Developing a Masters Training Programme in Innovation and Development

An ideas paper
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1. Introduction

There is currently a dearth of dedicated post-graduate training available in Africa that specifically focuses on the subject area known as ‘innovation and development’ that teaches how to maximise innovations’ potential benefits for economic and social development. A survey conducted by the AfricaLics Secretariat in 2016 found that 9% of respondents (n=22) taught on MSc courses that they felt continued material that taught issues relating to the subject area of innovation and development. Of these only 14 courses were taught in Africa and only one of these actually included the words ‘innovation’ and ‘development’ in the title (an MPhil in Sustainable Innovation at University of Cape Town, South Africa and an MSc in Technological Innovation and Industrial Development at Makerere University, Uganda). The majority of teaching by the respondents appears – from a review of their responses and a desk review of curriculum overviews available on the internet – to be courses or modules within a Masters training programme that focuses wholly, partially or tangentially on the relationship between innovative activity and economic or social development. To the best of our knowledge, there is – at the moment – no Master programmes at African universities dedicated to the study of the relationship between innovation and development.

This is problematic given the focus on innovation at policy level in many African countries. There is increasing recognition of the role innovative activity will have on economic and social development by the African Union through its Science, Technology and Innovation Strategy for Africa (STISA, 2024) launched in 2014 and individual African governments through national level policies. Countries in Africa, notably Kenya and Ghana, are promoting the creation of whole new cities focused on innovation. The 9th edition of the African Economic Conference in November 2014 in Addis Ababa, Ethiopia, co-organised by the African Development Bank (AfDB), United Nations Economic Commission for Africa (ECA) and United Nations Development Programme (UNDP), had the theme ‘Knowledge and Innovation for Africa’s Transformation’. There are increasing numbers of innovation conferences specifically for Africa (notably Innovation Africa) and innovation prizes focused on Africa (e.g. Innovation Prize for Africa (IPA) that awards $150,000 for Africa’s brightest innovators to accelerate Africa’s development), while multinational companies are building research laboratories and innovation centres in Africa (e.g. Philips, IBM, Nokia). Furthermore there is increasing international recognition of the importance of science, technology and innovation as exemplified by the inclusion of innovation in the Sustainable Development Goals (Goal 9 in particular). Likewise, there is increasing recognition of science, technology and innovation (STI) as an important contributor to and ‘game-changer’ in achieving many of the other SDGs.

In addition, employers all over Africa are arguing that graduates they are receiving today are not equipped with the knowledge and skills that are required.1 Despite numerous efforts to improve the contribution of Africa’s education systems to meaningful economic development, there are multiple challenges that remain to be tackled. The following are examples that have been given during experience exchange sessions held with teaching staff at AfricaLics events:

- Curricula often not responsive to real life problems
- Approaches to teaching and learning do not necessarily ensure that students learn to learn
- Many graduates find it hard to find employment and have difficulties applying the theoretical knowledge gained in a way that helps them solve real life problems in communities, firms, ministries etc.
- While the rise of mass education is increasing access to education it has led to issues relating to quality of education, inequity in access etc.

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Many universities are still heavily dominated by traditional disciplines making it difficult for students and researchers to cross boundaries and for multi/inter/trans-disciplinary approaches to research and teaching to take hold

Many universities lack funding for research putting a disproportionate emphasis on teaching work for staff reducing the opportunities for staff and students to engage in research and publication activities

Poor incentive mechanisms (salary scales, bonuses and promotion opportunities) create competition between teaching or university based research work and more lucrative consultancy activities.

In some countries there is a ‘brain drain’ rate up to 40%; partly caused by poor employment possibilities

The AfricaLics network aims to contribute to change this situation through promoting and supporting the development of appropriate training, particularly at post-graduate level, in the field of innovation and development. Over the past three years we have been working to promote the introduction of a module or course within existing Masters programmes (in engineering, economics, development studies or agriculture for example) that introduces students to the concept of innovation, its place in economic and social development and how to research this.

This has not gone far enough however. We believe there is a need for more dedicated complete Masters programmes in ‘Innovation and Development’ on the African continent which provide the opportunity to create skilled graduates with more in-depth understandings of the interrelationships between innovation and development as well as how to promote such interconnections which foster sustainable and inclusive development for African societies. As such, such courses will create the opportunity to develop a new and larger cadre of innovation and development scholars in Africa who are able to study, research and provide relevant advice to businesses and policymakers in opportunistic, new or under-researched topic areas. Such research is essential if innovation and development studies is to take hold in Africa in order that there is sufficient knowledge on the continent not only of how to promote innovation at firm and country level but also how to maximise innovations’ potential benefits for sustainable economic and social development more broadly.

