

UNIVERSITY OF DAR ES SALAAM
College of Natural and Applied Sciences



Information to New Students

November, 2020

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INTRODUCTION

The College of Natural and Applied Sciences (CoNAS) comprises of seven (7) departments namely: Botany, Chemistry, Geology, Mathematics, Physics, Zoology and Wildlife Conservation; Molecular Biology and Biotechnology. The college also has two units, namely the Central Science Workshop and Natural Sciences Consultancy Bureau that serves all departments

The College offers the following three-year undergraduate programmes leading to bachelor degrees:

- (i) Bachelor of Science with Education (BScEd)
- (ii) Bachelor of Science in Chemistry (BScChem)
- (iii) Bachelor of Science in Petroleum Chemistry (BScPChem)
- (iv) Bachelor of Science in Molecular Biology and Biotechnology (BScMBB)
- (v) Bachelor of Science in Applied Zoology (BScAppZoo)
- (vi) Bachelor of Science in Wildlife Science and Conservation (BScWSc)
- (vii) Bachelor of Science in Botanical Science (BScBotSc)
- (viii) Bachelor of Science in Microbiology (BScMicr)
- (ix) Bachelor of Science in Actuarial Sciences (BScActSc)
- (x) Bachelor of Science in Meteorology (BScMet)
- (xi) Bachelor of Science in Mathematics and Statistics (BScMatSt)
- (xii) Bachelor of Science in Chemistry and Physics (BScChemPhys)
- (xiii) Bachelor of Science in Applied Microbiology and Chemistry (BScAppMicChem)

The College also offers the following four-year undergraduate programmes leading to bachelor degrees::

- (i) Bachelor of Science in Geology (BSc. Geo)
- (ii) Bachelor of Science in Engineering Geology (BSc. Eng. Geo.)
- (iii) Bachelor of Science with Geology (BSc. with Geo.)
- (iv) Bachelor of Science in Petroleum Geology (BSc. Petr. Geo)
- (v) Bachelor of Science in Geophysics (BSc. Geophysics)
- (vi) Bachelor of Science in Geology and Geothermal Exploration (BSc. Geol. & Geoth.)

COLLEGE ADMINISTRATION

The College Principal, who is assisted by Deputy Principal, is responsible for the academic and administrative matters of the college through coordination of all activities of the Departments. The Head of department is responsible for all academic activities and general management of the Department. The College Principal Administrative Officer (PAO) handles the routine administrative activities while an Office Supervisor routinely handles student general affairs. The College Accountant deals with College finances, including administering students' funds provided by the University for various academic activities. The College Supplies Officer handles all procurement requirements.

Currently, the College administration consists of the following officials:

OFFICE OF THE PRINCIPAL OF COLLEGE

PRINCIPAL	Prof. T.J. Lyimo
DEPUTY PRINCIPAL	Dr. S. S. Nyandoro
COLLEGE PRINCIPAL ADMINISTRATIVE OFFICER	Mr. O. Sawuka
COLLEGE ADMINISTRATIVE OFFICER	Ms. H. M. Mkongo
COLLEGE SUPPLIES OFFICER	Mr. S. Mwinshashi
CLERICAL OFFICER	Ms. A. Athumani
OFFICE MANAGEMENT SECRETARY	Ms. J. Ngalo and Ms. I. M. Kivugo
COLLEGE ACCOUNTANT	Ms. S. Mrikaria
COORDINATOR - PRACTICAL TRAINING	Dr. W. Ngalason
COORDINATOR - CONSULTANCY AND PUBLIC SERVICES	Dr. C. Werema
DEPUTY COORDINATOR – CONSULTANCY & PUBLIC SERVICES	Dr. C. Messo
CHIEF EDITOR - TANZANIA JOURNAL OF SCIENCE	Prof. J. Mahugija
COORDINATOR - PLANNING AND FINANCE	Dr. W. Kidima
COORDINATOR - UNDERGRADUATE STUDIES	Dr. H.M. Mangosongo
COORDINATOR - QUALITY ASSURANCE & DEPUTY COORDINATOR UNDER GRADUATE STUDIES	Dr. G. E. Temu
COORDINATOR - POSTGRADUATE STUDIES	Dr. G. Mulibo
COORDINATOR - RESEARCH AND KNOWLEDGE EXCHANGE	Dr. F. Stephano
EXAMINATIONS OFFICER, TIMETABLE COORDINATOR AND DEPUTY.COORDINATOR POST GRADUATE STUDIES	Dr. M. James

HEADS OF DEPARTMENTS

BOTANY	Dr. E. Mvungi, Room 311, Ext. 2139
CHEMISTRY	Dr. K. F. Kilulya, Room 301, Ext. 2048
GEOLOGY	Dr. E. Mshiu, (Currently the Acting Dean, SoMG) Room 413, Ext.2687
MATHEMATICS	Prof. E. Mureithi, Room 302, Ext. 2046
MOL. BIOLOGY & BIOTECH	Dr. S. A. A. Kassuwi, Ext. 2788
PHYSICS	Dr. N. Mlyuka, Room 217, Ext. 2047
ZOOLOGY & WILDLIFE CONS.	Prof. F. Magige, Room 203, Ext. 2011
CENTRAL SCIENCE WORKSHOP	Dr. I. Lugendo, Room 208, Ext. 2452

THE COLLEGE BOARD

All important Academic matters of the College (such as details of undergraduate courses, syllabi, examinations, postgraduate studies) are discussed and decided upon by the College Board, which is composed of members appointed from amongst the Academic Staff of the College, Students and representatives of other colleges/schools. The College Board is responsible to the University Senate. All College Board decisions of general University interest have to be approved by Senate. Students in the College are entitled to have three representatives to the College Board. The three student representatives are full members of the College Board and are entitled to present suggestions, petitions and College Board Papers (written memoranda) for discussion and deliberation by the College Board. In addition, one or two DARUSO-CoNAS ministers may attend as invitee for a specific theme of the meeting. This provides a very important way for students to make their feelings and ideas about matters concerning their academic studies and general welfare at the University known to the University Authorities. The Principal always welcomes constructive suggestions, criticism and ideas from students through their representatives to the College Board. The Principal will also listen to student ideas and concerns even outside the College Board as long as such discussions are properly arranged. Students are advised to refrain from creating a non-conducive atmosphere for dialogue with the College Administration.

STUDENTS' ACADEMIC ADVISORS

Each student is assigned an Academic Advisor, who is a member of academic staff whom the student should regard as a personal friend. The student is free and entitled to approach the academic advisor at any time to seek advice on any matter concerning the student's academic or private life at the University. Academic advisors should always be consulted whenever a student faces difficulties that may interfere with his or her academic performance at the University. Experience shows that some students ignore this very important aspect of student counselling in the College, resorting to it only after they have experienced irreversible setbacks in their academic performance. This practice is strongly discouraged and students should feel free to talk to their advisors even in the absence of any serious academic and/or social crisis.

CAREER PROSPECTS FOR SCIENCE GRADUATES

According to priorities in manpower requirements of Tanzania, the greatest need for science graduates has been in the field of Education since the College was established as a faculty in 1965. Moreover, the nation realizes that it is from science graduates that Tanzania will achieve her scientific and technological advancement. To this course, the College is responsible for training of future scientists to meet national needs. It is possible for graduates in science with good degrees (1st class or upper 2nd class) to enrol in higher degree programmes in the College. Such higher degrees would make the holder eligible for a career in research and teaching including University lectureship and research in academia and other institutions. Students are strongly encouraged to aim at academic excellence at the University, that will enable them achieve good academic performance.

ACADEMIC TRANSCRIPTS

All transcripts are issued by the office of Deputy Vice Chancellor (Academic) upon completion of studies. However, the College can give academic progress reports, especially to those students who are in their final year of study and need such reports to assist them in scouting for jobs. A small fee is charged for the processing of these reports. A processing time of 2 weeks should be allowed for each progress report request.

COURSE STRUCTURE

The College runs programmes organized in the semester system whereby the academic year is subdivided into 2 semesters of teaching, each lasting 15 weeks followed by Practical Training (PT) or Teaching Practice (TP). Each course is examined at the end of the semester. Each academic discipline offers a variety of courses, including core courses, which are compulsory to students majoring in the subject, and optional courses. One credit is equivalent to 10 learning hours. Each course is given a credit weighting according to the time devoted to it. This includes time for Lectures, Seminars/Tutorials, Assignments, Independent studies and Research as well as practical training. These learning activities vary in different courses depending on the designed mode of delivery.

GENERAL EXAMINATION REGULATIONS

All first year students will be issued with a copy of the University Prospectus, which contain details of degree programmes and curricula offered in the various Colleges/Schools, as well as examination and general regulations governing student academic activities at the University. The prospectus will also be available online at UDSM website (www.udsm.ac.tz). Students are strongly advised to read carefully and understand all the regulations governing their studies. In particular, students are strongly advised to understand the examination regulations including what constitutes an examination irregularity and penalties for such irregularities. Some of the key regulations governing important aspects of academic life at the university are summarized below:

Regulations Governing the Award of the BSc Degree

The UDSM operates a semester system of studies. Each Degree Programme offers a variety of courses, including core courses which are compulsory to students, and optional courses. Each course is given a credit weighting according to the time devoted to it on the timetable and other learning activities. Thirty one-hour lectures (30 hrs), 15 three-hour practical classes (45 hrs) and 45 hrs of assignment and independent studies constitute twelve (12) credits. Thus, $(30 + 45 + 45) = 120$ hours are equivalent to 12 credits.

General Degree Regulations

- 1 With exception of BSc. Ed, a minimum of 360 credits must be passed for the award of a 3-year degree. For BSc. Ed degree programme a minimum of 388 credits must be passed. For the award of a 4-year degree, a minimum of 480 credits must be passed. Passing a course shall mean scoring a C grade or

- higher.
- 2 All students admitted to the College of Natural and Applied Science for BSc. Education and BSc. with Geology shall major in two science subjects starting from their first year of study.
 - 3 The subject combination for each programme is outlined in Section 11. All undergraduate students shall major in two science subjects or the equivalent thereof.
 - 4 Majoring in a Science subject shall involve passing at least 120 credits including all the prescribed core courses in that subject. To avoid double counting, no course may be counted towards the 120 credits of more than one subject.
 - 6 Science students must take and pass the recommended core courses in Development Studies (100 series), Communication skills and Environmental Science (200 series).
 - 7 Each student must include and pass in his/her study programme at least 80 credits in the 300 course series in the science majors and not more than 144 credits in the 100 course series.
 - 7.1 In addition to their Science course load, BSc. Ed students shall take a minimum of 120 credits of Education, including all prescribed core courses.
 - 7.2 BSc. Ed students must also take all prescribed Teaching Practice courses offered by the School of Education.
 - 8 Each student shall register for courses totalling to at least 120 credits per academic year.
 - 9 In addition to core courses required for his/her major subjects, Development Studies, Communication skills and Environmental Science, a student may choose as an elective any course for which he/she can meet the prerequisite/co-requisite requirements and which is compatible with the teaching timetable (subject to regulation No. 10).
 - 10 At the end of the academic year every student shall, in consultation with his/her Academic Advisor, map out his/ her course programme for the next year. A course programme shall be subject to approval by the Head of the Department in which the student intends to major and by the Principal of the College. The Principal's approval shall constitute formal enrolment for all the courses listed in the programme. For first year students, mapping of the course programme will be done during the orientation week.
 - 11
 - 11.1 For BSc; Gen. programmes, students should select their two major subjects from the following: Botany (BT), Chemistry (CH), Geology (GY), Applied Microbiology (MC), Mathematics (MT), Computer Science (IS), Physics (PH), Wildlife Science and Conservation (WS), Zoology (ZL). A major may be taken in Geography (GE) in the College of Social Sciences in lieu of so long as the regulations for majoring in subjects in that College are fulfilled.
 - 11.2 First year students who are pursuing BSc. Ed programme should select their two major science subjects from the following combinations:
 - i. Biology and Chemistry
 - ii. Biology and Geography

- iii. Mathematics and Chemistry
- iv. Physics and Chemistry
- v. Physics and Mathematics
- vi. Mathematics and Geography
- vii. Physics and Biology
- viii. Physics and Geography
- ix. Chemistry and Geography
- x. Economics and Mathematics
- xi. Mathematics and Information Science

11.3 For the BSc with Geol. programme, students should, in addition to Geology, select any one subjects in their first year of study from the list below:

Chemistry, Mathematics, Computer Science, Physics, Botany, Zoology and Geography. BSc Eng. Geol. students shall be required to do a selection of approved courses from the programmes in Geology and Civil Engineering.

