

CURRICULUM VITAE

LUCAS JOHANNES BARTEL ERASMUS

PERSONAL INFORMATION

Surname: Erasmus
Given Names: Lucas Johannes Bartel
Identity Number: 920610 5130 086 (Scanned copy of Identity Document included in **Appendix A**)
Gender: Male
Nationality: South African
Passport Number: A04546781 (Scanned copy of Passport included in **Appendix B**)
Tax Number: 3151158163
Driving Licence Number: 3004008NH38 (Scanned copy of Driving Licence included in **Appendix C**)
Student Number: 2010028633
Personnel Number: 0871554
Languages: Fluent in English and Afrikaans (verbal and written)

CONTACT INFORMATION

Postal Address: 5 Krokos, Grosskopf Street
Langenhoven Park
Bloemfontein
9301
Cell Phone: +2772 019 6677
E-mail: ErasmusLB@ufs.ac.za

EDUCATION

2010 National Senior Certificate
Sentraal High School, Bloemfontein (BFN), Free State (FS), Republic of South Africa (RSA)
Seven distinctions with an average of 82% - Met the minimum requirements for admission to Bachelor's Degree
(Scanned copies of qualification and academic record included in **Appendix D**)

2011 - 2013 Baccalaureus Scientiae with endorsement in Physics
University of the Free State (UFS), BFN, FS, RSA
Credit based weighted average of 73% - Met the minimum requirements for admission to Baccalaureus Scientiae Honours
(Scanned copies of qualification and academic record included in **Appendix E**)

- 2014 Baccalaureus Scientiae Honours with specialisation in Physics
UFS, BFN, FS, RSA
Credit based weighted average of 73% - Met the minimum requirements for admission to Master of Science by dissertation
(Scanned copies of qualifications and academic record included in **Appendix E**)
- 2015 - 2017 Master of Science by dissertation with specialisation in Solid State Physics with the focus on luminescent materials
UFS, BFN, FS, RSA
Final mark of 81% - Met the minimum requirements for admission to Doctor of Philosophy
(Scanned copies of award letter and academic record included in **Appendix E**)
- 2018 Joint Doctor of Philosophy with specialisation in Solid State Physics
UFS, BFN, FS, RSA, Ghent University (UGent), Ghent (GHT), Flanders (FLD), Belgium (BE)
Currently enrolled
(Scanned copy of proof of registration included in **Appendix F**)

RELEVANT COMPETENCIES

Pulsed Laser Deposition:	2016	Assigned to gain experience in the Pulsed Laser Deposition technique at the Council for Scientific and Industrial Research, Pretoria, Gauteng, RSA.
	2016 - 2022	Appointed to operate, maintain and update the Pulsed Laser Deposition system to meet the demands for the research projects of visiting and in-house Masters, Doctorial students and researchers, UFS, BFN, FS, RSA.
	2017	Assigned to synthesise thin films utilising the Pulsed Laser Deposition technique at the National Institute for Lasers, Plasma, and Radiation Physics, Magurele, Muntenia, Romania.
Fluorescence/ Photoluminescence Spectroscopy:	2016 - 2022	Appointed to operate, maintain and update Fluorescence spectroscopy and Lifetime systems to meet the demands for the research projects of visiting and in-house Masters, Doctorial students and researchers. Planned and performed analysis of samples and interpreted obtained data in accordance with fundamental mechanisms. Wrote technical software to allow interfacing between various hardware, UFS, BFN, FS, RSA.
Electroluminescence:	2016	Assigned to analyse synthesised thin films at the UGent, GHT, FLD, BE.

Auger Electron Spectroscopy:	2014	First-hand Honours level knowledge, operating experience and analysis and interpretation of obtained data, UFS, BFN, FS, RSA.
X-ray Photoelectron Spectroscopy:	2014 - 2017	First-hand Masters level knowledge, operating experience and analysis and interpretation of obtained data, UFS, BFN, FS, RSA.
X-ray Diffraction:	2013 - 2022	First-hand Masters level knowledge, operating experience and analysis and interpretation of obtained data, UFS, BFN, FS, RSA.
Electron Beam Deposition:	2014	First-hand Honours level knowledge, operating experience and synthesis of thin films, UFS, BFN, FS, RSA.

