Faculty of Oceanography
University of Calabar
Calabar, Nigeria

Students' Handbook

BSc Oceanography

With options in

Biological Oceanography
Chemical Oceanography
Geological Oceanography
Physical Oceanography
Mariculture & Marine Fisheries Resources

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1.0 Introduction

The University of Calabar has over the past three decades been actively involved in coastal and ocean research through her Institute of Oceanography. Consequently, the University has established reputation as the nation's pioneer and leading citadel for full-fledged Oceanography training up to doctoral level. Our ocean research and teaching programmes have benefited from technical support from the Federal Republic of Germany at inception and subsequently from several overseas research grants and fellowships awarded to our scientists and technologists. Although the oceans have commonly been considered mankind's last frontier, information on the ocean and coastal waters contiguous to Nigeria is very rudimentary, yet this frontier has vast potentials and hosts diverse resources critical to our nation's economic development and advancement of human civilization. The geographic location of the University within reach of major regional ocean currents as well as the largest estuary in the Gulf of Guinea provides strategic advantage for field studies and experimentation. In addition, the largest mangrove swamps in pristine condition in the West African sub-region with their rich biodiversity and diverse coastal sedimentary depositional bodies are in proximity to Calabar. Problems of local and trans-boundary deterioration of the coastal zone and offshore region as well as resource over-exploitation are among the research areas where multi-disciplinary approach is being encouraged. This degree programme is designated B.Sc. Oceanography with five study options namely: Biological Oceanography, Chemical Oceanography, Geological Oceanography, Physical Oceanography, and Mariculture & Marine Fisheries Resources. Accordingly, for purposes of nomenclature, the programme shall be categorized thus:

- B.Sc. Oceanography (Biological Oceanography)
- B.Sc. Oceanography (Chemical Oceanography)
- B.Sc. Oceanography (Geological Oceanography)
- B.Sc. Oceanography (Physical Oceanography)
- B.Sc. Oceanography (Mariculture & Marine Fisheries Resources)

Biological Oceanography focuses on the zoological, botanical and microbiological aspects of the ocean environment. Foundation lectures in statistics for ocean sciences, computer programming and biological oceanography techniques are built into the programme palette. The multidisciplinary challenges of biological oceanography are realized through lectures in introductory chemical oceanography, geological oceanography and physical oceanography. Limnology as a related science to oceanography is also included. Other courses like marine fisheries resource management, marine law and policy, and pathology of marine organisms complement the programme.

Chemical Oceanography focuses on the composition, concentrations and changes in the chemical conditions of coastal and marine environments. The main objects of study are the water column, interstitial water, sediments and biota in the marine environment. The role of Chemical Oceanography graduates is increasingly diversifying, given the strong interface of this discipline with many other ocean science disciplines on the one hand, and the growing challenging issues of marine pollution and health of aquatic habitats, modelling ocean

chemical cycles and processes, on the other. In addition to class lectures, field monitoring, sampling and laboratory exposures are strongly emphasized.

Geological Oceanography emphasizes on the application of scientific knowledge to understand the origin, characteristics and changes in the coastal and ocean environments. The main objects of study in geological oceanography are the mineral and energy resources, sediments, rocks, seabed morphology, fossils, as well as processes and phenomena on and within the ocean bottom. Scope of geological oceanography is expanding given the quest for geo-resources exploration and generation of new body of knowledge most crucial to unravelling the many challenges of natural global ocean change and earth's geodynamics. In addition to class lectures, several practical and field classes constitute the curriculum.

Physical Oceanography emphasizes on the application of basic principles in physics to study the energetics of the ocean environment. The main focus includes identifying, measurement, characterizing and modelling the properties and processes that operate in the oceans at various time scales and their role in the formation and modification of ocean features, the dynamics of living and non-living components as well as the utility of the ocean environment in general. The scope of physical oceanography is rapidly expanding, given the strong interface of this discipline with many other branches of ocean science, coastal engineering, and ocean technology. In addition to class lectures, several practical and field classes constitute the curriculum.

Mariculture is the cultivation of sea animals and plants in marine environment. Marine Fishery Resources include all aspects of exploitable and non-exploitable marine fishes, techniques and modalities for management. Training in Mariculture and Marine Fishery Resources programme is geared towards producing man-power capable of functioning in the marine fish culture and fisheries industry. Topics in the programme include: marine habitats, local and international fishery policies, fishery resources management, hatchery/fish farm management, fishery techniques, aquaculture and systematics, fish processing and preservation methods, mariculture systems and practices, fish health management, site selection and construction of culture enclosure, and the breeding of various species of marine organisms. Excursions and fieldwork as well as practical demonstrations in the above specialist areas shall be emphasized.

1.1 Philosophy

Students will be exposed to different interrelated fields of ocean sciences and techniques. The major thrust of their training is to understand the complexities of the ocean environment in all its ramifications and the value of multidisciplinary approach in proffering solutions to a wide range of issues in ocean environmental and resource management and conservation. Graduates of the programme will be assets to national and international establishments with interest in the ocean environment, especially resource exploration and exploitation, regulatory and monitoring, research and teaching as well as defence and strategic planning.

1.2 Vision

We envisage being a foremost ocean science training institution producing graduates that will contribute significantly to global ocean development through research.

1.3 Mission

To produce high quality graduates and scholars in focal areas of learning with theoretical, practical and entrepreneurial skills for the world of work in a conducive environment through quality research and teaching.

1.4 Objectives of the Programme

The objectives of the programme shall be:

1. To develop a core of ocean scientists that can explore and proffer solutions to localized, regional and global coastal and ocean problems;
2. To train globally competitive manpower for ocean science and research institutions
3. To instil ocean-based entrepreneurial competence and resourcefulness in the students

1.5 Admission Requirements

To qualify for admission, all candidates must possess at least 5 credits in SSCE/GCE (O/L) or equivalent in not more than two sittings. Credit passes are required in English and Mathematics and in the core science subjects: Chemistry, Physics and Biology.

Admission into the programme shall be open to two categories of candidates depending on their entry qualifications as follows:

a) Four (4) year study programme (UME and Pre-Degree)
b) Three (3) year study programme (Direct Entry)

Four-Year Study Programme

Candidates for the Four-Year Programme duration shall normally be admitted through the regular University Matriculation Examination (UME). However, candidates who passed the University of Calabar Pre-Degree Programme at the required levels shall be considered for admission upon the recommendation of the Directorate of Pre-Degree Programmes.

Direct Entry (3-Year Study Programme)

Candidates for direct entry shall be required to satisfy the minimum University requirements for admission into degree programmes in addition to any of the following conditions:

i. Hold Bachelor's degree or HND with Second Class (Lower) or Merit passes respectively, in the relevant sciences from the University of Calabar or any other recognized institution.

ii. Hold a Diploma of the University of Calabar or any other recognized institutions in the relevant disciplines. Minimum GPA for admission shall be 2.75 on a 4-point scale or 3.00 on a 5-point scale.
iii. Possess HSC/GCE (A/L) with passes in three science subjects at grades not less than C.

1.6 Graduation Requirements

This includes the total number of credit units required to qualify for graduation.

a) Minimum number of 120 credit units required for graduation (4-year programme)
b) Minimum number of 110 credit units required for graduation (3-year programme)
c) Minimum CGPA for graduation 1.50
d) Minimum of 4 Years for UME and Pre-Degree
e) Minimum of 3 Years for Direct Entry

1.7 Programme Structure

The UME and Pre-Degree entrants shall spend four years, while the Direct Entry students shall spend three years. In all cases, candidates shall undertake the mandatory one-semester industrial training, in addition to field work and laboratory practical.

The programme is organized around three categories of courses as follows:

1. Category A: Core department/Faculty courses;
2. Category B: Supporting courses from other departments/faculties of relevance to the programme;
3. Category C: University General Courses.

1.7.1 Academic Adviser

An Academic Adviser shall be assigned to the respective options of the programme to assist students in both academic and personal issues that may affect their studies. Students are also encouraged to avail themselves of the services of the University Counselling Units where the need arises.

1.8 Swimming and Sea Survival Training

Candidates shall undertake swimming and personal sea survival training during the programme. Successful candidates shall be certified. Note that all students of the BSc. Oceanography Programme are required to obtain above certification before being eligible to participate in field work activities.

1.9 Industrial Training (Students' Industrial Work Experience Scheme (SIWES))

All students admitted into the BSc. Oceanography programme shall undertake a one-semester industrial training during the second semester of the 300 Level of study. Location and timing shall be approved by the Department.

1.10 Career Prospects in Oceanography and Marine Sciences

Career prospects for graduates of Oceanography are diverse and rapidly increasing as man focuses attention on the resources, opportunities and health of the oceans. Of critical importance is the conservation of the ocean environment and resources so as to retain its goods and services to mankind. These graduates shall continually find relevance in both the public and private sectors of the ocean-related economy,

Graduates of Biological Oceanography have prospects in maritime industries; oil and allied companies; national and international organizations with interest in environmental management and resource conservation; NGOs, consultancy firms and institutions of learning.

Graduates of Chemical Oceanography are assets, nationally and globally, in maritime industries; marine environmental research and management organizations; marine health and conservation programmes; as well as in academic institutions.

Graduates of our Physical Oceanography programme will be assets, globally, in maritime industries, marine environmental research and management organizations; marine resources exploitation and conservation programmes; ocean and coastal engineering constructions, as well as in academic institutions.

Graduates of our Geological Oceanography programme will be assets, globally, in maritime industries, coastal and ocean evolution research and development establishments; ocean geo-hazard management organizations; marine geo-resources exploitation and conservation programmes; ocean and coastal engineering constructions, as well as in academic institutions.

Graduates of Mariculture and Marine Fisheries Resources shall have engagements in marine fish production for feeding the teeming population of Nigeria. Private fish farms and hatcheries provide added opportunities for profitable and rewarding engagement of graduates of the programme. Employment opportunities also exist in relevant Ministries, Departments, NGOs, international organizations (such as FAO, WHO, IFAD, UNDP, etc) and environmental protection agencies. Furthermore, graduates of this programme can be self-employed as well as employers of labour.