This ideas paper should be seen as inspiration to universities and faculty interested in developing a Masters training programme in ‘innovation and development’ at universities and teaching institutions in African countries. It provides an overall outline of the possible contents of such a programme – while acknowledging that any such course needs to take into account local context and requirements to curriculum development and also to local/national needs and target groups.

The ideas paper also provides details of suggested courses that should be included and the related learning outcomes.

The proposed content for a two year training course includes ten taught courses which we feel provide the minimum skills set for prospective policy researchers and analysts who will populate public and private organisations and contribute to create a cadre of researchers and practitioners dedicated to support the implementation of regional and national strategies and visions concerning how innovation and development studies and research (methodologies and results) can contribute to inclusive and sustainable development in Africa.

To help students become more able to adapt the theoretical knowledge gained from reading course materials and attending lectures, the course outline emphasise that students should, during the second year, undertake a Master’s thesis research project that is focussed on innovation and development issues in Africa.

The course outline builds on a review of existing curricula taught around the world in this area. It draws especially for inspiration from an MSc programme in Innovation, Knowledge and Economic
Dynamics (MIKE-E) at Aalborg University, Denmark which includes a special track on development and innovation issues.

The major objective of this brief report is to suggest a course outline for a Master’s programme in Innovation and Development, which can be considered and adapted to the specific curricular contexts of universities in Africa.

2. What is a Masters in Innovation and Development?

A Masters in Innovation and Development can take different forms, but essentially should be a multidisciplinary programme. It incorporates theory and methods from innovation studies and development studies. Both of these are multidisciplinary subjects themselves also. As such, it involves elements of the disciplinary areas of economics, sociology, politics, history, business and management at a minimum.

A postgraduate Masters training programme in Innovation and Development is focused on training students so that by the end of the course they can answer the following types of questions:

1. Why do some countries develop economically at different rates and in different manners compared to others?
2. How can firms, communities or individuals harness technologies or knowledge that is new to their context in a way that delivers social value and not just business value?
3. What is the role of government and other stakeholders in creating an enabling environment for innovation to take place that leads to sustainable and inclusive development?
4. How can researchers study and understand the relationship between innovation and development concepts and activities?
5. How can universities through research and teaching contribute to inclusive and sustainable development?

Some of the existing courses in Africa and Europe that address research questions are provided in Appendix 1. Note there are only two African programmes listed. These are the only two programmes that focus specifically on innovation and development. The first, at University of Cape Town is however focused much more on practitioners and therefore only partially answers the research questions outlined above.

3. Who is a Masters of Innovation and Development for?

This Master programme would be relevant for:

- Students looking for Master training in the field of innovation and development with a view to pursuing a career either in research or practical work where an understanding of the interlinkages between innovation and development will be useful
- Government employees who want to broaden their knowledge base on the issues with which they work with and assist them in developing and implementing more appropriate policies
- Managers from the private sector who wish to understand why and how to orientate their business towards social value and promotion of inclusive development within their target or impacted communities
- Researchers and academics looking for an academic multidisciplinary specialism that moves them beyond their current disciplinary based focus areas such as economics or engineering or to specialize even more into particular areas of innovation or development studies.
It is possible develop the course for one or more of these target groups depending on the potential markets for students available. To make the programme more attractive to one or more of these groups, it is also possible to work in thematic research themes or pathways through the programme to encourage those from a particular background to apply (e.g. dedicated modules on social innovation for those working in the public sector or energy, health or agriculture pathways for those working in these thematic areas). See section 4 below for more on these possibilities.

That said, some universities have strict policies on admission requirements which can determine the level of eligibility to participate of members of the above three (four?) prospective student groups. The approach taken here is that a Master’s programme in Innovation and Development should target students who have a strong interest and motivation for innovation studies. Suitable academic backgrounds should include (but not be limited to) Bachelor’s Degrees in Development Studies, Economics, Organisational Sciences, Business Management and Public Policy.

### 4. How would you design a Masters in Innovation and Development?

There are three things that must be considered when designing any Masters training programme:

1. The rules and regulations on curriculum design within the university and in your country/region
2. The latest pedagogy on motivating students and ensuring they learn skills and knowledge that will ensure employability
3. The latest theory and practice in the chosen subject area

The first is contextual and individual in nature and therefore this ideas paper cannot talk at length to this matter. That said, a review of some of the existing related Masters programme offerings at four universities in Africa (see Appendix 2) highlight a large variation in rules on contact time, credit systems and assessment types.