- 12 Students may be admitted to CoNAS as transfer students (advanced standing status) provided that their previous work was done at an institution recognized by the University of Dar es Salaam. Such students must provide also a detailed syllabus elaborating the course done and transcript of the grades obtained.
- 13 The maximum transferable load shall be 120 credits (approximately one year's work).
- 14 The degree classification of a transfer student shall be based solely on credits done at the University of Dar es Salaam. I

College Examination Regulations

- 15 Each course will be assessed at the time of its completion and a grade awarded. The grade will be based on an end of course examination and a course work assessment. The course work assessment shall normally constitute 40% of the total course assessment. Course work assessment, may however, with the approval of Senate, constitute up to 100% of the total course assessment provided that where it exceeds 40% the assignments on which it is based shall be available Laboratory for scrutiny by the External Examiner.
- 16 Monitoring of the student's progress in each course will be based on the following:
 - 16.1 Grade to marks (%) correspondence:

A = 70%-100%;	B+ = 60%-69%;	B = 50%-59%;
C = 40%-49%;	D = 35%-39%;	E = 0%-34%
 - 16.2 Grade to points correspondence:

A=5 points, B+=4 points, B=3 points, D=3 points, E = 0 points
 - 16.3 Course grade multiplied by the appropriate credit weighting will be accumulated over the whole period of study and will form the basis for the assessment of the degree.
- 17 An average grade for each major subject shall be worked out by adding together, by means of weighted points, all the grades of the core course in that

subject. The following points to grade correspondence shall apply in monitoring the student's progress in each major subject:

4.4 — 5.0 = A	3.5 — 4.3 = B+	2.7 — 3.4 = B
2.0 — 2.6 = C	1.0 — 1.9 = D	0.0 — 0.9 = E

- 18 A student who has passed courses totalling more than 360 (or 388 for BSc. Ed) credits in a three year programme, or 480 credits in a four- year programme shall have one or more elective courses excluded from the assessment in the degree classification. The assessment shall in this case exclude those elective courses in which the student had the worst performance.
- 18.1 The average score for the degree will be computed in the same way as for the average score for a major subject. The degree classification shall be based on the best 360 or 480 provided that regulations Nos. 1 to 9 above are fulfilled. In the case of BSc. Ed programme, the degree classification shall be based on the best 388. The Grade Point Average (GPA) for the degree shall be computed by dividing the total score points by total credits and truncating down to one decimal point. The final classification shall be as follows: First Class A (5.0-4.4); Upper Second Class B+ (4.3-3.5); Lower Second Class B (3.4-2.7); and Pass C (2.6-2.0)
- 19 To be allowed to continue with any degree programme in the College of Natural and Applied Sciences, a full time student must pass all the prescribed core courses in each of the major Science subjects and attain an overall GPA of 2.0 or above.
- 19.1 A candidate may be allowed to re-sit failed courses in Supplementary Examinations if he or she has attained an overall GPA of 1.8 or above in the First Sitting calculated in accordance with the credit-weighting of individual courses.
- 19.2 Any student who has failed a core course and does not qualify for a supplementary examination shall be discontinued.
- 20 Supplementary Examinations will be held once each year prior to the commencement of the subsequent academic year, for the core courses examined during the previous session. Any student, who has qualified to continue with his studies under regulation No. 19.1, must sit for a supplementary examination in any core courses in which he/ she has failed (*i.e.* scored a D or E) in the examination. The highest grade to be awarded shall be the minimum passing grade (*i.e.* C).
- 21 With the approval of the College Board and Senate, certain courses (e.g., Practical, Field Training, Project) may be designated as courses where supplementation will not be permitted. When the assessment in such a course is failed, the entire course must be repeated.
- 22 If after taking supplementary examinations a student fails to obtain a C average at 2.0 or better in all the core courses he/she shall be discontinued from studies.
- 23 A grade scored in the supplementary examination shall constitute the final grade in that course regardless of the score in the original examination.
- 24 A student who has qualified to continue with his/her studies (under

Regulations 21 and 22 above) must repeat any core course in which he/she has failed even if he/she drops the subject to which the course belongs.

- 24.1 A student who has failed a practical course, which cannot be supplemented, shall be allowed to proceed by carrying over the course flexibly in subsequent years of study provided his/her GPA in that major subject is 1.8 or higher.
- 25 Supplementary work in or repetition of elective courses will only be allowed in exceptional circumstances, normally only when those units are needed to complete a degree programme.
- 26 A special examination in a course to be regarded as constituting a first sitting shall be given to students who for satisfactory reasons were allowed by the Principal not to take the regular examination.
- 26.1 Normally, special examinations will be given at the time of supplementary examinations
- 26.2 A student who is required to sit for a special examination or who, for satisfactory reasons, has not completed an important portion of his/her course work, shall be awarded an "I" ("Incomplete") Grade
- 26.3 A student who has been awarded an "I" grade during any academic year is required to clear the grade during the time of supplementary examinations for that academic year. Except with the approval of the College Board, any "I" grade not cleared at the time of the supplementary examinations automatically becomes an "E" grade.
- 27 No student will be enrolled in a course for which he/she has not fulfilled the prerequisites. A course for which a "D" grade or lower is obtained shall not be counted as fulfilling a prerequisite for any course unless it is a course in the same series taken during the same session
- 28 To be allowed to repeat a course, in which an examination is a part of the assessment, a student must first sit for supplementary examination in that course
- 29 The maximum time for which a student may remain registered in the College of Natural and Applied Sciences is 5 years for a 3-year programme and 6 years for a 4-year programme. Any student who is required to repeat/complete certain courses in order to qualify for the award of a degree shall be deemed to have failed the programme at the end of the maximum period if any of such courses have not been passed.

PRACTICAL TRAINING

CoNAS runs a practical training programme in which students enrolled in various Bachelor of Science degree programmes engage in practical activities related to their fields of study. Normally these activities are held in various Institutions outside the University. The programme may have two parts: one coming immediately after the First Year and the other immediately after the Second Year. The programme seeks:

- (i) To expose students to the various research and/or production activities being carried out in different parts of the country;
- (ii) To enable students to apply their knowledge in practice;
- (iii) To ensure that, on leaving the University, graduates have acquired some

- appropriate work experience;
- (iv) To establish and maintain contact between prospective employers and the University in order to ensure that Students are given the appropriate skills and knowledge for the jobs they are likely to be called upon to perform after graduation;
 - (v) To enable prospective employers and employees to become acquainted with one another in the working situation.

Regulations Governing Practical Training

- 1 A student must pass practical training before qualifying for the award of the degree.
- 2 The assessment will be based on the following four items:

Employers assessment	10%
Logbook	20%
Final Report	60%
Presentation	10%
TOTAL	100%

2.1 Assessment by the Employer

The Employer using an assessment forms shall grade the items listed below using the following weighting:

A = Excellent,	B = Very Good,	C = Good,
D = Fair	E = Poor.	

The items to be graded by the employer will include the following:

- (i) Skills obtained by the student.
- (ii) Attitude towards work.
- (iii) Personal initiatives and independence.
- (iv) Reliability in carrying out duties. v. Punctuality to work.

The above 5 items will account for 10% of the overall assessment.

2.2 Assessment of Logbook

The logbooks should contain description of activities and tasks assigned to students, output from such activities and remarks by the employer. The employer shall sign the document on a weekly basis. The logbook shall be submitted to the University supervisor together with the final report. The grading of the logbook shall be marked out of 20% based on the following:

- (i) Clear description of activities 10%
- (ii) Description of Outputs 10%

2.3 Assessment of Final Report

Grading of the report shall take into consideration the following distribution of marks.

Description and analysis of tasks given	10%
Problem identification and scientific methods	15%
Presentation of results and data	20%
Correctness of information (graphs, maps etc)	10%
Summary and conclusions	05%

- 3 A student in his/her last but one year of study who fails practical training will be required to go through and pass a supplementary training period, which will be arranged for him/her in June-August of the subsequent year after completion of University Examinations. A first year student who fails practical training will be required to go through and pass a 8-week supplementary training period, which will be arranged during the long vacation of the subsequent year.
- 4 Students who do not go to places allocated to them for practical training without satisfactory reasons will be deemed to have absconded their practical training, and will as a result be discontinued from the University.
- 5 Students who go to the allocated PT places but refuse to follow the training programme will be deemed to have absconded and consequently shall be discontinued from studies.

Course Mapping on the Semester Time Frame

A.1. B.Sc. WITH EDUCATION [B.Sc. (Ed.)] PROGRAMME

Common Core Courses for all B.Sc.(Ed.) students

Year	Semester	Course Code and Title	Credits
1	I	DS 112 Development Perspectives I	12
	II	DS 113 Development Perspective II	12
Total Credits			24

Descriptions of the courses above are provided by the Institute of Development studies.

Common Optional Courses for all Science students

		Credits
DS 211:	Entrepreneurship, small business and development	8
SC 215:	Scientific Methods	8
EV 300	Environmental Science II	8
CL 107	Communication Skills for Science	12
IS 131	Introduction to Informatics and Micro-computer	12

Semester Mapping for Core Education Courses for the B.Sc.(Ed.) programme.

Year	Semester	Course Code and Title	Credits	Total
1	I	SUBJECTS 1 & 2 and common courses	≤48*	≤72
		EF 100 Principles of Education	12	
		CT 108 Secondary Education Science Methods	12	
	II	EP 101 Introduction to Educational Psychology	12	≤72
		CT 100 Introduction to Teaching	12	
		<i>Subject 1 & 2 and common courses</i>	≤48*	
TP	CT 101 Teaching Practice I	12		
2	I	CT 201 Educational Media and Technology	12	≤72
		<i>Subject 1 & 2 and optional courses</i>	≤60*	
	II	SUBJECTS 1& 2 and optional courses	≤60*	≤72
		CT 200 Principles of Curriculum development and Evaluation	12	
	PT/TP	CT 202 Teaching Practice II	12	
3	I	SUBJECTS 1& 2 and optional courses	≤48*	≤72
		EA 300 Management of Education and School Administration	12	
		EP 306 Counselling and Special needs Education	12	
	II	SUBJECTS 1& 2 and optional courses	≤48*	≤72
		EF 303 Professionalism and Ethics in Education	12	
		EP 300 Educational Measurement and Evaluation	12	

* Vary depending on subject combination.

Semester mapping for Common and Education Option Courses for the B.Sc.(Ed.) programme.

Year	Semester	Course Code and Title	Credits	Total
2	I	EF 200 History of Education	12	12
	II	EP 200 Human Development and School Learning	12	12
3	I	EV 200 Environmental Science I	8	8
	II	EF 302 International and Comparative Education	12	24
		EP 303 Psychology of Adolescence	12	

The descriptions of the Education courses are available from the School of Education.

Semester mapping of Biology Core Courses for the B.Sc. (Education) programme.

Year	Semester	Course Code & Title	Credits	Total
1	I	BL 111 Introductory Cell Biology and Genetics	12	20
		ZL 121 Invertebrate Zoology	8	
	II	CH 113 Chemistry for Life Sciences Students	12	20
		ZL122 Chordate Zoology	8	
2	I	BT I30 Evolutionary Botany	12	20
		ZL 210 Vertebrate Anatomy and Physiology I	8	
	II	ZL 220 Vertebrate Anatomy and Physiology II	12	28
		BT 1I3 Introduction to Plant Physiology	8	
		BL 113 Ecology I	8	
3	I	BT 225 Taxonomy of Higher plants	12	24
		ZL 236 Introductory Entomology and Parasitology	12	
	II	ZL 302 Evolution	8	16
		BT 327 Anatomy of Angiosperms	8	
Total Credits				128

Course not taken by Chemistry majors; the total number of core credits for biology/chemistry students is 50.

Semester mapping of Biology **Optional Courses** for the B.Sc. (Education) programme.