RELEVANT WORK EXPERIENCE

- 2008 – 2017 Audio-visual engineer for weddings, funerals, and music events.
DRC Bloemheuwel, BFN, FS, RSA
- 2015 – 2022 Presenter and Program Developer for public and community shows
Naval Hill Digital Planetarium, BFN, FS, RSA
- 2013 - 2015 Research/Laboratory/Student Assistant at Department Physics (units)
UFS, BFN, FS, RSA
Responsibilities included:
- Repair, replacement of broken parts and general maintenance work on the various instruments in the Department Physics and performing laboratory work as required;
 - Facilitating practical and theoretical sessions for 1st, 2nd, 3rd year and Honours students.
- 2016 – 2018 Junior Lecturer at Department Physics (units)
UFS, BFN, FS, RSA
Responsibilities included:
- Operating, enhancing and maintaining the Photoluminescence and Pulsed Laser Deposition Systems for the research projects of visiting and in-house Masters, Doctoral students and researchers;
 - Repair, replacement of broken parts and general maintenance work on the various instruments in the Department Physics and performing laboratory work as required;
 - Facilitating practical and theoretical sessions for 1st, 2nd, 3rd year and Honours students.

- 2018-2022 Junior Researcher at Department of Physics
UFS, BFN, FS, RSA
- Responsibilities include:
- Operate the Pulsed Laser Deposition Fluorescence spectroscopy including lifetime measurements.
 - Analyse samples, plan and perform the analysis and do data interpretation.
 - Maintain and update research apparatus.
 - Repair and replace broken parts during breakdowns and perform maintenance.
 - Perform laboratory work as required.
 - Conduct research that is aligned with the department's Solid-State Group.
 - Participate in the community service activities of the department.
 - Contribute to the general activities and administrative organisation of the department.

RELEVANT LEADERSHIP EXPERIENCE

- 2009 - 2010 Elected as a member of the Student Representative Council of Sentraal High School
Sentraal High School, BFN, FS, RSA
- 2011 - 2012 Elected as a member of the Management of the UFS Choir
UFS, BFN, FS, RSA

RELEVANT SOFTWARE EXPERIENCE

- Proficient in Microsoft Operating Systems and all Microsoft Office Applications.
- Intermediate to strong programming skills in Microsoft Visual Basic Language. Experience in writing technical software for interfacing between specialised electronic equipment.
- Intermediate three-dimensional design skill. Experience in developing and modifying research apparatus in collaboration with Instrumentation and Electronics Divisions, UFS, BFN, FS, RSA.
- Intermediate Structured Query Language (SQL) skills obtained in industry at Incline, Cape Town, Western Cape, RSA.

PUBLICATIONS

1. L. J. B. Erasmus, H. C. Swart, J. J. Terblans, R. E. Kroon, "Measuring the optical thermometry properties of $\text{La}_2\text{O}_2\text{S}:\text{Eu}$ ", *Proceedings of The 60th annual conference of The South African Institute of Physics*, pp. 422-7, 17 7 2016.
2. L. J. B. Erasmus, H. C. Swart, J. J. Terblans, "Measuring the optical thermometry properties of $\text{La}_2\text{O}_2\text{S}:\text{Eu}$ phosphor material", *South African Journal of Science and Technology*, vol. 35, no. 1, pp. 1, 29 7 2016.