On the issue of pedagogy, there has been a broad trend worldwide to acknowledge the benefits of moving from ‘chalk and talk’ or rote based learning approaches to more interactive learning styles in the classroom. However, their ability to be introduced has been mixed. The AfricaLics network, during work conducted between 2014 and 2016 to promote the uptake of a masters module (semester length course) on innovation and development, found that despite much enthusiasm for the use of interactive teaching methods, many obstacles often prevented these from being introduced in African countries. These range from university authorities promoting only exam based assessment, lack of resources in the classroom and in students’ own homes to support project based work, as well as, a general lack of experience among staff of teaching using interactive learning.

In terms of the types of skills and knowledge required, previous work by the AfricaLics Secretariat,² has noted that to be a well-rounded researcher at PhD level requires the knowledge and skills sets outlined in Table 1 below. MSc level requires these same knowledge and skills just not to the same level.

<table>
<thead>
<tr>
<th>Study topic</th>
<th>Material to cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation studies</td>
<td>What is innovation, why it is important for economic and social development – what is the relationship between them?</td>
</tr>
</tbody>
</table>

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The latest theory and practice is usually best found through regular reviews of relevant journals (in this case journals such as ‘Research Policy’, the ‘African Journal for Science, Technology, Innovation and Development’, ‘Innovation and Development’ and the ‘International Journal of Innovation and Sustainable Development’). This can be done through a regular review of such journals or a more general journal paper alert from a relevant journal database (e.g. Scopus or Google Scholar).

That said, all students need to have an understanding of how the current theory and practice came to be dominant and therefore any Masters in Innovation and Development should include an element of the history and context of the field.

Inspiration on how to cover this topic and other elements of the knowledge and skills required will be given below, but can also be found e.g. in the Masters Module on Innovation and Development (http://www.africalics.org/images/docs/ModelMastersModule-outline.pdf) and the good practice guide on PhD Supervision developed by AfricaLics (http://www.africalics.org/images/docs/AfricaLics-GoodPracticePhDSupervisionGuide-Dec15.pdf).

### 5. A sample template of a Masters in Innovation and Development

In Appendices 1 and 2 we have provided overview details of offerings at Masters level at universities in Africa and Europe that focus on innovation and development related issues. However, we thought it would be useful to those considering developing a Masters training programme in Innovation and Development to outline – in a little more depth – the types of classes a student might take and in what mix. In considering this, we have started from the following assumptions:

- A two year training programme with four semesters
- The first year would comprise of taught courses predominately on the theory of innovation and development with examples.
- The second year would comprise a set of methods courses and a period of writing up of a Masters’ thesis, which should take it’s point of departure in real-life problems.
- The courses can be categorized as those that are essential i.e. mandatory and those that are elective or discretionary
- Assessment will take place in both years. We have not specified what this would look like because it very much depends on individual university rules and regulations. However we have provided some guidance for those developing assessments at this level.

An overview of the sample programme is provided in Table 2 below. It is based on the idea that the programme would have the following learning outcomes:

<table>
<thead>
<tr>
<th>Area</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science and technology studies</td>
<td>How do people interact with science, technology and innovation?</td>
</tr>
<tr>
<td>Development studies</td>
<td>What explains uneven economic and social development across and within countries? What factors influence this development?</td>
</tr>
<tr>
<td>Econometrics</td>
<td>How can we test hypotheses about the interaction between innovation and development using maths and statistics?</td>
</tr>
<tr>
<td>Mixed methods</td>
<td>How can a mix of quantitative and qualitative research methods provide a means to study innovation and development?</td>
</tr>
<tr>
<td>Journal writing skills</td>
<td>How to write a paper in this field with academic rigour and how to approach a journal/ the journal submission process</td>
</tr>
<tr>
<td>Communicating results</td>
<td>Identification of stakeholders, understanding and practicing different communication forms (policy briefs, social media postings, newspaper articles etc.)</td>
</tr>
</tbody>
</table>
To enable students gain knowledge and understanding of core theoretical underpinnings, perspectives and debates of innovation, entrepreneurship, learning and competence building systems in a national/global context

To enable students gain knowledge and understanding of different theories of economic and social development and how innovation can support or hinder that development

To provide students with skills to be able to analyse the national innovation systems of African countries in an international context

To provide students with skills to be able to analyse and understand the role of social, organisational, political and institutional conditions of nation-states on learning and competence development processes

To ensure students understand different approaches to translating research methods and findings in the field of innovation and development into policy and practice.