Year	Semester	Course Code & Title	Credits	Total
2	I			
	II	ZL 124 Developmental Biology	8	16
		BT 218 Plant Physiology and Growth	8	
3	I	BL 215 Ecology II	12	32
		BT 211 Fundamentals of soil science	8	
		BL 331 Cell Biology and Molecular Genetics	12	
		Total Credits		

Semester mapping of **Core Chemistry** Courses for B.Sc. (Education) programme

Year	Semester	Course Code & Title	Credits	Total
1	I	CH 118 Basic Analytical and Physical Chemistry	12	20
		CH 121 Chemistry Practical 1	8	
	II	CH 117 Organic Chemistry I	12	12
2	I	CH 243 Organic Chemistry II	12	24
		CH 201 Chemical Thermodynamics	12	
	II	CH 241 Chemistry Practical III	8	20
		CH 219 Systematic Inorganic Chemistry	12	
3	I	CH 341 Chemistry Practical VI	8	16
		CH 248 Instrumental Methods in Analytical Chemistry	8	
	II	CH 290 Chemical Kinetics and Electrochemistry	12	20
		CH 364 Coordination Chemistry	8	
Total Credits				112

Semester Mapping for **Optional** Chemistry Courses for the B.Sc. (Education) programme.

Year	Semester	Course Code & Title	Credits	Total
2	I	CH 262 Analytical and Environmental Chemistry	12	32
		CH 244 Chemistry Practical IV	8	
	II	CH 280 Organic Structure, Reactions and Mechanisms	12	
3	I	CH 377 Industrial Chemistry	12	20
		CH 323 Organic Spectroscopy	8	
Total Credits				52

Semester mapping of **Core Mathematics** Courses for B.Sc. (Education) programme

Year	Semester	Course Code and Title	Credits	Total
1	I	MT 100 Foundations of Analysis	12	24
		MT 127 Linear Algebra I	12	
	II	MT 136 Ordinary Differential Equations	8	20
		MT 120 Analysis I: Functions of a Single Variable	12	
2	I	MT 200 Analysis 2: Functions of Several Variables	12	24
		MT 233 Mathematical Statistics	12	
	II	MT 278 Linear Programming	12	12
	I	MT 357 Abstract Algebra	12	12

3	II	MT 310 Analysis 3: Complex Analysis 1	12	24
		MT 360: Functional Analysis	12	
Total number of credits				116

Semester Mapping of **Optional** Mathematics Courses for B.Sc. (Education) Programme

Year	Semester	Course Code and Title	Credits	Total
1	I	MT 114* Computing Programming	12	24
	II	MT 147 Discrete Mathematics	12	
2	II	MT 274 Numerical Analysis I	12	24
		MT 227 Linear Algebra 2	12	
3	I	MT 378 Queuing Theory and Inventory Models	12	24
		MT 348 Integer and Non-Linear Programming	12	
	II	MT 389 Mathematics Project	8	32
		MT 358 Graphs and Network Optimization	12	
		MT 374 Numerical Analysis 2	12	
Total Credits				104

- Should not be taken by Computer Science students

Semester mapping of **Core Physics** Courses for B.Sc. (Education) programme

Year	Semester	Course Code & Title	Credits	Total
1	I	PH 127 Vibrations and Waves and Optics	12	20
		PH 122 Classical Mechanics	8	
	II	PH 116 Experimental Methods of Physics I	8	20
	PH 128 Electromagnetism	12		
2	I	PH 247 Experimental Methods of Physics II	8	8
	II	PH 217 Quantum Physics	12	20
		PH 220 Statistical Thermodynamics	8	
		PH 339 Electronics	12	
		PH 346 Physics Project	8(4)	
	II	PH 351 Physics of the Atom	12	16
PH 346 Physics Project		8(4)		
Total Credits				128

Semester mapping of **Optional Physics** Courses for B.Sc.(Education) programme

Year	Semester	Course Code and Title	Credits	Total
2	I	PH 222 Advance Mechanics PH 204 Mathematical Methods of Physics I	8 12	20
	II	PH 249 Fundamentals of Materials Science	8	16
PH 332 Solid State Physics		8		
3	I	PH 334 Energy in the Environment	8	32
		PH 312 Elementary Particles	8	
		PH317 Fundamentals of electrodynamics	8	
		PH 319 Fundamentals of Atmospheric Physics	8	
	II	PH 359 Astrophysics	8	24
		PH373 The basics of NMR spectroscopy	8	
PH364 Earth-Atmosphere system		8		
Total Credits				64

Semester mapping of **Information Sciences Core Courses** for the **B.Sc. (Education)** programme

Year	Semester	Course Code & Title	Credits	Total
	I			
	II	CS 173 Business Computer Communication	12	24
CS 175 Programming in Java		12		
2	I	IS 237 Data Abstraction and Algorithms	12	44
		IS 264 Principles of Database Systems	12	
		IS 274 Object Oriented Analysis and Design	8	
		CS 243 Computer Network Design and Administration	12	
	II	CS 234 Object Oriented Programming in Java	12	12
3	I	IS 344 Human Computer Interaction	12	32
		CS 336 Trends and Social Cultural Implications of Information Technology	8	
		CS 334 Principles of Operating Systems	12	
	II			
Total Credits				112

Semester mapping of **Information Sciences Optional** Courses for the B.Sc. (Ed.) programme

Year	Semester	Course Code & Title	Credits	Total
2	I	CS 151 Computer Organization and Architecture I	12	12
	II	IS 171 Introduction to Computer Networks	8	40
		IS 158 Computer Hardware and System Maintenance	8	
		CS 252 Computer Organization and Architecture II	12	
IS 283 Web Services and Technologies	12			
3	I	CS 335 Software Engineering	12	24
		IS 371 Systems Administration and Programming in Linux	12	
		IS 335 Final Year Project	16	
		IS 336 Principles of Systems Security	8	
		Total Credits		100

Semester Mapping of **Core Geography** Courses for B.Sc. (Education) Programme:

Year	Semester	Course Code and Title	Credits	Total
1	I	GE 140 Introduction to Physical Geography	12	24
		GE 142 Spatial Organisation	12	
	II	GE 144 Surveying and mapping science	12	24
		GE 141 Spatial Organisation	12	
2	I	GE 244 Quantitative Methods in Geography	12	24
		GE 145 Environmental Education	12	
	II	GE 241 Biography	12	24
		GE 247 Population Studies	12	
3	I	GE 343 Population and Development	12	24
		GE 352 Natural Resources Management	12	
	II	GE 341 Contemporary Geography in Africa	12	24
		GE 349 Agriculture and Rural Settlements	12	
Total Credits				144

Semester mapping of **Optional Geography** Courses for B.Sc.(Education) programme

Year	Semester	Course Code And Title	Credits	Total
2	I	<i>A student may select one course from the following</i>		
		GE 243 Urban Systems	12	24
		AS 217 Introduction to Computers	12	
	II	<i>A student may select one or two courses from the following</i>		
		GE 248 Transport Systems	12	24
		GE 252 Medical Geography	12	
3	I	<i>A student may select one or two courses from the following</i>		
		GE 347 Urban Transport Planning and Management	12	60
		GE 348 Disaster Management	12	
		GE 344 Regional Development Planning	12	
		GE 355 Geography of Economic Inequalities	12	
		GE 399 Dissertation++	24	
	II	<i>A student may select one or two courses from the following</i>		
		GE 342 Urban Planning and Management	12	72
		GE 349 Contemporary Geography	12	
		GE 341 Agriculture and Rural Settlement	12	
		GE 346 Project Planning and Management	12	
		GE 345 Regional Development Planning in Tanzania	12	
GE 399 Dissertation++	24			
Total Credits				180

The descriptions of Geography courses are to be provided by the Department of Geography, College of Social Sciences.

Semester mapping of **Core Economics** Courses for B.Sc.(Education) Programme:

Year	Semester	Course Code and Title	Credits	Total
1	I	EC 116 Introductory Microeconomic Analysis I	12	24
		EC 117 Introductory Macroeconomic Analysis I	12	
	II	EC 126 Introductory Microeconomic Analysis II	12	24
		EC 127 Introductory Macroeconomic Analysis	12	
2	I	EC 216 Intermediate Microeconomic Analysis I	12	24
		EC 217 Intermediate Macroeconomic Analysis I	12	
	II	EC 226 Intermediate Microeconomic Analysis II	12	24
		EC 227 Intermediate Macroeconomic Analysis II	12	
3	I	EC 371 Monetary Economics I	12	24
		EC 373 International Economics I	12	

	II	EC 381 Monetary Economics II	12	24
		EC 383 International Economics II	12	
Total Credits				144

Semester mapping of **Optional Economics** Courses for B.Sc.(Education) programme

Year	Semester	Course Code and Title	Credits	Total	
2	I	<i>A Student May Choose only One of the Following Courses</i>			72
		AS 220	Pan-African Thought and Practice I	12	
		AS 217	Introduction to Computers	12	
		ST 210	Probability Distributions I	12	
		ST 121	Analytical Calculus	12	
		FN 201	Introduction to Financial Services	12	
		EC 221	Managerial Economics	12	
3	I	<i>A Student May Choose only One of the Following Courses</i>			84
		EC 367	Industrial and Production Economics I	12	
		EC 368	Transport Economics and Industrial Location I	12	
		EC 369	Agricultural Economics I	12	
		EC 370	Laboratory of Economics and Human Resources I	12	
		EC 375	Natural Resources and Environmental Economics I	12	
		EC 386	Cost-Benefit Analysis I	12	
		EC 390	Health Economics	12	
	II	<i>A Student May Choose only One of the Following Courses</i>			96
		EC 377	Industrial and Production Economics II	12	
		EC 378	Transport Economics and Industrial Location II	12	
		EC 379	Agricultural Economics II	12	
		EC 380	Laboratory of our Economics and Human Resources II	12	
		EC 385	Natural Resources and International Economics II	12	
		EC 387	Cost Benefit Analysis II	12	
EC 391	Health Economics II	12			
	AS 221	Pan-African Thought and Practice II	12		
Total Credits				252	

A.2. B.Sc. IN CHEMISTRY [B.Sc.(Chem.)]

Semester mapping of **core** courses for BSc.(Chem.) Programme

Year	Semester	Course Code & Title	Credits	Total
1	I	CH 118 Basic Analytical and Physical Chemistry	12	56
		CH 121 Chemistry Practical I	8	
		CH 172 Chemical Separation	12	
		DS 112 Development Perspectives I	12	
		CL 107 Communication Skills for Science Students	12	
	II	CH 117 Organic Chemistry I	12	52
		CH 122 Chemistry Practical II	8	
		CH 173 Introduction to Electronic Structure and Spectroscopy	12	
		DS 113 Development Perspectives II	12	
		MT 111 Mathematics for Biological and Chemical Sciences		
		Total core courses' Credits for first year		100
2	I	CH 244 Chemistry Practical IV	8	60
		CH 248 Instrumental Methods in Analytical Chemistry	8	
		CH 201 Chemical Thermodynamics	12	
		CH 262 Analytical and Environmental Chemistry	12	
		CH 243 Organic Chemistry II	12	
		EV 200 Environmental Science I	8	
	II	CH 241 Chemistry Practical III	8	52
		CH 219 Systematic Inorganic Chemistry	12	
		CH 245 Chemistry Practical V	8	
		CH 290 Chemical Kinetics and Electrochemistry	12	
		CH 280 Organic Structure, Reactions and Mechanisms	12	
		CH 299 Practical Training	8	8
		Total core courses' credits for second year		120
3	I	CH 314 Project Work	12(6)	58
		CH 303 Organic Synthesis	12	
		CH 341 Chemistry Practical VI	8	
		CH 323 Organic Spectroscopy	8	
		CH 377 Industrial Chemistry	12	
		BM 100 Principles of Management and Administration	12	
	II	CH 314 Project Work	12(6)	38
		CH 394 Fundamentals of Theoretical Chemistry	12	
		CH 379 Organometallic Chemistry	12	
		CH 364 Coordination Chemistry	8	
		CH 399 Practical Training	8	8
		Total Core Courses' Credits for Third Year		104
		Total credits		324

Semester mapping of **optional** courses for B.Sc. (Chem.) Programme

Year	Semester	Course Code & Title	Credits	Total
1	I	GY 100 Introduction to Geology and Geological Processes	12	
		MC 100 Fundamentals of Microbiology	12	
	II	IS 131 Introduction to Informatics and Microcomputers	12	
2	I	SC 215 Scientific methods	8	16
	II	PH 249 Fundamentals of Materials Science	8	
3	I	CH 308 Polymer Chemistry	8	72
		CH 315 Surface and Colloid Chemistry	8	
		CH 371 Quality Control and Assurance	8	
		CH 363 Chemical Waste Management	8	
		CH 353 Biochemistry*	8	
	II	CH 391 Advanced Electrochemistry	8	
		CH 305 Chemistry of Natural Products	8	
		CH 357 Fuel Chemistry and Technology	8	
		CH 351 Forensic Chemistry	8	
Total credits				88

*The course not to be opted by MBB students.

