

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

COURSE STRUCTURES

1. Bachelor of Science – ZOOLOGY

Year 1

Semester I		Units
ZOO 110	Basic Zoology I	3
BOT 110	Basic Botany I	3
CHE 110	Basic Chemistry I	3
PHY 110	Basic Physics I	4
MAT 110	Calculus I	3
IRD 100	Communication Skills I	3
IRD 101	Quantitative Skills I	3
	Total Units	22

Semester II		Units
ZOO 111	Basic Zoology II	3
BOT 111	Basic Botany	3
CHE 111	Basic Chemistry II	4
MAT 111	Geometry and Elementary Applied Mathematics	3
PHY 111	Basic Physics II	4
IRD 102	Communication Skills II	3
IRD 103	Development Concepts and Applications	3
	Total Units	23

Year II

Semester I		Units
ZOO 210	Invertebrate Zoology	3
ZOO 211	Basic Concepts in Animal Ecology	3
BOT 210	Cryptogamic Botany	3
BOT 213	Genetics and Evolution	3
CHE 210	Atomic structure and bonding	4
CHE 211	Basic Analytical Chemistry	2
MAT 200	Mathematics and Statistics	3
IRD 105	Post-Independent Kenya and Developmental Issues	3
	Total Units	21

Semester II		Unit
ZOO 212	Vertebrate Zoology	3
ZOO 213	Concepts of Genetics	3
BOT 211	Plant Structure and Function	3
BOT 212	Plant Ecology I	3
CHE 212	Basic Organic Chemistry	3
CHE 213	Basic Kinetics and Thermodynamics	3
CHE 214	Biochemistry	3
	Total Units	21

Year III
Semester I
Required Courses

ZOO 310	Developmental Biology	3
ZOO 311	Histology	3
ZOO 312	Cell and Molecular Biology	3
ZOO 313	Evolutionary Biology	3
COM 300	Computer Science	3
	Recommended Courses and electives	6
	Total Units	21

Elective Courses

BOT 310	Morphogenesis and Developmental Anatomy	3
BOT 311	Plant Taxonomy	3
CHE 310	Inorganic Chemistry I	3
CHE 311	Analytical Chemistry I	3

Semester II

ZOO 314	Physiology I	3
ZOO 315	Arthropod Biology	3
ZOO 316	Mammalogy	3
ZOO 317	Field Course	3
ZOO 321	Industrial attachment	3
IRD 106	Kenya Social Philosophies	3
	Required Courses and electives	6

Required Courses

BOT 312	Microbiology I	3
BOT 313	Plant Physiology I	3
CHE 314	Inorganic Chemistry II	3
CHE 315	Analytical Chemistry II	3

Electives

ZOO 318E	Comparative Endocrinology	3
ZOO 319E	Animal Behavior	3
ZOO 320E	Fresh Water Ecology	3
ZOO 322	Biostatistics	3

Year IV
Semester I

Units

ZOO 410	Immunology I	3
ZOO 411	Marine Ecology	3
ZOO 412	Terrestrial Ecology I	3
ZOO 413	Entomology I	3
ZOO 414	Microbiology of infectious Diseases of animals	3
ZOO 415	Parasitology I	3
ZOO 416	Environmental Physiology	3
	Total Units	21

Semester II

5. Electives + Research Project

ZOO 41E	Immunology II	3
ZOO 418E	Applied Terrestrial Ecology	3
ZOO 418E	Agricultural Entomology	3
ZOO 420E	Medical and Veterinary Entomology	3
ZOO 421E	Parasitology	3
ZOO 422E	Physiology II	3
ZOO 423E	Ichthyology	3
ZOO 424E	Natural History of Kenya	3
ZOO 425	Research Project	6
Total Units		24

2. Bachelor of Science – BOTANY

YEAR ONE

SEMESTER I

BOT 110	Basic Botany	3
ZOO 110	Basic Zoology I	3
CHE 110	Basic chemistry I	3
PHY 105	Physics for Life Sciences I	4
MAT 110	Basic Mathematics Skills	3
IRD 100	Communication Skills I	3
IRD 101	Quantitative Skills I	3
Total Units		22

SEMESTER II

BOT 111	Basic Botany II	3
ZOO 111	Basic Zoology	3
CHE 111	Basic Chemistry II	4
PHY 106	Physics for Life Sciences II	4
COM 110	Geometry and Elementary Applied Mathematics	3
IRD 102	Communication Skills II	3
IRD 103	Development Concepts and Applications	3
		23

YEAR TWO

SEMESTER 1

BOT 210	Cryptogamic Botany	3
BOT 213	Introductory Genetics and Evolution	3
CHE 210	Atomic Structure and Bonding	4
CHE 211	Basic Analytical Chemistry	3
ZOO 210	Invertebrate Zoology	3
ZOO 211	Basic Concepts in Animal Ecology	3
MAT 200	Mathematics and Statistics	3
IRD 200	State, Society and Development	3
		25

SEMESTER II

BOT 211	Plant Structure and Function	3
BOT 212	Plant Ecology	3
CHE 212	Basic Organic Chemistry	3

CHE	214	Biochemistry	3
ZOO	212	Vertebrate Zoology	3
ZOO	213	Introduction to Animal Ecology	3
COM	210	Introduction to Computer Sciences	3
			21