3. L. J. B. Erasmus, H. C. Swart, J. J. Terblans, "Determination of the optical thermometry properties of a phosphor material for application as an optical temperature sensor", *South African Journal of Science and Technology*, vol. 36, no. 1, pp. 1, 2017.
4. B. P. Kore, A. Kumar, L. J. B. Erasmus, R. E. Kroon, J. J. Terblans, S. J. Dhoble, H. C. Swart, "Energy Transfer Mechanisms and Optical Thermometry of $\text{BaMgF}_4 : \text{Yb}^{3+}, \text{Er}^{3+}$ Phosphor", *Inorganic Chemistry*, vol. 57, pp. 288-99, 2018.
5. J. Prakash, V. Kumar, L. J. B. Erasmus, M. Duvenhage, G. Sathiyar, S. Bellucci, S. Sun, H. C. Swart, "Phosphor Polymer Nanocomposite: $\text{ZnO}:\text{Tb}^{3+}$ Embedded Polystyrene Nanocomposite Thin Films for Solid-State Lighting Applications", *ACS Applied Nano Materials*, no. 1, pp. 977-88, 2018.
6. L.J.B. Erasmus, J.J. Terblans, H.C. Swart, "Development of an optical thermometry system for phosphor materials," *Vacuum*, vol. 55, pp. 702-11, 09 2018.
7. T.K. Pathak, A. Kumar, L. J. B. Erasmus, A. Pandey, E. Coetsee, H. C. Swart, R. E. Kroon, "Highly efficient infrared to visible up-conversion emission tuning from red to white in Eu/Yb co-doped NaYF_4 phosphor", *Spectrochimica Acta Part A Molecular and Biomolecular Spectroscopy*, pp. 207, 2018

INTERNATIONAL CONFERENCE CONTRIBUTIONS

1. International Conference on Physics of Advance Materials 2016, "Characterisation and calibration of the optical thermometry properties of $\text{La}_2\text{O}_2\text{S}:\text{Eu}$ phosphor material", Poster Presentation, Cluj-Napoca, Transylvania, Romania.
2. International Conference on Advanced Materials 2017, "Measurement of the optical thermometry properties of $\text{La}_2\text{O}_2\text{S}:\text{Eu}$ phosphor material for application as an optical temperature sensor", Oral Presentation, Bucharest, Muntenia, Romania.

NATIONAL CONFERENCE CONTRUBITIONS

1. South African Conference on Photonics Materials 2015, "Effect of doping concentration on the conductivity and optical properties of p-type ZnO thin films", Poster Presentation, Mabula Game Reserve Lodge, Limpopo, RSA.
2. South African Institute of Physics 2015 Conference, "Measuring the optical thermometry properties of a phosphor", Poster Presentation, Port Elizabeth, Eastern Cape, RSA.
3. Die Suid-Afrikaanse Akademie vir Wetenskap en Kuns 2015 Studentesimposium, "Bepaling van die opto-termiese eienskappe van 'n fosformateriaal om te benut as temperatuur sensor", Oral Presentation, BFN, FS, RSA.
4. South African Institute of Physics 2016 Conference, "Characterisation of the optical thermometry properties of a phosphor material", Oral Presentation, Cape Town, Western Cape, RSA.
5. Die Suid-Afrikaanse Akademie vir Wetenskap en Kuns 2016 Studentesimposium, "Bepaling van die optiese termometrie eienskappe van 'n fosfor materiaal vir toepassing as 'n optiese temperatuur sensor", Oral Presentation, Potchefstroom, North West Province, RSA.
6. South African Conference on Photonics Materials 2017, "Characterisation of the optical thermometry properties of $\text{La}_2\text{O}_2\text{S}:\text{Eu}$ phosphor material", Amanzi Private Game Reserve, FS, RSA.

7. Die Suid-Afrikaanse Akademie vir Wetenskap en Kuns 2017 Studentesimposium, "Ontwikkeling van 'n optiese termometriestelsel vir fosformateriale", Oral Presentation, Pretoria, Gauteng, RSA.