A.3. B.Sc. IN CHEMISTRY AND PHYSICS [BSc.ChemPhys.]

Semester mapping of core and optional courses for BSc. ChemPhys. Programme

Code	Course Title	Credits	Semester	Core/Option
First Year				
CH 118	Basic Analytical and Physical Chemistry	12	1	Core
CH 121	Chemistry practical I	8	1	Core
CH 172	Chemical Separation	12	1	Core
PH 122	Classical Mechanics	8	1	Core
PH 124	Optics	8	1	Core
PH 133	Vibrations and Waves	8	1	Core
CH 117	Organic Chemistry I	12	2	Core
CH 173	Introduction to Electronic Structure and Spectroscopy	12	2	Core
PH 116	Experimental Methods Of Physics I	8	2	Core
PH 121	Electricity and Magnetism	8	2	Core
PH 126	Analogy Electronics	8	2	Core
IS 131	Introduction to informatics and Microcomputers	12	2	Option
CH 174	Scientific Methods In Chemistry	12	2	Option
Second Year				
EV 200	Environmental Science I	8	1	Core
CH 243	Organic Chemistry II	12	1	Core
CH 248	Instrumental Methods in Analytical Chemistry	8	1	Core
PH 204	Mathematical Methods For Physics	12	1	Core
PH 210	Physics Practical Training I	8	1	Core
PH 224	Digital Electronics	8	1	Core
PH 247	Experimental Methods Of Physics II	8	1	Core
CH 219	Systematic Inorganic Chemistry	12	2	Core
CH 241	Chemistry Practicals III	8	2	Core
CH 290	Chemical Kinetics And Electrochemistry	12	2	Core
PH 217	Quantum Physics	12	2	Core
PH 220	Statistical Thermodynamics	12	2	Core
PH 229	Computational Physics	8	2	Core
CH 262	Analytical and Environmental Chemistry	12	1	Option
PH 222	Advanced Mechanics	8	1	Option
CH 280	Organic Structure, Reactions and Mechanisms	12	2	Option
PH 249	Fundamentals of Materials Science	12	2	Option
Third Year				
CH 201	Chemical Thermodynamics	12	1	Core
CH 314 /PH 346	Project Work	12(6) /8	1	Core

Code	Course Title	Credits	Semester	Core/Option
CH 323	Organic Spectroscopy	8	1	Core
CH 341	Chemistry Practical VI	8	1	Core
CH 399	Chemistry Practical Training II	8	1	Core
PH 320	Atomic Physics	12	1	Core
CH 364	Coordination Chemistry	8	2	Core
CH 394	Fundamentals of Theoretical Chemistry	12	2	Core
PH 326	Nuclear Physics and Applications	12	2	Core
PH 332	Solid State Physics	8	2	Core
PH 347	Electromagnetism	8	2	Core
PH 359	Astrophysics	8	2	Core
CH 303	Organic Synthesis	12	1	Option
CH 308	Polymer Chemistry	8	1	Option
CH 318	Medicinal Chemistry	8	1	Option
CH 363	Chemical Waste Management	8	1	Option
CH 371	Quality Control and Assurance	8	1	Option
PH 317	Fundamentals of Electrodynamics	8	1	Option
PH 319	Fundamentals Of Atmospheric Physics	8	1	Option
PH 334	Energy and Environment	8	1	Option
CH 305	Chemistry of Natural Products	8	2	Option
CH 335	Chemistry of Biofuels	12	2	Option
CH 351	Forensic Chemistry	8	2	Option
CH 374	Bio-inorganic chemistry	8	2	Option
CH 379	Organometallic Chemistry	12	2	Option
CH 381	Physical Organic Chemistry	8	2	Option
PH 364	The Earth-Atmosphere System	8	2	Option

A.4. B.Sc. IN PETROLEUM CHEMISTRY PROGRAMME [B.Sc. Petr. Chem.]

Semester Mapping for the B.Sc. Petr. Chem. Programme

First Year

Semester Mapping of Core Courses

Semester	Code	Course Title	Credits	Total
I	CH 118	Basic Analytical and Physical Chemistry	12	68
	CH 172	Chemical Separation	12	
	CH 121	Chemistry Practicals I	8	
	GY 100	Introduction to Geology and Geological Processes	12	
	DS 112	Development Perspectives I	12	
	MT 111	Mathematics for Biological and Chemical Sciences	8	
II	CH 122	Chemistry Practicals II	8	64 (60)
	CH 173	Introduction to Electronic Structure and Spectroscopy	12	
	CH 117	Organic Chemistry I	12	
	DS 113	Development Perspectives II	12	
	CH 174	Scientific Methods in Chemistry	12	
		Optional Course 1	12(8)	
Total credits for first year				124(120)

Recommended First Year Optional Courses

Semester	Code	Course title	Credits
II	IS 131	Introduction to Informatics and Microcomputers	12
II	GY 120	Earth Materials (Rocks and Minerals)	12
II	OG 101	Introduction to Petroleum Engineering	12

Second Year

Semester mapping of Core Courses

Semester	Code	Course title	Credits	Total
I	CH 254	Petroleum Chemistry Practicals I	12	68
	CH 248	Instrumental Methods in Analytical Chemistry	8	
	CH 201	Chemical Thermodynamics	12	

	CH 251	Formation and Composition of Petroleum	12	
	CH 243	Organic Chemistry II	12	
	CH 262	Analytical and Environmental Chemistry	12	
II	CH 252	Chemistry of Coal	12	52 (56)
	CH 255	Petroleum Chemistry Practicals II	12	
	CH 253	Surface Chemistry for Petroleum Industry	12	
		Optional Course 2	8 (12)	
	CH 299	Practical Training	8	8
	Total Credits for Second Year			120 (124)

Recommended Second Year Optional Courses

Semester	Core	Course title	Credits
II	CH 245	Chemistry Practicals V	8
II	CH 280	Organic Structure, Reactions and Mechanisms	12
II	PH 249	Fundamentals of Materials Science	8

Third Year

Semester Mapping of Core Courses

Semester	Code	Course title	Credits	Total
I	CH 323	Organic Spectroscopy	8	56
	CH 336	Petroleum Refining and Petrochemicals	12	
	CH 337	Petroleum Chemistry Practicals III	12	
	CH 338	Corrosion and its Control in the Petroleum Industry	12	
		OPTIONAL COURSE 3	12	
II	OG 310	Industrial Health Safety and Environmental Protection in Petroleum Engineering	12	56
	CH 341	Chemistry Practicals VI	8	
	CH 339	Petroleum Chemistry Practicals IV	12	
	OG 477	Petroleum Refining Techniques	12	
		OPTIONAL COURSE 4	12	
	CH 399	Practical Training	8	8
	Total credits for third year			120

Recommended Third Year **Optional** Courses

Semester	Code	Course title	Credits
I	CH 308	Polymer Chemistry	8
I + II	CH 314	Project Work	12
I	CH 331	Chemometrics	8
I	CH 334	Fuel Cells	12
II	CH 335	Chemistry of Biofuels	12
I	CH 363	Chemical Waste Management	8
I	CH 377	Industrial Chemistry	8
I	CP 473	Risk Assessment and Management	12
I	GM 100	Principles and Practice of Management	12
II	GY 445	Oil and Gas Policy and Environmental Law	12

A.5. B.Sc. IN GEOLOGY PROGRAMME [BSc.Geo.]

Semester Mapping of Common Core Courses for All Students in the College

Year	Semester	Code and Title of Courses	Credits	Total
1	I	DS 112 Perspective in Development I	12	24
	II	DS 113 Perspective in Development II	12	
2	I	EV 200 Environmental Science I	8	8

Semester Mapping for Core Courses for B. Sc. (Geology)

Year	Semester	Code and Title of Courses	Credits	Total	
1	I	CH 118 Basic Analytical and Physical Chemistry	12	56	
		GY100 Introduction to Geology and Geological Processes	12		
		MT 161 Matrices and Basic Calculus for Non Majors	12		
		PH 122 Classical Mechanics	8		
			PH 127 Vibration, Waves and Optics	12	
	II	GY 120 Earth Materials (Rocks and Minerals)	12	48	
		GY 125 Introduction to Survey and Mapping	12		
		MT171 One Variable Calculus for Non Majors	12		
PH 128 Electromagnetism		12			
		GY 265 Geological Mapping I	4	4	
2	I	GY 201 Optical Mineralogy	12	48	
		GY 229 Introduction to Geochemistry	12		
		GY 250 Mineralogy and Crystallography	12		
		GY 252 Fundamentals of Engineering Geology	12		
	II	MT 271 Statistics for Mathematics Non Majors	12	60	
		GY 245 Remote Sensing and GIS	12		
		GY 243 Structural Geology	12		
		GY 260 Sedimentology and Sedimentary Petrology	12		
		GY 263 Fundamentals of Geophysics	12		
		GY 355 Geological mapping II		4	
3	I	GY 310 Principles of Stratigraphy and Palaeontology	12	48	
		GY 336 Introduction to Hydrogeology	12		
		GY 361 Magmatic Petrology	12		
		GY 371 Geotectonics	12		

	II	GY 311	Metallic Mineral Deposits	12	48
		GY 344	Geomorphology and Soils	12	
		GY 362	Metamorphic Petrology	12	
		GY 363	Integrated Prospecting Methods	12	
		GY 485	Practical Training		8
4	I	GY 401	History of the Earth	8	52
		GY 411	Geology and Mineral Resources of Tanzania	12	
		GY 412	Ore Microscopy	8	
		GY 413	Mining Geology	12	
		MK100	Introduction to Business	12	
	II	GM 100	Principles and Practice of Management	12	48
		MN 405	Mineral Economics	12	
		GY 402	Industrial Minerals and Rocks	12	
GY 405		Independent Project	12		
Total credits					424

Semester Mapping for Optional Courses for B. Sc. (Geology)

Year	Semester	Code and Title of Courses	Credits	Total	
2	I	MT 114	Computers and Programming	12	20
		SC 215	Scientific Methods	8	
	II	CL 108	Communication Skills for Commerce and Management	12	28
		GY 352	Marine Geology	8	
		DS 200	Development Studies I	8	
3	I	GY 312	Palaeontology	12	24
		GY 333	Applied Geophysics	12	
	II	EV 300	Environmental Science II	8	28
		GY 351	Fundamentals of Seismology	8	
		GY 356	Applied Geochemistry	12	
4	I	GY 406	Petroleum Geology	12	20
		GY 407	Basin Analysis	8	
	II	GY 408	Basement Analysis	8	48
		GY 410	Advanced Hydrogeology	8	
		GY 424	Rock Excavation and Support	8	
		GY 457	Isotope Geology	8	
		GY 446	Environmental Geology	8	
		MM 343	Geostatistics	8	

A.6. B.Sc. IN ENGINEERING GEOLOGY [BScEngGeo]

Semester Mapping for Core Courses for BScEngGeo.

