DEPARTMENT OF SCIENCE AND TECHNOLOGY EDUCATION

Research focus areas of the Department (2024)

- Physical science education
- Life science education
- Natural science education
- Geography education
- Environmental education
- Technology and entrepreneurship
- Technology education
- ICT in education
- Indigenous knowledge systems
- Inquiry-based instructions
- Pedagogical content knowledge
- Practical work in science
- Rural education
- Mentoring of novice science teachers
- Language and science teaching and learning
- Teacher thinking/belief/conception
- Physics and chemistry education
- IBL in the senior phase

Research projects that postgraduate students can participate in
Models of supervision
The individual and co-supervision models are used. Co-supervision is mostly done for mentoring purposes and multi, inter and trans-disciplinary (MIT) research. Some supervisors in the College supervise across departments. Students are therefore advised to study the lecturer profiles of other departments in the College when trying to identify a suitable supervisor.

Opportunities regarding external supervision
External supervisors may be considered if a suitable supervisor is not available in the Department. However, this will depend on the financial viability of the Department.

Contact details of the department
Dr P Blose: Nkoana Simon Radipere Building, 7-15; tel: 012 429 2234 e-mail: eblosep@unisa.ac.za
Prof AV Mudau Nkoana Simon Radipere Building, 7-05; tel: 012 429 6353; e-mail: mudauav@unisa.ac.za (CoD)
Research projects that postgraduate students can participate in

Name of project	Brief description of the project	Project leader	No of available positions for MEd students for 2024	No of available positions for PhD students for 2024

E-tutor programme in ODeL	The project explores the online support services for teaching and learning mathematics, science and technology education courses. The research explains the nature and efficacy of practices of online teaching for the improvement of school subjects in the country. Furthermore, it also seeks to study the meanings and practices for the various actors in each specialisation in the college.	Prof MZ Ramorola	2	2
Competitive Programme for Rated Researchers (CPRR)	The project is about recruiting M&D students that can be part of the programme and will be enrolling with UNISA. Their research focus will be on developing scientific language registers for science subjects – Natural Sciences, Physical Sciences, Agricultural Sciences and Life Sciences in indigenous languages.	Prof AV Mudau	10	2
A Strategic Intervention in Mathematics, Science and Technology Education	the project aims at improving mathematics, science and technology teachers' pedagogical content knowledge including the integration of indigenous knowledge. The project is a partnership with the Mathematics, Science and Technology Academy under the auspices of the Department of Basic Education in Mpumalanga.	Prof MT Gumbo	1	0
Youth, indigenous knowledge and the sustainable development goals	The engagement of youth in indigenous knowledge research and education on the sustainable development goals.	Prof S Shava	2	2

Focused M & D programmes

Name of programme	Qualification code	Course work/full research
Master's of Education in Natural Science Education	98448	Research proposal module plus full research dissertation
Master's of Education in Environmental Education	98428	Research proposal module plus full research dissertation
PhD in Education (Streams: Natural Science Education (NSE); Environmental Education (ENE); Technology in Education (TED)	90019	Research proposal module plus full research thesis

Details of individual supervisors and their research interests or fields of expertise

Name of Supervisor	Research interest/field of expertise	**No of positions for MEd students still available for 2023**	**No of positions for PhD students still available for 2023**
Dr P Blose	• Technology Education • Education for Sustainable Development Indigenous knowledge systems	4	2
Mrs J Broadhurst	• Life science education • Natural science education Digitization of Science Education	0	0
Prof L Goosen	ICT in education	2	3
Prof MT Gumbo	• Technology teachers' professional development in pedagogical content knowledge • Indigenous Technology Systems Education • Decolonisation and/or Africanisation of the curriculum • Decolonisation and/or Africanisation of the Postgraduate Education Distance education and e-learning	2	0
Prof H Hebe	• Environmental education/education for sustainable development • Teaching and learning of science in early childhood education • The position of EE in the school curriculum Geography education	4	4
Prof. LDM Lebeloane	• Curriculum studies (decolonizing school curriculum, Environmental Education) • Environmental management in schools • Educational leadership and management • Comparative Education (multicultural education) History of Education	3	2
Prof MV Makokotlela	• Environmental education/education for sustainable development • Indigenous knowledge • OER Education and Technology	0	2
Prof TA Mapotse	• Technology and environment education • Pedagogic content knowledge in TE • Mentoring of novice TE teachers through action research methodologies • TE teacher thinking/belief/conception around TVET and Electrical Engineering • Indigenous knowledge systems in TE • Pan Africanism, Decolonization and Africanization within Education	0	0