CONFERENCE AWARDS

1. Best M.Sc. Poster Presentations, National Applied Physics Forum, South African Institute of Physics Conference 2015 (Scanned copy of received certificate included in **Appendix G**)
2. Third Place in Oral Presentation Division, Physics and Mathematics Session, National Afrikaans Student Symposium 2015 (Scanned copy of received certificate included in **Appendix G**)
3. Best M.Sc. Oral Presentations, National Applied Physics Forum, South African, Institute of Physics Conference 2016 (Scanned copy of received certificate included in **Appendix G**)
4. First Place in Oral Presentation Division, Physics and Mathematics Session, National Afrikaans Student Symposium 2016 (Scanned copy of received certificate included in **Appendix G**)
5. First Place in Oral Presentation Division, Physics and Mathematics Session, National Afrikaans Student Symposium 2017 (Certificate not yet received)

COURSE CERTIFICATE

Basic Laser Safety Course, National Laser Centre, Council for Scientific and Industrial Research (Scanned copy of received certificate included in **Appendix H**)

RELEVANT MEMBERSHIPS

- South African Institute of Physics, Student Member, Membership number 2016044
- Invited to become a member of the Golden Key International Honour Society, 2012

COMMUNITY SERVICE AND CONTRIBUTIONS TO ACTIVITIES

- Regular public engagement at the Naval Hill Digital Planetarium with a total of 33 public shows up to date.
- Radio and written media interviews with "Radio Rose Stad", "Radio Sonder Grense" and "Bloemnuus".
- Rewarded as a "Highly Commended Photographer" in the 2017 South Africa Science Lens competition.
- Participation in the regional finals of the 2017 FameLab science communication and 2018 Flash Fact competitions.
- Facilitated tour groups during University of 2017 Free State Nanotechnology Facility Tour.
- Facilitated in logistics and organised student excursions to Drakensberg Pumped Storage Scheme, Port Elizabeth, Cape Town, Gariep Dam and the Lowveld.

OTHER INTERESTS

Music: Completed Grade 5 Trinity College London Cello Practical and Grade 5 UNISA Music Theory Examinations.
Nature: Completed numerous hiking trails throughout Southern Africa.
Photography: Three Star rated photographer at Bloemfontein Camera Club.
Travel: Toured a total of fifteen countries across Africa, Europe and North America.

REFERENCES

Prof. H.C. Swart
Department Physics, University of the Free State, Bloemfontein, Free State, South Africa
SwartHC@ufs.ac.za, 051 401 2926

Prof. M.J. Hoffman
Naval Hill Digital Planetarium, Bloemfontein, Free State, South Africa
HoffmaMJ@ufs.ac.za, 051 401 2924

Mr. P.J. Coetzer
DRC Bloemheuwel, Bloemfontein, Free State, South Africa
skriba@ngbloemheuwel.co.za, 051 447 7468

I, hereby, declare that all the information contained in this document is true and updated to the best of my ability.



Lucas Johannes Bartel Erasmus
Junior Researcher

Department Physics
University of the Free State, Bloemfontein, Free State, South Africa
Cell Phone: +2772 019 6677
E-mail: ErasmusLB@ufs.ac.za

February 2022



Telephone: +2751 401 9666
 Enquiries: Student Academic Services
 Our reference: 2010028633
 E-mail: studentadmin@ufs.ac.za
 6 March 2018

**PROOF OF REGISTRATION
 IT IS HEREBY CERTIFIED THAT
 LJB ERASMUS**

Campus ID: 2010028633

National ID: 9206105130086

Is a full-time registered student at the University of the Free State for 2018. The student is registered for the following qualification and modules:

BC490040-Doctor of Philosophy majoring in Physics					
Module	Class	Term	Description	Campus: Location	Status
PHYS9100	12555	2018 Sem 1	Physics Thesis	MAIN : BFN	Enrolled

It is your responsibility as student to ensure that the information on this document is correct.