2. Registrations

All students are required to register after payment of prescribed school charges every semester, session or upon admission into the University as the case may be.

2.1 Department

2.1a. Registrations in the Department are done per semester basis. All students admitted into the BSc. Oceanography Programme should consult with the Head of Department or his/her designated representative for guidance.

2.1b. Carry over or Repeat Courses are registered first before adding current courses during registration. A student is allowed only 3 chances to repeat and pass a particular course except GSS courses, after which he or she carries F grade in that course if he or she fails it the third time. GSS Courses must be passed before graduation.

2.1c. A maximum of 24 credit hours are allowed for registration in each semester.

2.1d. Final year students with more than 4 carry over courses from 3rd year are not qualified to carry out research project that year.

2.1e. Final year students needing extra credit hour must apply at the beginning of the session, through the Head of Department, for not more than 3 additional credit hours per semester (i.e. maximum of 27 Credit Hours per Semester).

2.1f. Only final year students are qualified to apply for extra credit hours.

2.1g. The final year research project is a 6 credit hour course and runs through the first and second semesters. Registration for this course and research work must commence in the first semester of the final year.

2.1h. Any student on probation that advances illegally to the next year of study, does so at his or her own risk as this action may lead to his or her withdrawal from the programme.

2.1i. All students should consult with their respective academic advisers for guidance before registering of courses.

2.2 **Faculty**

Registration at the Faculty is also done per semester basis. Students should consult with Dean/Faculty Officer for guidance.

2.3 **Library**

All bonafide students of the University of Calabar are entitled to the Library resources in the University main Library. To access these resources, all students are required to register with the University Library and obtain Library cards. A student may borrow with the cards. Registration at the University Library is once for the study period.

2.4 **Medical Centre**

The University of Calabar Medical Centre provides medical services to all students. To access the services, you must be a registered student, and should have registered with the Medical Centre. In addition to mental and physical health, the Centre also provides counselling services. Registration at the University Medical Centre is once for the study period.

2.5 **GSS and Entrepreneurship Courses**

All GSS and Entrepreneurship Courses are compulsory and must be passed before graduation.

3. Examinations

The University of Calabar operates the Semester system. Each Session consists of two semesters termed First and Second Semesters. At the end of each semester, students are expected to sit for the examination on all prescribed and registered Courses. Students are required to observe all regulations guiding the conduct of examinations in the University of Calabar. These regulations are contained in the University of Calabar Students' Handbook and Departmental Handbook. The Head of Department shall update students from time to time should there be rule-changes.

All Course examinations shall consist of Continuous Assessment (30%) and Examination (70%).

3.1 Conduct of Examinations

The Head of Department (HOD) is the chief examiner of the Department. He in collaboration with other academic staff organizes all examinations as prescribed by the University Senate. The timing of every examination is determined by the University Academic Calendar.

3.2 Misconducts in Examination

The following are deemed examination misconducts (wrong-doings) in the University of Calabar.

i) Copying with cooperation
ii) Copying without cooperation ('Giraffing')
iii) Possession and/or use of extraneous material(s)
iv) Impersonation (writing examination for another student)
v) Supplying and/or receiving extraneous material(s)
vi) Exchange of entire or part of Answer Booklet
vii) Possessing another student's answer booklet
viii) Courier (Smuggling of question paper(s) and/or answer booklet(s) in or out of the examination room)
ix) Reading of notes/other relevant material(s) in toilet during an examination
x) Writing on tables, desks, dresses, palms, laps or other material(s)
xi) Plagiarism (using another person's thought or work without due acknowledgement)
xii) Pre-knowledge of examination question(s)
xiii) Writing of term paper or project for another student
xiv) Possession and/or use of cell phone in an examination
xv) Presentation of another student's fee clearance card or receipt in an examination

The various examination malpractices and the respective penalties as prescribed by the University of Calabar Senate are summarized in the Table below.

Examination Misconduct and prescribed punishment by Senate of the University of Calabar

SN	Offences	Punishment
1	Communication with another student in the examination room	Cancellation of the papers of both students
2	Possession of extraneous material(s) in the examination room	Suspension for one academic session
3	a) Copying from extraneous material b) Copying from extraneous material received from another student in the examination	Suspension for two academic sessions for the student or students involved
4	Writing examination, term paper or project for another student	Expulsion of the students involved. Where the other party is a non-student, he/she should be reported to the police.
5	Breaking in or unauthorized entry into any	Expulsion from the University

	office of the University of Calabar and/or removing, changing or tampering with examination materials or results and illegal removal of same.	
6	i) Plagiarizing the entire: a) Undergraduate/Diploma/Certificate Term Paper or Project b) Graduate Term Paper or Project c) Graduate Thesis/Dissertation ii) Plagiarizing only part or sections of any of the above	 Cancellation of term paper or project plus suspension for one academic session. Suspension for two academic sessions Cancellation of the Thesis/Dissertation and expulsion. Suspension for one academic session. Cancellation of the particular chapter or chapters
7	Presentation of fake result(s) by a student or for a student to the University	a) Cancellation of the result, if there is no evidence that the student is involved in organizing the fake result. b) If it is discovered that the student had a hand in the presentation of the fake result or results, suspension for two academic sessions.
8	Snatching of examination material(s) before or after an examination by a student or students	Expulsion of all involved
9	a) Possession of cell phone in an examination hall. b) Usage of the phone	a) Seizure of phone and cancellation of the paper. b) Suspension for one academic session.
10	Possession of another student's fee clearance card or receipt in the examination hall with the intention of writing for herself/himself.	Suspension for one academic session.

3.3 Grading system

The grading system shall constitute of continuous assessment and examination scores to be summed up as follows:

Range of score (%)	Letter Grade	Point
70-100	A	5
60-69	B	4
50-59	C	3
45-49	D	2
40-44	E	1
0-39	F	0

3.4 Computation of GPA and CGPA

The Grade Point Average (GPA) is computed at the end of each Session for each student using the First and Second Semester Results. The Cumulative Grade Point Average (CGPA) is computed from Second Year and above. The final pass level (or Class of Degree) is based on the CGPA at the end of the final year of study.

The steps for computation of GPA and CGPA are outlined in sub-sections that follow.

3.4.1 **Computation of GPA (Year 1, Year 2)**

Year 1

First Semester Result

Course code	**Credit Hours**	**Grade**	**Point**	**Grade Point (Point x Credit Hour/Unit)**
GOC 111	3	A	5	5x3 = 15
BIO 101	3	B	4	4x3 = 12
CHM 101	3	B	4	4x3 = 12
PHY 101	2	F	0	0x2 = 0
MTH 111	3	B	4	4x3 = 12
LAW 111	2	C	3	3x2 = 6
GSS 101	2	D	2	2x2 = 4
GSS 131	2	D	2	2x2 = 4
	= 20			Total = 65

Second Semester Result				
GOC 112	3	B	4	4x3 = 12
BIO 102	3	A	5	5x3 = 15
CHM 102	3	A	5	5x3 = 15
PHY 102	2	C	3	3x2 = 6
MTH 132	3	F	0	0x3 = 0
GSS 112	2	B	4	4x3 = 12
GSS 122	2	C	3	3x2 = 6
Law 112	2	B	4	4x2 = 8
GSS 102	2	D	2	2x2 = 4
	= 22			Total = 78

Total Grade Point = 65 + 78 = 143

Total Credit Hours = 20 + 22 = 42

GPA = Total Grade Point / Total Credit Hours

= 143/42

GPA = 3.40

Year 2

First Semester Result

Course code	**Credit Hours**	**Grade**	**Point**	**Grade Point**
BOC 221	3	A	5	5x3 = 15
COC 221	3	B	4	4x3 = 12
MAF 221	3	C	3	3x3 = 9
POC 211	3	D	2	2x3 = 6
	= 12			Total = 42
Second Semester Result				
BOC 222	3	A	5	5x3 = 15
BOC 212	3	B	4	4x3 = 12
COC 212	3	C	3	3x3 = 9
POC 212	3	D	2	2x3 = 6
MAF 212	3	B	4	4x3 = 12
	= 15			Total = 54

GPA = 96/27 = 3.56

So the GPA of this 'student' at the end of Year 1 was 3.40 and 3.56 at the end of Year 2.

3.4.2 **CGPA (Year 2 and above)**

To compute CGPA, two or more years are required. Thus using our example above, the CGPA would be computed thus:

CGPA (Year 2) = 143 + 96/42+27

CGPA = 3.46

Note that adding the GPAs for Years 1 and 2, then dividing by 2 is WRONG. This will over-estimate the CGPA.

3.4.3 **Probation**

Probation is a study year an under-performing student is asked to repeat and pass all outstanding courses previously failed.

There two categories of students that should be on probation as prescribed by the University of Calabar Senate.

i) A student who fails up to 10 Credit Units with CGPA of LESS THAN 1.50.
ii) A student who fails up to 15 Credit Units and the CGPA is 1.50 or above.

A student on probation is required to register only the FAILED Courses. Any Course with a pass grade should not be registered.

Computing Probation GPA and CGPA

At the end of the Probation Year, the GPA and CGPA will be computed to determine if the affected student is qualified to move on to the next level or Withdraw. Probation GPA is the GPA of the probation year, while the Probation CGPA is the CGPA of the Courses from previous Year(s) (including all passed and failed courses) and the Probation Year.

3.4.4 **Withdrawal from the programme**

i) A student who fails up to 15 Credit Units BUT CGPA is LESS THAN 1.50 should WITHDRAW OR CHANGE PROGRAMME.

ii) A student who fails MORE THAN 15 Credit Units should WITHDRAW.

3.4.5 **Repeat Course(s)**

When a student fails one or more Courses but the GPA or CGPA is above 1.50, those failed courses should be repeated at the next available opportunity. Note that Repeat Courses should be registered first before adding new level courses to make up to the maximum Credit Units approved per semester.

