

UNIVERSITY OF NAIROBI

DEPARTMENT OF GEOSPATIAL & SPACE TECHNOLOGY

VIRTUAL OPEN DAY REQUIREMENTS

An overview of the course offered

Undergraduate

- Bachelor of Science in Geospatial Engineering (F19)

Postgraduate

- Master of Science in Geographic information Systems (F56)
- Master of Science in Geospatial Engineering (F56) - Under Review
- PhD. in Geographic Information Systems (F803)
- PhD. in Geospatial Engineering(F801)

Structure of the courses

BSc. Geospatial Engineering

<u>Year</u>	<u>Semester</u>	<u>Course</u>	<u>Hours</u>	<u>CW</u> %	<u>Exam</u> %	<u>Units</u> (Weight)
Year I	<u>Semester 1</u>	FGE 101: Introduction to Engineering	60	40	60	1.25
		FGE 171: Pure Mathematics A	48	30	70	1
		FGE 173: Applied Mathematics A	48	30	70	1
		FGE 175: Physics A	48	30	70	1
		FGE 177: Informatics A	48	30	70	1
		FGE 181: Philosophy	45	20	80	1
		FGE 183: Communication Skills	45	20	80	1
	<u>Total</u>		<u>342</u>			<u>7.25</u>
	<u>Semester 2</u>	FGE 102: Introduction to Geospatial Engineering	60	40	60	1.25
		FGE 162: Earth Science	48	30	70	1
		FGE 172: Pure Mathematics B	48	30	70	1
		FGE 174: Applied Mathematics B	48	30	70	1
		FGE 176: Physics B	48	30	70	1
		FGE 178: Informatics B	48	30	70	1
		FGE 182: Elements of Economics	45	20	80	1
<u>Total</u>			<u>345</u>			<u>7.25</u>
<i>Total</i>		<u>687</u>			<u>14.5</u>	
Total		687			14.5	

Year II	<u>Semester 1</u>	FGE 231: Geospatial Measurement Techniques	60	40	60	1.25
		FGE 241: Cartographics	60	40	60	1.25
		FGE 261: Electrical Technology	48	40	60	1
		FGE 271: Engineering Mathematics IA	48	30	70	1
		FGE 273: Geophysics	48	30	70	1
		FGE 275: Geometry	48	30	70	1
		FGE 277: Computer Programming	48	60	40	1
		<u>Total</u>	<u>360</u>			<u>7.5</u>
	<u>Semester 2</u>	FGE 232: Topometry	60	40	60	1.25
		FGE 242: Cartography	60	40	60	1.25
		FGE 262: Digital Electronics and Microprocessors	48	40	60	1
		FGE 264: Communications and Signal Processing	48	30	70	1
		FGE 272: Engineering Mathematics IB	48	30	70	1
		FGE 276: Geospatial Statistics	48	30	70	1
		FGE 278: Computer Graphics	48	60	40	1
		<u>Total</u>	<u>360</u>			<u>7.5</u>
		<i>Total</i>	<u>720</u>			<u>15</u>
	<u>Semester 3</u>	FGE 299: Practical Project (8 weeks)	288	100	0	3
		<i>Total</i>	<u>288</u>			<u>3</u>
		Total	1008			18
	Year III	<u>Semester 1</u>	FGE 311: Introduction to Geodesy	60	40	60
FGE 341: Photogrammetry IA			60	40	60	1.25
FGE 345: Remote Sensing Systems			60	40	60	1.25
FGE 347: Geoinformation Systems A			60	40	60	1.25
FGE 349: Geospatial Surface Modelling			48	40	60	1
FGE 371: Engineering Mathematics IIA			48	30	70	1
FGE 373: Numerical Methods			48	30	70	1
<u>Total</u>			<u>384</u>			<u>8</u>
<u>Semester 2</u>		FGE 302: Adjustment Theory	48	40	60	1
		FGE 322: Geospatial Positioning Techniques	60	40	60	1.25
		FGE 342: Photogrammetry IB	60	40	60	1.25
		FGE 344: Digital Cartography	60	40	60	1.25
		FGE 346: Digital Image Processing	48	40	60	1
		FGE 348: Geoinformation Systems B	60	40	60	1.25
		FGE 372: Engineering Mathematics IIB	48	30	70	1
		<u>Total</u>	<u>384</u>			<u>8</u>
		<i>Total</i>	<u>768</u>			<u>16</u>
<u>Semester 3</u>		FGE 399: Practical Project (8 weeks)	288	100	0	3
		<i>Total</i>	<u>288</u>			<u>3</u>

