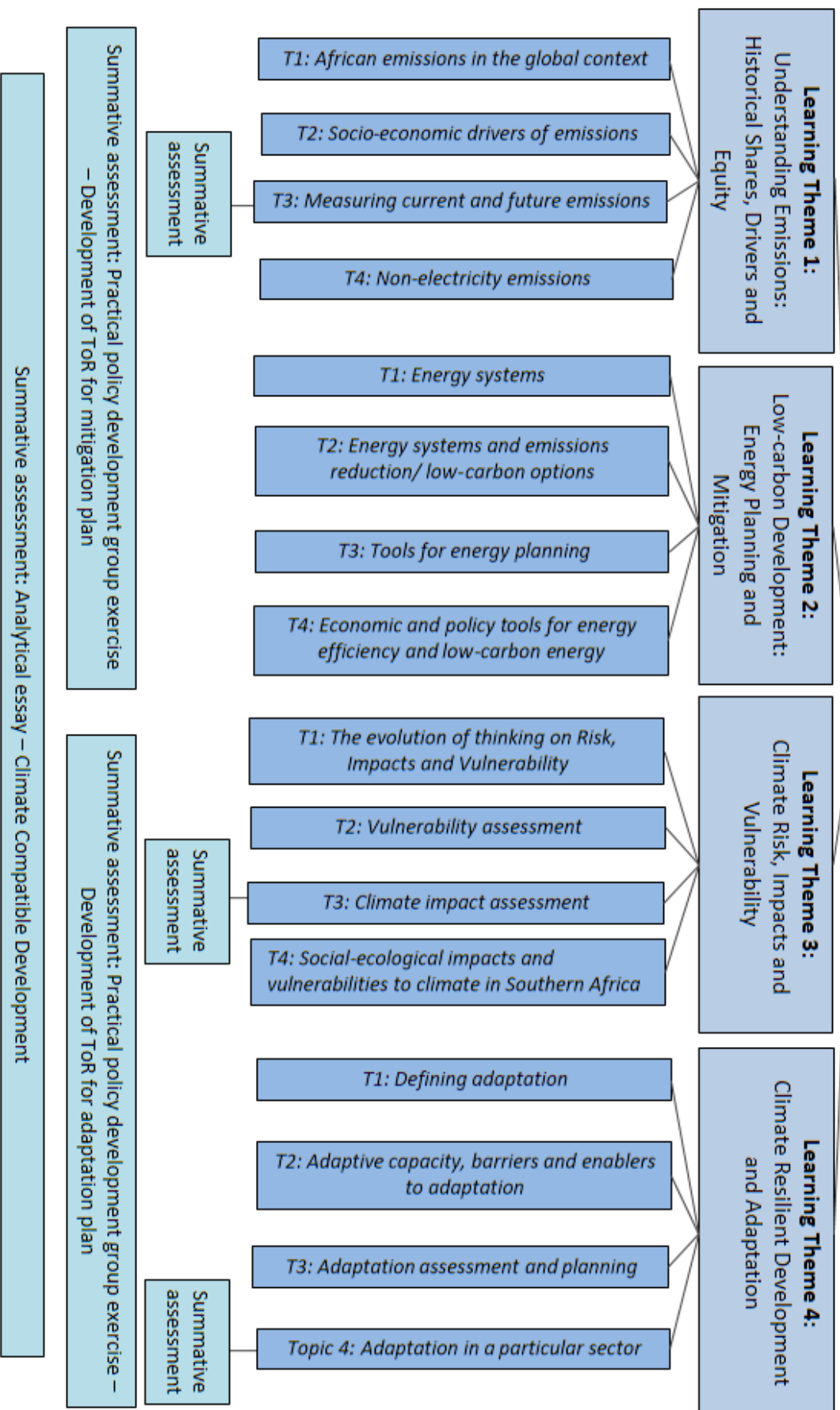
Specialist knowledge: The student is able to demonstrate knowledge and understanding of:

- The concept and challenges of sustainable development and climate compatible development
- The physical/ science basis of climate change, at global, African and southern African scales
- The global climate change policy context, and the requirements for national governments within the UNFCCC regime
- Climate economics and climate finance
- The complexities and uncertainties of the Anthropocene era

Producing and communicating information: The student is able to produce, amongst others, the following forms of writing: Informal / free writing/ mind maps; report; analytical essay; case study analysis

Transdisciplinary thinking: The student is able to apply transdisciplinary thinking to interrogate the conventional relationship between science and policy, and science and society, as well as different approaches to knowledge production, theoretical frameworks and social-learning processes; the student is able to demonstrate respect for, and valuing of, different positions within the research and civil society communities.

Mitigation and Adaptation in Theory and Practice



Learning Theme 1: Understanding Emissions:

Historical Shares, Drivers and Equity

Rationale for Learning Theme

Reducing (and avoiding further) greenhouse gas emissions to avoid dangerous climate change is one of the key objectives of the global climate response framework. Understanding of the scientific, policy and technical aspects of mitigation is important for those who plan to work or undertake further research in the low-carbon development and mitigation field. It is also important background for LT2 of this module, which looks at tools and approaches to mitigation planning.

At the end of the learning theme, students will have gained understanding of how emissions are measured (or estimated) and verified, how Africa (and countries within southern Africa) compares to other regions in terms of the types and amounts of GHG emissions, and the options for emissions reduction across key emissions sources: electricity generation, other energy sources, transport, waste, buildings and cement, and land-use/ land-cover change. Students will also have practical experience of emissions datasets.