YEAR THREE

SEMESTER I

BOT	310	Morphogenesis and Developmental Anatomy	3
BOT	314	Phycology	3
BOT	315	Applied Plant Ecology	3
BOT	316	Genetics	3
BOT	319	Botany Field Course	3
ZOO	312	Molecular Biology	3
ZOO	322	Biostatistics	3
IRD	305	Entrepreneurship	3
			24

SEMESTER II

BOT	311	Plant Taxonomy of Higher Plants	3
BOT	312	General Microbiology	3
BOT	313	Plant Physiology	3
BOT	317E	Cytogenetics	3
BOT	318E	Plant Biochemistry	3
BOT	320	Mycology	3
BOT	321E	Plant Micro-Propagation	3
BOT	322	Industrial Attachment	3
ZOO	322	Industrial Attachment	3
			24

YEAR IV

SEMESTER I

BOT	410	Introduction to Ecophysiology	3
BOT	411	Plant Pathology	3
BOT	413	Plant Geography	3
BOT	414	Introduction to Plant Biotechnology	3
BOT	416	Plant Cell Biology	3
BOT	417	Economic Botany	3
BOT	421	Botany Research Project	3
BOT	422E	Aquatic Plant Ecology	3
			24

SEMESTER II

BOT	412	Biosystematics	3
BOT	415	Plant Growth and Development	3
BOT	418	Population Genetics & Evolutionary Mechanisms	3
BOT	419	Applied Microbiology	3
BOT	420E	Plant Breeding	3
BOT	421	Botany Research Project	3
IRD	400	Development Project Appraisal	3
BOT	423E	Bacteriology	3
BOT	424E	Virology	3
			21

3. Bachelor of Science- PHYSICS

YEAR I

<u>Semester I</u>	Units
PHY 110 Basic Physics I	4
IRD 100 Communication Skills I	3
IRD 101 Quantitative Skills	3
BOT 110 Basic Botany I	3
CHE 110 Basic Chemistry I	3
MAT 110 Basic Calculus I	3
ZOO 110 Basic Zoology I	<u>3</u>
TOTAL UNITS	22

Semester II

PHY 111 Basic Physics II	4
BOT 111 Basic Botany II	3
CHE 111 Basic Chemistry II	4
MAT 111 Geometry and elementary Applied Mathematics	3
ZOO 111 Basic Zoology II	3
IRD 102 Communication Skills II	3
IRD 103 National Development	3
TOTAL UNITS	23

YEAR II

<u>Semester I</u>	UNITS
PHY 210 Electricity and magnetism	3
PHY 211 Vibration and Waves	3
MAT 210 Calculus	3
MAT 212 Linear Algebra I	3
MAT 214 Vector Analysis	3
CHE 210 Atomic Structure & Bonding	4
CHE 211 Basic Analytical Chemistry	2
IRD 200 State, society and development	<u>3</u>
TOTAL UNITS	24

Course for Wood Science Students

PHY 200 Physics for Wood Science & Technology	3
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Semester II

PHY 212 Modern Physics	3
PHY 213 Electronics I	3
COM 210 Introduction to Computer Science	3
MAT 211 Calculus and Analytical Geometry	3
MAT 213 Linear Algebra II	3
CHE 212 Basic Organic Chemistry	3
CHE 213 Introduction to Kinetics and Thermodynamics	<u>3</u>
TOTAL UNITS	21

YEAR III

<u>Semester I</u>	UNITS	PREREQUISITE	
PHY 310	Mathematical Physics I	3	MAT210&214
PHY 311	Solid State Physics 1	3	
PHY 312	Optics	3	
PHY 313	Electronics II	3	PHY 213
MAT 314	Ordinary Differential Equations	3	

and EITHER ANY TWO OF

MAT 313	Abstract Algebra	3
MAT 317	Numerical Analysis I	3
MAT 318	Fluid Mechanics I	3

OR

CHE 311	Methods of Chemical Analysis	3	CHE211
CHE 313	Chemical thermodynamics and Phase equilibria		3

21

Semester II

PHY 314	Quantum Mechanics I	3	PHY212, MAT314
PHY 315	Electromagnetism	3	PHY 210
PHY 316	Introduction to Material Science	3	
PHY 317	Classical mechanics	3	
COM 310	Computer Programming3	COM210	

and EITHER ANY TWO OF

MAT 312	Complex analysis		3
MAT 316	Methods I	3	MAT314
MAT 319	Advanced Calculus	3	MAT211

OR

CHE 315	Instrumental Analysis	3	CHE311
CHE 317	Electrochemistry	3	

TOTAL UNITS

21

YEAR IV

<u>Semester I</u>	UNITS	PREREQUISITE
PHY 410	Quantum Mechanics II	3
PHY 411	Thermodynamics	3
PHY 412	Workshop & Drawing	3
PHY 413	Mathematical Physics II	3
PHY 414	Solid state Physics II	3
Two electives courses		3
TOTAL UNITS		21

Semester II

PHY 415	Statistical mechanics	3	PHY 411
PHY 416	Atomic and Nuclear Physics	3	PHY 212
PHY 417	Research Project	6	
Three Elective courses		<u>9</u>	
TOTAL UNITS		21	
YEAR IV ELECTIVE COURSES			