Table 2: A sample overview of a sample Masters training programme in innovation and development

<table>
<thead>
<tr>
<th>Year 1</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Semester 1</td>
<td>4-6 courses depending on university regulations on credit hours etc. such as:</td>
<td>Most likely 1-2 courses from any number of options that are relevant and available from across the university and rules on credit transfer across departments/faculties. Electives could be courses such as:</td>
<td>Either coursework based (marked assignments for each course) or exams.</td>
</tr>
<tr>
<td>Semester 2</td>
<td>- Innovation and Development</td>
<td>- Energy and development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- History and theory of innovation studies</td>
<td>- Health and development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Systems of innovation</td>
<td>- The development of the African nation state</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Markets, firms and industrial dynamics</td>
<td>- Macro-economic theory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- The political economy of innovation and development</td>
<td>- Development economics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Innovation policy for developing countries</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 1</td>
<td>2-4 courses depending on university regulations on credit hours etc. such as:</td>
<td>Most likely 1-2 courses from any number of options that are relevant and available from across the university and rules on credit transfer across departments/faculties. Electives could be courses such as:</td>
<td>Either coursework based (marked assignments for each course) or exams.</td>
</tr>
<tr>
<td></td>
<td>- Qualitative research methods</td>
<td>- Communicating research results</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Quantitative research method</td>
<td>- An introduction to econometrics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Introduction to statistics</td>
<td>- Utilising mixed methods</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Writing academically</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
An introduction to the content of each of the mandatory courses is provided below.

To ensure that the students do not only attend classes/lectures and read literature on their own, but actually engage actively with the literature and practice the application of theoretical knowledge to real life problems, it is strongly recommended that elements of project- and group based learning and/or other interactive learning methods are used in developing the course. Inspiration on this can be found e.g. in the Master Module on Innovation and Development (insert link).

**Innovation and Development**

The aim of this course should be to introduce students to the role that innovation activities have on, and how they are impacted by, economic and social development. The AfricaLics Secretariat has developed a template for this course, available [here](#). This module will create reflexive practitioners who understand the importance of creating social value as well as business added value.

**History and theory of innovation studies**

An increasing recognition has been placed on innovation as a key enabler of economic development both in developed and developing economies. It is therefore important to understand the conceptual and theoretical origins of innovation. The main objective of this course should therefore be to confer insights into the origins and theories of innovation by looking at the works of prominent innovation thinkers, such as Joseph Schumpeter, Chris Freeman, Bengt-Ake Lundvall, Richard Nelson, Franco Malerba, Jan Fagerberg and in Africa the likes of Mammo Muchie or Dorothy McCormick.

**Systems of innovation**

The major aim of this course should be to confer definitions, origins, applications and merits of the innovation system approach. It should discuss the core theoretical underpinning of the systems perspective in analysing economic and innovation activities and processes at global, national, regional, sectoral and technological levels. The key focus should be on learning, innovation and competence building systems in general and the relevance and application of the innovation system approach to developing countries in terms of designing effective policy aimed at accelerating innovation processes in particular. It should also elaborate on concepts of interactive learning, technology transfer, absorptive capacity and technological catch up, which are relevant to economic growth in the global south.

**Markets, firms and industrial dynamics**

Innovation is a dynamic process and is conducted by individuals, firms and communities. It contains both formal elements of science, technology and innovation (STI) - and informal elements i.e. doing, using and interacting (DUI; tacit knowledge). Research indicates that the most innovative firms are those combining STI and DUI modes of learning. There is a lot of attention on the role of innovation in markets and firms and the implications of this for industrial development. This course should introduce these dynamics, including recognition that innovation takes place both outside and inside firms and comprises both formal and informal elements. It should also explain and discuss the importance of social innovation and how this may or may not be related to industrial dynamics.

**The political economy of innovation and development**

As innovation has become an important activity, shaping its direction, speed and intensity has also become a key policy agenda. However, influencing innovation is not an easy process and often
outcomes are unpredictable. This course should provide insights into what shapes innovation processes, notably the power and politics flows that dominate interactions between stakeholders in the innovation process and the positive or negative impacts this is likely to have on development.

**Innovation policy for developing countries**

The key objective of this course should be to discuss academic literature on innovation policies and explore innovation policy frameworks that have been adopted by international and regional African organizations as well as selected African Governments to enhance learning and innovation capability of firms and R&D institutions.