Year	Semester	Course Code and Course Title	Credits	
	I	GY 100 Introduction to Geology and Geological Processes	12	44
		MT 161 Matrices and Basic Calculus for Non Majors	12	
		ME 101 Engineering Drawing	8	
		EG 100 Workshop Training	12	
	II	GY 120 Earth Materials (Rocks and Minerals)	12	58
		GY 125 Introduction to Survey and Mapping	12	
		MT 171 One Variable Calculus for Non Majors	12	
		SC 101 Civil Engineering Drawing	10	
		SC 112 Civil Engineering Materials I	12	
			GY 265 Geological Mapping I	4
2	I	GY 201 Optical Mineralogy	12	52
		GY 252 Fundamentals of Engineering Geology	12	
		MT 261 Several Variable Calculus for Non Majors	12	
		TR 111 Engineering Surveying I	8	
		TR 231 Geology for Civil Engineers	8	
	II	GY 245 Remote Sensing and GIS	12	68
		GY 243 Structural Geology	12	
		GY 260 Sedimentology and Sedimentary Petrology	12	
		MT 271 Statistics for Mathematics Non Majors	12	
		TR 112 Engineering Surveying II	8	
		TR 232 Soil Mechanics	12	
		GY 355 Geological Mapping II	4	
3	I	GY 336 Introduction to Hydrogeology	12	14
		GY 250 Mineralogy and Crystallography	12	
		GY 361 Magmatic Petrology	12	
		GY 310 Principles of Stratigraphy and Palaeontology	12	
		SD 212 Civil Engineering Materials II	12	
		TR 334 Foundation Engineering I	8	

	II	GY 362	Metamorphic Petrology	12	44
		GY 423	Applied Rock Mechanics	12	
		TR 324	Pavement Design and Maintenance	12	
		TR 335	Foundation Engineering II	8	
		GY 485	Practical Training	8	
4	I	GY 405	Independent Project	12	32
		GY 411	Geology and Mineral Resources of Tanzania	12	
		GY 420	Dam Geology	8	
	II	GY 363	Integrated Prospecting Methods	12	44
		GY 424	Rock Excavation and Support	8	
		SC 430	General Engineering Procedures and Ethics	12	
		IE 445	Entrepreneurship for Engineers	12	
	Total credits				

Semester Mapping for Option Courses for BScEngGeo.

Optional courses					
Year	Semester	Code and Title of Courses		Credits	Total
1	II	CS 172	Computer Programming	8	8
2	I	MT 114	Computer and Programming	12	32
		SC 215	Scientific Methods	8	
		CS 171	Introduction to Computer Programming	8	
		GY 229	Introduction to Geochemistry	12	
	II	CL 108	Communication Skills for Commerce and Management	12	40
		DS 200	Development Studies I	8	
		GY 352	Marine Geology	8	
3	I	GY312	Paleontology	12	28
		EV 300	Environmental Science II	8	
	II	GY 356	Applied Geochemistry	12	
		GY 351	Fundamental of Seismology	8	
4	I	GY 401	History of the Earth	8	36
		GY 406	Petroleum Geology	12	
		MM 405	Mineral Economics	8	
		GY 407	Basin Analysis	8	
	II	GM 100	Principles and Practice of Management	12	56
		MK 100	Introduction to Business	12	
		GY 408	Basement Analysis	8	

		GY 410	Advanced Hydrogeology	8	
		GY 457	Isotope Geology	8	
		GY 446	Environmental Geology	8	

A.7. B.Sc. WITH GEOLOGY [BSc-Geo]

Semester Mapping for Core Courses for B. Sc. (With Geology)

Year	Semester	Code and Title of Courses		Credits	Total
1	I	GY 100	Introduction to Geology and Geological Processes	12	12
	II	GY 120	Earth Materials (Rocks and Minerals)	12	
		GY 125	Introduction to Mapping and Surveying	12	24
		GY 265	Geological Mapping I	4	
2	I	GY 201	Optical Mineralogy	12	36
		GY 229	Introduction to Geochemistry	12	
		GY 250	Mineralogy and Crystallography	12	
	II	GY 243	Structural Geology	12	36
		GY 260	Sedimentology and Sedimentary Petrology	12	
		GY 263	Fundamentals of Geophysics	12	
		GY 355	Geological Mapping II	4	
3	I	GY 310	Principles of Stratigraphy and Paleontology	12	36
		GY 361	Magmatic Petrology	12	
		GY 336	Introduction to Hydrogeology	12	
	II	GY 245	Remote Sensing and GIS	12	36
		GY 311	Metallic Mineral Deposits	12	
		GY 362	Metamorphic Petrology	12	
		GY 485	Practical Training	8	
4	I	GY 401	History of the Earth	8	48
		GY 411	Geology and Mineral Resources of Tanzania	12	
		GY 412	Ore Microscopy	8	
		GY 413	Mining Geology	12	
		MM 405	Mineral Economics	8	
	II	GY 363	Integrated Prospecting Methods	12	44
		GY 402	Industrial Minerals and Rocks	12	
		GY 405	Independent Project	12	
		GY 446	Environmental Geology	8	
Total Credits					288

Semester Mapping for Option Courses for B. Sc. (With Geology)

Optional Courses				
Year	Semester	Code and Title of Courses	Credits	Total
2	I	MT 114 Computer Programming	12	20
		SC 215 Scientific Methods	8	
	II	CL 108 Communication Skills for Commerce and Management	12	40
		DS 200 Development Studies I	8	
		GY 352 Marine Geology	8	
GY 252 Fundamentals of Engineering Geology	12			
3	I	GY312 Palaeontology	12	48
		GY333 Applied Geophysics	12	
		GY 336 Introduction to Hydrogeology	12	
		GY 371 Geotectonics	12	
	II	EV 300 Environmental Science II	8	36
		GY 344 Geomorphology and Soil	12	
		GY 356 Applied Geochemistry	12	
		GY 351 Fundamental of Seismology	8	
4	I	GY 409 Industrial Minerals and Rocks	12	40
		GY 404 Mineral Processing	8	
		GY 406 Petroleum Geology	12	
		GY 407 Basin Analysis	8	
	II	GM 100 Principles and Practice of Management	12	56
		MK 100 Introduction to Business	12	
		GY 408 Basement Analysis	8	
		GY 410 Advanced Hydrogeology	8	
		GY 457 Isotope Geology	8	
		MM 343 Geostatistics	8	

A.8. B.Sc. IN PETROLEUM GEOLOGY PROGRAMME [BScPGeo]

Semester Mapping of **common CORE courses** for all students in the College

Year	Semester	Code and Title of Courses	Credits	Total
1	I	DS100 Perspective in Development I	8	16
	II	DS101 Perspective in Development II	8	
2	I	EV200 Environmental Science I	8	8

Semester Mapping for **Core Courses** for B. Sc. (Petroleum Geology)

Year	Semester	Course Title	Credits	Total
1	I	CH 118 Basic Analytical and Physical Chemistry	12	56
		GY 100 Introduction to Geology and Geological Processes	12	
		MT 161 Matrices and Basic Calculus for Non Majors	12	
		PH 122 Classical Mechanics	8	
		PH 127 Vibration, Waves and Optics	12	
	II	GY 120 Earth Materials (Rocks and Minerals)	12	60
		GY 125 Introduction to Survey and Mapping	12	
		MT 171 One Variable Calculus for Non Majors	12	
		CH 117 Organic Chemistry I	12	
		PH 128 Electromagnetism	12	
		GY 265 Geological Mapping I	4	4
2	I	GY 230 Petroleum Geology I	8	56
		GY 201 Optical Mineralogy	12	
		GY 229 Introduction to Geochemistry	12	
		GY 250 Mineralogy and Crystallography	12	
		MT 261 Several Variable Calculus for Non Major	12	
	II	MT 271 Statistics for Mathematics Non Majors	12	60
		GY 243 Structural Geology	12	
		GY 245 Remote Sensing and GIS	12	
		GY 260 Sedimentology and Sedimentary Petrology	12	
		GY 263 Fundamentals of Geophysics	12	
		GY 355 Geological mapping II	4	4
3	I	GY 310 Principles of Stratigraphy and Palaeontology	12	48
		GY 336 Introduction to Hydrogeology	12	

		GY 314 Igneous and metamorphic Petrology	12		
		GY 338 Petroleum Geophysics	12		
	II	GY 301 Petroleum Geology II	12	52	
		GY 313 Biostratigraphy	12		
		GY 349 Data Analysis Methods in Petroleum Geology	12		
		GY 352 Marine Geology	8		
		GY 323 Petroleum Geochemistry	8		
		GY 485 Practical Training	8	8	
4	I	GY 411 Geology and Mineral Resources of Tanzania	12	44	
		GY 418 Sedimentary Basins and Petroleum Systems	12		
		GY 479 Reservoir Characterization	8		
		GY 449 Technology Review	12		
	II	GY 444 Petroleum Geology Review	12	48	
		GY 405 Independent Project	12		
		GY 440 Production Geology	12		
		GY 450 Prospect assessment, Evaluation and Petroleum Economics	12		
	Total Credits				440

Semester Mapping for Optional Courses for B. Sc. (Petroleum Geology)

Year	Semester	Course Code and Title	Credits	Total
3	I	MT 114 Computers and Programming	12	44
		GY 252 Fundamental of Engineering Geology	8	
		GY 333 Applied Geophysics	12	
		GY 371 Geotectonics	12	
	II	OG 101 Introduction to Petroleum Engineering	12	36
		GY 372 Coal Geology	12	
GY 344 Geomorphology and Soils		12		
4	I	EV 200 Environmental Science I	8	36
		SC 215 Scientific Methods	8	
		CH 252 Chemistry of Coal	12	
		GY 401 History of the Earth	8	
	II	GY 446 Environmental Geology	8	20
		GY 402 Industrial Minerals and Rocks	12	
Total Credits			32	136

A.9. B.Sc. IN GEOPHYSICS [BscGeophys]

Semester Mapping of core and optional courses for Bachelor of Science in Geophysics

Common Courses

Code	Course Title	Credits	Semester	Core/ Option
DS 101	Development Perspectives I	8	1	Core
DS 102	Development Perspectives II	8	2	Core
EV 200	Environmental Science I	8	1	Core
First Year				Core
GY 100	Introduction to Geology and Geological Processes	12	1	Core
MT 127	Linear Algebra	12	1	Core
MT 100	Foundations of Analysis	12	1	Core
PH 122	Classical Mechanics	8	1	Core
PH 133	Vibration and Waves	8	1	Core
GY 120	Earth Materials (Rocks and Minerals)	12	2	Core
GY125	Introduction to Survey and Mapping	12	2	Core
GP 120	Earth Physics	8	2	Core
MT 136	Ordinary Differential Equations	8	2	Core
MT 120	Analysis 1: Functions of Single Variable	8	2	Core
PH121	Electricity and Magnetism	8	2	Core
Second Year				
MT 114	Computer Programming	12	1	Core
PH 347	Electromagnetism	8	1	Core
MT 200	Calculus of Several variables	12	1	Core
GP 211	Rock Physics	12	1	Core
MT 226	Partial Differential Equations	8	1	Core
GP 265	Geophysical Field School I	8	1	Core
GY 252	Fundamentals of Engineering Geology	8	1	Core
GY 243	Structural Geology	12	2	Core
GP 221	Nuclear Geophysics	12	2	Core
GY 260	Sedimentology and Sedimentary Petrology	12	2	Core
GY229	Introduction to Geochemistry	12	1	Option

GY250	Mineralogy and Crystallography	12	1	Option
GY245	Remote Sensing and GIS	12	1	Option
GY 230	Petroleum Geology 1	12	1	Option
GY 250	Crystallography and Mineralogy	12	1	Option
CL107	Communication Skills for Science	12	2	
Third Year				
GY 310	Principles of Stratigraphy and Palaeontology	12	1	Core
GY 314	Igneous and Metamorphic Petrology	12	1	Core
GP 311	Gravity and Magnetic Method	12	1	Core
GP 312	Seismology	12	1	Core
GY 311	Metallic Mineral Deposits	12	1	Core
GP 321	Exploration Seismology	12	2	Core
GP 322	Electrical and Electromagnetic Methods	12	2	Core
GP 313	Geophysical Time Series Analysis	12	2	Core
PH 204	Mathematical Methods for Physics	12	1	Option
GY 371	Geotectonics	12	1	Option
GY 326	Introduction to Hydrogeology	12	2	Option
GY 301	Petroleum Geology II	12	2	Option
GP 335	Practical Training	8		Core
Fourth Year				
GY411	Geology and Mineral Resources of Tanzania	12	1	Core
GP401	Groundwater and Environmental Geophysics	12	1	Core
GP 421	Seismic Data Interpretation	12	1	Core
GP 414	Inversion of Geophysical Data	12	1	Core
GP 455	Geophysical Field School II	8	1	Core
MK 100	Principles of Management and Administration	12	2	Core
GP 412	Borehole Geophysics	12	2	Core
GM 102	Introduction to Business	12	2	Core
GP 435	Geophysical independent project	12	2	Core
GY 479	Reservoir Characterization	8	1	Option
GY 418	Sedimentary Basin and Petroleum Systems	12	1	Option
GP 413	Mining Geophysics	8	1	Option
GY 402	Industrial Minerals and Rocks	12	1	Option