3.4.6 **Carryover Course(s)**

When a student drops one or more Courses having exceeded the maximum recommended Credit Units for the semester, such course(s) is termed 'Carryover'. These courses should be registered for at the next available opportunity.

3.5 **Classification of Degree Results**

Final Degree Results are classified as follows.

CGPA Range	**Class of Degree**
4.50-5.00	1st Class
3.50-4.49	2nd Class Upper (or 2[1])
2.40-3.49	2nd Class Lower (or 2[2])
1.50-2.39	3rd Class
<1.50	Fail

4.0 Summary of Course Requirements

Year I of IV
First Semester

Course code	**Course Title**	**Category**	**Credit Hours**
GOC 111	History & Philosophy of Science	A	3
BIO 101	General Biology I	B	3
CHM 101	General Chemistry I	B	3
PHY 101	General Physics I	B	2
MTH 111	Algebra & Trigonometry	B	3
GSS 141	Anti-corruption I	C	2
GSS 101	General Oceanography I	C	2
GSS 131	Use of English & Communication Skills I	C	2
	Total Credits		**20**
Second Semester			

GOC 112	General Oceanography II	A	3
BIO 102	General Biology II	B	3
CHM 102	General Chemistry II	B	3
PHY 102	General Physics II	B	2
MTH 132	Coordinate Geometry & Calculus	B	3
GSS 112	Citizenship Education	C	2
GSS 122	Philosophy and Logic	C	2
GSS 142	Anti-corruption II	C	2
GSS 102	Use of English and Communication Skills II	C	2
	Total Credits		**22**

Year I1 of IV
First Semester

Course code	**Course Title**	**Category**	**Credit Hours**
BOC 221	Biological Oceanography I	A	3
COC 221	Introductory Chemical Oceanography I	A	3
MAF 221	Introduction to Mariculture	A	3
POC 211	Ocean Safety and Survival	A	3
POC 221	Ocean Circulation	A	3
GLG 101	Physical Geology	B	3
GSS 211	Introduction to Computers I	C	2
	Total Credits		**20**
Second Semester			
BOC 222	Application of GIS and Remote Sensing in Oceanography	A	3
BOC 212	Biological Oceanography II	A	3
COC 212	Introductory Chemical Oceanography II	A	3
POC 212	Introduction to Physical Oceanography of Nigeria	A	3
MAF 212	Nigerian Inland, Coastal and Marine Fisheries	A	3
GLG 102	Earth History	B	3
GSS 212	Computer Applications	C	2
GST 202	Entrepreneurship Development I	C	2
	Total Credits		**22**

Year III of IV **(Biological Oceanography Option)**
First Semester

Year III of IV ***First Semester***			
COC 311	Marine Biochemical Cycle	A	3
BOC 301	Biological Oceanographic Techniques	A	3
BOC 311	Limnology	A	3
BOC 321	Marine Ecology	A	3
BOC 331	Statistical Methods in Oceanography	A	3
BOC 341	Marine Ecosystem Conservation	A	3
	Total Credits		**18**
Second Semester			
BOC 302	SIWES Programme		**6**
	Total Credit		**6**
Year IV of IV ***First Semester***			
BOC 400	Thesis Research Project	A	3
BOC 401	Biological Oceanography Seminar	A	2
BOC 411	Fish Population Biology	A	3
BOC 421	Marine and Policy	A	2
BOC 431	Marine Fisheries Resources & Magt.	A	3
COC 421	Marine Pollution	A	3
	Total Credits		**16**
Second Semester			
BOC 400	Thesis Research Project	A	3
BOC 402	Pathology of Marine Organisms	A	3
BOC 412	Fisheries Oceanography	A	3
BOC 422	Biogeography of Marine Organisms	A	3
BOC 432	Marine Microbiology	A	2
GST 302	Entrepreneurship Development II	C	2
	Total Credits		**16**
	Grand Total		**140**

Year III of IV **(Chemical Oceanography Option)**
First Semester

Course code	**Course Title**	**Category**	**Credit Hours**
COC 301	Ocean Biogeochemical Cycles	A	3
BOC 351	Statistical Methods in Oceanography	A	3
COC 311	Sampling and Analytical Methods in Chemical Oceanography	A	3
COC 321	Interstitial Chemistry of Marine Sediments	A	3
COC 331	Chemistry of Sea Surface Micro-layer	A	3
COC 341	Marginal Seas Chemistry	A	3
	Total Credits		**18**
Second Semester			
COC 302	Industrial Training (SIWES)	A	6
	Total Credits		**6**

Year IV of IV
First Semester

Course code	**Course Title**	**Category**	**Credit Hours**
COC 400	Research Project	A	3
COC 401	Chemical Oceanography Seminar	A	3
COC 411	Marine Petroleum Chemistry	A	3
COC 421	Marine Pollution	A	3
COC 431	Deep Sea Chemistry	A	3
COC 441	Marine Atmospheric Chemistry	A	3
	Total Credits		**18**
Second Semester			
COC 400	Research Project	A	3
COC 412	Estuarine Chemistry	A	3
COC 422	Chemical Tracer Oceanography	A	3
COC 432	Marine Organic Geochemistry	A	3
COC 442	Chemical Oceanography and Coastal Management	A	3
GST 302	Entrepreneurship Development II	C	2
	Total Creditsi		**17**
	Grand Total		**143**

Year III of IV **(Geological Oceanography Option)**
First Semester

Course code	Course Title	Category	Credit Hours
GOC 311	Marine Geophysics	A	3
GOC 321	Ocean Basin Tectonics and Geo-hazards	A	3
GOC 331	Geological Oceanography Survey Techniques and Map Analysis	A	3
GOC 341	Coastal Hydrogeology	A	3
GOC 351	Coastal Geomorphology and Sedimentology	A	3
GOC 361	Marine Geo-Statistics and Models	A	3
GLG 251	Systematic Palaeontology	B	3
	Total Credits		**21**
Second Semester			
GOC 302	Industrial Training (SIWES)	A	6
	Total Credits		**6**

Year IV of IV
First Semester

Course code	Course Title	Category	Credit Hours
GOC 400	Research Project	A	3
GOC 411	Geological Oceanography Seminar	A	3
GOC 421	Ocean Sedimentation Modelling	A	3
GOC 431	Marine Geochemistry and Paleo-Geochemistry	A	3
GOC 441	Marine Geology of Nigeria	A	3
GLG 461	Micropaleontology	B	3
	Total Credits		**18**
Second Semester			
GOC 400	Research Project	A	3
GOC 412	Palae-Oceanography	A	3
GOC 422	Geological Oceanography and Coastal Management	A	3
GOC 432	Ocean Geo-Resources	A	3
GLG 242	Igneous and Metamorphic Petrology	A	3
GST 302	Entrepreneurship Development II	C	2
	Total Credits		**17**
Grand Total			**146**

Year III of IV **(Mariculture and Marine Fisheries Resources Option)**
First Semester

Course code	**Course Title**	**Category**	**Credit Hours**
MAF 301	Mariculture& Aquaculture Systems / Practices I	A	3
MAF 311	Fish Nutrition and Feeding Habits of Marine Fishes	A	3
MAF 321	Culture of Marine Organisms	A	3
MAF 331	Fisheries Techniques	A	3
MAF 341	Anatomy and Physiology of Fishes	A	3
BOC 351	Statistical Methods in Oceanography	A	3
Total			**18**
Second Semester			
MAF 302	Industrial Training (SIWES)	A	6
	Total		**6**
Year IV of IV **First Semester**	**Course Title**	**Category**	**Credit Hours**
MAF 400	Thesis Research Project	A	3
MAF 401	Current Topics in Mariculture Capture Fisheries	A	2
MAF 411	Hatchery Management, Fish Breeding and Genetics	A	3
BOC 431	Marine laws and Policy	A	2
COC 421	Marine Pollution	A	3
MAF 421	Marine Resource Management and Conservation	A	3
Total			**16**

Year IV of IV **Second Semester**			
MAF 400	Thesis Research Project	A	3
MAF 412	Pathogens and Diseases of Marine Organisms	A	3
MAF 422	Mariculture& Aquaculture Systems / Practices II	A	3
BOC 442	Marine Microbiology	A	2
MAF 432	Fish processing, preservation and marketing	A	2
GST 302	Entrepreneurship Development II	C	2
Total			**15**
Grand Total			**139**

Year III of IV **(Physical Oceanography Option)**
First Semester

Year III of IV **First Semester**			
Course code	**Course Title**	**Category**	**Credit Hours**
POC 311	Ocean Waves and Tides	A	3
POC 321	Nearshore Currents	A	3
POC 331	Inshore and Deltaic Hydraulics	A	3
POC 341	Beach Processes	A	3
POC 351	Ocean Physical Processes Monitoring and Mapping	A	3
GOC 311	Marine Geophysics	A	3
	Total Credits		**18**
Year III of IV **Second Semester**			
POC 302	Industrial Training (SIWES)	A	6
	Total Credits		**6**
Year IV of IV **First Semester**			
POC 400	Research Project	A	3
POC 411	Physical Oceanography Seminar	A	3
POC 421	Acoustic,Optical and Tracer Oceanography	A	3
POC 431	Regional Oceanography	A	3
POC 441	Sea Level Dynamics	A	3
POC 451	Introductory Physical Oceanography	A	3

	Modelling		
	Total Credits		**18**
Year 1V of 1V **Second Semester**			
POC 400	Research Project	A	3
POC 412	Ocean Continental Margin and Deep-Water Processes	A	3
POC 422	Marine Meteorology	A	3
POC 432	Coastal Ocean Interactions	A	3
POC 442	Physical Oceanography in Coastal Engineering and Management	A	3
GST 302	Entrepreneurship Development II	C	2
	Total Credits		**18**
Grand Total			**144**

***Category A = Core Courses, B = Elective Courses, C = General Courses**

5.0 Description of Courses

BIO 101: General Biology I ***3 Credit Units***

An introductory course which aims to give the students a background to the general tenets of animal and plant biology – cell structure and organization; diversity; reproduction; interrelationship of organisms, heredity, evolution and elements of ecology.