SEMESTER I

COURSE	UNITS	PREQ.
PHY 420E Renewable Sources of Energy	3	
PHY 421E Digital Electronics	3	
PHY 422E Applied Material Science and Polymer Physics	3	PHY 316
PHY 424E Measurement and Instrumentation	3	
PHY 425E The Physics of Semiconductor Devices	3	PHY 414
MAT 418 P.D.E.I	3	MAT314
MAT 426 Methods II	3	MAT316

SEMESTER II

PHY 426E	Microwaves	3	PHY 315
PHY 427E	Solar Energy Physics	3	PHY 420E
PHY 428E	Geophysics	3	
PHY 429E	Introduction to lasers	3	
PHY 430E	Electronic circuits and Microprocessors	3	PHY 421E
PHY 431E	Thermodynamics of Materials	3	PHY 316
PHY 432E	Vacuum Techniques	3	
PHY 433E	Computational Physics	3	
PHY 434E	Fourier Optics	3	
PHY 435E	Trouble Shooting digital Circuits	3	PHY 421E
MAT 419	P.D.E.II	3	
MAT 417	Fluid Mechanics II	3	MAT 318

4. BACHELOR OF SCIENCE

BOTANY MAJOR

Year 1

Semester I

Course Code	Course Title	Units
BOT110	Basic Botany I	3
ZOO110	Basic Zoology I	3
CHE110	Basic Chemistry I	4
PHY110	Basic Physics I	4

MAT110	Basic Mathematics	3
IRD100	Communication Skills I	3
IRD 103	Development Concepts and Applications	3
Total		23

Semester II

BOT111	Basic Botany II	3
ZOO 111	Basic Zoology II	3
CHE 111	Basic Chemistry II	4
PHY 111	Basic Physics II	4
MAT 111	Geometry and Elementary Applied Mathematics	3
IRD 102	Communication Skills II	3
IRD 104	Quantitative Skills II	3
Total		23

YEAR 2 SEMESTER I

BOT 210	Cryptogamic Botany	3
BOT 213	Introductory Genetics and Evolution	3
CHE 210	Atomic Structure and Bonding	4
CHE 211	Basic Analytical Chemistry	3
ZOO 210	Invertebrate Zoology	3
ZOO 211	Animal Genetics and Evolution	3
MAT 200	Mathematics and Statistics	3
IRD 200	State, Society and Development	3
Total		25

Semester II

BOT 211	Plant Structure and Function	3
BOT 212	Plant Ecology	3
CHE 212	Basic Organic Chemistry	3
CHE 214	Biochemistry	3
ZOO 212	Vertebrate Zoology	3
ZOO 213	Introduction to Animal Ecology	3
COM 210	Introduction to Computer Science	3
Total		21

Year 3

Semester I

BOT 310	Morphogenesis and Developmental Anatomy	3
BOT 314	Phycology	3
BOT 315	Applied Plant Ecology	3
BOT 316	Genetics	3
BOT 319	Botany Field Course	1
ZOO 312	Molecular Biology	3
STA 300	Biostatistics	3
IRD 305	Entrepreneurship	3
Total		22

Semester II

BOT 311	Plant Taxonomy of Higher Plants	3
BOT 312	General Microbiology	3
BOT 313	Plant Physiology	3
BOT 320	Mycology	3
BOT 322	Industrial Attachment	3
	TWO Electives	6
Total		21

Electives

BOT 317E	Cytogenetics	3
BOT 318E	Plant Biochemistry	3
BOT 321E	Plant Micro-Propagation	3

Year 4**Semester I**

BOT 410	Introduction to Ecophysiology	3
BOT 411	Plant Pathology	3
BOT 413	Plant Geography	3
BOT 414	Introduction to Plant Biotechnology	3
BOT 416	Plant Cell Biology	3
BOT 417	Economic Botany	3
BOT 421	Botany Research Project	3
Total		21

Elective

BOT 422E	Aquatic Plant Ecology	3
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Semester II

BOT 412	Biosystematics	3
BOT 415	Plant Growth and Development	3
BOT 418	Population Genetics and Evolutionary Mechanisms	3
BOT 419	Applied Microbiology	3
BOT 421	Botany Research Project	3
IRD 400	Development Project Appraisal	3
	ONE Elective	3
Total		21

Electives

BOT 423E	Bacteriology	3
BOT 424E	Virology	3
BOT 420E	Plant Breeding	3

ZOOLOGY MAJOR**Year 1****Semester I**

Course Code	Course Title	Units
ZOO 110	Basic Zoology I	3

BOT 110	Basic Botany I	3
CHE 110	Basic Chemistry	4
PHY 110	Basic Physics I	4
MAT 110	Calculus I	3
IRD 100	Communication Skills I	3
IRD 103	Developmental Concepts and Applications	3
Total		23

Semester II

ZOO 111	Basic Zoology II	3
BOT 111	Basic Botany II	3
CHE 111	Basic Chemistry II	4
MAT 111	Geometry and Elementary Applied Mathematics	3
PHY 111	Basic Physics II	4
IRD 102	Communication Skills II	3
IRD 104	Quantitative Skills II	3
Total		23