	Total		1056		19	
Year IV	<u>Semester 1</u>	FGE 421: Geospatial Reference Systems	60	40	60	1.25
		FGE 431: Engineering Surveying A	60	40	60	1.25
		FGE 441: Photogrammetry IIA	60	40	60	1.25
		FGE 447: Remote Sensing Applications	60	40	60	1.25
		FGE 433: Hydrographic Mapping	48	40	60	1
		FGE 461: Geotechnical and Foundation Engineering	48	40	60	1
		FGE 463: Water and Environmental Engineering	48	40	60	1
		<u>Total</u>	<u>384</u>			<u>8</u>
	<u>Semester 2</u>	FGE 432: Engineering Surveying B	60	40	60	1.25
		FGE 442: Photogrammetry IIB	60	40	60	1.25
		FGE 444: Digital Photogrammetry	60	40	60	1.25
		FGE 452: Cadastral Surveying	60	40	60	1.25
		FGE 462: Highway and Transportation Engineering	48	40	60	1
		FGE 464: Structural and Deformation Engineering	48	40	60	1
		FGE 466: Spatial Planning and Design	48	40	60	1
		<u>Total</u>	<u>384</u>			<u>8</u>
	<i>Total</i>		<u>768</u>			<u>16</u>
	<u>Semester 3</u>	FGE 400: Geospatial Engineering Camp (2 weeks)	96	100	0	1
		FGE 434: Hydrographic Mapping Project (1 week)	48	100	0	0.5
		FGE 499: Industrial Attachment (8 weeks)	288	100	0	3
		<u>Total</u>	<u>432</u>			<u>4.5</u>
	Total		1200			20.5
Year V	<u>Semester 1</u>	FGE 541: Land Registration Systems	60	40	60	1.25
		FGE 582: Principles of Management	60	40	60	1.25
		FGE 591: Project	96	100	0	2
		<i>Total</i>	216			4.5
	<u>Electives</u>					
	<u>1 Geodesy and Geodynamics</u>					
		FGE 511: Physical Geodesy	48	40	60	1
		FGE 512: Geodynamics	48	40	60	1
		FGE 514: Spherical Astronomy	48	40	60	1
		FGE 516: Map Projections	48	40	60	1
		FGE 517: Time and Timing	48	40	60	1
	<u>2 Positioning and Navigation</u>					
		FGE 521: Satellite Positioning Systems	48	40	60	1