GP 402	Seismic Hazard Analysis	12	2	Option
GY 401	History of the Earth	8	2	Option
GY 446	Environmental Geology	8	2	Option

A.10. B.Sc. IN GEOLOGY AND GEOTHERMAL RESOURCES [BScGeoGeothRes]

Semester mapping of core and optional courses for Bachelor of Science in Geology and Geothermal Resources

Common Courses

Code	Course Title	Credits	Semester	Core/Option
DS 101	Development Perspectives I	8	1	Core
DS 102	Development Perspectives II	8	2	Core
EV 200	Environmental Science I	8	1	Core
First Year			1	
CH 118	Basic Analytical and Physical Chemistry	12	1	Core
GY 100	Introduction to Geology and Geological Processes	12	1	Core
MT161	Matrices and Basic Calculus for Non Majors	12	1	Core
PH 133	Vibration and Waves	12	1	Core
EE 171	Introduction to Computers and Programming for Engineers	8	1	Core
PH 122	Classical Mechanics	8	1	Core
GY 120	Earth Materials (Rocks and Minerals)	12	2	Core
GY 125	Introduction to Survey and Mapping	12	2	Core
MT 171	One Variable Calculus for Non Majors	12	2	Core
PH 121	Electricity and Magnetism	12	2	Core
PH 129	Atmospheric Thermodynamics	12	2	Core
GY265	Geological Mapping I	4		Core
Second Year				
GY201	Optical Mineralogy	12	1	Core
GY229	Introduction to Geochemistry	12	1	Core
GY250	Mineralogy and Crystallography	12	1	Core

*GR 201	Volcanology	8	1	Core
CH 201	Chemical Thermodynamics	8	1	Core
GY243	Structural Geology	12	2	Core
GY245	Remote Sensing and GIS	12	2	Core
GR 204	Geothermal Systems	12	2	Core
GY 260	Sedimentology and Sedimentary Petrology	12	2	Core
GY263	Fundamentals of Geophysics	12	2	Core
SC 215	Scientific Methods	8	1	Option
GY 252	Fundamentals of Engineering Geology	12	1	Option
MT 271	Statistics For Mathematics Non Major	12	2	Option
GE 246	Hydrometeorology	12	2	Option
GY355	Geological mapping II	4	2	Core
Third Year				
GY310	Principles of Stratigraphy and Palaeontology	12	1	Core
GY336	Introduction to Hydrogeology	12	1	Core
GY 314	Igneous and metamorphic Petrology	12	1	Core
GY 371	Geotectonics	12	1	Core
GR 301	Geochemistry of Thermal Fluids	8	1	Core
GR 302	Isotopes and Tracers of Geothermal Systems	8	2	Core
GR 305	Geothermal Exploration Methods and Modelling	12	2	Core
GR 306	Geothermal Drilling Technology and Risk Management	12	2	Core
GY 333	Applied Geophysics	12	2	Core
GY 351	Fundamentals of Seismology	8	2	Option
ME 228	Mechanics of Fluids	12	1	Option
CH 290	Chemical Kinetics and Electrochemistry	8	2	Option
GY 356	Applied Geochemistry	12	2	Option
GY 363	Integrated Prospecting Methods	12	2	Option
GY485	Practical Training	8		Core
Fourth Year				
GY411	Geology and Mineral Resources of Tanzania	12	1	Core

MN 480	Mineral Economics	12	1	Core
GY 410	Advanced Hydrogeology	12	1	Core
GR 400	Borehole Logging	8	1	Core
GR 401	Geomechanics	12	1	Core
GR 402	Project Proposal Development	8	1	Core
GY 401	History of the Earth	8	2	Core
GM 100	Principles and Practice of Management	12	2	Core
ME 322	Renewable Energy Technology	12	2	Core
GR 403	Geothermal Utilization	8	2	Core
GY 402	Industrial Minerals and Rocks	12	1	Option
GY 446	Environmental Geology	8	2	Option
GY405	Independent Project	12		Core

A.11. B.Sc. IN MOLECULAR BIOLOGY AND BIOTECHNOLOGY [BScMolBioBTech]

Semester Mapping of common core courses for the B.Sc. (Mol. Biol. & Biotech.) programme

Year	Semester	Course Code and Title	Credits
1	I	DS101 Development Perspectives I	8
	II	DS102 Development Perspectives II	8
2	I	EV200 Environmental Science I	8
		SC215 Scientific Methods	8
	II		
Total Credits			32

Semester Mapping of core courses in B.Sc. (Mol. Biol. & Biotech.) programme

Year	Semester	Course Code and Title	Credits	Total Credits
1	I	MC 100 Fundamentals of Microbiology	12	68
		MC 130 Methods and Safety in Microbiology	12	
		MC 131 Eukaryotic Microorganisms	12	
		MT 111 Mathematics for Biological & Chemical Sciences	8	
		BL 111 Introductory Cell Biology and Genetics	12	
		CH 118 Basic Analytical and Physical Chemistry	12	
	II	BN 130 Molecular Biology	12	56
		BN 131 Biochemistry I	12	
		BN 112 Immunology I	12	
		MC 132 Practicals in Eukaryotic Microorganisms	8	
		PH 103 Applied Physics in Biology	12	
Total Credits				124
2	I	BN 230 Methods in Molecular Biology I	12	44
		BN 231 Bioinformatics I	12	
		BN 235 Practicals in Molecular Biology I	8	
		BN 238 Biochemistry II	12	
	II	BN 234 Molecular Virology	12	52
		BN 237 Immunology II	12	
		BL 214 Biostatics I	12	
		BN 236 Practicals in Molecular Biology II	8	
		BN 240 Practicals in Biochemistry	8	
Total Credits				96
3	I	BN330 Environmental Biotechnology	12	56

		BN 333 Downstream Processing	12	
		BN 342 Methods in Molecular Biology II	12	
		BN 340 Practical Training	8	
		BL 390 Research Project	12	
	II	BL 314 Biostatistics II	8	52
		BN 338 Biosafety, Biopolicy and Bioethics	12	
		BN 341 Immunology III	12	
		BN 332 Industrial Biotechnology	12	
		BN336 Practicals in Biotechnology	8	
Total Credits				108
Total Credits for three years 1+2+3				328

Semester mapping of optional courses in B.Sc. (Mol. Biol. & Biotech.) programme

Year	Semester	Course Code and Title	Credits	Total Credits
1	II	CH 117 Organic Chemistry	12	12
	Total Credits			12
2	I	MC 234 Medical Bacteriology	12	36
		BN 232 Food Biotechnology	12	
		MC 232 Food Microbiology and Processing	12	
	II	MC 236 Medical Mycology	12	76
		MC 238 Practicals in Microbiology II	8	
		MC 233 Environmental Microbiology	12	
		BN 233 Forensic DNA Typing	12	
		BN 239 Molecular Developmental Biology	12	
		BT 217 Plant genetics and evolution	8	
		BT 218 Metabolic Physiology and Plant growth	12	
Total Credits				112
3	I	BN 331 Agricultural Biotechnology	12	68
		BN 337 Practicals in Microbial Biotechnology	8	
		BN 339 Biochemistry III	12	
		MC 330 Entrepreneurship Microbiology	12	
		MC 332 Agricultural Microbiology	12	
		ZL 336 Entomology	12	
	II	BN 334 Molecular Cell Biology	12	96
		BN 335 Bioinformatics II	12	
		BN 343 Pharmaceutical Biotechnology	12	
		MC 333 Applied Mycology	12	
		MC 334 Medical Virology	12	
		BT 333 Plant Pathology	8	

		BT 337 Plant Tissue Culture	8	
		ZL 302 Evolution	8	
		ZL 338 Parasitology	12	
	Total Credits			164
Total Credits for three years 1+2+3				288

A.12. B.Sc. IN MICROBIOLOGY [B.Sc.(Microbiol.)]

Semester Mapping of **Common Core Courses** for the B.Sc. (Microbiol) programme

Year	Semester	Course Code and Title	Credits
1	I	DS 101 Development Perspectives I	8
	II	DS 102 Development Perspectives II	8
2	I	SC 215 Scientific Methods	8
		EV 200 Environmental Science I	8
	II		
Total Credits			32

Semester Mapping of **Core Courses** in B.Sc. (Microbiol) programme

Year	Semester	Course code and Title	Credits	Total Credits
1	I	MC 100 Fundamentals of Microbiology	12	68
		MC 130 Methods and Safety in Microbiology	12	
		MC 131 Eukaryotic Microorganisms	12	
		BL111 Introduction to Cell Biology and Genetics	12	
		CH 118 Basic Analytical and Physical Chemistry	12	
	MT 111 Mathematics for Biological & Chemical Sciences	8		
	II	BN 130 Molecular Biology	12	52
		BN112 Immunology I	12	
		MC 132 Practicals in Eukaryotic Microorganisms	8	
CH117 Organic Chemistry I		12		
Total Credits				120
2	I	MC 231 Microbial Nutrition and Metabolism	12	44
		MC 232 Food Microbiology and Processing	12	
		MC 237 Practicals in Microbiology I	8	
		BN 231 Bioinformatics I	12	
	II	MC 230 Microbial taxonomy	12	56

		MC 235 Microbial Ecology	12	
		BL 234 Biostatistics I	12	
		MC 233 Environmental Microbiology	12	
		MC 238 Practicals in Microbiology II	8	
		Total Credits		100
3	I	MC 330 Entrepreneurship Microbiology	12	44
		MC 331 Microbial Biotechnology	12	
		MC 332 Agricultural Microbiology	12	
		MC 340 Practical Training	8	
	II	BL 314 Biostatistics II	8	44
		MC 333 Applied Mycology	12	
		BN 338 Biosafety, Bio-policy and Bioethics	12	
		BL 390 Research Project	12	
		Total Credits		88
Total Credits for 1+2+3 three years				300

Optional Courses in BSc. (Microbiol) programme

Year	Semester	Course Code and Title	Credits	Total Credits
1	I	-	-	-
	II	PH 103 Applied Physics in Biology	12	28
		ZL 121 Invertebrate Zoology	8	
		BL 113 Ecology I	8	
	Total Credits			
2	I	MC 234 Medical Bacteriology	12	32
		BN 232 Food Biotechnology	12	
		BN 235 Practicals in Molecular Biology I	8	
	II	ZL 236 Introductory Entomology and Parasitology	12	36
		MC 236 Medical Mycology	12	
		BN 237 Immunology II	12	
Total Credits				68
3	I	BN 331 Agricultural Biotechnology	12	52
		BN330 Environmental Biotechnology	12	
		BN 337 Practicals in Microbial Biotechnology	8	
		BT 337 Plant Tissue Culture	8	
		ZL 336 Entomology	12	
	II	MC 335 Practicals in Microbiology III	8	72
		MC 334 Medical Virology	12	
		BN 341 Immunology III	12	
		BN 333 Downstream Processing	12	
		BT 333 Plant Pathology	8	
		ZL 338 Parasitology	12	

	EV 300 Environmental Science II	8	
Total Credits			124
Total Credits for 1+2+3 three years			220

A.13. B.Sc. IN APPLIED MICROBIOLOGY AND CHEMISTRY [BScAppMicChem]

Semester Mapping of Core and Optional Courses for BScAppMicChem.