Last date for cancellation of modules:

- 01 March 2018: First Semester and Year Modules
- 15 August 2018: Second Semester Modules

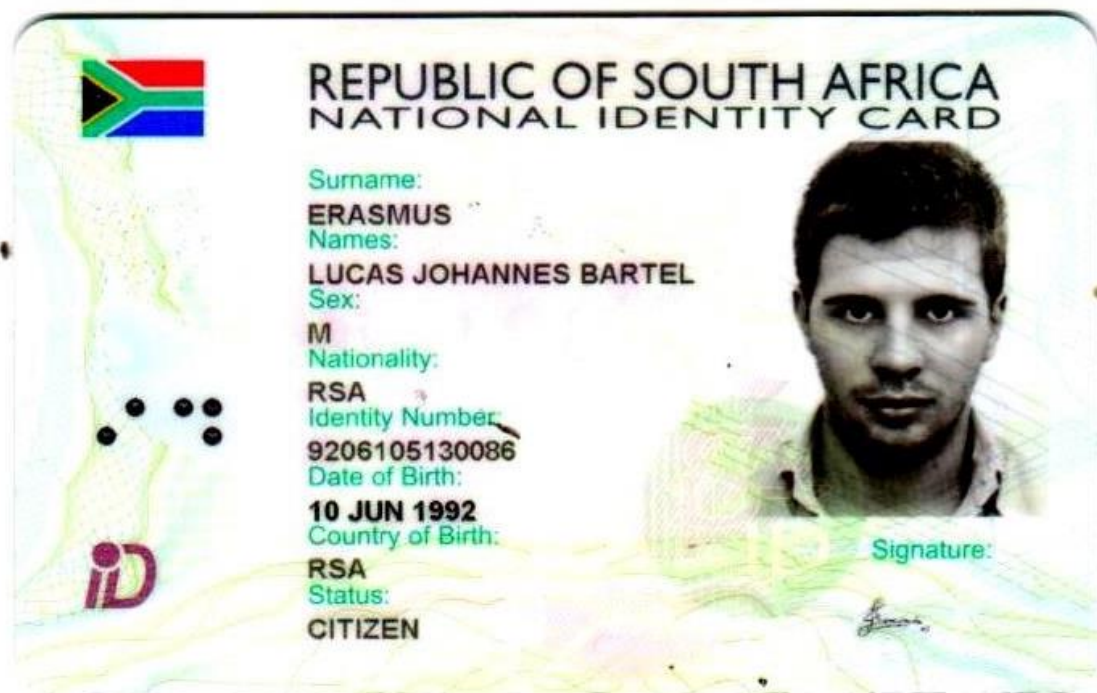



DIRECTOR: STUDENT ACADEMIC SERVICES

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Appendix A

Scanned copy of Identity Document



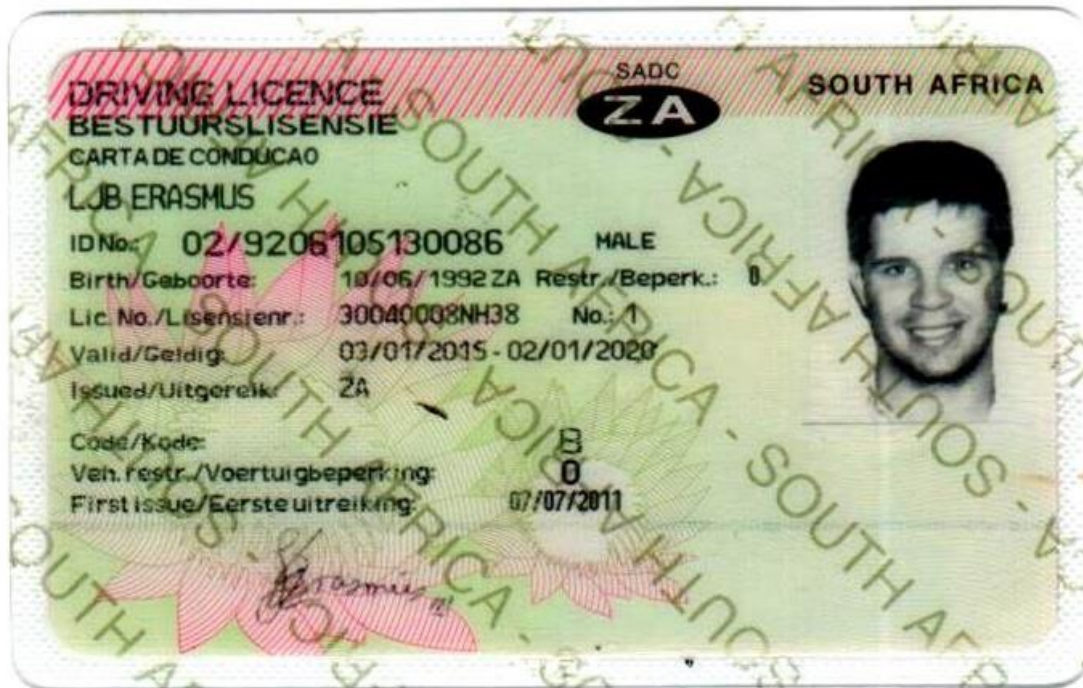
Appendix B

Scanned copy of Passport



Appendix C

Scanned copy of Driving Licence



Appendix D

Scanned copy of National Senior Certificate qualification and results



Appendix E

Scanned copies of B.Sc. and B.Sc. Honours qualifications, Master of Science by dissertation award letter and full academic record



Baccalaureus Scientiae

HAS BEEN CONFERRED UPON
TOEGEKEN IS AAN

ERASMUS, Lucas Johannes Bartel

IN ACCORDANCE WITH THE STATUTES AND
RULES OF THE UNIVERSITY, AS WITNESS
OUR RESPECTIVE SIGNATURES
AND THE SEAL OF THE
UNIVERSITY BELOW.

NADAT AAN DIE STATUTE EN REËLS VAN
DIE UNIVERSITEIT VOLDOEN IS, AS BEWYS
DAARVAN PLAAS ONS ONS ONDERSKEIE
HANDTEKENINGE EN DIE SEËL VAN DIE
UNIVERSITEIT HIERONDER.

ENDORSEMENT: PHYSICS
ENDOSSEMENT: FISIKA


VICE-CHANCELLOR / VISEKANSELIER


REGISTRAR / REGISTRATEUR



13227


DEAN / DEKAAN

BLOEMFONTEIN