BIO 102: General Biology II ***3 Credit Units***

The course is intended to give a comparative study of the major morphological characteristics of the different plant and animal groups showing the gradual evolution from lower to higher organisms. The ecological adaptations of the different groups of plants and animals will be studied.

BOC 221: Biological Oceanography I ***3 Credit Units***

Introduction to the world of marine plankton. Definitions based on size and habitat categories. Marine plankton groups; Plankton reproduction and growth rates. Factors affecting photosynthetic reproduction of phytoplankton. Marine zooplankton groups and methods of phytoplankton and zooplankton sampling.

Practical: Field sampling for phyto- and zoo-plankton. Microscopy - study of plankton samples.Emphasis shall be on characteristic features and identification using keys.

BOC 212: Biological Oceanography II ***3 Credit Units***

Marine benthos, nekton and microbes. Basic ecological divisions of the oceans. Benthos: different classes, identification; substrate types and grain size analysis; physical and biological factors affecting distribution of benthic communities; life on the seashore, zonation of organisms. Sampling techniques for marine benthos. Nekton: different groups including fish, crustaceans, mollusca, mammals etc, adaptations to life; factors affecting their distribution; migrations; sampling methods for nekton. Microbes: different groups in the ocean,; emphasis on identification; importance of microbial loop in the detrital food chain.
Practical: sampling benthos, nekton and microbes in the field. Laboratory analysis and identification of specimens.

BOC 222: Application of GIS and Remote Sensing in Oceanography ***3 Credit Units***

Definitions, fundamentals and applications of Geographic Information System (GIS); principles of GIS; Map making; use of GIS in fisheries and marine geo-spatial planning, use of GIS in aquaculture development; use of GIS in marine protected areas. What is remote sensing; application of remote sensing in oceanography and aquaculture. Types of sensors and their application. Software used in GIS and Remote Sensing, examples ArcGIS, QGIS, GRASS, ENVI; ERDAS IMAGIN, etc. Hands-on laboratory components.

BOC 301: Biological Oceanographic Techniques ***3 Credit Units***

The course will focus on introducing students to biological oceanographic instrumentation: microscopy, microtechniques, quadrats, plankton nets, water samplers, sediment samplers, trawls and dredges, biomarkers, benthos sampling, microbial sampling, underwater photography and general marine biological research methods.Practical demonstration of instruments and their workings.

BOC 311: Limnology ***3 Credit Units***

Introduction to the study of lakes and rivers, morphology and typography of lakes and rivers. Hydrodynamics and water circulation. Physico-chemical characteristics of lakes and rivers. Phyto- and zooplankton and biological production in lakes & rivers. Nitrogen and phosphorus cycles in freshwaters. Biogeochemical cycling of nutrients; the significance of lakes and rivers and their floodplains for fish production. Evolutionary significance of lakes as a milieu for fish speciation. Water cycle and management of river basins (watershed).
Practical: laboratory study of physio-chemical parameters of lakes and rivers. Identification of freshwater plankton and macro invertebrates.

BOC 321: Marine Ecology ***3 Credit Units***

Emphasis on the relationship between marine organisms and their environment. Interactions between the various organisms or groups of organisms: predation, competition, parasitism, symbiosis, commensalism. Specialized marine ecosystems: estuaries, kelps, mangroves, coral reefs, open oceans, hydro-thermal vents and cold seeps. Organic production in the sea and

regulating factors. Marine productivity – measurements and calculation; Food web analysis; microbial loop and detrital chain. Energy balance sheet; The use of ECOPATH as a marine ecological tool; Human impact on the marine environment.
Practical: Experimentation on methods of measurement of organic production – e.g. the oxygen bottle for measuring photosynthesis.

BOC 341: Marine Ecosystem Conservation ***3 Credit Units***

The purpose of this course is describe the marine ecosystem and approaches to the conservation of the marine life and their habitats. Negative impacts of human activities (habitat pollution, degradation and modifications), and the unprecedented climate change on the existence of marine ecosystems shall be considered. The most vulnerable are the so-called blue ecosystems, comprising of the mangroves, coral reefs, seagrass beds and kelp. Techniques and technologies for marine conservation shall be espoused. International Laws and treaties relating to marine ecosystems conservation shall be examined. Endangered and threatened species conservation and rehabilitation, establishment procedures for and management of marine protected areas (MPAs), Marine Reserves and Sanctuaries shall be components of the course. Examples of marine ecosystem conservation projects are used as case studies. The role of International Union for the Conservation of Nature (IUCN), Marine Conservation Society and other governmental and non-governmental organizations are emphasized. Community-based efforts in marine conservation shall be encouraged.

BOC 332: Statistical Methods in Oceanography ***3 Credit Units***

Introduction to the application of statistical principles in the marine sciences; role of statistics in experimental design and analysis of data. Developing the scientific question; hypothesis testing and drawing inferences. Topics to range through definition and classification of variables and parameters; statistics of central tendency and measure of spread; probability theory; binomial and Poisson distributions; normal distribution; confidence limits; X^{2-}test; analysis of variance (anova); regression & correlation, and Ecological Statistics.

BOC 401: Biological Oceanography Seminar ***2 Credit Units***

Graduating students to conduct a literature survey on topical issues in marine biology and produce a properly arranged report. Both oral presentation of report and bound copy will be assessed and graded.

BOC 411: Fish Population Biology ***3 Credit Units***

Introduce students to fish population dynamics and stock assessment. To be emphasized shall be the four elements of fish population dynamics (recruitment, growth, natural and fishing mortality) other topics: models of fish growth and mortality, age and growth determinations, determination of mortality rates, length-weight relationships, condition factors (GSI and HSI). Fish migrations – types and importance. Methods of estimating fish population size.
Practical: Exercises on fish population analysis with real and hypothetical data.

BOC 421: Marine Law and Policy ***2 Credit Units***

Concepts in marine policy as related to human use of marine space and resources. Various elements of marine policy (objectives, laws, guidelines and processes of evolution of marine policy). Various economic and strategic interests covered by marine policy. UN Convention on Law of the Sea (UNCLOS 82). Agenda 21 of UNCED. Marine laws and regulations of Nigeria.

BOC 431: Marine Fisheries Resources and Management ***3 Credit Units***

The various marine fishery resources: fin-fish, shell fish (shrimps, krill, lobsters, crabs) molluscs (periwinkles, mussels, clams, cephalopods, octopods), mammals (whales etc.). Resources size and state of exploitation for different world areas. Major fish harvesting and processing methods to be studied. Fisheries management at national regional and international levels. Role of international fisheries commissions such CECAF, ICNAF, NAFO, IOFC, etc. the roles of UNESCO's Regional Seas Program and Large Marine Ecosystem (LME Programme) in fisheries management. Methods of fishery regulation, monitoring, control and surveillance. Marine nature reserves. Biology of some Nigerian food fishes and shellfish. Impact of fisheries and aquaculture on the marine environment.

BOC 402: Pathology of Marine Organisms ***3 Credit Units***

The course will provide knowledge and understanding of the nature and aetiology of the various pathological conditions in the different phylogenetic classes of marine organisms, particular attention being paid to those species of commercial/medical/ environmental significance.

Basic definitions. The major pathogen groups in marine organisms: viruses, bacteria, fungi, protozoa, helminthes etc. pathologies in different taxonomic groups of marine organisms – invertebrates, vertebrates. Environment-host-pathogen interactions in the marine environment Epidemiology of disease in wild marine fish stocks; impact of stock specific parameters; impacts of environment parameters.Pathology as a contributory factor to natural mortality.Economic and public health aspects of marine pathologies.Use of pathogens as biological tags for marine organisms.Pathology as indicator of pollution effects.Marine pathological techniques.

BOC 412: Fisheries Oceanography ***3 Credit Units***

Students will be introduced to the concepts of marine fish population and regulation; role of environmental variability on year class strength and recruitment. Species concepts; component populations of fish species; population characteristics.Extant hypothesis on marine fish population regulation; cardinal hypothesis (match/mismatch and member/vagrant hypotheses); Lasker hypothesis.Recorded long term variability in fish stock abundance. Scales of physical and biological processes and the problem of population analysis; stock recruitment relationships, sequential population analysis, biochemical index of survivors.

BOC 422: Biogeography of Marine Organisms ***3 Credit Units***

The course provides insight into the patterns of distribution of different species, genera, families and higher taxa of marine organisms in different geographic regions of oceans; relations between distribution and evolution of different groups and their adaptations to different marine regions. To cover the range of marine organisms – plankton invertebrate and vertebrate groups.Major ecological divisions of the oceans (littoral, continental shelf, deep benthic zones.Epipelagic, mesopelagic, bathypelagic etc.). Major marine regions: Indo-West Pacific, Western Atlantic, Eastern Pacific, Eastern Pacific Barrier, Eastern Atlantic, Mediterranean Sea, Arctic and Antarctic.

BOC 432: Marine Microbiology ***2 Credit Units***

Hydrologic cycle, Distribution of microorganisms in marine ecosystems and factors influencing such distributions. Measurements of microbial abundance, biomass and growth; primary and secondary productivity; Microbial food chain, web and the "microbial loop" concept. Biogeochemical cycle of nutrients; Pollution and self-purification of water.

COC 221: Introductory Chemical Oceanography I ***3 Credit Units***

Roles, ethics and challenges of Chemical Oceanographers in national and global development; Oceans as a natural laboratory; Chemical processes in the oceans; Factors that affect ocean chemistry – natural and human-induced; General global trends in ocean chemical parameters and ship-based sampling; An overview of ocean chemistry monitoring and surveillance systems and platforms; Mussel Watch; Applications of GIS and Remote Sensing; Ecotoxicology; Nano particles; Contaminant risk factors; Bio-indicators and biomarkers; Chemical remediation techniques.