	Research on African Continental Free Trade (AfCFTA).		
Prof EO Mashile	• ICT in Education • Educational Technology • Open Distance eLearning • Physical Science Education Learning Analytics	3	2
Dr EN Mazibe	• Science education. • Pedagogical content knowledge. • Science teaching and learning materials: document analysis. Simulations for teaching science	3	2
Dr MM Mcknight	• Teaching and learning of Natural Science and Life science Indigenous Knowledge Systems	0	0
Prof HO Mokiwa	• STEM education • Language in science education Curriculum development of science	0	3
Prof AR Molotsi	• ICT in education • ODL • Educational technology • ODeL • Education management and leadership • Technological, pedagogical and content knowledge (TPACK) • OER • Artificial Intelligence (AI-TPACK) • Synchronous and Asynchronous teaching and learning • Blended teaching and learning e-Portfolio	2	2
Prof AT Motlhabane	• Science education • Physical science education • Natural science education Physics and chemistry education	2	2
Prof AV Mudau	• Teaching and learning of physical science Teaching and learning of natural sciences	0	3
Dr KR Munasi	• Environmental Education/ Education for Sustainable development • Life Sciences Education Natural Science Education	3	0
Dr EC Ndlovu	• Technology education • Indigenous knowledge systems • Pedagogic content knowledge • Natural Science and technology • STEM Curriculum issues • TVET (Technical) ODeL	4	0
Dr TG Ntuli	• Natural Science Education • Physical Sciences Education • Teaching in indigenous languages	0	0
Dr P Photo	• Life science education • Natural science education • Informal learning environment	3	1

	• Practical work in science • Rural education • Mentoring of novice science teachers • Indigenous knowledge systems • Virtual reality		
Mr CA Raseale	• ICT in education Computer-integrated learning	3	1
Dr MZ Sedio	• Technology education • Open Distance Learning • Virtual reality • AI E-tutorship	3	1
Dr NP Shabalala	• Environmental education • Natural science education • Climate change education • Global citizenship education • Indigenous knowledge systems • Education for sustainable development	0	0
Dr Lettah Sikhosana	• Environmental education • Education for Sustainable Development Natural Science education	3	2
Ms Ngakane HM	Technology Education	2	2
Dr Netshivhumbe NP			
Ms MV Chuene	• ICT in Education • Natural Science Education • Physics Education • Chemistry Education Mathematics Education	2	1
Mr S Mampa	• ICT in Education • Information Technology • Computer Applications Technology Mathematics Education	2	0
Prof SB Msezane	• Environmental Education/Education for Sustainable Education • Science Education • Agricultural Sciences Education	2	2

Minimum admission requirements for master's and doctoral studies in the College of Education

Masters' of Education

- An appropriate Bachelor of Education honours degree, or a postgraduate diploma, or a 480 credit Bachelor of Education Degree with a minimum of 96 credits at NQF level 8 in Mathematics Education. The average mark obtained for the degree shall be 60%. All students should have completed a module in research methods and methodologies as part of their previous level 8 qualification. Students who do not meet these requirements may follow an alternative pathway (e.g. RPL, submitting a portfolio or working through a prescribed reading list – refer to Possible alternative pathways). The application should accord with the various research focus areas/areas of specialisation of the Department, the Department's capacity to provide expert supervision and the requisite qualifications listed above.

Doctor of Philosophy (PhD) in Education
An appropriate Master's of Education in Science Education or Environmental Education is required. The average mark obtained for the degree shall be 60%. Students who do not meet this requirement may follow an alternative pathway (e.g. RPL or submit a portfolio – refer to **Possible alternative pathways**). The application should accord with the various research focus areas/areas of specialisation of the Department, the Department's capacity to provide expert supervision and the requisite qualification listed above.
Supporting documentation to be submitted with application

For a master's degree:
All relevant documentation as specified by the Department for Master's and Doctoral Administration Support.

Students should submit a short research outline of 600 to 750 words which sketches the intended research project, the research approach, problem statement, short literature review and a working title. In addition, a list of five scholarly articles and two books that have been consulted to compile the research outline should be provided. These sources should be predominantly recent, with the exception of (classical) theories which can only be found in old sources. The Harvard referencing method should be used. Students should provide a declaration that they have consulted the relevant department's website prior to submitting their application and should propose the name of his/her preferred supervisor. Any form of plagiarism in the research outline is unacceptable.

For a doctorate degree:
All relevant documentation as specified by the Department for Master's and Doctoral Administration Support.