2014-04-11
2010028633



UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

THIS IS TO CERTIFY THAT THE DEGREE HIERMEE WORD VERKLAAR DAT DIE GRAAD

Baccalaureus Scientiae Honores

WITH SPECIALISATION IN PHYSICS
MET SPESIALISASIE IN FISIKA

HAS BEEN CONFERRED UPON
TOEGEKEN IS AAN

ERASMUS, Lucas Johannes Bartel

IN ACCORDANCE WITH THE STATUTES AND
RULES OF THE UNIVERSITY, AS WITNESS
OUR RESPECTIVE SIGNATURES
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HANDTEKENINGE EN DIE SEËL VAN DIE
UNIVERSITEIT HIERONDER.


VICE-CHANCELLOR / VISEKANSELIER


REGISTRAR / REGISTRATEUR
ACTING / WAARNEMEND



36222


DEAN / DEKAAN

BLOEMFONTEIN
2015-04-14
2010028633



Tel.: +27 (0) 401 9666
Enquiries: StudentAdmin@ufs.ac.za
Our Ref.: 2010028633
12 March 2018

TO WHOM IT MAY CONCERN

THIS IS TO CERTIFY THAT

LUCAS JOHANNES BARTEL ERASMUS

STUDENT NUMBER: **2010028633**

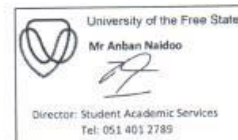
IDENTITY / PASSPORT NUMBER: **9206105130086**

was a registered student at the University of the Free State from 2015 to 2017.

The student complied with all the requirements for the **Master of Science** qualification on 02 March 2018.
The qualification will be conferred on 28 June 2018.