COC 212: Introductory Chemical Oceanography II ***3 Credit Units***

Study of the sources, fate and sink of organic constituents of seawater; Dissolved organic materials in the sea – sources and supply, removal processes, organic composition of seawater. Particulate organic carbon in the sea – origin, quantity and nature of particulate organic carbon; chemical composition. Interaction between organic and inorganic compounds. Input and diagenesis of organic materials in sediments. Complex forming properties of organic matter, soluble, polymeric and colloidal complex, interdependence of complex formation, Carbon isotope ratios.

COC 301: Ocean Biogeochemical Cycles ***3 Credit Units***

This will involve the study of sedimentary and gaseous cycles of major nutrient elements; Sedimentary chemistry and mineralogy; Rock type distribution; Compositional trends in shales, carbonate rocks, evaporites; Cycles of silicon, iron, titanium and aluminium; Cycles of magnesium and potassium; Cycles of sodium and chlorine; Cycles of sulphur; Cycles of calcium and carbon; Micronutrient element cycles (nitrogen, phosphorous, carbon, silicon); Uptake, regeneration and distribution of micronutrients in the sea.

COC 311: Seawater Chemistry* and Colloids** ***3 Credit Units

Chemistry of sea surface microlayer. Speciation of dissolved elements in seawater; Solubility concept; Chemical equilibrium in sea water; Concentration ratios and dissociation constants; Activity coefficients and ionic strength of seawater; Colloids availability and mobility; sources, distribution, partitioning in sea water. Characterization of colloids; isotopic exchanges; Fe-Mg-Si-Al colloid complexes, colloids as sink for marine pollutants. Influence of colloids and sediments on water quality. Geochemistry of marine colloids and seston.

COC 321: Sampling and Analytical Methods in Chemical Oceanography 3 Credit Units

Sampling techniques for the collection of water, sediment, organisms and aquatic plants. Instrumentation – principles. Laboratory procedures. Preliminary treatment, Tissue preparation and preservative methods. Titrimetric and spectrophotometric methods (colorimetry, AAS, FT-IR etc). Chromatography: Organic compounds (hydrocarbons, pesticides, polychlorinated biphenyls etc.). Separation techniques, HPLC, Amino acid analyser, GC-MS. Data handling and interpretation.

COC 331: Interstitial Chemistry of Marine Sediments ***3 Credit Units***

A description of the chemical composition of interstitial waters; Chemistry of Interstitial waters of shallow and deep marine sediments; Nutrient fluxes in interstitial waters of tropical marine sediments; Redox processes in interstitial marine sediments; Sub-surface chemistry and elements profiling.

COC 341: Marginal Seas Chemistry ***3 Credit Units***

The course examines the characteristics of marginal seas based on chemical constituents. Water quality of marginal seas. Contrasting features (chemical and physical) between coastal ocean, marginal seas and open ocean such as salinity, precipitation, temperature trends; Transport and fate of chemicals in marginal seas and pollution trends as well as biogeochemical processes; Bathymetry, water mass and circulation patterns, biomass and productivity of marginal seas; Interactions with the coastal ocean.

COC 401: Chemical Oceanography Seminar ***3 Credit Units***

The student is expected to undertake detailed review of a given topic of interest in chemical oceanography and present the literature information in a seminar.

COC 411: Marine Petroleum Chemistry ***3 Credit Units***

Organic geopolymers; Macromolecular organic matter; Petroleum hydrocarbon formation; Hydrocarbon geochemistry; Source rocks and organic matter type; Geochemical/maturity parameters: CPI, Pristane/Phytane ratios, Steranes, hopanes, sterols, styrenes, phenanthrenes ratios, etc. Hydrocarbon/crude oils classification; Sources and fate of hydrocarbons in seawater; Polyaromatic hydrocarbons; Hydrocarbon (HC) bioconversion by bacteria; HC accumulation in water, sediments and biota; Biomarker chemistry.

COC 421: Marine Pollution ***3 Credit Units***

Definition, types and classes. Transport pathways of marine pollutants: Littering, ocean mining, Oil spills, Heavy metals pollution, toxic waste dumping, persistent organic pollutants (PCBs, PAHs, Organochlorines etc) – abundance and distribution in the marine environment.. Agricultural activities, urbanisation, fisheries and eco-tourism: impacts on the ocean. Effects of anthropogenic additions on waters, sediment and biota. Economic impacts of ocean pollution. Legal aspects of marine pollution. partitioning and toxicity; determination of techniques and control.

COC 431: Deep Sea Chemistry ***3 Credit Units***

The course shall evaluate deep ocean sedimentation and diagenetic processes; Sink and fate of organic and inorganic constituents in deep sea; Chemical speciation; Redox processes in deep sea sediments; Major and minor elemental species, Fe, Mn, and S in deep sea sediments; Anoxic oxidation of sedimentary sulphur; Chemical reactions at mid-ocean ridge; Gas hydrates; Oxygen minimum zones; Anoxic basins; Chemistry of hydrothermal systems; Deep sea chemical mass balance.

COC 441: Marine Atmospheric Chemistry ***3 Credit Units***

Ocean properties; Transfer of gases and chemical species across air-sea interface; Oceanic evaporation and precipitation; Acid rain chemistry; Transport of pollutants at the air-sea interface; Long range transport of Atmospheric pollutants (LRTAP): Dust haze and effects on coastal ocean; Chemistry of ocean-climate interactions; Marine aerosols and influence on ocean chemistry; Chemical aspects of marine meteorology.

COC 412: Estuarine Chemistry ***3 Credit Units***

Estuarine types based on degree of mixing and geomorphology; Chemical composition and processes in estuaries; Chemical species in estuaries – major and minor elements, dissolved and particulate organic carbon; Salinity and salinity stratification; Conservative and non-conservative parameters; Mixing zones and turbidity maximum; Ionic strength and flocculation processes; Materials and pollutant fluxes; Organic and inorganic complexes in estuaries; Estuarine productivity and pollution.

COC 422: Chemical Tracer Oceanography ***3 Credit Units***

Radioactive nuclides in seawater; Radioactive substances enrichment; Useful isotopes; Abundance and distribution of radionuclides in sea water, biota and sediments of the world's ocean and seas; Oceanic water mass tracers; Stable isotope tracers; Artificial radionuclides as tracers in the ocean; Tracer techniques in chemical instrumentation; Application of chemical tracers in the determination of mixing times of water masses in the surface and deep ocean.

COC 432: Marine Organic Geochemistry ***3 Credit Units***

General principles of organic geochemistry with emphasis on element distribution in hydrosphere, lithosphere, biosphere and atmosphere; Chlorophyll as a precursor organic matter; Organic matter in water and sediments; Formation and export; Nutrients and organic matter; Diagenesis, catagenesis and metagenesis of organic matter; Organic matter at sediment-water interface; Chemical composition of biomass: Redfield ratio, marine versus terrigenous organic matter, degradation and selective preservation of organic matter; Formation of kerogen; Pathways of organic constituents in the ocean; Oxic and anoxic environments; Measurements of organic matter.

COC 442: Chemical Oceanography and Coastal Management ***3 Credit Units***

This course deals with application of chemical principles in prevention, containment, and management of variety of natural and anthropogenic discharged lethal substances into the oceans from various sources. Major focus is on waste treatment and chemistry-based remediation technologies.

GOC 111: General Oceanography I ***3 Credit Units***

Description of ocean basins; Evolution of ocean basins; Terrestrial processes impacting marine realm; Marine sediment types; Marine economic minerals; Sea level change; Ocean Circulation; Coastal processes; Geological oceanographic survey techniques; Physical oceanographic survey techniques; Ocean bed stratigraphy and correlation; Geological and physical oceanography thoughts and ethics.

GOC 112: General Oceanography II ***3 Credit Units***

The course will provide an overview of the oceanic environment with emphasis on its chemical composition and properties. Origin of seawater and chemical elements in seawater; Major cations, major anions; Salinity and salinity determinations; Dissolved gases in seawater – composition of gases in the atmosphere; Solubility of gases in water; Non-reactive gases in ocean (nitrogen and noble gases), minor gases in ocean (nitrous oxide, gaseous hydrocarbons, carbon monoxide); Oxygen and carbon dioxide in ocean; Photosynthesis and primary production; Physical control of primary production; Food chain and energy transfer; Benthic plants and animals; Determinants of benthic community structure.

GOC 311: Marine Geophysics ***3 Credit Units***

Seismic wave generation, propagation and modification; Acoustic properties of earth materials; Shallow-water seismic survey planning and implementation; Deep-water seismic survey planning and implementation; Processing and interpretation of seismic information; Principles of seismic stratigraphy; Seismic survey case studies and Practical.Earth's gravity, magnetic and geoelectrical fields; Density, magnetic and electrical properties of earth materials; Concept of anomalies in gravity, magnetic and geoelectric surveys; Planning and implementation of gravity, magnetic and geoelectric marine surveys; Processing and interpretation of gravity, magnetic and geoelectric survey data; Magneto-stratigraphy and electrical log analysis; Application and case studies of gravity, magnetic and geoelectric surveys in the marine realm; Laboratory and field practical exercises.

GOC 321: Ocean Basin Tectonics and Geo-hazards ***3 Credit Units***

Plate tectonics theory; Ocean basin structure; Continental margin types; Birth and development of ocean basins; Earthquakes and volcanisms; Mid-ocean ridges; Island arc dynamics; Impacts on coastal geology***;*** Nature and types of marine geological hazards; Monitoring and prediction of marine geological hazards; Marine geological hazards mapping and interpretation; Prevention and contingency planning for marine geological hazards; Ecologic and human impacts of marine geological hazards.

GOC 331: Geological Oceanographic Survey Techniques and Map Analysis 3 Credit Units

This course is a practical on-site, independent, multi-facet mapping of coastal and marine seabed and adjoining subaerial portion. It further requires the students to conduct appropriate laboratory analyses of samples and interpretation of field observations. These results will then be aptly presented in geological maps accompanied with a scientific report. To be addressed are: Navigational and platform observations; Base maps and charting; Bottom and water column sampling; Sub-surface sampling; Grain size and bed-form analyses; Microscopic analysis. Stratigraphy and correlation; Palaeo-environmental reconstruction; Focus is also placed on elucidating and correctly interpreting information represented in one or some combination of bathymetric, sediment type, geochemical, mineralogical, geotechnical, geophysical intensity, and palaeontological maps of the ocean bottom in relation to trend surface analysis, anomaly recognition, facies discrimination for further application including environmental change dynamics assessment, exploration target, vulnerability evaluation and knowledge communication. Though a largely a laboratory instruction, the underlying theory will be laid in each case.