Year 2

Semester I

ZOO 210	Invertebrate Zoology	3
ZOO 211	Animal Genetics and Evolution	3
BOT 210	Cryptogamic Botany	3
BOT 213	Introductory Genetics and Evolution	3
MAT 200	Mathematics and Statistics	3
CHE 210	Atomic Structure and Bonding	4
CHE 211	Basic Analytical Chemistry	3
IRD 200	State, Society and Development	3
Total		25

Semester II

ZOO 212	Vertebrate Zoology	3
ZOO 213	Introductory Animal Ecology	3
BOT 211	Plant Structure and Function	3
BOT 212	Plant Ecology I	3
CHE 212	Basic Organic Chemistry	3
CHE 213	Introduction to Kinetics and Thermodynamics	3
CHE 214	Biochemistry	3
Total		21

Year 3

Semester I

ZOO 310	Developmental Biology	3
ZOO 311	Physiology and Histology	3
ZOO 312	Cell and Molecular Biology	3

ZOO 313	Evolutionary Biology	3
COM 310	Computer Science	3
	<i>TWO Recommended Courses</i>	6
<i>Recommended Courses</i>		
BOT 310	Morphogenesis and Developmental Anatomy	3
BOT 311	Plant Taxonomy	3
CHE 310	Chemistry of the s and p Block Elements	3
CHE 311	Methods of Chemical Analysis I	3
Semester II		
ZOO 314	Environmental Physiology	3
ZOO 315	Arthropod Biology	3
ZOO 316	Vertebrate Zoology II	3
ZOO 317	Field Course	1
IRD 305	Entrepreneurship	3
STA 300	Biostatistics	3
	TWO Courses: Recommended/Electives	6
	Total	22
<i>Recommended Courses</i>		
BOT 312	Microbiology	3
BOT 313	Plant Physiology I	3
CHE 314	Chemical Kinetics	3
CHE 315	Alicyclic and Heterocyclic Chemistry	3
<i>Electives</i>		
ZOO 318E	Comparative Endocrinology	3
ZOO 319E	Animal Behaviour	3
Year 4		
Semester I		
ZOO 419	Research Project	6
ZOO 410	Immunology	3
ZOO 411	Aquatic Ecology I	3
ZOO 412	Terrestrial Ecology I	3
ZOO 413	Entomology I	3
	ONE Elective	3
	Total	21
<i>Elective</i>		
ZOO 423E	Ichthyology	3

Semester II

ZOO 414	Terrestrial Ecology II	3
ZOO 415	History and Philosophy of Biology	3
ZOO 416	Parasitology I	3
ZOO 417	Physiology I	3
IRD 400	Development Project Appraisal	3
	TWO Electives	6
Total		21

Electives

ZOO 418E	Aquatic Ecology II	3
ZOO 420E	Entomology II	3
ZOO 421E	Parasitology II	3
ZOO 422E	Physiology II	3

CHEMISTRY MAJOR**Year 1****Semester I**

Course Code	Course Title	Units
CHE 110	Basic Chemistry I	4
PHY 110	Basic Physics I	4
MAT 110	Basic Calculus	3
BOT 110	Basic Botany I	3
ZOO 110	Basic Zoology I	3
IRD 100	Communication Skills I	3
IRD 103	Development Concepts and Applications	3
Total		23

Semester II

CHE 111	Basic Chemistry II	4
PHY 111	Basic Physics II	4
MAT 111	Geometry and Elementary Applied Mathematics	3
BOT 111	Basic Botany II	3
ZOO 111	Basic Zoology II	3
IRD 102	Communication Skills II	3
IRD 104	Quantitative Skills II	3
Total		23

Year 2**Semester I**

CHE 210	Atomic Structure and Bonding	4
CHE 211	Basic Analytical Chemistry	3
MAT 210	Calculus	3
STA 210	Probability and Statistics	3

IRD 200	State, Society and Development	3
	Recommended Courses	6

Total 22

Recommended courses

PHY 210	Electricity and Magnetism	3
PHY 211	Vibration and Waves	3
BOT 210	Cryptogamic Botany	3
BOT 213	Introductory Genetics and Evolution	3
ZOO 210	Invertebrate Zoology	3
ZOO 211	Animal Genetics and Evolution	3

Semester II

CHE 212	Basic Organic Chemistry	3
CHE 213	Basic Thermodynamics	3
CHE 214	Biochemistry	3
COM 210	Introduction to Computer Science	3
MAT 211	Calculus and Analytical Geometry	3
	TWO Recommended Courses	6

Total 21

Recommended courses from other departments

PHY 212	Electricity and Magnetism	3
PHY 213	Electronics I	3
BOT 211	Plant Structure and Functions	3
BOT 212	Plant Ecology	3
ZOO 212	Vertebrate Zoology	3
ZOO 213	Introduction to Animal Ecology	3

Year 3

Semester I

CHE 310	Chemistry of the S and P Block Elements	3
CHE 311	Methods of Chemical Analysis I	3
CHE 312	Chemistry of Aromatic Compounds	3
CHE 313	Chemical Thermodynamics and Phase Equilibria	3
CHE 314	Chemical Kinetics	3
CHE 315	Alicyclic and Heterocyclic Chemistry	3
IRD 305	Entrepreneurship	3

Total 21

Recommended courses

PHY 313	Electronics II	3
BOT 314	Phycology	3
ZOO 312	Cell and Molecular Biology	3