Cross-cutting Key resources for Learning Theme 1:

[56] IPCC WG3 (2014) Mitigation of Climate Change. AR5.
Summary for Policymakers

LT1. Topic 1: African emissions in the global context

Historic and current emissions from Africa, Southern Africa, and individual countries compared to other regions

- Outcomes**
- **Specialist knowledge:** Student is able to engage with and critique historic contributions and current emissions from across the world, Africa, Southern Africa, and individual countries compared to other regions, in terms of both total and per capita basis; and an understanding of burden-sharing theory and implications for development.
 - **Knowledge of applications:** Student is able to access, navigate and explore key online emissions datasets (WRI CAIT, Climate Action Tracker)
 - **Research literacies:** Using emissions datasets, student is able to compare data from different countries and draw conclusion from the data

LT1	Teaching-Learning-Assessment Activity	Hrs	Key resources
T1.1	<p>Class activity: Lecture</p> <p>Introductory lecture on key concepts and introduction to the mitigation problem in Africa – energy systems and other emissions: land use, forestry, waste, agriculture, burden-sharing theory and practice</p>	2	<p><i>Readings:</i></p> <p>[87] Oxfam (2015)</p> <p>[58] IPCC WG3 (2014) Technical Summary on Emissions from Africa</p> <p><i>Databases:</i></p> <ul style="list-style-type: none"> • WRI CAIT database on emissions http://cait.wri.org/ • Climate action tracker http://climateactiontracker.org/
T1.2	<p>Student/s: Read Key readings and explore database</p> <p>In preparation for class discussion, students Student/s: Read Key readings and explore emissions database.</p>	4	
T1.3	<p>Class activity: Discussion</p> <p>Facilitated class discussion of historical and future responsibilities: Compare GHG emissions (absolute/ per capita/ per GDP) from different continents, and SA and other countries in Southern Africa, compared to USA, China, Sweden, using databases.</p> <p>Lecturer to provide feedback on individual student’s contributions.</p> <p>Introduction of cross cutting summative assessment spanning LTs 1 & 2.</p>	4	

LT1. Topic 2: Socio-economic drivers of emissions

- Outcome**
- **Specialist knowledge:** Student is able to demonstrate an understanding of the socio-economic drivers of emissions, and the potential trajectories of these drivers for their own country context.
 - **Method and procedure:** Student is able to identify and draw conclusions from appropriate sources to develop narrative scenarios for key drivers of emissions in their own country.
 - **Communicating information:** Student is able to develop and present an emissions scenario
 - **Teamwork:** Student works flexibly in a team, engages effectively with peers, and contributes meaningfully to group project

LT1	Teaching-Learning-Assessment Activity	Hrs	Key resources
T2.1	<p>Student/s: Read Key readings, identify own resources, prepare presentation</p> <p>Students read in preparation for group presentations using Key readings and identifying their own resources.</p>	6	<p><i>Readings:</i> [96] Rosa and Dietz (2012) [103] Satterthwaite (2008) [69] Merven & Durbach (2016)</p> <p><i>Report:</i> [132] OECD (2015) African Economic Outlook 2015</p> <p>Example of scenarios (e.g. Future of Food Scenarios)</p>
T2.2	<p>Class activity: Lecture</p> <p>Lecture on the underlying drivers of greenhouse gas emissions</p>	2	
T2.3	<p>Students: Students work in groups on a narrative scenario presentation of key drivers of emissions. Each group can be allocated a driver(s), such as population, GDP, energy intensity, energy mix, etc. The focus is not on actual emissions but rather on the socio-economic drivers of emissions.</p> <p>Students assess groupwork skills (individual participation skills) using Groupwork Guidelines - Process</p>	3	
T2.4	<p>Class activity: Group presentations on emissions scenarios</p> <p>Group presentations (5 minutes per student) on narrative scenario for key drivers of emissions in students' home countries.</p> <p>Formative assessment by peers, based on adapted Presentation Rubric</p>	3	

LT1. Topic 3: Measuring current and future emissions

Outcome

- **Knowledge literacy:** Student is able to access key international databases on GHG emissions, and evaluate current processes of knowledge production/ framing around emissions estimations and MRV through evaluating uncertainty in the methodologies
- **Producing and Communicating Information:** Student is able to produce a written report using academic and practitioner discourses to communicate national emissions estimations.

LT1	Teaching-Learning-Assessment Activity	Hrs	Key resources
T3.1	Students: Readings Students read the Key readings	5	<p><i>Website:</i> UNFCCC Climate. Get the Big Picture. Transparency http://bigpicture.unfccc.int/</p> <p><i>Key papers on estimation approaches</i> [21] Boyd (2012) [22] Boyd et al. (2014) [24] Breidenich & Brodansky (2009)</p> <p><i>Databases:</i></p> <ul style="list-style-type: none"> • WRI CAIT database on emissions http://cait.wri.org/ • Climate action tracker http://climateactiontracker.org/
T3.2	Class activity: Introductory lecture Lecture explaining key concepts, including: <ul style="list-style-type: none"> • MRV • How emissions are estimated • Sinks and sources (LULUCF and non-LULUCF) • Accessing key international databases on GHG emissions 	1	
T3.3	Students: Report Student writes a short report (2000 words) on how national emissions are estimated for GHGs non-LULUCF and LULUCF for a nominated country, and discuss some of the key uncertainties affecting these calculations. Summative assessment by lecturer using adapted report rubric	4	

LT1. Topic 4: Potential for mitigation of non-electricity emissions

Outcome

- **Specialised knowledge:** Students are able to demonstrate understanding of international approaches to African mitigation options and implications for development
- **Context and systems-thinking:** Student uses specialist knowledge in context, and understands the systemic trade-offs and linkages between mitigation and development. Student understands relations within the system, and the intended and unintended consequences of interventions, applying transdisciplinary thinking to complex mitigation and development problems