GOC 341: Coastal Hydrogeology ***3 Credit Units***

Hydrological cycle and hydrogeological properties of coastal sediments, concept of aquifers and problems of saltwater intrusion, basic water quality parameters and standards, hydrogeological mapping and interpretation, groundwater wells, drilling and budgeting, groundwater exploration and coastal subsidence, sea level rise and coastal aquifer quality, hydrogeology of coastal Nigeria

GOC 351: Coastal Geomorphology and Sedimentology ***3 Credit Units***

General classification of coastal environments; Origin of coastal morphologies; Coastal processes; Characteristics of wind-dominated coasts; Characteristics of wave-dominated coasts; Characteristics of tide-dominated coasts; Sea level and coastal change; Man as a coastal modifying agent; Fundamentals of sediments as building blocks of morphology will receive attention including types, classifications, textural and mineralogical properties and internal structures.

GOC 361: Marine Geo-Statistics and Models ***3 Credit Units***

The course outlines the utility of statistics of geological attributes in enhancing understanding of complex and dynamic nature of the ocean system in relation to tectonic regime, climatic condition, material supply, bathymetric characteristics, and interfacing inshore and offshore fluid motion at multi-time scales. Within existing plethora of types of models, this course will focus on those that are provenance-based, process-based, property-based and product-based. Special attention is given to time-space domain, concept of equifinality, simulations and heuristic approach. Emphasis will be given to Relevance of statistical analysis in the following: Problems of scaling and representativeness; Random and stratified sampling; Summary and independent value statistics; Trend surface analysis; Cluster analysis; Regression and correlation; Significance and confidence limits.

GOC 411: Geological Oceanography Seminar ***3 Credit Units***

The student is expected to conduct, in the main, literature review of a given topic of interest in geological oceanography and communicate such collated information in a seminar presentation. Students are encouraged to enrich the presentation with own observations.

GOC 421: Ocean Sedimentation Modelling ***3 Credit Units***

Origin and classification of marine sediments; Marine depositional environments; Factors controlling marine sediment deposition; Sedimentation patterns and facies; Sea level and depositional sequence; Preservation potentials of sedimentary bodies; Rock record reconstruction of coastal and marine sand bodies. Fluvio-estuarine sedimentation models and facies; Beach-surf zone morphodynamic models and facies; Tidal flat/mangrove swamp sedimentation models and facies; Shoreface sedimentation models and facies; Shelf sedimentation models and facies; Deltaic depositional models and facies; Deep-sea sedimentation models; Storm depositional models; Sea level and coastal/marine sedimentation styles.

GOC 431: Marine Geochemistry and Palaeo-Geochemistry ***3 Credit Units***

Petrology and mineralogy of the lithosphere; Sources of geochemical inorganic and organic material fluxes in the oceans; Elemental composition of seafloor sediments; Geochemical processes and mineralization; Concept of geochemical anomaly, enrichment indices and signature; Geochemical mapping and correlation. Preparation of marine geochemical maps and interpretation; marine geochemical reporting. Concepts in paleo-geochemistry,

petrogenesis and geochronology; Ocean magmas and volcanism; Geochemical signatures of ocean province tectonism; Geochemical discriminating diagrams; Chemostratigraphy; Tracking anthropogenic contaminants; Geochemical concentration profiles and ratios. Case studies.

GOC 441: Marine Geology of Nigeria ***3 Credit Units***

This a synthesis of results of Nigeria's fluvial, estuarine, lagoon, swamp and tidal creek, barrier beach, surf zone, mouth bar and deltaic and offshore processes, sediments, mineralogy, geochemistry, paleontology, geotechnical, geophysical and hydrogeological characteristics as well as geo-resources. The genesis, morphodynamics, and facies relationships of these coastal sub-environments to other global counterparts are emphasized.

GOC 412: Paleo-Oceanography ***3 Credit Units***

This courses addresses modern-day geologic controls on ocean circulation as well as the geological expressions of the circulation necessary for paleo-reconstruction. Topics include: Concept of ocean circulation; Advance view of continental drift and sea-floor spreading; Coastal and open ocean upwelling; Boundary currents; Shelf-break currents; Contourites; Geostrophic currents; Topographic rips; Turbidity currents and turbidites; Deposits of phosphates; Coral reefs; Deep sea fan systems; Global paleo-temperature; Distribution of planktonic/benthic foraminiferal assemblages and isotopic ratios in ocean sediment; Paleo-circulation reconstruction through geologic time.

GOC 422: Geological Oceanography and Coastal Management ***3 Credit Units***

This course elucidates the application of geological knowledge to a wide range of coastal management issues, namely shoreline erosion, coastal conservation, storm surges and coastal flooding, sea-floor constructions and stability, oil spill longevity, tracking sediment transport, tracing coastal currents and waste disposal associated with resource exploitation and use.

GOC 432: Ocean Geo-Resources ***3 Credit Units***

Classification of minerals; Mineral-forming processes; Ocean mineral provinces; Marine mineral prospecting and reserve estimation; Marine mineral exploitation techniques; Mineral ore processing and refining; Marine mineral deposits of Nigeria; Crude oil formation, accumulation, and exploration; Ocean energy types and harnessing prospects; Ecotourism.

GLG 101: Physical Geology ***3 Credit Units***

Planet Earth, its composition from core to crust. Minerals, rocks and weathering; Processes sculpturing the Earth and resulting landforms. Major structures of the Earth; Practical identification of common rock-forming minerals, rocks, and interpretation of Topographic and simple geologic maps

GLG 102: Earth History ***3 Credit Units***

Geologic time-scale and its methods of measurement. Origin and chemical evolution of the atmosphere and hydrosphere; the history of life from bacteria to man; concepts of paleoclimate, paleogeography, Paleoceanography, paleomagnetics, and mountain-building. Development of geologic concepts and principles; practical identification of common fossil groups

GLG 251: Systematic Palaeontology ***3 Credit Units***

Paleontologic principles including the preservation and occurrence of fossils, and fossils as paleo-environmental indicators. Morphology, evolution and identification of major animal phyla, viz., Protozoa, Porifera, Coelenterate, Bryozoa, Brachiopods, Mollusca, Arthropoda, Echinodermata, Graptolithina; their distribution through time. Vertebrate and plant fossils. Trace fossils.

GLG 461: Micropaleontology ***3 Credit Units***

Morphological outline and biostratigraphic distribution of major groups of microfossils; outline classification of foraminiferal paleoecology and planktonic fora mineral biochronology.

GLG 242: Igneous and Metamorphic Petrology ***3 Credit Units***

Origin, occurrence, geologic setting and systematic description of igneous rocks. Metamorphism and description of metamorphic rocks; metamorphic minerals and textures of metamorphic rocks.

MAF 221: Introduction to Mariculture ***3 Credit Units***

Definition of mariculture, aims and objectives. Concepts and methods used in cultivation. History of mariculture. Types of mariculture. Mariculture systems /enclosures. Farm siting. Cultured and emerging species. Prospects and economic importance. Mariculture versus aquaculture. Land-based mariculture. Mariculture in Nigeria. Mariculture in India and others.

MAF 212: Nigerian inland, Coastal and Marine Fishes ***3 Credit Units***

Inland, coastal and marine fish species of Nigeria and associated rivers, lakes, reservoirs, coastal and marine waters. Surveys, fish identification and classification. Field and laboratory practical.

MAF 301: Mariculture and Aquaculture Systems and Practices I ***3 Credit Units***

Design and development of mariculture and aquaculture systems(Land and sea based), fluid mechanic, mariculture enclosures, re-circulating mariculture and aquaculture systems .Pond and cage construction and maintenance – survey techniques, site selection criteria for land and sea based enclosures .Maintenance of culture systems(including erosion control. dike repairs ,water drainage systems, desilting etc) Impoundment of aquaculture enclosures. Ocean ranching.

Practical: Field study and excursions to different farms in diverse terrain. Students will gain direct experience by installing or building enclosures as determine by course lecturers.

MAF 311: Fish Nutrition & Feeding Habits of Marine Fishes 3 Credit Units

Calorific energy, protein and amino acids fat/lipid requirement of fish. Ingredients used for fish feed formulation. Types of fish food (Natural /artificial).Advantages and disadvantages.) Feed formulation techniques, least cost diets. Supplementary feed, food cycles and natural foods and their production in fish ponds. Practical aspects of fish feeding. Food and feeding habits of major culture species .Growth promotion. Factors influencing energy requirements of fish, fish growth and fish yield relationships, food conversion ratio, and digestive coefficients.

MAF 321: Culture of Marine Organisms 3 Credit Units

Particular attention shall be focused on the culture of organisms in freshwater, estuarine, brackish and marine waters. List of cultured fish species in fresh, brackish and marine waters. Culture of oysters, barnacles, cockles, shrimps, crabs, sea urchins, sea anemones, sea cucumbers, phyto/ zooplankton, periphyton, artemia, scallops. Mussels, marines gastropods. Culture of edible sea weeds etc. Plankton culture - phyto/ zooplankton, periphyton, artemia, etc. shellfish culture-shrimps, oysters, crabs, lobsters. Cockles, scallops. Mussels etc .marines gastropods. Culture of edible sea weeds .Evolution/history of fish culture .Requisite conditions for fish culture .Methods of isolation of plankton for pure culture.
Practical: As part of the fulfilment for the course each student should choose any organism of interest to culture.