Semester II

CHE 316	Analytical Techniques in Structure Determination I	3
CHE 317	Electrochemistry	3
CHE 318	Organo-metallic and Co-ordination Chemistry	3
CHE 319	Stereochemistry and Conformational Studies	3
CHE 320	Industrial Chemistry I	3
CHE 321	Organic Spectroscopy	3
CHE 322	Industrial Attachment	2
COM 310	Computer Science	3
Total		23

Recommended courses

PHY 316	Introduction to Materials Science	3
BOT 312	Microbiology I	3

Year 4**Semester I**

CHE 410	Transition Metal Chemistry	3
CHE 411	Methods of Chemical Analysis II	3
CHE 412	Chemistry of Natural Products	3
CHE 413	Environmental Chemistry	3
CHE 414	Quantum Chemistry	3
CHE 420	Research Project	3
COM 410	Data Processing	3
Total		21

Semester II

CHE 413	Statistical Thermodynamics	3
CHE 414	Industrial Chemistry	3
CHE 415	Environmental Chemistry	3
CHE 416	Organic Synthesis	3
CHE 420	Research Project	3
CHE 419	Chemistry of Natural Products	3
IRD 400	Development Project Appraisal	3
Total		21

Electives

CHE 421E	Chemical Reactivity and Mechanisms	2
CHE 423E	Medicinal Chemistry	2
CHE 424E	Radiochemistry and Nuclear Chemistry	2
CHE 425E	Statistical Thermodynamics	2
CHE 426E	Introduction to Group Theory	2

MATHEMATICS MAJOR**Year 1****Semester I**

Code	Title	Units
MAT 110	Basic Calculus I	3
BOT 110	Basic Botany I	3
ZOO110	Basic Zoology I	3

CHE 110	Basic Chemistry I	4
PHY 110	Basic Physics I	4
IRD 100	Communications Skills I	3
IRD 103	Development Concepts and Applications	3
Total		23

Semester II

MAT 111	Geometry and Elementary Applied Mathematics I	3
BOT 111	Basic Botany II	3
ZOO 111	Basic Zoology II	3
CHE 111	Basic Chemistry II	4
PHY 111	Basic Physics II	4
IRD 102	Communication Skills II	3
IRD 104	Quantitative Skills II	3
Total		23

Recommended courses

CHE 112:	Basic Organic Chemistry (for B. Ed Sc.)	3
PHY 112:	Electricity and magnetism I	3
MAT 112:	Basic Mathematics	3

Year 2

Semester I

MAT 210	Calculus	3
MAT 212	Linear Algebra I	3
MAT 214	Vector Analysis	3
STA 210	Probability and Statistics I	3
IRD 200	State, Society and Development	3
	Two Recommended Courses	6
Total		21

Two Recommended Courses

PHY 210	Electricity and Magnetism	3
PHY 211	Vibrations and Waves	3
CHE 210	Atomic Structure and Bonding	4
CHE 211	Elementary Analytic and Chemistry	3

Semester II

MAT 211	Calculus and Analytical Geometry	3
MAT 213	Linear Algebra II	3
MAT 215	Classical Mechanics	3
STA 211	Probability and Statistics II	3
COM 210	Introduction to Computer Science	3
	Two Recommended Courses	6
Total		21

Recommended Courses

PHY 212	Modern Physics	3
PHY 213	Electronics I	3

CHE 212	Basic Organic Chemistry	3
CHE 213	Basic Thermodynamics	3
Year 3		
Semester I		
Core Courses		
MAT 310	Real Analysis I	3
MAT 314	Ordinary Differential Equations I	3
MAT 315	Operations Research I	3
MAT 317	Numerical Analysis I	3
IRD 305	Entrepreneurship	3
	TWO Recommended Courses	6
Total		21
<i>Recommended Courses</i>		
Applied Mathematics Option		
MAT 318	Fluid Mechanics I	3
MAT 320	Dynamics	3
Statistics Option		
STA 310	Advanced Probability and Statistics	3
STA 311	Sample Surveys	3
Semester II		
Core Courses		
MAT 312	Complex Analysis I	3
MAT 313	Algebra	3
MAT 311	Real Analysis II	3
MAT 319	Advanced Calculus	3
COM 310	Computer Science	3
	TWO Recommended Courses	6
Total		21
<i>Recommended Courses</i>		
Applied Mathematics Option		
MAT 316	Methods I	3
PHY 310	Mathematical Physics I	3
PHY 314	Quantum Mechanics I	3
Statistics Option		
STA 312	Regression Analysis and Analysis of Variance	3
STA 313	Theory of Estimation	3
STA 314	Quality Control and Acceptance Sampling	3
Year 4		
Semester I		
Core Courses		
MAT 410	Rings and Modules	3
MAT 412	Measure Theory	3
MAT 413	Topology I	3
MAT 418	Partial Differential Equations I	3

IRD 400	Development Project Appraisal	3
	<i>TWO Recommended Courses</i>	6
	Total	21

Recommended Courses

Pure Mathematics Option

MAT 421	Complex Analysis II	3
MAT 427	Ordinary Differential Equations II	3

Applied Mathematics Option

MAT 417	Fluid Mechanics II	3
MAT 420	Numerical Analysis II	3
MAT 422	Operations Research II	3