LT1	Teaching-Learning-Assessment Activity	Hrs	Key resources
T4.1	Students: Preparatory readings Students read the Key readings	8	<i>Readings on REDD:</i> [8] Angelsen et al. (2011)
T4.2	Students: Group case study analysis on local mitigation option Student groups will use an illustrative local case study of a mitigation option such as REDD. Students will assess the pros and cons of the option, as well as the potential local socio-economic benefits and critiques on both science and benefits. Each group prepares a 10-minute presentation showing key findings. [We suggest REDD or biofuels but lecturers and students can choose other options e.g. BECCS, CCS, conservation agriculture, or transport].	4	[14] Bernard & Minang (2013) <i>Readings on Transport:</i> [143] IRENA (2016) <i>Readings on Biofuels:</i> [74] Mshandete (2011)
T4.3	Class activity: Group presentation on local mitigation option Class presentations: Each group presents findings and class provides formative feedback. Criteria: standard rubric for group presentation.	2	

Learning Theme 2: Low-carbon Development: Energy Planning and Mitigation

Rationale for Learning Theme

Economic and social development in Africa requires growth in access to energy services. Low-carbon energy planning is critical to ensuring the right choices are made over the next several decades to minimise lock-in to fossil fuel energy systems. The module therefore aims to introduce student to the nature of energy systems and their emissions, using examples from different development contexts in and beyond Africa, give them an understanding of how energy planning is undertaken, how this can then be applied to thinking about mitigation, and provide practical experience in the use of energy planning tools, from regional to national to local, and in different sectors, including business.

At the end of this theme, students will have a deepened understanding of how to consider different energy options as part of energy planning. Students will also be exposed to the way that energy planning has been undertaken in a number of different developing country contexts. While not a central part of the LT, students will also be challenged to think about the social and equity dimensions of energy planning.

Key concepts to understand prior to the activities in Learning Theme 2:

Socio-economic drivers of emissions, feed-in tariffs, carbon tax, cap and trade

LT2. Topic 1: Energy systems

Outcome

- **Specialist knowledge:** Students will gain knowledge of energy systems and how they vary between developed/ developing country situations, and between formal/ informal and urban/ rural contexts

LT2	Teaching-Learning-Assessment Activity	Hrs	Key resources
T1.1	Class activity: Lecture on energy systems, covering: <ul style="list-style-type: none"> • What is an energy system? • Typical energy systems in developed and developing worlds, formal vs. informal • Urban vs. rural energy systems in Southern Africa • The Southern African electricity system • Distributed versus national electricity systems 	2	<i>Website:</i> [144] Global Energy Assessment . Grubler et al. (2012) Chapter 1 (Energy Primer) <i>Interactive tool:</i> Our Energy System
T1.2	Students: Readings and online tool Students read the Key readings and explore the online tool	3	

LT2. Topic 2: Energy systems and emissions reduction/ low-carbon options

Outcome

- **Specialised knowledge:** Knowledge of different options for mitigation across different components of the energy system; of issues and debates, both economic and political, around different options for large scale electricity
- **Knowledge literacy:** Awareness of key resources available for information on mitigation options, and how to access them; assess and compare competing arguments and the evidence they use
- **Producing and Communicating Information:** report writing using practitioner language

LT2	Teaching-Learning-Assessment Activity	Hrs	Key resources
T2.1	Class activity: Introductory lecture Lecturer presents an analytical framework [144] and [67] for thinking about emissions reduction options, looking at key components	2	<i>Readings:</i> [67] MacKay, D (2008) 10-page

	of the energy system		synopsis
T2.2	<p>Students: Readings and peer discussions</p> <p>Students read the Key readings, taking note of the following points to discuss with peers:</p> <ul style="list-style-type: none"> • Different options to emissions reductions/low-carbon energy, including relative cost (current and projected) and social benefit • Use of overnight capital costs, levelised costs of energy • Key sectors / entry points: efficiency, electricity, transport 	8	<p>[58] IPCC WG3 (2014) Technical Summary</p> <p>[45] Global Energy Assessment (2012)</p> <p>[36] Eberhard et al. (2016)</p> <p>[12] Bazilian et al. (2011)</p> <p>[60] IRENA.org (latest report on cost of renewables)</p> <p>[91] Pfenniger & Keirstead (2015)</p> <p><i>Websites:</i></p> <p>[19] Bloomberg New Energy Finance</p> <p>[144] Global Energy Assessment.</p>
T2.3	<p>Students: Individual Report</p> <p>Student to prepare a written report, using South Africa as an illustrative case study of coal versus renewable versus nuclear, assessing the environmental and social costs and benefits. [60] and [91].</p> <p>Alternative case study from other African country can be substituted.</p> <p>Formative feedback: Peer provides feedback on written report, using report rubric</p> <p>Student prepares for presentation</p>	4	<p>[19] Bloomberg New Energy Finance</p> <p>[144] Global Energy Assessment.</p>
	<p>Class activity: Presentations</p> <p>Individual presentations followed by peer assessment and discussion in class.</p> <p>Criteria: adapted presentation rubric</p>	2	<p>Grubler et al. (2012) Chapter 1 (Energy Primer)</p>
T2.4	<p>Additional hours:</p> <p><i>Read and critically evaluate two opinion pieces with different views on renewables and/or nuclear and write a response to each correcting any misinformation</i></p>	(2)	

LT2. Topic 3: Tools for energy planning

Outcome

- **Knowledge literacy:** Understand how energy planning models are constructed and used, and their limitations; Understand complexity of energy plans developed using energy planning models
- **Knowledge of applications:** LEAP (Long range Energy Alternatives Planning System), the ERC energy modelling tools
- **Problem solving:** Student is able to draw together theory and apply it in relation to own country context to critically assess a report and/or plan against “best practice”