MAF 331: Fisheries Techniques 2 Credit Units

External meristic characteristics of cartilaginous and bony fishes useful for classification and identification. Planning for sampling, safety. Aquatic habitat measurement, care and handling of captured organisms, passive capture techniques, active fish capture methods, electrofishing, collection, preservation, and identification of eggs and larvae, sampling with toxicants. Tagging and marking, acoustic assessment of fish abundance and distribution, underwater observations, underwater biotelemetry. Age determination of fishes. Fishing Gears, netting, angling, trawling and trapping, commercial and artisanal modelling. The principles, types and the use of microscopes as an important tool in fisheries study. Measurement with the microscope using stage micrometer. Tissue processing for microscopic study. Fixation and types of fixatives. Types and use of microtomes. Photomicrography and image capturing. Preparation and storage of permanent slides for future use. Safety and precautions in the laboratory.

MAF 341: Anatomy and Physiology of Fish 3 Credit Units

Anatomy of the digestive, respiratory, urino-genital, respiratory, nervous, endocrine, skeletal and circulatory systems of cartilaginous and bony fishes. Musculature, shape of mouth and mode of feeding, comparative anatomy of the organs in different fish groups. Reproduction in fishes and Fecundity. Introduction to fish physiology. Homeostasis, regulation of salt and water contents. Osmo-regulation and excretion. Alimentary system. Food digestion and absorption. Production and reception of electric currents in fishes.
Courtship behaviour. Reproductive strategies, internal and external fertilizations, parental care in fishes, breeding guilds, substrate and mouth brooders etc. larval development and early life history.

MAF 401: Current Topics in Mariculture and Fisheries 2 Credit Units

Recent advances in mariculture technology. Intensive and extensive culture techniques, monoculture/polyculture technologies .Integrated aquaculture. Advances in fish feed technology. Water management in aquaculture. Status of mariculture and shell fish farming. Alternative aquaculture – seaweed production.Impact of coastal pollution on fish and fisheries. Approaches to management of lakes and rivers .Inland and marine fisheries legislation in Nigeria.International maritime legislation and conservation of marine resources.

MAF 411: Hatchery Management, Fish Breeding and Genetics 2 Credit Units

Principles of fish genetics and hybridization. Breeding and cultivation of some common types of fishes .Natural, semi-natural and artificial reproduction of fish. Choice & rearing of brood-stock and factors influencing brood-stock performance .Artificial fertilization. Rearing fry and fingerlings. Structure and behaviour of chromosomes, chromosomal polymorphism, evolution of karyotypes in fishes.Sex chromosomes and non-chromosomal heredity. Principles of Mendellian inheritance, inheritance of quantitative traits in pond fishes, genetics of wild fish species. Methods of heredity determination in fish and associated problems, variations and heritability in fish morphometry (body weight, length, age, sex etc.). Resistance to diseases, principles of fish immunogenetics, gynogenesis in fish. Selection in aquaculture. Water quality management, Components of a standard/Eco-hatchery and maintenance/hygiene/environment.

MAF 421: Marine Fisheries Resource Management & Conservation 3 Credit Units

Major, fisheries resources (vertebrates, invertebrates, major pelagic/benthic resources). Methods of exploitation (traditional/industrial fishing methods); Problem of over-fishing, capitalization and by-catch .Fisheries management/stock assessment, Fishing policy and regulations, ecosystem approach to fisheries management, regulation of fishing activities, MCS, fisheries data collection in marine and inshore fisheries. Spawning migrations and spawning grounds. Wildlife resources and their management to include Managing the habitat for wildlife. Control of wildlife. Threatened species extinction and causes of threat to both flora and fauna species. categories of threatened species. consequences of species extinction. Global approach to conservation strategy. Problems of Biological Conservation. UN Convention on endangered species.
Practical: Excursion shall be made to observe the wildlife such as dolphins, manatee, sea turtle etc.

MAF 412: Pathogens and diseases of Marine Organisms 3 Credit Units

Course Objectives: The course is intended to expose the students to pathogens and diseases of marine organisms and their implications on human who consume or make contacts with such organisms. At the end of the course, the student is expected to know how to manage disease organisms under mariculture environments or in the wild with a view to restoring normal health. Topics to be covered include:

- Predisposing factors of marine organisms to diseases
- Pathogenic and non-pathogenic diseases
- Collection and management of disease samples
- Diagnosis of diseases in marine organisms
- Clinical examination procedures
- Laboratory procedures in fish pathology
- Histology and haematological techniques in fish pathology
- Quarantine administration and procedure
- Zoonotic diseases of fish and public health implications
- Treatment of diseases in fish
- Physiotherapeutic and chemotherapeutic administration and constraints
- Immunology and immunization of fish

Field work and laboratory practical: Laboratory practical and field exposure will constitute a greater part of the time spent on the course for better understanding and achievement of the course objectives

MAF 422: Mariculture and Aquaculture Systems and Practices II 3 Credit Units

The course will emphasize management practices during production of fish in defined enclosures. Stocking practices – pond preparation for stocking (Fertilization and liming), stocking of ponds, growth monitoring/parameters. Natural production, farming systems including strategies for the management integrated system e.g. Aquaponics (fish/plants systems). Feed efficiencies. Productivity of culture enclosures – maintenance and management. General fish husbandry practices. Control of predators and noxious animals. Harvesting techniques.

MAF 432: Fish Processing, Preservation and Marketing 2 Credit Units

The course will focus on the principles and practices of fish processing and preservation. The process of fish spoilage, determination and assessment of freshness/spoilage grades, organoleptic testing. Fish processing techniques – traditional and modern, the Chorkor smoking kiln etc. preservation/storage procedures – sun drying, brining, smoke-drying (cold/hot), ensilage, fermentation, canning, , cold storage etc. Inspection /hygiene criteria and quality control. Packaging, Distribution, Transportation and Marketing of fish and fish products. Marine Stewardship Council role in marketing.
Practical: Field study and excursions to fish storage (cold rooms) and processing facilities. Students will also apply the techniques for a Course project.

POC 211: Ocean Safety and Survival ***3 Credit Units***

This course is designed to create awareness on hazards associated with offshore/marine environments. It will provide students with basic training on skills for responding to offshore emergencies to ensure personal survival. Students will also be acquainted with knowledge for corporate safety and survival. Safety consciousness, emergency preparedness and response will constitute the core of this course. Introduction to use of equipment such as fire-fighting, buoyancy apparatus, personal transfer devices, evacuation, survival crafts, launching systems, signalling devices, search & rescue, helicopter safety and emergency procedures, as well as first aid administration, will be taught in this course. Practical demonstrations will accompany classroom work.

POC 211: Ocean Circulation ***3 Credit Units***

Importance of ocean circulation; Water mass mapping; Types and spatio-temporal scale of ocean circulation; Surface circulation; Thermohaline circulation; Boundary currents; Ocean circulation and climate change; Upwelling types and temporal variability; Modelling ocean circulation.

POC 212: Introduction to Physical Oceanography of Nigeria ***3 Credit Units***

Overview of the physical oceanography of Nigeria based on interpretation of aerial and satellite data, hydrographic charts and soundings, tide tables, wind and sea survey data. Emphasis is placed on the importance of local features and events in modifying the broad-scale physical oceanographic picture along and off the Nigerian coast.

POC 311: Ocean Waves and Tides ***3 Credit Units***

Wave theories; Types, generation, characteristics and modification of ocean waves; Ocean wave reflection, refraction and diffraction; Wave-breaking processes; Wave-forecasting and hind-casting. Computational exercises on wave characteristics and behaviour. Theories of tides and types of tides; Characteristics of tides; Tidal distortion and asymmetries; Open sea and inshore tides. Tidal modulation of coastal processes; Tidal prediction and tidal chart; Practical exercises on tides.

POC 321: Nearshore Currents ***3 Credit Units***

Types and patterns of coastal fluid motion; Characteristics of water currents; Vertical and horizontal flows; Flow separation; Wind-drift currents; Wave-generated currents; Tidal currents; River flows; Runoffs; Density currents; Subsurface hydrodynamics; Prediction and modelling of current characteristics; Paleo-current reconstruction.

POC 331: Inshore and Deltaic Hydraulics ***3 Credit Units***

River drainage basin and river system types; Hydraulic geometry of river channels; Discharge and relationship to hydraulic factors, sediment transport; Physiographic response to fluvial hydraulics and concept of river system equilibrium; Fluvial hydraulics computations and measurements; Concept of frontal zone; Kinematics of river mouth outflow as buoyant jets

and plumes; Types of estuaries; Estuarine circulation; Mixing processes; Tidal asymmetries and residual flow in estuaries; Estuarine plumes and turbidity maximum dynamics; Tidal bores and seiches; Lagoon types; Lagoon inlet hydraulics and dynamics; Inlet jet outflow models; Lagoon inter-tidal and supra-tidal processes; Delta types and configuration as response to fluvio-estuarine and inlet outflows and basin processes interaction, including sea level.

POC 341: Beach Processes ***3 Credit Units***

Beach system anatomy; Beach classifications; Dune-beach-surf zone interactions; Beach change and sediment transport models; Aeolian processes; Wave-shoaling processes; Breaker types; Swash-backwash and wave run-up; Over-wash processes; Tidal oscillation and beach water level; Sea level change; Edge waves and infra-gravity oscillations; Longshore current; Rip current and undertow current; Human impacts.

POC 351: Ocean Physical Processes Monitoring and Mapping ***3 Credit Units***

This is a field-based course in which students will be expected to monitor some sets of physical parameters in a dynamic natural water body (surface and subsurface) over an appropriate time and space domain for the purpose of depicting the distribution pattern, and developing predictive governing equations through elementary statistical and parameterization approach. Results of the monitoring including implications will normally be submitted as a report after a brief oral presentation. Skills to be acquired include: observing, measuring and analysis of a variety of physical oceanographic variables using visual and instrument techniques. Current measurements, wave parameters, tidal dynamics, wind pattern, infra-gravity oscillations, water physical parameters, sediment entrainment and bed-form dynamics, mixing and stratification processes. Principles of sea and channel bottom charting, tidal correction, contouring and bathymetric map interpretation will be addressed alongside basic navigation techniques. Bases of physical ocean data analysis will be introduced such as: Vertical (depth) profiles; Horizontal (lateral and longitudinal) gradient; Directional asymmetry; Significant values; Modal classes and summary statistics; Peaks and spikes; Threshold; Recurrence interval; Longevity; Periodicity; Regression and significance.