Yours Faithfully

MR A NAIDOO
DIRECTOR: STUDENT ACADEMIC SERVICES



Student Academic Services, 205 Nelson Mandela Drive, Park West, Bloemfontein, 9301, South Africa,
P.O. Box 339, Bloemfontein, 9300, South Africa, E: studentadmin@ufs.ac.za,
T: +27 (0) 51 401 9666, www.ufs.ac.za





ACADEMIC RECORD

STUDENT NUMBER: 2010028633
 SURNAME: ERASMUS
 FULL NAME(S): Lucas Johannes Bartel
 IDENTITY NUMBER: 9206105130086
 BIRTHDATE: 10 June 1992

Date: 12 March 2018

Year	Degree/Module Description	Module	Final Mark	Credits	Result
2011	Bachelor of Science majoring in Physics				
	Basic Computer Literacy	BRS 111	68	4	Pass
	Advanced Computer Literacy	BRS 121	65	4	Pass
	Inorganic and Analytical Chemistry	CEM 114	75	16	Pass with Distinction
	Physical and Organic Chemistry	CEM 124	60	16	Pass
	Mechanics, Optics and Electricity	FSK 114	75	16	Pass with Distinction
	Mechanics, Thermodynamics, Electricity and Magnetism	FSK 124	76	16	Pass with Distinction
	Introductory Astronomy	FSK 154	79	16	Pass with Distinction
	Principles and Practice of Observational Astronomy	FSK 164	87	16	Pass with Distinction
	Calculus	WTW 114	42	0	Fail
	Calculus and Linear Algebra	WTW 144	67	16	Pass
2012	Bachelor of Science majoring in Physics				
	Physical Chemistry	CEM 214	75	16	Pass with Distinction
	Organic Chemistry	CEM 224	60	16	Pass
	Analytical Chemistry	CEM 232	75	8	Pass with Distinction
	Inorganic Chemistry	CEM 242	80	8	Pass with Distinction
	Mechanics, Waves and Optics	FSK 214	68	16	Pass
	Electronics	FSK 224	73	16	Pass
	Practical Work: Physics	FSK 232	80	8	Pass with Distinction
	Electromagnetism	FSK 242	60	8	Pass
	Calculus	WTW 134	96	16	Pass with Distinction
	Mathematical Modelling	WTW 234	71	16	Pass
	Ordinary Differential Equations	WTW 244	62	16	Pass
2013	Bachelor of Science majoring in Physics				
	Analytical Chemistry	CEM 314	67	16	Pass
	Inorganic Chemistry	CEM 324	75	16	Pass with Distinction
	Physical Chemistry	CEM 334	66	16	Pass
	Organic Chemistry	CEM 344	75	16	Pass with Distinction
	Modern Physics	FSK 314	67	16	Pass
	Solid State Physics	FSK 324	77	16	Pass with Distinction
	Statistical Physics I	FSK 332	73	8	Pass
	Statistical Physics II	FSK 342	76	8	Pass with Distinction
	Practical Work : Physics	FSK 352	73	8	Pass
	Practical Work : Physics	FSK 362	68	8	Pass
	Obtained qualification: Bachelor of Science				
2014	Baccalaureus Scientiae Honores: Physics				
	Quantum Mechanics	FSK 601	64	16	Pass
	Solid State Physics I	FSK 602	70	16	Pass
	Research Techniques	FSK 603	67	16	Pass
	Semi-Conductors	FSK 606	63	16	Pass
	Material Science I	FSK 609	93	16	Pass with Distinction
	Electronics	FSK 611	80	16	Pass with Distinction

University of the Free State
 Mr Anban Naidoo
 Director: Student Academic Services

DIRECTOR: STUDENT ACADEMIC SERVICES
 Requested by: Johannes Stone



1/2

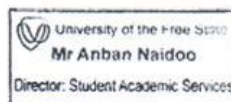


ACADEMIC RECORD

STUDENT NUMBER: 2010028633
SURNAME: ERASMUS
FULL NAME(S): Lucas Johannes Bartel
IDENTITY NUMBER: 9206105130086
BIRTHDATE: 10 June 1992