Statistics Option

STA 410	Tests of Hypothesis	3
STA 411	Time Series Analysis and Forecasting	3
STA 412	Probability and Stochastic process	3
STA 413	Statistical Methods of Econometrics	3

Semester II

Core Courses

MAT 411	Field Theory	3
MAT 416	Functional Analysis	3
MAT 419	Partial Differential Equations II	3
COM 410	Data Processing	3
	<i>THREE Recommended Courses</i>	9

Total **21**

Pure Mathematics Option

MAT 414	Topology II	3
MAT 415	Differential Geometry	3
MAT 425	Fourier analysis	3

Applied Mathematics Option

MAT 423	Operations Research III	3
MAT 424	Fluid Mechanics III	3
MAT 426	Methods II	3

Statistics Option

STA 414	Non-Parametric Methods	3
STA 415	Design and Analysis of Experiments	3
STA 416	Sequential Analysis and Decision Theory	3
STA 417	Multivariate Analysis	3

PHYSICS MAJOR

Year 1

Semester I

Code	Title	Units
PHY 110	Basic Physics I	4
BOT 110	Basic Botany I	3
CHE 110	Basic Chemistry I	4
MAT 110	Basic Calculus	3
ZOO 110	Basic Zoology I	3

IRD 100	Communication Skills I	3
IRD 103	Development Concepts	3
Total		23
Semester II		
PHY 111	Basic Physics II	4
BOT 111	Basic Botany II	3
CHE 111	Basic Chemistry II	4
MAT 111	Geometry and Elementary Applied Mathematics	3
ZOO 111	Basic Zoology II	3
IRD 102	Communication Skills II	3
IRD 104	Quantitative Skills II	3
Total		23
Year 2		
Semester I		
PHY 210	Electricity and magnetism	3
PHY 211	Vibration and Waves	3
MAT 210	Calculus	3
MAT 212	Linear Algebra I	3
MAT 214	Vector Analysis	3
CHE 210	Atomic Structure and Bonding	4
CHE 211	Basic Analytical Chemistry	3
IRD 200	State, Society and Development	3
Total		25
Semester II		
PHY 212	Modern Physics	3
PHY 213	Electronics I	3
MAT 211	Calculus and Analytical Geometry	3
MAT 213	Linear Algebra II	3
CHE 212	Basic Organic Chemistry	3
CHE 213	Introduction to Kinetics and Thermodynamics	3
COM 210	Introduction to Computer Science	3
Total		21
Year 3		
Semester I		
PHY 310	Mathematical Physics I	3
PHY 311	Solid State Physics 1	3
PHY 312	Optics	3
PHY 313	Electronics II	3
MAT 314	Ordinary Differential Equations I	3
	TWO Recommended Courses	6
Total		21
<i>Recommended Courses</i>		
MAT 313	Abstract Algebra	3
MAT 317	Numerical Analysis I	3
MAT 318	Fluid Mechanics I	3
CHE 311	Methods of Chemical Analysis	3
CHE 313	Chemical Thermodynamics and Phase Equilibria	3
Semester II		
PHY 314	Quantum Mechanics I	3
PHY 315	Electromagnetism	3
PHY 316	Introduction to Material Science	3

PHY 317	Classical Mechanics	3
COM 310	Computer Science	3
	TWO Recommended Courses	6
	Total	21

Recommended Courses

MAT 312	Complex Analysis I	3
MAT 316	Methods I	3
MAT 319	Advanced Calculus	3
CHE 316	Analytical Techniques in Structure Determination I	3
CHE 317	Electrochemistry	3

Year 4

Semester I

PHY 410	Quantum Mechanics II	3
PHY 411	Thermodynamics	3
PHY 412	Workshop and Drawing	3
PHY 413	Mathematical Physics II	3
PHY 414	Solid State Physics II	3
PHY 417	Research Project	3
	ONE Recommended Courses	3

Total 21

Recommended Courses

PHY 420E	Renewable Sources of Energy	3
PHY 421E	Digital Electronics	3
PHY 422E	Applied Material Science and Polymer Physics	3
PHY 423E	Seminar in Applied Physics	3
PHY 424E	Measurement and Instrumentation	3
PHY 425E	The Physics of Semiconductor Devices	3
MAT 418	Partial Differential Equations I	3
MAT 426	Methods II	3

Semester II

PHY 415	Statistical Mechanics	3
PHY 416	Atomic and Nuclear Physics	3
PHY 417	Research Project	3
	THREE Recommended Courses	12

Total 21

Recommended Courses

PHY 426E	Microwaves	3
PHY 427E	Solar Energy Physics	3
PHY 428E	Geophysics	3
PHY 429E	Introduction to Lasers	3
PHY 430E	Electronic Circuits and Microprocessors	3
PHY 431E	Thermodynamics of Materials	3
PHY 432E	Vacuum Techniques	3
PHY 433E	Computational Physics	3
PHY 434E	Fourier Optics	3
PHY 435E	Trouble Shooting Digital Circuits	3
MAT 419	Partial Differential Equations II	3
MAT 417	Fluid Mechanics II	3