**Qualitative research methods**

The major objective of this course should be to equip students with the basic skills of designing and conducting qualitative research in innovation and development. Qualitative data collection methods, such as interviewing, observations and exploring secondary data sources and qualitative data analysis techniques, such as thematic coding, categorization and comparative case study approach, should be covered.

**Quantitative research method**

The purpose of this course should be to equip students with skills and competencies of designing and analysing survey data in innovation and development research. The course should introduce and practically guide through the collection and analysis of cross-sectional and panel (survey) data, including basic quantitative research techniques, such as descriptive summary statistics and inferential statistics.

**Introduction to statistics**

This course should introduce students to the role of statistics in data analysis, key statistical techniques and preferably introduce students to one relevant statistical software package.

**Writing academically**

This course should familiarise students on how to creatively and efficiently write scientific reports in English.

6. **Conclusion**

This ideas paper has attempted to provide an outline of a set of considerations for those interested in developing a Masters training programme in Innovation and Development. It has outlined why such a Masters training programme is relevant and considered how it could be designed based on examples from elsewhere. It recognises that there are certain knowledge and skills that any student of innovation and development at post-graduate level should attain but that there are also contextual matters that will determine the exact format and content of each training programme.

If you have questions or queries arising from this paper, please send them to: rebecca@africalics.org.
### Appendix 1: Masters training programme descriptions

<table>
<thead>
<tr>
<th>University</th>
<th>Programme title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Cape Town, South Africa</td>
<td>MPhil in Sustainable Innovation</td>
<td>“The Master of Philosophy specialising in Inclusive Innovation (MPhil) is an interdisciplinary, research-based degree that leads to the development of sustainable solutions for challenges in Africa. Inclusive innovators who take this learning journey will travel through a rigorous academic curriculum right through to practical prototyping of new business models, processes, services or products that help create a more inclusive economy and society at large. Unconstrained by set cultures or organisations, they will work together in a “living lab” environment, where expertise, life experience, passion and innovation all converge to support new possibilities and ideas. In this rich, integrative space, commercial, technological and social innovations all combine to further Africa’s future.”&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Makerere University, Uganda</td>
<td>MSc in Technological Innovation and Industrial Development</td>
<td>“…the main aim of the Master of Science in Technology Innovation and Industrial Development is: To enhance the national capacity for academia and industry to innovate and improve national competitiveness by offering specialized knowledge and skills for implementation of innovation and commercialization projects in industry. In addition, the programme aims at developing the necessary capacity for the national goal of rapid industrialization of the country’s economy and modernization.”&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Sussex University</td>
<td>MSc in Sustainable Development</td>
<td>Formerly entitled ‘Innovation for Sustainable International Development’ this MSc’s description is as follows: “The United Nation’s post-2015 Sustainable Development Goals propose to end poverty and hunger while achieving sustainable production and consumption. The World Bank and other influential international agencies increasingly talk about sustainable development in terms of ‘Inclusive Green Growth’. Yet the different aspects of economic growth, greening and inclusiveness, may be at odds with each other. Strategies to address these challenges are urgently needed by international agencies, NGOs, national ministries and firms in developing countries. This course will help you translate theories of social and technological innovation into effective development policies and practices to achieve genuinely sustainable development.”&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
</tbody>
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<sup>3</sup> http://www.gsb.uct.ac.za/s.asp?p=443
<sup>4</sup> https://cedat.mak.ac.ug/graduate-programmes/master-of-science-in-technology-innovation-and-industrial-development
<sup>5</sup> http://www.sussex.ac.uk/study/masters/2016/3272/33107#course
| Aalborg University, Denmark | MSc in Economics | This MSc provides a specialisation option in **Knowledge, innovation and Economic dynamics** which “focuses on the interaction between knowledge, innovation and economic dynamics in a world characterized by globalization, rapid change and uncertainty. The programme gives the students an opportunity to enhance their knowledge and analytical capability to make profound and reflective economic analyses and the capability to define and implement sustainable strategies in relation to knowledge and innovation.” The MSc in Economics also include a ‘development track’ aimed at directly combining innovation and development issues in Economics. The development track basically consists of a number of elective courses + the possibility to focus your master thesis on innovation and development issues benefitting from supervision from AAU researchers engaged in the field. |

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6 http://www.en.aau.dk/education/master/economics/specialisations/innovation-knowledge-and-economic-dynamics/
Appendix 2: Selected examples of Master’s Degree qualifications, credit systems and assessment