	FGE 523: Navigation Systems	48	40	60	1
	FGE 524: Vehicle Location and Navigation	48	40	60	1
	FGE 525: Telemetry and Data Communication	48	40	60	1
	FGE 526: Marine Positioning and Cadastre	48	40	60	1
	<u>3 Topometry and Measurement Systems</u>				
	FGE 531: Medical Imaging and Topometry	48	40	60	1
	FGE 532: Precision and Industrial Metrology	48	40	60	1
	FGE 533: Mining and Tunnel Surveying	48	40	60	1
	FGE 536: Laser Technology	48	40	60	1
	FGE 537: Structural Deformation Analysis	48	40	60	1
	<u>4 Geoinformatics and Visualisation</u>				
	FGE 542: Cartographic Animation	48	40	60	1
	FGE 543: Close Range Imaging Systems	48	40	60	1
	FGE 544: Web-Based Mapping	48	40	60	1
	FGE 545: Spatial Data Mining	48	40	60	1
	FGE 547: Digital Terrain Modelling	48	40	60	1
	<u>5 Land and Infrastructure Management</u>				
	FGE 551: Land Administration and Management	48	40	60	1
	FGE 552: Land Information Systems	48	40	60	1
	FGE 553: Land Tenure Systems	48	40	60	1
	FGE 554: Facility and Infrastructure Management	48	40	60	1
	FGE 561: Environmental Planning and Management	48	40	60	1
	<i>Total</i>	<i>144</i>			<i>3</i>
	<u>Total</u>	<u>360</u>			<u>7.5</u>
<u>Semester 2</u>	FGE 504: Professional Practice	48	40	60	1
	FGE 544: Geospatial Data Infrastructures	60	40	60	1.25
	FGE 546: Cartographic Map Design and Production	60	40	60	1.25
	FGE 556: Land Law	48	30	70	1
	FGE 582: Management of Engineering Systems	48	30	70	1
	FGE 592: Project	96	100	0	2
	<u>Total</u>	<u>360</u>			<u>7.5</u>
	<u>Total</u>	<u>720</u>			<u>15</u>
<u>Semester 3</u>	FGE 599 Technical Project (4 weeks)	144	100	0	3
	<u>Total</u>	<u>144</u>	<u>100</u>	<u>0</u>	<u>3</u>
	Total	864			18
	<u>Total: Sem1+Sem2</u>	<u>3663</u>			<u>76.5</u>

<u>Total: Sem3</u>	<u>1152</u>	<u>13.5</u>
<u>Total</u> (Session-1+Session-2+Session-3)	<u>4815</u>	<u>90</u>
<u>Total</u> (Year1+Year2+Year3+Year4+Year5)	<u>4815</u>	<u>90</u>

Subject coding system

- 0 General Methodologies
- 1 Geodesy + Geodynamics
- 2 Positioning + Navigation
- 3 Topometry + Measurement Systems
- 4 Geoinformatics + Visualisation
- 5 Land + Infrastructure Management
- 6 General Engineering + The Environment
- 7 Mathematical + Natural Sciences
- 8 Humanities + Social Sciences
- 9 Projects + Practicum

MSc. Geographic Information Systems

CODE:	TITLE	HOURS
FGS 601	Geoinformatics	45
FGS 603	Fundamentals of Mapping	45
FGS 605	Research Methodology	45
FGS 607	GIS Software Systems	45
FGS 609	GIS Database Systems	45
FGS 604	GIS Programming	45
FGS 606	Spatial Data Infrastructure	45
FGS 608	Surface Modelling	45
FGS 610	Digital Cartography	45

FGS 701	GIS Project Management	45
FGS 703	GIS in Practice	45
FGS 705	Project Proposal	45
FGS 722	Research Project	180

ELECTIVES

FGS 707	Digital Photogrammetry	45
FGS 709	Remote Sensing	45
FGS 711	Satellite Positioning Systems	45
FGS 713	Land Information Systems	45
FGS 715	Digital Image Analysis	45
FGS 717	Spatial Data Mining	45
FGS 719	Cartographic Animation	45
FGS 721	Web-Based Mapping	45

Admission Requirements

Bachelor of Science in Geospatial Engineering

Minimum mean grade of C+ with a minimum C+ score in all of the following:

- Mathematics
- Physics and
- Chemistry
- Any group II or III or IV or V

Geography has also been considered in the past.

Course Duration: 5 academic years

Master of Science in Geospatial Engineering

Upper Second Class Honours in Geospatial Engineering or other equivalent qualification acceptable to the University Senate. Past experience may allow holders of Lower Second Class Honors to qualify.

Course Duration: 2 academic years

Master of Science in Geographical Information System

Upper Second Class Honours in any geo-information related field or other equivalent qualification acceptable to the University Senate. Past experience may allow holders of Lower Second Class Honors to qualify.

Course Duration: 2 academic years

PhD

A Master of Science degree in Geospatial Engineering or any other equivalent qualification acceptable to the University Senate.