LT2	Teaching-Learning-Assessment Activity	Hrs	Key resources
T3.1	<p>Class activity: Lecture</p> <p>Lecture on energy systems modelling and the application of models to mitigation planning</p> <ul style="list-style-type: none"> • Energy system modelling tools – such as LEAP • Carbon footprint – what it is, its importance, and calculations for individuals, organisations and products 	2	<p><i>Website:</i> <i>CarbonTrust.com</i></p> <p><i>Readings</i> [16] Bhattacharyya & Timilsina (2010) [119] Urban, F, Benders, RMJ, and Moll, HC (2007)</p>
T3.2	<p>Students: Preparatory reading</p> <p>In preparation for the group discussion, students read the Key articles and LEAP user manual.</p>	6	<p><i>User manual</i> [48] Heaps C. (2008) <u>An introduction to LEAP</u></p>
T3.3	<p>Class activity: Workshop</p> <p>Facilitated introduction to LEAP energy-modelling tool to support cross-cutting assignment at the end of the learning Theme.</p>	2	
T3.4	<p>Students: Assessment of report</p> <p>Critically assess one or more energy planning studies at the national or city scale.</p> <p><i>Potential case studies:</i></p> <ul style="list-style-type: none"> • [68] Mahumane & Mulder (2015) <u>Introducing MOZLEAP</u> • SEA (2012) <u>Energy Scenarios for eThekweni</u> • <u>SAMSET</u> – regional case studies • SwaziLEAP 	2	

	<p>Students will read through a report and energy plan from their country / region. They will assess the report in the context of the theory they have covered. This assessment will be used in Topic 5, for the summative assessment task.</p>		
	<p>Class activity: discussion Critically assess one or more energy planning studies at the national or city scale.</p> <p>Students will participate in a lecturer facilitated discussion on the report in the context of the theory they have covered.</p> <p>Lecturer will provide formative feedback on discussion. [see Group participation rubric]</p>	2	

LT2. Topic 4: Economic and policy tools for energy efficiency and low-carbon energy

Outcome

- **Knowledge of applications:** Student is able to identify and evaluate the main economic and regulatory tools for mitigation, along with critical debates about their effectiveness, and examples of where they have been applied
- **Producing and communicating information:** Student is able to substantiate arguments evaluating a particular economic instrument, using appropriate language

LT2	Teaching-Learning-Assessment Activity	Hrs	Key resources
T4.1	<p>Class activity: Lectures</p> <p>Two lectures on economic and regulatory instruments for mitigation.</p> <ul style="list-style-type: none"> • Economic examples include feed-in tariffs for renewables, carbon taxes, cap and trade, the SA REIPPP programme • Regulatory include building standards, car emission limits, etc. <p>Class development of criteria for following topic</p>	4	<p>[115] Tyler & Cloete (2015)</p> <p>[70] Meyer-Renschhausen (2013)</p> <p>[80] Nordhaus (2007)</p> <p>[146] RSA National Treasury (2013) Carbon Tax Policy Paper</p>
T4.2	<p>Students: Briefing note</p> <p>Student writes a briefing note to a “minister”, critically evaluating a particular economic instrument, or comparing two instruments, using the case study readings.</p>	6	
T4.3	<p>Class activity: Formative feedback on the briefing note by peers, using criteria developed by class.</p>	2	

LT2. Topic 5. Cross-cutting summative task: Mitigation policy

Outcome

- **Specialist knowledge:** Student is able to demonstrate specialised knowledge of energy systems analysis, country-specificities and data.
- **Knowledge of applications:** Student is able to understand and assess how baseline energy and associated emissions are estimated
- **Leadership, accountability, teamwork:** Student is able to operate independently and take full responsibility for his or her own work.
- **Context and systems-thinking:** Student uses the specialist knowledge gained in context, and understands the systemic trade-offs and linkages between mitigation and development. Student is able to make interventions at an appropriate level, based on an understanding of hierarchical relations within the system. Student is able to apply transdisciplinary thinking to complex climate and development problems.
- **Problem solving/ planning:** Student is able to use specialised skills in identifying, conceptualising, designing and implementing methods of enquiry for mitigation in the context of CCD; Student understands the principles of good planning for effective implementation of mitigation policies, as well as the consequences of mitigation policies

Cross cutting summative assessment task: Mitigation policy	Hrs
<p>Group assignment: Development of Terms of Reference for a mitigation plan</p> <p>Key resource: [134] MyManagementGuide (2012)</p> <p>This task is based on the work done in Topic 3, in which students assessed the quality of the baseline emissions. Students will re-read the LEAP case studies, at national or municipal level.</p> <ul style="list-style-type: none"> • [68] Mahumane & Mulder (2015) Introducing MOZLEAP • SEA (2012) Energy Scenarios for eThekweni • Use of LEAP to develop Swaziland’s INDCs • SAMSET – regional case studies <p>The students work in teams to develop a Terms of Reference (ToR) that a policy-maker would draw up to appoint a team of technical advisors to develop the country’s Nationally Determined Mitigation Contribution (NDMC). The NDMC would be based on the current UNFCCC agreement (e.g. Paris 2015) followed by the use of energy modelling tools for emissions profiling and planning.</p> <p>Summative assessment by lecturer using Report Rubric and Guidelines for assessing group work (on ePlatform).</p> <p>Criteria, adapting Report rubric: rationale, objectives and research outlines/ questions/ areas, integrating energy, non-energy and development aspects</p>	12

Learning Theme 3: Climate Risk, Impacts and Vulnerability

Rationale for Learning Theme

Adaptation requires an understanding of the risks, potential impacts and vulnerabilities to climate change of society and the built and natural systems on which they depend. Once the Risk, Impacts and Vulnerability is understood, then adaptation responses that take steps to reduce or remove the risks and vulnerabilities can be developed, chosen and implemented. This block therefore aims to (i) equip the student with a knowledge of the key ways in which climate variability and change poses risks and impacts, across different key sectors or domains (such as coastal areas, water resources and related ecosystem services, agriculture and food, human settlements, infrastructure and transport, health); (ii) develop an understanding of the nature of, and key structural drivers, of vulnerability in a developing country context, using Southern African examples, and (iii) provide an overview of the main approaches (theoretical and practical) to assessing impacts, vulnerability and risk.