5. Bachelor of Science in Natural Resource Management

FIRST ACADEMIC YEAR – FIRST SEMESTER

NRM 111	Introduction to Natural Resource	3 Units
NRM 112	Human Ecology	3Units
NRM 113	Technical Writing Skills	3 units
PHY 105	Physics for life science I	3 units
MAT 110	Calculus	3 units
BOT 110	Basic Botany I	3 units
CHEM 110	Basic Chemistry I	3 units
	Total	22Unit

FIRST ACADEMIC YEAR – SECOND SEMESTER

NRM 121	Education, Science and Technology Development	3 units
NRM 122	Information and Communication Technology	3 units
NRM 123	Public Speaking and Communication Skills	3 units
NRM 124	Concepts of Ecology	2 units
PHY 106	Physics for life science II	4 units
CHEM 111	Basic Chemistry II	4 units
MAT 111	Geometry and Applied Elementary Mathem	3 units
TEC 107	HIV/ AIDS Awareness	2 units
	Total	24 Unit

SECOND ACADEMIC YEAR – FIRST SEMESTER

NRM 211	Survey, Remote Sensing and Aerial Interpretation	3 Units
NRM 212	Principles of Economics	3Units
NRM 213	Microbiology for Natural Resource Studies	3 units
NRM 214	Mineralogy and Petrology	3 units
FOR 210	Introductory Statistics	3 units
FOR 214	Introduction of soil science	3 units
MAT 201	Mathematics for Natural Resource Management	2 units
FOR 210	Forestry	3 units
	Total	23Unit

SECOND ACADEMIC YEAR – SECOND SEMESTER

NRM 221	Geographical Information Systems	3 Unit
NRM 222	Statistics & Computer Aided Statistical Application	3Units
NRM 223	Information & Communications Technology II	3 units
NRM 224	Introductory Biodiversity	3 units
NRM 225	Management of Arid and Semi –Arid Lands	3 units
NRM 226	Hydrology and watershed Management	3 units
ECC 221	Energy, Environment and Climate Changes	3 units
FOR 227	Soil survey, classification and land use planning	3 units
	Total	24Uni

THIRD ACADEMIC YEAR – FIRST SEMESTER

NRM 311	Concepts of Environmental Science	3 Units
NRM 312	Natural Resource Economics	3Units
NRM 313	Human Resource Management	3 units
NRM 314	Analytical Techniques for Natural Resource Management	3 units
NRM 315	Conflicts in Natural Resource Management and Utilization	3 units
NRM 316	Biodiversity Conservation and Management	3 units
NRM 317	Wildlife Resource Management	3 units
AFR 318	Rangeland Management	3 units
Total		24Units

THIRD ACADEMIC YEAR – SECOND SEMESTER

NRM 321	Environmental Impact Assessment	3 Units
NRM 322	Coastal and Marine Resource Management	3Units
NRM 323	Scientific & Research Methods	2 units
NRM 324	Forest Assessment & Management	3 units
WRM 32	Watersheds Management & Conservation	3 units
WRM 32	Aquatic and Wetland Resource Management	3 units
WRM 32	Pollution Control Measures and Risk Assessment	3 units
NRM 326	Mineral Exploration	3 units
Total		23Units
NRM 410	NATURAL RESOURCE MANAGEMENT INTERNSHIP	6 Units

FOURTH ACADEMIC YEAR – FIRST SEMESTER

WST 411	Business Economics & Financial Accounting	3 Units
NRM 412	Natural Resource Policy and Law (3 units)	3Units
NRM 413	Coastal Wetlands and Marine Parks Management	3 units
NRM 414	Climate Change and Natural Resources	3 units
NRM 415	Community – based Natural Resource Management	3 units
WRM 41	Waste Water management	3 units
	One Elective Course	3 units
Total		21 unit
NRM 420	Special Project in Natural Resource Management Seminar	6 units

FOURTH ACADEMIC YEAR – SECOND SEMESTER

NRM 421	Gender & Natural Resource Management	3 Units
NRM 422	Project and Management (3 units)	3Units
NRM 423	Natural Hazards, Disaster Preparedness & Management	3 units
NRM 424	Entrepreneurship & Marketing Management	3 units
NRM 425	Environmental policy & socio- economic values	3 units
AFR 421	Management of Degraded Lands	3 units
	One Elective Course	3 units
		21 unit

ELECTIVE COURSES

NRM 431	Forestry and Rural Development	3 Units
NRM	Community Wildlife Management	3Units

432E		
NRM	Integrated Natural Resource Management	3 units
433E		
NRM	Conservation Biology	3 units
434E		
NRM	Protected Area Management	3 units
435E		
NRM	Eco Tourism	3 units
436E		
NRM	Dry land Forestry Practices	3 units
437E		
NRM	Natural Resource and Environmental Quality	3 units
438E		
NRM	Ornithology and Mamma logy	3 units
439E		

6. BACHELOR OF ENVIRONMENTAL STUDIES (SCIENCE)-BES (SCIENCE)

Year 1

Semester 1

Code	Course Title	Units
IRD 100	Communication skills I	3
IRD 101	Quantitative Skills I	3
ECO 110	Introduction to Micro Economics	3
CHE 110	Basic Chemistry I	3
BOT 110	Basic Botany I	3
ZOO110	Basic Zoology I	3
PHY 110	Basic Physics I	3
SES 100	Introduction to Environment and development	3