POC 411: Physical Oceanography Seminar ***3 Credit Units***

The student is expected to conduct, in the main, literature review of a given topic of interest in physical oceanography and communicate such collated information in a seminar presentation. Students will be encouraged to enrich the presentation with own observations.

POC 421: Acoustic, Optical and Tracer Oceanography ***3 Credit Units***

Theories of acoustic signal propagation and reflection in seawater; Acoustic soundings and depth-determination; Acoustic mapping of water masses; Further applications of acoustic signals technology in maritime and military activities. Optical properties of seawater, variability in sea surface colour and depth of light penetration, optics-based estimation of sediment suspended concentration, optical mapping of water masses and mixing processes.Various physical tracers that describe the instantaneous and time-integrated mean

or predominant flow in the complex flow field of coastal environments will be examined such as sediment textures and mineralogy; bed-form shapes, internal structures, and configuration of morphologies; salinity dispersion; turbid plume entrainment; sediment budget analysis; shoreline configuration; water type tracking; geochemical concentration gradients. Overview of physical tracer experiments.

POC 431: Regional Oceanography ***3 Credit Units***

A critical evaluation of the physical oceanography of ocean regions showing distinction or having specific importance regarding their resources, tectonic, climatic or geographic setting. Sufficient emphasis will be given to the following: Gulf of Guinea, Mediterranean Sea, North Sea, Equatorial Pacific Ocean, Indian Ocean, Black Sea etc.

POC 441: Sea Level Dynamics ***3 Credit Units***

Concept of sea level change, requirements and constraints to sea level change monitoring, time-scale and factors controlling sea level change, sea level change scenarios, coastal impacts of surges and sea level change, future directions in sea level change research.

POC 451: Introductory Physical Oceanographic Modelling ***3 Credit Units***

Empirical models, theoretical models, predictive models, stochastic models, mathematical/computer-aided models, statistical models, qualitative models commonly used in evaluating physical oceanographic data

POC 412: Ocean Continental Margin and Deep-Water Processes 3 Credit Units

Ocean floor characteristics; Geological and geomorphologic characteristics of continental margins; Shelf tides and storm currents; Gravity currents; Shelf-break processes; El-Nino phenomenon; Geostrophic flow and Ekman transport; Turbidity currents; Tsunamis; Hydrothermal processes in mid-oceanic ridges; Bottom (deep) water currents; Submarine earthquakes and volcanic activities

POC 422: Marine Meteorology 3 Credit Units

Scope of meteorology in ocean science, weather elements and determination, global wind system and variability, air-sea interaction phenomenon, prediction of atmospheric disturbances, recurrence intervals of storms and inclement weather, meteorology of Nigeria, future directions in marine meteorological research

POC 432: Coastal Ocean Interactions 3 Credit Units

This course is aimed at a more critical look at the interactions between fluid motions at different temporal and spatial scales. In particular, the following phenomena are descriptively and modeling perspective examined: Inlet-surf zone flow interaction; Tidal current-wave interaction; Wave-wave interaction; Shoaling wave and backwash interaction; Beach water table effects on swash-backwash processes; Air-sea interaction in the nearshore region; Shelf current interactions; Onshore-offshore wave-generated flows; Flow-morphology interactions.

POC 442: Physical Oceanography in Coastal Engineering and Management 3 Credit Units

This course elucidates the application of physical oceanography to a wide range of coastal engineering constructions and coastal management issues, namely shoreline and river/ tidal inlet bank dynamics and erosion, storm surges; coastal flooding, sea-floor constructions and stability, oil spill dispersal, tracking sediment transport, tracing coastal currents, and migratory behaviour of living resources

Research Project 400 Series * 6 Credit Units

This is a two-semester independent field-based scientific investigation aimed at ascertaining the theoretical and practical proficiency of the student in a selected area of Oceanography. Generally, the results of the project should represent improved understanding of the subject under inquiry and students will orally defend the bound report.

*Chosen project shall be in any of the 5 options above.

SIWES PROGRAMME 300 Series** 6 Credit Units

Students shall undergo a 3-6 months industrial training otherwise known as “Students Industrial Work Experience Scheme (SIWES)” at designated institutions and organisations recognized by the department in order to acquire hands-on experience on different aspects of Oceanography. Each student shall write a report and submit at the end of the training to the department for grading purposes.

**Compulsory for Year 3 Students in all options.

6.0 Academic and Technical Staff of the Department

The core academic and technical staff for the BSc. Oceanography Programme with the various options are listed below.

1. Biological Oceanography Option

Name of Staff	Area of Specialization	Discipline	Qualification	Rank
Prof. Francis M. Nwosu	Marine Fisheries & Ecosystem Conservation	Biological Oceanography	B.Sc., MSc. Ph.D	Professor/HOD
Prof. Ekpo E. Antai	Marine Microbiology	Biological Oceanography	B.Sc., Ph.D	Professor
Prof. Sieghard Holzlöhner	Marine Ecology, Fisheries Oceanography	Biological Oceanography	MSc., Ph.D	Professor
Prof. Udeme I. Enin	Capture Fisheries/Management	Biological Oceanography	B.Sc., Ph.D	Professor
Prof. Ita Ewa- Oboho	Benthic Ecology, Marine Pollution	Biological Oceanography	B.Sc., MPhil, Ph.D	Professor
Prof. Daniel Ama-Abasi	Capture Fisheries/ Marine Ecology	Biological Oceanography	B.Sc., MSc. Ph.D	Professor
Dr. Jack O. Showell	Marine Microbiology	Biological Oceanography	F. Diploma, M. Sc., PhD	Senior Lecturer
Dr. Godwin A. Otogo	Marine Ecology	Biological Oceanography	B.Sc., MSc., PhD	Lecturer II
Mr. Bassey E. Job	Plankton Ecology/ Fisheries	Biological Oceanography	F. Diploma, PGD, M. Sc.	Assistant Lecturer
Mr. Linus A. Enang	Benthic Ecology		BSc	Technologist II
Ms. Ekeme A. Ufford	Plankton		BSc	Technologist II
Ms. Blessing I. Asuquo	Fisheries		BSc., PGD	Technologist II

2. Mariculture and Marine Fisheries Resources Option

Name of Staff	Area of Specialization	Discipline	Qualification	Rank
Prof. Paul O. Ajah	Mariculture & Marine Fisheries	Mariculture & Marine Fisheries	B.Sc., MSc., Ph.D	Professor
Prof. Austin I. Obiekezie	Fish Pathology/ Parasitology	Fisheries Oceanography	B.Sc., Ph.D	Professor
Prof. Albert P. Ekanem	Pathology of Marine Organisms	Mariculture & Marine Fisheries	B.Sc., MSc., Ph.D	Professor
Prof. Paul J. Udo	Fish Culture/Nutrition	Fisheries Oceanography	B.Sc., Ph.D	Professor
Dr. Philomena Asuquo	Marine Fisheries	Mariculture & Marine Fisheries	B.Sc., MSc., Ph.D	Senior Lecturer
Dr. Mrs. Aniema P. Inyang-Etoh	Fish Pathology	Mariculture & Marine Fisheries	B.Sc., MSc., PhD	Lecturer I
Dr. Sunday Eteng	Marine Fisheries	Mariculture & Marine Fisheries	B.Sc., MSc.	Lecturer II
Mrs. Theresa Edet	Fish Pathology	Fisheries Oceanography	B.Sc., MSc	Assistant Lecturer
Mr. Antigha Ambo	Mariculture , Coastal Zone management	Mariculture & Marine Fisheries	BSc., MSc	Assistant Lecturer
Ms. Grace Olaleye	Fish Genetics	Fisheries Oceanography	B.Sc., MSc	Assistant Lecturer
Mr. Timothy Okon	Pond Construction/ Water Quality	Fisheries Oceanography	F. Diploma, M. Sc.	Chief Technol.
Mr. Ajom Vincent Ajom	Fish Feed/ Nutrition	Fisheries Oceanography	Final Diploma	Technol.II
Mr. Everest C. Ngele-Uma	Fish Breeding	Fisheries Oceanography	BSc.,PGD	Fisheries Technol.

3. Chemical, Geological and Physical Oceanography Options

Name of Staff	Area of Specialization	Discipline	Qualification	Rank
Prof. Effiom E. Antia	Geological Oceanography, Coastal Processes	Geological/ Physical Oceanography	B.Sc., Dr.rer. nat	Professor
Prof. Francis E. Asuquo	Ocean Chemistry, Toxicology, Pollution	Chemical Oceanography	B.Sc., M.Sc., Ph.D	Professor
Prof. Ekom R. Akpan	Marine Biogeochemistry	Chemical Oceanography	B.Sc., Ph.D	Professor
Prof. Chidi Ibe	Physical Oceanography, Climate Change	Physical Oceanography	B.Sc., Ph.D, DIC	Professor
Ms. Edak Efiom	Marine Geo-resources	Geological Oceanography	B.Sc., MSc.	Assistant Lecturer
Ms. Victoria Antia	Marine Palaeontology	Geological Oceanography	BSc., M.Sc.	Assistant Lecturer
Mr. Samuel Ukpong	Coastal Hydrodynamics	Physical Oceanography	B.Sc., M.Sc.	Assist. Lecturer (Adjunct)
Mr. Paul Udom	Ocean Modelling	Physical Oceanography	B.Sc., M.Sc.	Assist. Lecturer (Adjunct)
Ms. Lynda-Uta Okon	Marine Sedimentology	Geological Oceanography	B.Sc., MSc.	Assistant Lecturer
Mr. Usen A. Umana	Geological Surveys and Sample Analysis	Geological Oceanography	F. Diploma, M. Sc.	Chief Technologist
Mr. Patrick E. Iwuagwu	Field Sampling and Analysis	Physical Oceanography	B. Sc.	Technologist II