At the end of the learning theme, students will understand:

- The history and current debates with regard to risk, vulnerability and impacts assessment, including an understanding of how climate change affects communities differently, depending on their economic status, and the links between vulnerability and socio-economic development
- The main risks and vulnerabilities to climate change in key sectors and systems – water, agriculture and food, health, weather related disasters, etc.
- How to undertake vulnerability/risk assessments in different contexts, including identifying the structural (political-economic) drivers of vulnerability
- How to assess the impacts of climate change on different natural and managed systems.

Key concepts to understand prior to the activities in Learning Theme 3:

Climate change risk, vulnerability and climate impacts, resilience, adaptation,

Cross cutting Key research or policy reports for Learning Theme 3:

[54] IPCC WG2. Niang et al. (2014) AR5. Chapter 22: Africa.

[52] IPCC WG2. Field et al. (2014) AR5. Summary for policymakers.

[29] CDKN (2014) The IPCCs Fifth Assessment Report: What's in it for Africa?

LT3. Topic 1: The evolution of thinking on risk, impacts and vulnerability

- Outcome**
- **Specialised knowledge:** Student is able to demonstrate understanding of the evolution of thinking around climate change risk, vulnerability and impacts.
 - **Knowledge literacy:** Student is able to draw from key recent literature on vulnerability and risk to answer specific questions
 - **Producing and communicating information:** Students are able to communicate and participate in a seminar type discussion, where academic papers are critically addressed.

LT3	Teaching-Learning-Assessment Activity	Hrs	Key resources
T1.1	Students: Preparatory Reading Students to read and summarise the Key readings	6	<i>Readings:</i> [3] Adger (2006) [49] IPCC WG2. Field et al. (2014): Technical Summary

<p>T1.2</p>	<p>Class activity: Lecture Lecture on the evolution of thinking on Risk, Impacts and Vulnerability, covering</p> <ul style="list-style-type: none"> • Key definitions for Risk, Impacts, Vulnerability • Resilience Theory, Adaptive Capacity, Adaptation Deficit (Burton 2004) • Origins of thinking about vulnerability (e.g. hazards literature) • History of impacts research (Wilby & Dessai 2010) • Current IPCC framing of risk, and its evolution (IPCC 2012) 	<p>2</p>	<p>[52] IPCC WG2. Jones et al. (2012) Foundations for decision-making [59] IPCC WGs 1 & 2. Cardona et al. (2012) Determinants of Risk [124] Wilby & Dessai (2010) [25] Burton (2004)</p>
<p>T1.3</p>	<p>Students: Reading & Class discussion</p> <p>Students will read three key papers (Dow et al.; Preston et al.; Tschakert et al.) and discuss them in class. Students can form groups to have a discussion. They will be asked to discuss the risk and vulnerability concepts.</p>	<p>6</p>	<p>[34] Dow et al. (2013) [92] Preston et al. (2013) [114] Tschakert et al. (2013)</p>

LT3. Topic 2: Vulnerability assessment

- Outcome**
- **Knowledge of applications:** Knowledge of key approaches to assessing vulnerability, along with critiques
 - **Knowledge literacy:** Ability to draw on content of literature to answer specific questions
 - **Producing and communicating information:** Students are able to communicate and to participate in a seminar type discussion, where academic papers are critically addressed, and can confidently interact with specialists in vulnerability.

LT3	Teaching-Learning-Assessment Activity	Hrs	Key resources
T2.1	<p>Class activity: Framing lecture</p> <p>Introductory lecture on vulnerability assessment – refresh from previous topic, defining vulnerability, and introducing a typology of vulnerability assessment methods (Preston; Soares)</p>	2	<p><i>Readings:</i></p> <p>[93] Preston et al. (2011)</p> <p>[106] Soares et al. (2012)</p>
T2.2	<p>Students: Preparatory readings</p> <p>In preparation for the class discussion, students to read the Key reading, making notes around these points relating to the theory and practice of vulnerability assessment:</p> <ul style="list-style-type: none"> • Typology of approaches to assessing vulnerability (Preston; Soares) • Biophysical / Index based vulnerability mapping • Community based vulnerability approaches • Structural vulnerability identification (using Tschakert paper) 	8	<p><i>Readings on specific approaches:</i></p> <p>[17] Birkmann et al. (2013)</p> <p>[73] MOVE (2011)</p> <p>[72] Morchain & Kelsey (2016)</p> <p><i>Websites</i></p> <p>Online tool for Community Vulnerability</p>
T2.3	<p>Class activity: Discussion/ lecture - different approaches to vulnerability assessment</p> <p>This can be covered in a lecture but the recommended approach is a class discussions.</p> <p>(i) one that compares Index Based and Community Based vulnerability assessment; students read key papers, and groups have to prepare presentation explaining one approach, its advantages and disadvantages</p> <p>Assessment approach: Formative feedback on class discussion</p>	3	<p>Evaluation: WOTR Co-Drive</p> <p>Oxfam Gender and Vulnerability Webinar</p>

	<i>This can be adjusted into a summative exam question if required by the institution.</i>		
T2.4	<p>Class activity: Discussion/ lecture - different approaches to vulnerability assessment. A second class discussion on structural causes of vulnerability, where students are provided with a set of structural factors (such as poverty, inequality, education, gender, governance) against which they should interrogate their own local situation.</p> <p>Assessment approach: Formative feedback on class discussion</p> <p><i>This can be adjusted into a summative exam question if required by the institution.</i></p>	3	

LT3. Topic 3: Climate impact assessment

Outcome

- ***Knowledge of applications:*** Student is able to understand how impact modelling is undertaken, and scenarios developed, with a critical understanding of inherent uncertainties
- ***Knowledge literacy:*** Student is able to evaluate the progression of a field of science (impact assessment) over time
- ***Producing and communicating information:*** Student is able to present findings confidently to class