Course Duration: 3 academic years

Career Options

- Cadastral Surveying & Digital Cadastre
- Engineering Surveying
- Hydrographic Surveying
- Photogrammetric Mapping
- Defense Mapping
- Asset Management and Utilization
- Environmental Management
- Educational Institutions
- Spatial Data Management
- Remote Sensing
- Planning and Urban Development
- Business Mapping
- Land Mapping
- Land Planning
- GIS and GPS Applications
- Cartography

Undergraduate fees structure for Module II (Self sponsored) students

Year	Semester I	Semester II	Other Charges
1 st	80,000.00	80,000.00	24,700.00
2 nd -5 th	80,000.00	80,000.00	19,500.00

Note:

- *The above fee is under review*

- *The fees does not include the cost of books or accommodation*
- *Foreign students outside the East African Community pay 20%.*

Examination Regulations

BSc. Geospatial Engineering

- The common regulations for the degree of Bachelor of Science in the Faculty of Engineering shall apply. These cover admission requirements, course structure and duration, examinations and degree award.
- All course units up to the fourth year of study are compulsory. In the fifth year of study, in addition to the compulsory units, all students will also take up three units from the elective subject areas of *Geodesy and Geodynamics* , *Positioning and Navigation*, *Topometry and Measurement Systems*, *Geoinformatics and Visualisation* , and *Land and Infrastructure Management* . Two of the electives should come from the main elective subject area, with one selected from any of the other elective subject areas. All choices of electives will be subject to approval by the Department.
- All candidates for the degree of B.Sc. (Geospatial Engineering) shall, in addition to the prescribed course-work, satisfactorily complete the following:
 - (a) Practical assignments (preferably on campus) of not less than 8 weeks, in each case, at the end of the second and third years of study designed and supervised by the Department.
 - (b) A hydrographic mapping exercise for not less than seven (7) days at the end of the second session of fourth year of study.
 - (c) Attendance at a university geospatial engineering camp for not less than fourteen (14) days after the second session of the fourth year of study.
 - (d) An industrial attachment of not less than 8 weeks after the geospatial engineering camp and the hydrographic mapping exercise at the end of the second session of the fourth year of study.

***NB:** At the end of the practical assignments, industrial visits, geospatial engineering camp and industrial attachment, as the case may be, each candidate will be required to submit an individual report on the respective exercise(s) which will be examined and assessed as either "satisfactory" or "not satisfactory". Candidates must satisfactorily complete the above tasks before graduating with the degree of Bachelor of Science in Geospatial Engineering.*

MSc. Geospatial Engineering

The common regulations governing examinations for the Master's Degree in the University of Nairobi shall apply.

Written Examination Regulations

- All course units taken in a given semester shall be examined at the end of that semester.
- A candidate for the Master of Science in Geographic Information Systems shall be required to complete all course work and assignments.

- All course units shall be examined by a three (3) hour written examination paper, except the course unit FGS 705.
- The final written examination shall account for 70% of the marks in each course unit, while course work shall account for 30%.
- The pass mark for each course unit shall be 50%.
- A candidate who fails to obtain a pass mark in any course unit shall, on the recommendation of the Board of Examiners and approval by Senate, be allowed to re-sit or re-take the failed units in the next examination semester for a maximum of two times. 5
- A pass obtained by re-sitting/re-taking a course unit shall be recorded as 50% in the student's academic record.
- A candidate who fails a course unit in the second re-sit or re-take, or fails to complete the course in the prescribed time, shall on the recommendation of the Board of Examiners and approval by Senate be discontinued.
- Research Project Report
- Candidates shall be required to submit a research project report to the Department for examination at least two weeks before the end of the second semester.
- The project shall be graded out of 100 marks.
- The final assessment shall be based on the maximum of 70% for the written research project report and 30% for the oral presentation and subsequent defence.
- The pass mark shall be 50%.
- A candidate who fails to obtain the pass mark in the research project report shall on the recommendation of the Board of Examiners be allowed to re-submit the project report up to a maximum of two times.
- A pass obtained after re-submission of the project report shall be recorded as 50%.
- A candidate who fails to obtain the pass mark in the project report at the second re-submission or fails to complete the course within the prescribed period shall on the recommendation of the Board of Examiners and approval by Senate be discontinued.