Date: 12 March 2018

Year	Degree/Module Description	Module	Final Mark	Credits	Result
	Capita Selecta I	FSK 613	71	16	Pass
	Capita Selecta II	FSK 614	76	16	Pass with Distinction
	Practicals	FSK 692	71	32	Pass
Obtained qualification: Bachelor of Science Honours					
2015	Master of Science by dissertation Physics Dissertation	PHYS8900	0	0	Continuation
2016	Master of Science by dissertation Physics Dissertation	PHYS8900	0	0	Continuation
2017	Master of Science by dissertation Physics Dissertation	PHYS8900	81	180	Pass with Distinction
Obtained qualification with distinction: Master of Science					
2018	Doctor of Philosophy majoring in Physics Physics Thesis	PHYS9100		360	---



DIRECTOR: STUDENT ACADEMIC SERVICES
 Requested by: Johannes Stone



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Appendix F

Scanned copy of Doctor of Philosophy proof of registration

UNIVERSITY OF THE
FREE STATE
UNIVERSITEIT VAN DIE
VRYSTAAT
YUNIVESITHI YA
FREISTATA



Telephone: +2751 401 9666
Enquiries: Student Academic Services
Our reference: 2010028633
E-mail: studentadmin@ufs.ac.za
12 March 2018

PROOF OF REGISTRATION
IT IS HEREBY CERTIFIED THAT
LJB ERASMUS

Campus ID: 2010028633

National ID: 92061051300 86

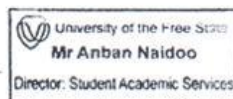
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Last date for cancellation of modules:

- 01 March 2018: First Semester and Year Modules
- 15 August 2018: Second Semester Modules



DIRECTOR: STUDENT ACADEMIC SERVICES



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To whom it may concern

DEPARTMENT OF EDUCATIONAL POLICY
REGISTRAR'S OFFICE

E studentenadministratie@ugent.be
T +32 9 331 00 99

Campus Uits
Sint-Pietersnieuwstraat 33
9000 Gent
www.ugent.be

CERTIFICATE OF ENROLMENT

The Rector of Ghent University
confirms that **Lucas Erasmus**
student number: **01805586**
born on: **10 June 1992 in Bloemfontein**
is enrolled as a student at Ghent University in the academic year 2018-2019 for the following study programme(s):
Doctor of Science: Physics
- under diploma contract
Doctoral Training Programme Ghent University
- under diploma contract
- language of instruction: English
This academic year runs from 24 September 2018 to 22 September 2019.

The Rector per pro

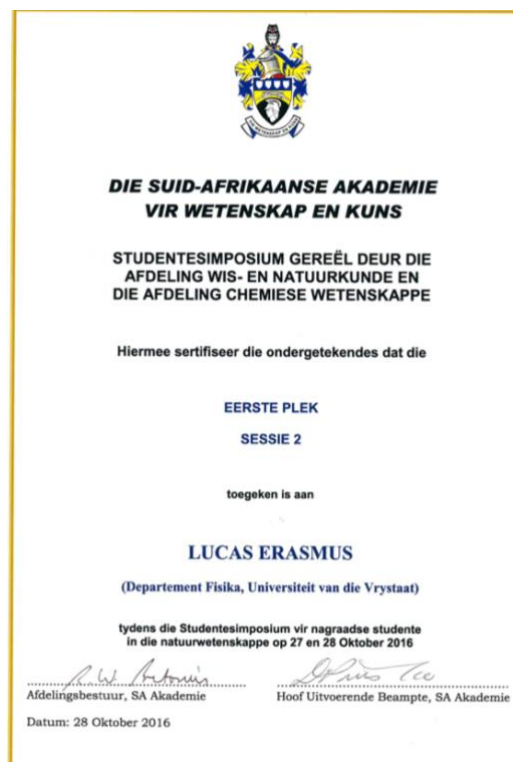
Piet Ruysinck
Head of Registrar's Office


**GHENT
UNIVERSITY**

The institutional number for Ghent University (UGent) is 0004.
This number has been attributed by the Flemish Ministry of Education and
Training.
Check the authenticity on <http://officering.ugent.be/>
with code 62615-act7e-06165-05a52
Printed on: 16/08/2018 Page 1/1

Appendix G

Scanned copies of received certificates



Appendix H

Scanned copies of received certificate