LT3	Teaching-Learning-Assessment Activity	Hrs	Key resources
T3.1	<p>Class activity: Lecture in climate impact assessment</p> <ul style="list-style-type: none"> • General approaches to impact modelling • The use of scenarios and climate projections in impacts modelling • Uncertainties in impacts modelling • Integrated assessment modelling 	2	<p><i>Readings:</i></p> <p>[13] Beck et al. (1993) IF OBTAINABLE</p> <p>[125] Wilby and Wigley (1997)</p>
T3.2	<p>Student/s: Read Key readings and discuss with peers</p> <p>Students to read the three Key readings and discuss these with peers to clarify their</p>	6	<p>[78] New and Hulme (2000)</p> <p><i>Websites:</i></p>

	understanding of different approaches to impacts modelling.		<i>Agriculture:</i> http://dssat.net/
T3.3	<p>Students: Development of a presentation on evolution of impacts modelling in a chosen sector</p> <p>Student picks one of the following sectors: <i>Water/ Agriculture/ Biodiversity</i></p> <p>Students to read three papers – one from each of last three decades – to explore how impacts modelling has evolved within this sector and prepare a 10 minute presentation. The idea is to show what was considered state-of-art in each decade, and how (or if at all) impacts modelling has progressed.</p>	4	<p>Class to find additional readings for the water and biodiversity sectors</p> <p><i>Agriculture:</i> [140] Jones et al. (2003) [141] Jones & Thornton (2003) [142] Rozenzweig et al. (2013)</p>
T3.4	<p>Class activity: Presentations</p> <p>Students each give a 10 minute presentation to the class</p> <p>Summative assessment by lecturer, adapting Presentation rubric: Criteria: Contrast the differences in the three papers, and discuss what this means for progression of impacts modelling.</p>	2	

LT3. Topic 4: Social-ecological impacts and vulnerabilities to climate

Outcome

- **Specialised knowledge:** Student is able to demonstrate knowledge of potential climate impacts across a range of sectors/systems important to the region, together with a deep understanding of a particular system of relevance to region/ country
- **Producing and communicating information:** Students are able to write a briefing note that draws on available evidence to translate expert information into policy/ practice relevant information

LT3	Teaching-Learning-Assessment Activity	Hrs	Key resources
T4.1	<p>Class activity: Framing lectures</p> <p>Lectures on key ways that climate might impact on different systems, and the nature of societal vulnerability to these impacts in different socio-economic settings:</p> <ul style="list-style-type: none"> - Systems include: hydrology/water, agriculture/food, ecosystems/biodiversity, human settlements/ infrastructure, (or alternatively health, coastal zone) - Socio-economic settings: urban (formal and informal), rural (commercial, small/subsistence farmer), social difference (gender, age, political voice, etc.) 	4	<p><i>Pick one of the following sectors from the IPCC website:</i></p> <p>[50] IPCC WG 2 (2014) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Chapters on:</p> <ul style="list-style-type: none"> • Freshwater resources / Terrestrial and inland water systems • Coastal systems and low-lying areas / Ocean systems • Food security and food production • Urban areas / Rural areas • Human health: impacts, adaptation, and co-benefits
T4.2	<p>Students: IPCC readings and peer discussion</p> <p>Students to read the IPCC chapters on different system impacts and discuss with peers, to form an integrated understanding of the sensitivities (impacts) of life-support systems in the region to climate change, and the nature of socio-economic exposure to impacts, leading to vulnerability. Students should read and discuss to understand:</p> <ul style="list-style-type: none"> • The key direct and indirect biophysical impacts of climate change on key sectors/systems: water, food and agriculture, natural ecosystems, human settlements and infrastructure • The causes of social and economic exposure to climate risks in region – examples of the 	6	

	nature of vulnerability in different settings		
T4.3	<p>Students: Briefing note</p> <p>Students take a deep dive into impacts and vulnerability on a key sector or setting. Students to undertake detailed reading on the potential impacts, key vulnerabilities, and drivers of vulnerability, of a key regional or national sector / system [Examples might be Zambezi River, regional maize production, natural ecosystems across the region]</p> <p>Students write a briefing note for policy-makers on what the possible vulnerabilities to climate change might be for the system, as well as key uncertainties, and recommendations on how to reduce sensitivity and exposure.</p> <p>Formative feedback by lecturer.</p>	6 4	

Learning Theme 4: Climate Resilient Development and Adaptation

Rationale for Learning Theme

Adaptation to climate variability and change, or climate resilient development, is a near- and medium-term response priority for all African countries. Therefore, understanding the theoretical underpinning of adaptation, how adaptation thinking has evolved, and how it fits into broader development issues is important for any graduate in climate change. At the same time, knowledge of how to approach adaptation policy, planning, practice and financing at different governance scales (national to local) and how policy and practice at these scales interact is important for graduates working on adaptation.

Key concepts to understand prior to the activities in Learning Theme 4:
Climate resilient development, transformative adaptation, adaptive capacity

LT4. Topic 1: Defining adaptation

Outcome

- **Specialised knowledge:** Student is able to demonstrate knowledge of adaptation theory and its application, and history of evolution in thinking, as well as debates on adaptation-development linkages
- **Accountability and independent learning:** Student is able to operate independently and take responsibility for own work
- **Teamwork:** Student demonstrates active listening skills in group discussions
- **Context and systems-thinking:** Student can use the specialist knowledge gained (Climate Risk, Impacts and Vulnerability; Adaptation to climate change) in context, and understands the systemic trade-offs and linkages between adaptation and development.
- **Transdisciplinary thinking:** Student is able to consider academic and practitioner points of view in adaptation and development problems.