PhD. Programs

1. **Submission of the Thesis and Examination of the Candidate**
2. At least three months before a thesis is submitted, a candidate shall give notice in writing to the Director of the Board of Postgraduate Studies with copies to the Dean of the Faculty and Chairman of the Department and an abstract outlining the general scope of work.
3. (a) Every thesis submitted for examination shall be in quadruplicate and in loose form, and must include a declaration by the candidate confirming that the thesis has not been submitted for a degree in any other institution of higher learning and that the contents of the thesis are the original work of the candidate. Every thesis shall bear the signature of the supervisor(s) indicating that the thesis has been submitted with his knowledge.

- (b) The final version of the thesis (6 copies) after examination and approval for the award of the degree must be in bound form. All six copies shall remain the property of the University of Nairobi.
4. A thesis submitted for the degree of Doctor of Philosophy must make a distinct contribution to the knowledge and show an understanding of the subject and display originality of thought. It must also include a complete bibliography or references to the materials used in its preparation, whether published or otherwise; and it must also conform to the regulations for the submission of thesis of the University of Nairobi.
 5. The Senate shall, on the recommendation of the Board of the Faculty concerned, appoint in respect of each candidate presenting a thesis, a Board of Examiners consisting of:-
 - (a) Dean of the Faculty as Chairman
 - (b) An external examiner
 - (c) Two internal examiners one of whom must not have supervised the candidate.
 - (d) Two other persons competent in the candidates area of research, and at least one external to the Department, and
 - (e) A representative of the Board of Postgraduate Studies.
 6. The external examiner and the internal examiners shall each be required to submit to Board of Postgraduate Studies within two months, an independent written assessment of the thesis indicating:-
 - (a) whether or not the thesis is adequate in form and content;
 - (b) whether or not the thesis reflects an adequate understanding of the subject and show display for original thought and significant contribution to knowledge and in consequence;
 - (c) whether or not the degree should be awarded;
 - (d) whether or not the thesis make significant contribution to the existing knowledge.
 7. Within a month of the receipt of all examiners reports, the Board of Postgraduate Studies in consultation with the Dean of the Faculty concerned shall convene a meeting of the Board of Examiners at which the Examiners reports, other academic matters arising from the thesis, and the candidates defence shall be considered.

A consolidated report and appropriate recommendation shall be prepared for submission to Senate through the Board of Postgraduate Studies within two weeks. Provisional results shall be released to the candidate after the meeting only where the recommendation of the Board of Examiners is unanimous.
 8. Candidates shall be required to present themselves for oral examinations and the Dean shall inform them of the time and place of the meeting of the Board of Examiners.
 9. Where the recommendation of the Board of Examiners is unanimous for or against the award of the degree, and where such unanimous recommendation is consistent in all respects with the reports of the external examiner and the results of an oral examination, the Director of Board of Postgraduate Studies shall forward such recommendation to the Vice-Chancellor for approval on behalf of the Senate.

10. Where the recommendation of the Board of Examiners is not unanimous, or the recommendation is not consistent in material respects with the matters referred to in regulation 22 it shall be referred to the full Board of Board of Postgraduate Studies for an appropriate recommendation to Senate.
11. The Senate may, on advice of the Board of Examiners and Board of Postgraduate Studies permit a candidate to re-submit a thesis for re-examination in a revised form once only.
Provided that a candidate whose thesis referred under this sub-section shall be required to re-submit it within twelve months.
12. A thesis accepted by the University of Nairobi and subsequently published in part of, in whole and in whatever form, shall bear the inscription "Work forming part of the requirements of the degree of Doctor of Philosophy of the University of Nairobi".

FN Karanja

Prof. F. N. Karanja

Chair,

Dept. of Geospatial & Space Technology