Common Courses		Credits	Semester	Core/Option
DS 112	Development Perspectives I	12	1	Core
DS 113	Development Perspectives II	12	2	Core
EV 200	Environmental Science I	8	1	Core
SC 215	Scientific Methods	8	1	Core

First Year

CH 118	Basic Analytical and Physical Chemistry	12	1	Core
MC 100	Fundamentals of Microbiology	12	1	Core
MC 130	Methods and Safety in Microbiology	12	1	Core
CH 121	Chemistry Practicals I	8	1	Core
CH 172	Chemical Separation	12	1	Core
MT 111	Mathematics for Biological and Chemical Sciences	8	2	Core
CH 117	Organic Chemistry I	12	2	Core
CH 173	Introduction to Electronic Structure and Spectroscopy	12	2	Core
BN 111	Introduction to Molecular Biology	12	2	Core
IS 131	Introduction to informatics and microcomputers	8	1	Option
ZL 121	Invertebrate Zoology	8	1	Option
MC 131	Eukaryotic Microorganisms	12	1	Option
PH 103	Applied Physics in Biology	12	2	Option
MC 132	Practicals in Eukaryotic Microorganisms	8	2	Option

Second Year

CH 243	Organic Chemistry II	12	1	Core
MC 231	Microbial Nutrition and Metabolism	12	1	Core
MC 232	Food Microbiology and Processing	12	1	Core
CH 299*	Practical Training	8	1	Core
CH 241	Chemistry Practicals III	8	2	Core

CH 219	Systematic Inorganic Chemistry	12		Core
MC 230	Microbial Taxonomy	12	2	Core
MC 237	Practicals in Microbiology I	8	2	Core
BL 210	Immunology for Life Science	12	2	Core
CH 290	Chemical Kinetics and Electrochemistry	12	2	Core
CH 262:	Analytical and Environmental Chemistry	12	1	Option
BN 232	Food Biotechnology	12	1	Option
BN 235	Practical in Molecular Biology I	8	1	Option
MC 234	Medical Bacteriology	12	1	Option
BL 234	Biostatistics I	8	1	Option
MC 235	Microbial Ecology	12	1	Option
CH 280	Organic Structure, Reactions and Mechanisms	12	2	Option
DS 211	Entrepreneurship, Small business and Development	8	2	Option
MC 238	Practicals in Microbiology II	8	2	Option
MC 236	Medical Mycology	12	2	Option
ZL 236	Introductory Entomology and Parasitology	12	2	Option
MC 233	Environmental Microbiology	12	2	Option
Third Year				
CH 248	Instrumental Methods in Analytical Chemistry	8	1	Core
CH 201	Chemical Thermodynamics	12	1	Core
CH 323	Organic Spectroscopy	8	1	Core
CH 341	Chemistry Practicals VI	8	1	Core
CH 314**	Project work	12	1	Core
MC 330	Entrepreneurship Microbiology	12	1	Core
MC 340*	Practical Training	8	1	Core
BL 390**	Research Project	12	1	Core
CH 364	Coordination Chemistry	8	2	Core
MC 333	Applied Mycology	12	2	Core
BN 338	Biosafety, Bio-policy and Bioethics	12	2	Core
CH 353	Biochemistry	8	2	Core
MC 331	Microbial Biotechnology	12	1	Option
MC 332	Agriculture Microbiology	12	1	Option
BT 337	Plant Tissue Culture	8	1	Option
Zl 336	Entomology	12	1	Option
CH 303	Organic Synthesis	12	1	Option
CH 308	Polymer Chemistry	8	1	Option
CH 363	Chemical Waste Management	8	1	Option

CH 318	Medicinal Chemistry	8	1	Option
CH 377	Industrial Chemistry	12	1	Option
CH 305	Chemistry of Natural Products	8	2	Option
CH 335	Chemistry of Biofuels	12	2	Option
CH 351	Forensic Chemistry	8	2	Option
CH 374	Bio-inorganic Chemistry	8	2	Option
CH 379	Organometallic Chemistry	12	2	Option
CH 381	Physical Organic Chemistry	8	2	Option
CH 371	Quality Control and Assurance	8	2	Option
MC 335	Practicals in Microbiology III	8	2	Option
MC 334	Medical Virology	12	2	Option
BN 332	Industrial Biotechnology	12	2	Option
ZL 338	Parasitology	12	2	Option
EV 300	Environmental Science II	8	2	Option

A.14. B.Sc. IN WILDLIFE SCIENCE AND CONSERVATION [B.Sc. (WS)] DEGREE PROGRAMME

Course Mapping on the semester time frame

Common Core Courses

Year	Semester	Course Code and Title	Credits
1	I	DS112 Development Perspectives I	8
	II	DS113 Development Perspectives II	8
	I	EV200 Environmental Science I	8
Total Credits			24

Mapping of Core Courses for B.Sc. Wildlife Science and Conservation degree programme

Year	Semester	Course code and title	Credits	Total
1	I	AC 102 Fundamentals of Accounting for non business majors	12	52
		ZL 121 Invertebrate Zoology	8	
		BT 130 Evolutionary Botany	12	
		MT 111 Mathematics for Biological and chemical Sciences	8	
		BL 111 Introduction to Cell Biology and Genetics	12	
	II	WS 101 Ecology and Utilisation of Natural Resources	8	36
		CH 113 Chemistry for Life Sciences	12	
		ZL 122 Chordate Zoology	8	
BL 113 Ecology I		8		
FIRST YEAR TOTAL CREDITS				88
2	I	ZL 215 Mammalian Biology	8	64
		ZL 210 Vertebrate Anatomy and Physiology I	8	
		ZL 236 Introductory Entomology and Parasitology	12	
		AQ 201 Aquatic Biology	8	
		BL 215 Ecology II	12	
		BT 225 Taxonomy of Higher Plants	12	
		AQ 218 Aquatic Biology Field Course	4	
	June/July	WS 200 Practical Training I	8	
	II	WS 202 Biology of Birds	8	56
		ZL 220 Vertebrate Anatomy and Physiology II	12	
WS 204 Community-based Conservation and Extension		8		

		ZL 214 Herpetology	8	
		BL 234 Biostatistics I	12	
	Total second year credits			120
3	I	WS 215 Range and Fire Ecology	12	60
		WS 301 Conservation Biology	8	
		GE 245 Remote Sensing	12	
		ZL 307 Animal Behaviour I	8	
		BT 329 Plant Ecology and Phytogeography	12	
	June/July	WS 300 Practical Training II	8	
	II	BL 390 Research Project	12	64
		WS 321 Analysis and Utilization of Wildlife Populations	12	
		WS 308 Animal Behaviour II	8	
		WS 309 Reproduction, Growth and Nutrition in Wild Mammals	8	
		GM 100 Principles and Practice of Management	12	
WS 314 Economics and Legislation for Wildlife Conservation		12		
THIRD YEAR TOTAL			124	
TOTAL CORE			356	

Mapping of Optional Courses for B.Sc. Wildlife Science and Conservation degree programme

Year	Semester	Course Code and Title	Credits	Total
1	I	EC 116 Introductory Microeconomic Analysis	12	32
		IS 131 Introduction to Informatics and Microcomputers	8	
		MC 100 Fundamentals of Microbiology	12	
	II	CL 107 Communication Skills for Science	12	20
		ZL 124 Developmental Biology	8	
2	I	GE 251 Tourism and Leisure	12*	12
	II	WS 203 Management of Wildlife in Captivity	8	44
		ZL 207 Ichthyology	8	
		WS 205 Biogeography	8	
		SC 215 Scientific Methods	8	
ZL 202 Macro-Evolution	12			
I	WS 306 Wildlife Diseases	8	56	
	EC 375 Resource and Environmental Economics	8		
	ZL 336 Entomology	12		

3		BL 313 Biological Impact Assessment	8**	48
		ZL 314 Environmental physiology	8	
		GE 352 Natural Resource Management	12	
	II	WS 310 Contemporary Topics in Wild Science and Conservation	8	
		ZL 338 Parasitology	12	
		BL 314 Biostatistics II	8	
		WS 311 Tourism and Recreation Management	8*	
		GE 354 Environmental Assessment	12**	
Total credits for optional courses				212

GE 251* and WS 311*, one should take either of the two
 GE 354** and BL 313**, one should take either of the two

A.15. B.Sc. IN APPLIED ZOOLOGY – [BScAppZoo]

Semester Mapping of common core courses for the B.Sc. (Applied Zoology) programme

Year	Semester	Course Code and Title	Credits
1	I	DS112 Development Perspectives I	8
	II	DS113 Development Perspectives II	8
2	I	EV200 Environmental Science I	8
Total Credits			24

Core Courses Year I

Semester	Course Code and Title	Credits	Total
I	BL 111 Introductory Cell Biology and Genetics	12	40
	ZL 121 Invertebrate Zoology	8	
	MC 100 Fundamentals of Microbiology	12	
	MT 111 Mathematics for Biological and Chemical Sciences	8	
II	BL 113 Ecology I	8	60
	BN 131 Biochemistry I	12	
	BN 130 Molecular Biology	12	
	CH113 Chemistry for Life Sciences students	12	
	ZL122 Chordate Zoology	8	
	ZL 124 Developmental Biology	8	
Year 1 Total			100

Core Courses Year II

Semester	Course Code and Title	Credits	Total
	AQ 201 Aquatic Biology	8	
	EV.200 Environmental Science I	8	

I	BL 215 Ecology II	12	72
	ZL 210 Vertebrate Anatomy and Physiology I	8	
	ZL 215 Mammalian Biology	8	
	ZL 236 Introductory Entomology and Parasitology	12	
	BN 238 Biochemistry II	12*	
	AQ 218 Aquatic Biology Field Course	4	
II	BL 234 Biostatistics I	12	64
	BL 210 Immunology for life sciences	12	
	ZL 202 Macro-Evolution	12	
	ZL 220 Vertebrate Anatomy and Physiology II	12	
	ZL 229 Insect Physiology & Pathology	8**	
	BN 240 Practical in Biochemistry	8 *	
Total Credits			136
Total for Environmental Zoology Stream including common courses		128	128
Total for Entomology and Parasitology Stream including common courses		116	116

*Core for Environmental Zoology Stream only

** Core for Entomology & Parasitology Stream only

CORE COURSES FOR ENVIRONMENTAL ZOOLOGY – YEAR III

Semester	Course Code and Title	Credits	Total
I	ZL 307 Animal Behaviour I	8	56
	BL 331 Cell Biology and Molecular Genetics	12	
	BL 313 Biological Impact Assessment	8	
	ZL 314 Environmental Physiology	8	
	BN 330 Environmental Biotechnology	12	
	ZL 300 Practical Training in Applied Zoology	8	
II	BL 390 Research Project	12	40
	ZL 318 Endocrinology & Reproductive Physiology	8	
	ZL 339 Ecotoxicology	12	
	ZL 302 Evolution	8	
Total Year 3 For Environmental Zoology Stream			96

CORE COURSES FOR ENTOMOLOGY & PARASITOLOGY STREAM– YEAR III

Semester	Course Code and Title	Credits	Total
I	BL 311 Cell Biology and Molecular Genetics	12	52
	ZL 336 Entomology	12	
	ZL 332 Molecular Biology of Parasites	12	

	ZL 331	Immunology of Parasitism	8	
	ZL 300	Practical Training in Applied Zoology	8	
II	ZL 333	Insect Ecology	12	44
	ZL 338	Parasitology	12	
	BL 390	Research Project	12	
	ZL 302	Evolution	8	
TOTAL YEAR 3 For Entomology & Parasitology Stream			88	

Optional course

Year	Semester	Course Code and Title	Credits	Total
1	I	CH 118 Basic Analytical and Physical Chemistry	12	32
		PH 103 Applied Physics in Biology	12	
		CL 101 Communication skills	8	
	II	WS 101 Ecology and Utilization of natural resources	8	8
YEAR 1 OPTIONAL TOTAL LOAD			8	40
2	I	CH 262 Analytical and Environmental Chemistry	12	28
		ZL 206 Molluscan Biology	8	
		ZL 207 Ichthyology	8	
	II	PH 203 Applied Physics in Biology	12	48
		MC 234 Medical Bacteriology	12**	
		SC 215 Scientific Methods	8	
		ZL 230 Introduction to Arachnology	8**	
			WS 202 Biology of Birds	8
Year 2 Optional Total Load				76
3	I	MC 311 Virology and Microbial Genetics	12**	88
		MC 307 Microbial Ecology	12	
		ZL 337 Molecular Physiology	12	
		ZL 319 Physiology of Sensory organs	12	
		AF 314 Parasitology and Diseases in Fisheries	8	
		WS 306 Wildlife Diseases	8**	
		ZL 324 Principles of Biosystematics	12	
		BM 100 Principles of Management and Administration	12	
	II	ZL 334 Insect Systematics	12	64
		BL 314 Biostatistics II	8	
		BL 312 Advanced Genetics	8	
		ZL 315 Physiology of Nutrition	8*	
		ZL 317 Experimental Physiology	8*	

	ZL 325	Techniques of Cell and Molecular Biology	8	
	ZL 338	Economic Zoology	12	
	Year 3 Optional Total Load			152
	Total Credits for Optional Courses			268

* Recommended for Environmental Zoology stream

** Recommended for Entomology & Parasitology stream

A.16. B.Sc. IN BOTANICAL SCIENCES [B.Sc. (Bot. Sci.)]