<table>
<thead>
<tr>
<th>Minimum standard qualification</th>
<th>Explanation of Credit Systems</th>
<th>Assessment of Courses</th>
</tr>
</thead>
</table>
| **Kenya (Minimum standard for a Master of Business Administration (MBA))**<sup>7</sup> | - 810 lecture hour  
- 16 courses (12 Core courses, consisting of 8 compulsory core courses and another 4 courses selected from electives)  
- Each course will have three Credit Hours/Factor  
- A research thesis with six Credit Hours/Factor.  
- The minimum number of Credit Hours/factor shall be 54 to complete the programme | One Credit Hour is equivalent to 15 lecture hours. Three Credit Hours/Factor is equivalent to 45 lecture hours (i.e. contact between the lecturer and the student). One course has three Credit Hours/Factor which are equivalent to 45 lecture hours. | Each unit is graded out of 100 marks and pass mark is 50 marks.  
- 70% and above=A  
- 60% to 69%=B  
- 50% to 59%=C  
- Below 50%=F |
| **South Africa (MPhil degree programme in Science and Technology Studies with a specialisation in Research Uptake and Utilisation and General Master’s minimum standard)**<sup>8</sup> | - The centre for research and evaluation, science and technology (Crest) MPhil degree programme in Science and Technology Studies with a specialisation in Research Uptake and Utilisation shows that candidates should successfully complete eight structured modules as well as a research report. The eight modules constitute 120 credits (15 credits each) and the research report 60 credits<sup>9</sup>.  
- According to the South African National Qualifications Framework (NQF), the minimum standard for a masters is:  
  - Exit Level 9  
  - Minimum total credits: 180  
  - Minimum credits at Level 9: 120<sup>9</sup>  
  - Should comprise a significant research component | Each credit awarded equates with ten notional hours of successful learning that includes teaching contact time, i.e. lectures, seminars, tutorials, laboratory work, practical work-based learning, workshops, fieldwork etc. A credit value of 120 credits or more is considered equivalent to a full year of studying a full-time programme (30 academic weeks x 5 working days per week x 8 hours per day). | Modules are assessed by assignments. Students must achieve at least 50% in each of the modules and a grade average of 50% or higher. The research report (approximately 15,000 words) are internally examined and externally moderated. |

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<sup>8</sup> [http://sun025.sun.ac.za/portal/page/portal/Arts/CREST/DRUSSA/MPhil_PhD_STS_RUU.pdf](http://sun025.sun.ac.za/portal/page/portal/Arts/CREST/DRUSSA/MPhil_PhD_STS_RUU.pdf)

<sup>9</sup> Lever descriptors for South African National Qualification system can be found at: [http://www.che.ac.za/sites/default/files/publications/Government%20Gazette%2038116%20October%202014%20HEQSF.pdf](http://www.che.ac.za/sites/default/files/publications/Government%20Gazette%2038116%20October%202014%20HEQSF.pdf)
<table>
<thead>
<tr>
<th>Country</th>
<th>Program Title</th>
<th>Course Duration</th>
<th>Course Details</th>
<th>Assessment</th>
</tr>
</thead>
</table>
| Uganda                       | Master of Science in Technology Innovation and Industrial Development | Four Semesters  | - Plan A (Coursework and Dissertation): total of 11 courses (each with 4 CU) from which two are selected from electives. The third and fourth semesters are devoted to Seminar Series and Project Report, each with 10 CU  
- Total CU (Credit Unit) for graduation is 60  
OR  
- Plan B (Extended Coursework and Project Report): 12 Courses from which 4 are selected from electives, a project work and project report at the fourth semester  
- Similarly, a student needs 60 credit units to graduate | 4 CU in general consists of 45 Lecture Hours, 30 Tutorial hours and 60 Contact Hours. But there is flexibility between lecture hours, tutorial hours, contact hours and practical hours among courses. Assessments are done through coursework which include home assignments, class room and take home tests, project work and presentations and a written examination. Course work carries a total of 40% and written examination carries 60%. Coursework marks are divided into: Assignments 5%, Tests 10% and Project Work 25%. |
- In general a typical two-year master’s degree in Nigeria requires 24 Credits of coursework with an average of B+ and satisfactory completion of a master’s thesis.  
- A one-year Master of Technology at the Federal University of Technology, Yola shows that a total of 31 credits is required to graduate. The master’s programme is comprised of a total of 11 courses from which two are selected from electives.  |