LT4	Teaching-Learning-Assessment Activity	Hrs	Key resources
T1.1	<p>Class activity: Lecture and debate on defining adaptation:</p> <p>Lecture introduces key concepts and definitions used in adaptation theory, with illustrations of what this means in practice, using case studies. This includes defining adaptation: typologies of adaptation, adaptation deficit, adaptation capacity, related concepts</p>	2	<p>Readings: [5] Adger et al. (2007) [104] Schipper (2007) [11] Ayers and Dodman (2010)</p>
T1.2	<p>Students: Reading</p> <p>Students read the Key readings and sector readings from LT3, T3, in preparation for the group discussion</p>	5	
T1.3	<p>Class activity: Lecture and debate linking adaptation to development:</p> <p>Introduce the current academic and practitioner debates linking adaptation and development. Explore the literature on adaptation and links to development: Linkages between adaptation and development, the adaptation-development continuum, the challenges of adaptation when there is a development deficit.</p>	2	
T1.4	<p>Students: Group discussion</p> <p>In groups, students look at a particular climate vulnerability and explore how systemic development issues make adaptation difficult</p>	2	
T1.5	<p>ADDITIONAL HOURS</p> <p>Students: Short essay (1500 words)</p> <p>Drawing from the lectures, readings and group discussion, students write a short essay on the challenges of adaptation in a developing country context Formative assessment by peers using Standard analytical essay rubric</p>	4	

LT4. Topic 2: Adaptive capacity, barriers and enablers to adaptation

Outcome

- **Specialised knowledge:** Student is able to demonstrate knowledge of barriers and enablers for adaptation in southern Africa.
- **Reserach literacy:** Student is able to conduct a literature review of adaptive capacity, barriers and enablers, focusing on southern Africa

LT4	Teaching-Learning-Assessment Activity	Hrs	Key resources
T2.1	Students: Preparatory reading Readings on Adaptive Capacity and Barriers and Enablers	8	<i>Intro:</i> [53] IPCC WG2 Klein et al. (2014) Adaptation opportunities, constraints and limits
T2.2	Class activity: Lecture and class discussion Lecture on adaptive capacity, barriers and enablers to adaptation, followed by class discussion drawing from the readings on: <ul style="list-style-type: none"> • What is adaptive capacity, and what does it mean at difference scales? • What are some of the main barriers and enablers to adaptation that have been identified in the literature 	2	<i>Adaptive capacity readings:</i> [41] Engle (2011) [42] Ensor et al. (2015) [85] ODI (2010)
T2.3	Student: Review of key literature (1000 words): Adaptive Capacity and Barriers and Enablers Student draws together the literature on adaptive capacity and barriers and enablers and explores the linkages between these two, via creation of a typology of barriers and enablers. Formative feedback from a peer.	3	<i>Barriers and enablers readings:</i> [108] Spires et al. (2014) [9] Antwi-Agyei et al. (2015)

LT4. Topic 3: Adaptation assessment and planning

Outcome

Knowledge of application: Student is able to understand and evaluate different approaches to undertaking adaptation assessment.

Producing and communicating information: Student produces a 'story of impact'

Stakeholder engagement: Student is able to demonstrate an understanding of the different roles and interactions of different scales of governance in setting adaptation agendas in southern Africa.

LT4	Teaching-Learning-Assessment Activity	Hrs	Key resources
T3.1	Student: Preparatory reading Students read the introductory readings in preparation for the lecture	4	<i>Readings on adaptation assessment:</i>
T3.2	Class activity: Lecture Lecturer introduces adaptation assessment, and some commonly used adaptation assessment approaches, defining the need and purpose of adaptation assessment, as well as a typology of adaptation assessment methods, and examples of resulting adaptation strategies <ul style="list-style-type: none"> • Key concepts in adaptation assessment, and its links to risk management and risk reduction • Governance arrangements for adaptation • Adaptation assessment tools 	2	[132] IPCC WG2. Mimura et al. (2014) Adaptation planning and implementation . [52] IPCC WG2. Jones et al. (2014) Foundations for decision-making [65] Klein et al. (2007) <i>Assessment toolkits:</i> [100] RSA (2012) Let's Respond [116] UKCIP Adaptation wizard
	Student: Key readings Students read examples of adaptation strategies and policies from different scales of governance, and critically evaluate how they interact across scales.	2	<i>Governance arrangement readings</i> [112] Termeer et al. (2015)

T3.4	<p>Class activity: Lecture and class exercise: Governance linkages</p> <p>The lecture provides insights into the roles of different actors, at difference scales of governance, in setting adaptation agendas, in enabling adaptation, and in implementing actions.</p> <p>Classwork maps out the governance linkages between national and local as they effect adaptation.</p>	2	<p><i>Case study readings</i></p> <p>[28] Cartwright et al. (2013)</p> <p>[84] Oettle et al. (2014)</p> <ul style="list-style-type: none"> • Ziervogel <p>[27] CARE Climate Change Information Centre (2013)</p>
T3.5	<p>Students: Case study analysis and presentation</p> <p>Group activity:</p> <p>A group chooses three contrasting adaptation assessment case studies (including a mix of scales and applications, from large infrastructure to community based adaptation). Each member reads and summarises one case study. The group then critically reflects on all the case studies, ranking them by usefulness for a similar situation in their own country, and making recommendations as how the approach could work better in own country.</p> <p>The group then develops a presentation on the findings.</p> <p>Class activity: Presentations with feedback</p> <p>Criteria: Presentation rubric</p> <p>Formative feedback by class</p>	5	

LT4. Topic 4: Deep dive into adaptation in a particular sector

Water, Agriculture, Coastal, Cities, Ecosystems

Outcome **Research literacy:** Student is able to conduct a comprehensive review of leading and current research in the area of adaptation to a particular sector to produce significant insights

Accountability: Student is able to operate independently and take responsibility for own work.