Semester mapping of **common Core courses** for the B.Sc. Botanical Sciences Programme

Year	Semester	Course Code & Title	Credits	Total
1	I	DS 112 Perspectives of Development	12	24
	II	DS 113 Perspectives of Development II	12	
2	I	EV 200 Environmental Science I	8	16
		SC 215 Scientific Methods	8	
Total Credits				40

Semester Mapping of **Core Courses** for the B.Sc. Botanical Sciences

Year	Semester	Course code and Title	Credits	Total
1	I	BT 130 Evolutionary Botany	12	52
		BL 111 Introduction to Cell Biology and Genetics	12	
		MT 111 Mathematics for Biological and Chemical Sciences	8	
		MC 100 Fundamentals of Microbiology	12	
		WS 101 Ecology and utilisation of natural resources	8	
	II	CH 113 Chemistry for Life Sciences Students	12	60
		BT 112 Principles of Plant Population Genetics	12	
		BT 113 Introduction to Plant Physiology	8	
		BL 113 Ecology I	8	
		BN 131 Biochemistry I	12	
		IS 131 Introduction to informatics and microcomputers	8	
Core Total Credits				84
2	I	BT 211 Fundamentals of Soil Science	8	44
		BT 224 Introduction to Plant Molecular Biology	12	
		BT 225 Taxonomy of higher Plants	12	
		BL 215 Ecology II	12	
	II	BL 223 Biometry for Plant Science	12	32
		BT 221 Management and Conservation of Soils	12	
		BT 218 Metabolic physiology and plant growth	8	
Total Core Credits				76
		BT 219 Practical training	12	12

3	I	BT 329 Plant Ecology and Phytogeography	12	36
		BT 349 Management and Monitoring of Fragile Ecosystems	12	
		BL 390 Research Project	12	
	II	BT 323 Algal Systematics and Ecology	12	32
		BT 327 Anatomy of Angiosperms	8	
		BT 356 Plant Diversity and Conservation	12	
Total Credits year 3				80
Core Total Credits				240

Semester Mapping of **Optional** courses for B.Sc. Botanical Sciences

Year	Semester	Course code and Title	Units	Total
1	I	AC 102 Fundamentals of Accounting for non Business majors	12	20
		ZL 121 Invertebrate Zoology	8	
	II	CL 107 Communication Skills for Science	12	52
		ZL 122 Chordate Zoology	8	
		BN 130 Molecular Biology	12	
2	II	BT 215 Introduction to mycology	8	40
		BT 217 Plant Genetics and Evolution	8	
		BL 214 Biostatistics I	12	
		ZL 236 Introductory Entomology and Parasitology	12	
		BT 352 Horticulture	8	
3	I	BL 313 Biological Impact Assessment	8	36
		GE 352 Natural Resource Management	12	
		BT 321 Applied Plant Physiology	8	
		BT 335 Plant breeding and Genetic Manipulation	8	
	II	BT 341 Economic Botany	12	68
		BT 350 Plant Systematics	12	
		BT 351 Watershed Management	12	
		BN303 Agricultural Biotechnology	8	
		BT 333 Plant Pathology	8	
		BT 337 Plant Tissue Culture	8	
				144

A.17. B.Sc. IN METEOROLOGY [BSc.(Met.)]

Semester course mapping

The course mapping on the semester time frame

Semester Course Mapping for the First Year

Year	Semester	Course Title	Credits	Total
1	I	DS 112 Development Perspectives I	12	68
		PH 122 Classical Mechanics	8	
		PH 127 Vibrations, Waves and Optics	12	
		MT 100 Foundations of analysis	12	
		MT 127 Linear Algebra	12	
		MR 101 Introduction to Meteorology	12	
	II	DS 113 Development Perspectives II	12	64
		PH 128 Electromagnetism	12	
		MR 102 Meteorological Instrumentation and Observations	12	
		MT 120 Functions of a single variable	8	
		PH 129 Atmospheric Thermodynamics	12	
		MT 136 Ordinary differential equations	8	
	Total Credits			

Semester Course Mapping for the Second Year

Year	Semester	Course Title	Credits	Total
2	I	MT 114 Computer Programming	12	64
		MT 200 Calculus of Several Variables	12	
		MT 233 Mathematical statistics	12	
		MT 346 Fluid mechanics	12	
		MT 226 Partial Differential Equations	8	
		SC 215 Scientific Methods	8	
	II	MR 201 Synoptic Meteorology	12	60
		MR 202 Climatology	12	
		MR 203 Dynamic Meteorology	12	
		MT 274 Numerical Analysis I	12	
		MR 204 Physical Meteorology	12	
		MR 210 Practical Training	12	
	Total Credits			

Semester Course Mapping for the Third Year

Year	Semester	Course Title	Credits	Total
3		MR 306 Numerical Weather Prediction	12	
		MR 302 Principles and Applications of Remote Sensing	12	

I	MR 303	Tropical Meteorology	8	56	
	MR 301	Weather Analysis and Forecasting	12		
	MR 305	Boundary-Layer and Micro-meteorology	12		
	Elective Courses:				12
	MR 304	Maritime Meteorology	12		
	MR 308	Climate Monitoring and Prediction	12		
	Total credits				68
II	MR 307	Short-term Weather Prediction	12	52	
	MR 314	Project in Meteorology	12		
	MR 309	Mesoscale Meteorology	12		
	MR 310	Climate change	8		
	MR 313	Air Pollution Meteorology	8		
	Elective Courses				8
	MR 311	Aviation Meteorology	8		
	MR 312	Agricultural Meteorology	12		
Total				60	
Total Credits				128	

A.18. B.Sc. IN ACTUARIAL SCIENCE [B.Sc. (Act. Sci.)]

Semester Mapping of the core courses for B.Sc. (Act. Sci.)

Year	Semester	Code	Title	Credits	Total	
1	I	DS 112	Development Perspectives I	12	72	
		MT 114	Computer Programming	12		
		ST 113	Basic Statistics	12		
		ST 121	Analytical Calculus	12		
		AC 102	Accounting for Non-business Majors	12		
		FN 102	Introduction to Actuarial Studies	12		
	II	DS113	Development Perspectives II	12	80	
		CL 106	Communication Skills	12		
		MT136	Ordinary Differential Equations	8		
		MT 180	Introduction to Actuarial Mathematics	12		
		ST122	Linear Algebra with Applications	12		
		ST114	Probability Theory I	12		
		FN101	Principles of Macroeconomics	12		
			Total Load			152
2	I	MT 281	Life Contingencies	12	52	
		ST220	Basic Demographic Methods	12		
		MT226	Partial Differential Equations	8		
		MT233	Mathematical Statistics	12		
		FN 200	Principles of Finance	12		
	II	MT278	Linear Programming	12	72	
		FN 209	Risk Theory	12		
		MT 280	Basic Pension Mathematics	12		
		FN 202	Financial Management	12		
		LW705	Legal Aspects of Actuarial Science	12		
		ST324	Linear Models	12		
		BM333	Field Practical with Research Component	24**		
			One optional from the following			12
		ST 212	Statistical Inference I	12		
		ST 215	Differential and Difference Equations	12		
			Total Load			136
3	I	ST 326	Survival Models	12	48	
		ST 327	Actuarial Modelling	12		
		FN 315	Basics of Actuarial Planning and	12		

			Control			
		FN 314	Quantitative Methods for Risk Management	12		
		Any two optional from the following				
		ST310	Statistical Inference II	12	24	
		ST312	Stochastic Processes	12		
		MT378	Queuing Theory and Inventory Models	12		
		MT348	Integer and Non-Linear Programming	12		
	II	FN 316	Superannuation Practices	12	60	
		MT 381	Credibility and Loss Distributions	12		
		FN 317	Actuarial Practices in Insurance Schemes	12		
		FN 318	Actuarial Practices in Pension and Retirement Benefits	12		
		ST325	Mathematical Demography	12		
			One option from the following			
			FN 310	Investment Analysis	12	12
			FN301	Financial Analysis	12	
			Total Load		144	
	Total Core = 384, Total Optional =48, Grand Total				432	

Semester Mapping of **Optional** Courses for B.Sc. Actuarial Science Programme

Year	Semester	Course Code and Title	Credits	Credits Needed
2	II	ST 212 Statistical Inference I 12	12	12
		ST 215 Differential and Difference Equations	12	
3	I	ST 310 Statistical Inference II	12	24
		MT 312 Stochastic Processes	12	
		MT 378 Queuing Theory and Inventory Models	12	
		MT 348 Integer and Non-Linear Programming	12	
	II	FN 310 Investment Analysis	12	12
		FN 301 Financial Analysis		
Total optional credits				48

A.19. B.Sc. IN MATHEMATICS AND STATISTICS [BSc(Mat.St.)]

Semester Mapping of **Core** Courses for B.Sc. Mathematics and Statistics Programme

Year	Semester	Course Code and Title	Credits	Total
1	I	MT 100 Foundations of Analysis	12	72
		MT 127 Linear Algebra 1	12	
		ST 113 Basic Statistics	12	
		MT 114 Computer Programming	12	
		FN 100 Principles of Microeconomics	12	
		DS 112 Development Perspectives 1	12	
	II	MT 120 Analysis 1: Functions of Single Variable	12	60
		MT 135 Ordinary Differential Equations	12	
		ST 114 Probability Theory 1	12	
		FN 101 Principles of Macroeconomics	12	
DS 113 Development Perspective II		12		
2	I	MT 200 Analysis 2: Functions of Several Variables	12	60
		ST 212 Statistical Inference I	12	
		Mt 225 Partial Differential Equations	12	
		ST 210 Probability Distribution I	12	
		ST 218 Applied Statistics I	12	
	II	MT 278 Linear Programming	12	48
		MT 274 Numerical Analysis I	12	
		ST 211 Probability Distribution II	12	
		ST 219 Applied Statistics II	12	
3	I	MT 357 Abstract Algebra	12	56
		MT 340 Analysis 4: Real Analysis	12	
		MT 398 Practical Training	8	
		ST 310 Statistical Inference II	12	
		ST 316 Statistical Quality Control	12	
	II	MT 310 Analysis 3: Complex Analysis	12	56
		MT 360 Functional Analysis	12	
		ST 318 Sampling Theory and Methodology	12	
		MT 389 Project	8	
		ST 321 Regression Analysis	12	
Total Core Credits				352

Semester Mapping of **Optional** Courses for B.Sc. Mathematics and Statistics Programme

Year	Semester	Course Code and Title	Credits	Credits Needed	
1	II	At most one or none			
		MT 147 Discrete Mathematics	12		
		CL 107 Communication Skills	12		
		ST 118 Time Series and Index Numbers	12		
2	I	At most one or none			
		ST 265 Mathematical Computing	8		
		ST 220 Basic Demographics Methods	12		
	II	At least one option from the following			
		MT 227 Linear Algebra II	12	12	
		MT 266 Rigid Body Mechanics	8		
		ST 221 Population Dynamics	12		
ST 217 Probability Theory II	12				
3	At least One Optional from the following:				
	I	MT 378 Queuing theory and inventory models	12	12	
		MT 348 Integer and Non-Linear Programming	12		
		ST 319 Design and Analysis of Experiments	12		
		ST 326 Survival Models	12		
	II	At least one Option from the following			
		ST 311 Multivariate Normal Distribution	12	12	
		MT 358 Graphics and network optimization	12		
		MT 370 Topology	12		
		ST 312 Stochastic Processes	12		
		MT 374 Numerical analysis II	12		
		MT 346 Fluid Mechanics	12		
		ST 324 Linear Models	12		
		TMT 370 Topology	12		
	MT 380 Number Theory	12			
Minimum Number of Credits				36	