SEMESTER II

Code	Course Title	Units
IRD 102	Communication Skills II	3
IRD 103	Development Concepts and Application	3
IRD 104	Quantitative Skills II	3
PHY 106	Physics for life Sciences II	3
BOT 111	Basic Botany II	3
ECO 111	Introduction to Macro Economics	3
CHE 111	Basic chemistry II	3
ZOO III	Basic Zoology	3

Year 2

Semester 1

Code	Course Title	Units
IRD 200	State, Society and development	3
SES 200	Introduction to environmental law and policy	3
SES 201	Principals of environmental biology	3
SES 202	Computer applications in Environmental management	3
SES 203	Earth Materials, Physical processes and the environment	3
SES 204	Introduction to atmospheric processes	3
SES 205	Introduction to Human Ecology	3
SES 206	Introduction to remote Sensing	3

Semester II

Code	Course Title		Units
SES 210	Introduction to environmental Pollution		3
SES 211	Environmental ethics and Phylosophy	3	
SES 212	Introduction to Geographic information systems	3	
SES 213	Basic ecology and biodiversity		3
SES 214	Society, poverty and environment		3
SES 215	Introduction to economics of Natural Resources		3
SES 216	Land use and Environment		3

Year 3**Environmental Biology and Health****Semester 1**

Code	Course Title		Units
EBH 300	Environmental stress on Flora and Fauna		3
EBH 301	Environment Health, Food and Nutrition	3	
EBH 302	Water Health and sanitation		3
EBH 303	Terrestrial tropical communities and their conservation		3
EBH 304	Environmental epidemiology		3
EBH 305	Genetics and evolution		3
EBH 306	Environmental Chemistry	3	

Semester 2

Code	Course Title		Units
SES 300	Research methods in Environmental Studies	3	
SES 311	Environmental field techniques	3	
SES 312	Environmental Education and Extension		3
EBH 310	Environmental Education and Extension		3
EBH 311	Soil and Water Pollution control		3
EBH 312	Fundamentals of medical geology		3
EBH 313	Wetland ecology and Conservation		3

Year 4**Semester 1**

Code	Course Title		Unit
SES 401	Project in Environmental Studies	3	
SES 410	Environmental conservation strategies	3	
SES 402	Industrial Attachment		3
EBH 400	Waste water management		3
EBH 401	Conservation Biology		3
EBH 402	Environmental toxicology		3
EBH 403	Environmental Health technologies		3

Semester II

Code	Course Title		Unit
SES 400	Project in Environmental Studies	3	
SES 410	Techniques for assessing environmental impacts		3
EBH 410	Biotechnology		3
EBH 411	Ecological techniques and Biometry	3	
EBH 412	Pollution processes in tropical Ecosystems		3
EBH 413	Environmental Microbiology	3	
EBH 414	Wildlife Ecology and Management	3	
EBH 415	Environmental Hazards		3

Year 3

Environmental hydrology**Semester 1**

Code	Course Title	Unit
EES 300	Introduction to stratigraphy and Historical Geology	3
EES 301	Igneous Petrology	3
EES 302	Metamorphic petrology	3
EES 303	Sedimentary petrology	3
EES 304	Palaeontology	3
EES 305	Isotope Geology	3
EES 306	Surface Hydrology	3

Elective course

EPM 304	Remote sensing and Image Interpretation	3
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Environmental Geology**Semester 1**

Code	Course Title	Unit
SES400	Project in environmental studies	3
SES401	Environmental conservation strategies	3
SES402	Industrial attachment	3
EES404	Geology of Kenya	3

EES405	Marine Ecology	3
EES406	Micropalaentology	3
EES407	Quaternary geology of Kenya	3

Environmental Meteorology**Semester 1**

Code	Course Title	Unit
SES400	Project in environmental studies	3
SES401	Environmental conservation strategies	3
SES402	Industrial attachment	3
EES408	Climatology and development	3

EES409	Artmospheric Physics	3
EES426	Practicals on Meteorological observation I	3
EES427	East African Palaeo climate	3

Semester II

Code	Course Title	Unit
EES415	Environmental Hazards	3

Environmental Hydrology**Semester II**

Code	Course Title	Unit
EES410	Coastal Processes	3
EES411	Practical Observation in meteorology	3
EES412	Stable Isotopes	3
EES413	Aquatic Chemistry	3
EES415	Environmental Harzards	3
EES414	Ground water Exploration	3
EES416	Surface hydrology II	3

Environmental Geology**Semester II**

Code	Course Title	Unit
SES400	Project in Environmental Studies	3
EES403	Physical processes of sedimentation	3
EES415	Environmental Hazards	3

EES417	Petroleum Geology	3
EES418	Mining Geology	
EES419	Geochemistry of Geothermal fluids	3
EES420	Physical Oceanography	3
EES421	Applied Seismology	3

Environmental Meteorology

Semester II

Code	Course Title	Unit
SES400	Project in Environmental Studies	3
EES403	Physical processes of sedimentation	3
EES415	Environmental Hazards	3
EES420	Physical Oceanography	3
EES422	Quantitative methods in Meteorology	3
EES423	Cloud physics and weather modification	3
EES424	Practicals in Meteorological Observations II	3
EES421	Applications of Remote sensing Techniques in Satellite Meteorology	3

Nelson Mbithi

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