LT4	Teaching-Learning-Assessment Activity	Hrs	Key resources
T4.1	<p>Student: Preparatory reading</p> <p>Student chooses a particular sector (water, agriculture, coastal, cities or ecosystems), and undertakes a deep dive into the climate risks that affect a particular sector and the ways that this sector can adapt to climate change risks. Student reads the Key readings plus sector specific readings in preparation for the assignment.</p> <p><i>Choose ONE of the following sectors:</i></p> <p><i>Water / Ecosystems</i> [50] IPCC Freshwater resources/ Terrestrial and inland water systems [50] Coastal systems and low-lying areas/ Ocean systems</p> <p><i>Agriculture</i> [50] IPCC Food security and food production [30] Connolly-Boutinan and Smit (2015)</p> <p><i>Coastal cities</i> [50] Urban areas / Rural areas [50] Human health: impacts, adaptation, and co-benefits</p>	5	<p><i>Use the IPCC reading and find two more readings:</i></p> <p>[50] IPCC WG 2 (2014) Climate Change 2014: Impacts, Adaptation, and Vulnerability.</p>
T4.2	<p>Student: Report on Risk assessment and evaluation of adaptation options for a particular sector</p> <p>Out of the readings, the student develops a portfolio of options that build resilience to climate change for that sector, providing explanations of the pros and cons of each option.</p>	7	

	<p>Assessment approach: Student submits a brief outline of the report for initial feedback from the lecturer. Student then submits a draft report for feedback from a peer.</p> <p>Summative assessment of final report by the lecturer.</p> <p>Criteria: Content: appropriate portfolio of options that build resilience to climate change; explanations of the pros and cons of each option Style: standard report rubric</p>		
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LT4. Topic 5. Cross-cutting summative assessment task: Adaptation policy

Outcome

- **Accountability and independent learning:** Student is able to operate independently and take full responsibility for own work
- **Problem solving:** Student is able to use specialised skills in identifying, and implementing methods of enquiry for adaptation in the context of CCD; Student understands the consequences of adaptation policies. Student understands the principles of good planning for effective implementation of adaptation policies

Cross-cutting summative assessment task: Adaptation policy	Hrs	Key resources
<p>Students: Group project: Development of Terms of Reference for an adaptation plan</p> <p>Students will use the theory and methods they have been exposed to in LTs 3 & 4 to critically assess a sample of adaptation strategies and then suggest appropriate criteria for an adaptation strategy. Group then draws up a Terms of Reference for the development of a locally relevant climate change adaptation strategy.</p> <p>Workshop and contact time to support student case study assignment.</p> <p>Summative assessment by lecturer (see options for assessing group work at the end of the TLA Plan) Criteria: to be developed by class in advance, using Report rubric</p> <p><i>ToR examples:</i> [136] Alfred Nzo District Municipality</p>	12	<p><i>Class/ students to identify additional resources</i></p> <p><i>Guidelines for preparing a Terms of Reference:</i> [134] My Management Guide (2012)</p>

Cross-Cutting Summative Assessment Task for the Module

- Outcome**
- **Independent learning:** Student is able to operate independently and take responsibility for own work
 - **Producing information:** Student is able to produce a well-structured analytical essay and an Infographic poster
 - **Context and systems-thinking:** Student can use the specialist knowledge gained (energy systems and emissions ; Mitigation of climate change ; Climate risk, impacts and vulnerability; Adaptation to climate change) in context, and understands the complexities and interrelationships between climate changes responses and development

<i>Cross-cutting summative assessment task for the module</i>	<i>Hrs</i>	<i>Key resources</i>
<p>Student: Analytical essay (6000 words) Based on all previous work in the module, student will write an analytical essay that examines the ways in which mitigation and adaptation and development interact, looking for synergies that can contribute towards climate compatible development. Start with a broad overview of mitigation and adaptation, drawing in particular on Suckall et al. (2015), then go deeper into what this means in own context.</p> <p>Criteria: standard analytical essay rubric.</p> <p>Summative assessment by lecturer</p>	16	<p><i>Students draw from the Key and additional resources from across the module, as well as from resources that they have identified.</i></p> <p>[109] Suckall et al. (2015)</p>
ADDITIONAL HOURS		
<p>Student: Infographic Student designs an infographic to represent key findings</p>	2	
<p>Class activity: Presentations of findings In final class session, each student presents Infographic poster.</p> <p>This concludes the module.</p>	2	

Summary of Summative Assessment in the Module

The student's grades are compiled from summative individual and/ or group tasks across the module. Summative assessment measures the student's achievement by comparing it against standard criteria (i.e. the desired module outcomes). Because summative assessment is for marks, it is 'high stakes' and has a motivational effect on student engagement. To avoid contention, it is recommended the lecturer and an independent assessor provide summative assessment, based on clear, explicit and transparent criteria. Standard rubrics are found in the *Assessment Guidelines and Tools* on the ePlatform and can be adapted and weighted as necessary. Careful proactive consideration must be given to ensuring that plagiarism is avoided.

It is recommended that summative tasks account for about 20% of the student notional hours of a module and do not place too big a burden on the lecturer.

<i>LT</i>	<i>Topic</i>	<i>Activity</i>	<i>Subject</i>	<i>Hrs</i>
LT1	T3.3	Report	Estimating national emissions	4
LT 1 & 2		Practical policy development	Develop ToR for a mitigation plan in a local context	12
LT3	T3.3	Presentation	Evolution of impacts modelling	6
LT4	T4.2	Report	Risk assessment and evaluation of adaptation options for a particular sector	7
LT 3 & 4		Practical policy development	Develop ToR for an adaptation plan in a local context	12
Cross-cutting for the module		Analytical essay	Climate Compatible Development: synergies between mitigation, adaptation and development in a local context	16

Possible exam questions

Climate Compatible Development: Discuss the benefits and challenges of taking a climate compatible development approach at the national level. What would some of the challenges be at the local level? Use an example from either the national or local level to support your answer.

Note for printing:

This TLA Plan has been formatted to be printed as an A5 booklet, with a gutter margin. Ensure that you select 'Booklet' on your Printer Settings, under the 'Layout' tab.

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Climate & Development
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