Students should submit a short research outline of 800 to 900 words which sketches the intended research project, problem statement, the research approach, a short literature review and a working title for the project. In addition, a list of ten scholarly articles and four books that have been consulted to compile the research outline should be provided. These sources should be predominantly recent, with the exception of (classical) theories which can only be found in old sources. The Harvard referencing method should be used. Students should provide a declaration that they have consulted the relevant department's website prior to submitting their application and should propose the name of his/her preferred supervisor. Please note that any form of plagiarism in the research outline is unacceptable.

PLEASE NOTE: Students must clearly indicate in their research outline whether they are planning to focus on Natural Science Education or Environmental Education in their PhD. It is therefore imperative that the first heading of the research outline should read: *PhD in Education focusing on Natural Science Education* OR *on Environmental Education.*

Selection procedures followed in the selection of candidates for postgraduate studies
All applications will be considered simultaneously by the Departmental Higher Degrees Committee, the chair of the Department, the director of the School and the head of the Office of Graduate Studies and Research for purposes of fairness and transparency. Only candidates who meet the minimum eligibility criteria will be considered.

The Department's supervision capacity and availability of external supervisors will be the first and most important selection criterion. No applicant will be admitted without a supervisor being allocated to the student. If a student requests to be supervised by a particular supervisor, but the supervisor is not available because of his/her existing supervision load, it is the Department's prerogative to allocate an alternative supervisor (internal or external). Further selection will be done based on the following selection criteria (the weight attached to each criteria is indicated between brackets as a percentage of the overall evaluation): the student's academic record and experience in research (30%); understanding of research methods as displayed in the research outline (30%); academic writing skills (30%); and addressing of past inequalities by taking race, gender and disability status into consideration (10%).

The Department will keep record of all the applications and reasons must be provided for unsuccessful applications.

Possible alternative pathways
The following alternative pathways exist for applicants who do not meet the admission requirements:

- Applicants with degrees that have different structures from normal South African honours or master's degrees, applicants whose degrees do not clearly correspond to the Departments admission requirements (e.g. no mark awarded for previous dissertations, no clear evidence of having completed a research-related module as part of the previous qualification, etc.), or applicants who do not meet the admission requirements but who possess applicable experience in research or working experience relevant to the field of interest, that may qualify them for admission to a master's or doctoral degree will be required to apply for recognition of prior learning (RPL). Prior academic and research activities by the applicant will be evaluated in accordance with formal Unisa RPL procedures and the outcome of the RPL process will be submitted to and approved by the chair of the Department. If the approved outcome of the RPL process is positive, the applicant will be allowed to proceed with an application for admission, subject to all terms and conditions governing the admission process.
- Applicants who apply for a master's degree on the strength of a postgraduate diploma or a 480 credit bachelor's degree with a minimum of 96 credits at level 8 and who have not completed a module in research methodology, will be required to obtain knowledge about research methods and methodology by working through a prescribed reading list which will be forwarded to them by the chair of the Departmental Higher Degrees committee upon request from the student. The student will have to complete and pass a number of assignments related to research methodology. The student may reapply in subsequent years.
- Applicants who do not meet the minimum requirement of 60%, may apply for an alternative pathway by submitting a portfolio containing a motivation letter indicating reasons for wanting to do the qualification and for selecting the specific area he/she is applying for, a CV highlighting experience relevant to the field of interest and evidence of engagement with research which could include one or more of the following: a written report of a scholarly nature, a literature survey, a paper presented at a conference, a published article.

The following alternative pathways exist for applicants whose applications were unsuccessful:

- Students who have been refused admission because of limited capacity within the Department or because their topic was not viable may reapply in subsequent years. It should be clearly indicated that it is a reapplication. The normal selection process will apply in case of reapplications.
- Students who were unsuccessful because of an inadequate research outline, may revise their research outline and may reapply in subsequent years.
- A student whose application was unsuccessful because of inadequate academic writing skills, may reapply in subsequent years provided that he/she can provide proof of measures put in place to improve his/her academic writing skills (e.g. enrolled for and passed a course in academic writing skills).

Application procedures and when to apply
The Department of Science and Technology Education will not make use of differentiated registration dates. Applications for admission and registration will take place in accordance with the dates set by the Department for Master's and Doctoral Administration Support for bulk applications and registrations. Students should

- apply for a student number, following the steps outlined in https://www.unisa.ac.za/sites/corporate/default/Apply-for-admission/Master%27s-&-doctoral-degrees/Apply-for-a-student-number-and-apply-for-admission
- apply for a space in one of the focus areas using the online application process

Once acceptance in the research focus area and the allocation of a supervisor have been confirmed, they may register for the research proposal module.