

University of Nigeria, Nsukka

Department of Pure and Industrial Chemistry

Revised Undergraduate Programme

2013

DEPARTMENT OF PURE AND INDUSTRIAL CHEMISTRY

Brief History of the Department

The Department of Pure and Industrial Chemistry was established in October 1960 as Department of Chemistry in the then Faculty of Science. In 1976, a degree in Industrial Chemistry was introduced. The University Senate in recognition of the two degree programmes offered by the department approved the change in the name of the department from Chemistry to Pure and Industrial Chemistry from the beginning of the 1984/85 session. In 2001, the department merged the two degree programmes into a degree in Pure and Industrial Chemistry retaining the degree in Combined Physical Sciences.

Philosophy and Objectives:

Chemistry is the index of industrial development everywhere in the world. The frontiers of chemistry are very large, ranging from one extreme of natural products to those synthesized by man. The giant strides made by man in the understanding and exploitation of nature, synthesis of new materials essential to the enhancement of the quality of life, and the surge in and sustenance of economic and technological progress have benefited immensely from chemistry and chemical technology. For economic sustenance and technological breakthrough, the undergraduate programme is designed to encompass an appreciation of the centrality of chemical sciences in the entire undergraduate curricula. It is also planned to arouse entrepreneurial spirits needed for self-employment and economic emancipation.

The degree programme in Pure and Industrial Chemistry has the following objectives:

- (a) To stimulate in the students sustained interest and enthusiasm in chemistry and applications.
- (b) To provide students with a thorough grounding in principles and sound knowledge of scientific methods of the chemical sciences.
- (c) Arouse a sense of curiosity and enquiring mind, in order to encourage and develop creative thinking and research aptitudes.
- (d) Provide students with a broad and balanced base of chemical knowledge and practical skills.
- (e) Generate in students an awareness of the enormous resources in their immediate environment so as to enhance solution to the challenges of our time in a march towards nation building.
- (f) To educate and train chemists, particularly applied chemists, who can think fundamentally about their subject and who can acquire as graduates a meaningful picture of the chemical and allied industries.
- (g) Provide students with a solid base of chemical knowledge and skills that are required for postgraduate studies and research.
- (h) Inculcate in students appropriate skills and abilities to manage and administer technological operations within the field of chemistry and allied areas.
- (i) It is intended that graduates of this programme will be able to adapt themselves to jobs which are problem solving or results oriented in the chemical, petrochemical, biochemical and allied technological field viz, food, environmental, textiles, polymer etc.

Entry Requirements

In addition to the University's minimum entry requirements, the following conditions must be met:

(i) UTME CANDIDATES

Candidates seeking admission through UTME are required to obtain credit in Chemistry, English Language, Physics and Mathematics in the Senior Secondary School certificates or its equivalent prior to admission.

(ii) DIRECT ENTRY CANDIDATES

Direct entry Candidates must have passed Chemistry, Physics and Mathematics in G.C.E. (Advanced Level) or HSC (Principal Level) or other equivalent examination.

ENTRY REQUIREMENTS:

Candidates seeking admission through UME/DE examinations, in addition to the University requirements are required to obtain credits in Chemistry, English Language, Physics and Mathematics in the Senior Secondary School Certificate or its equivalent prior to admission.

Direct entry students must have passed Chemistry, Physics and Mathematics in G. C. E. (Advanced Level) H. S. C. (Principal Level) or any other equivalent examination.

JOB OPPORTUNITIES:

The successful graduates are equipped for higher studies and careers in teaching, research institutes, chemical laboratories, Ministries of Science and Technology, Education, Agriculture, Health, Industry, Environment and in such diverse industries as vegetable oils, soap and detergents, paints and varnishes, plastics, brewing, pharmaceuticals, sugar, paper and pulp, textiles, fertilizer, cement, ceramics, iron and steel, petroleum, coal, dyestuff, etc. Our graduates are also equipped for self-employment.

Programme/Sub-discipline/Discipline structure:

1. **Period of formal studies** : 8 semesters
2. **Industrial training (Pure & Industrial Chemistry Students)** : 3 months at the end of the second and or 3rd year
3. **Planned visit to industries** : At least once during the course
4. **Project** : The final year students carry out research on topics assigned by the department
5. Also students participate in departmental seminar and give their own seminars in the final year and present a written report.

Course content specifications/syllabus of all courses in the programme/sub-discipline/discipline

Stress Areas

Courses in this programme are grouped into the following stress areas:

Stress Areas	Code No
Inorganic Chemistry	0
Physical Chemistry	1
Organic Chemistry	2
Analytical Chemistry	3
Chemical Process Technology	5
Seminar	6
Practical Courses	7
Chemical Industries	8
Research Projects	9

Four-Year Standard Programme

FIRST YEAR

First Semester

Course No.	Title	Units
Major Courses		
CHM 101	Basic Principles of Inorganic Chemistry	2
CHM 171	Basic Practical Chemistry	2
Required Ancillary Courses		
BIO 151	General Biology I	3
MTH 111	Elementary Mathematics I	3
MTH 121	Elementary Mathematics II	3
PHY 115	General Physics for Physical Sciences I	2
PHY 191	Practical Physics I	2
General Studies Courses		
GSP 101	Communication in English I	2
GSP 111	The use of Library and Study Skills	2
		<u>21</u>

Second Semester

Major Courses

CHM 112	Basic Principles of Physical Chemistry	2
CHM 122	Basic Principles of Organic Chemistry	2
CHM 152	Introduction to Industrial Chemistry	2
Required Ancillary Courses		
BIO 152	General Biology II	3
PHY 118	General Physics for Physical Sciences III	2
General Studies Courses		
GSP 102	Communication in English II	2
ECO102	Basic Principles of Economics II	2
		<u>15</u>

SECOND YEAR

First Semester

Course No.	Title	Units
Major Courses		

CHM 201	General Inorganic Chemistry	2
CHM 211	General Physical Chemistry	2
CHM 221	General Organic Chemistry I	2
CHM 273	Practical Organic Chemistry I	2

Required Ancillary Courses

MTH 207	Advanced Mathematics VII	2
PHY 251	Electromagnetism	2
COS 101	Introduction to Computer Science	2

General Studies Courses

GSP 207	Logic, Philosophy and Human Existence	2
GSP 201	Basic Concepts and theory of Peace	2

Electives

A minimum of 2 units combination from the following courses approved by the Department:

ECO 101	Principles of Economics I	2
GEO 103	Basic and Applied Geology for Environmental, Physical and Social Sciences	3
BCH 201	Introductory Microbiology	3
STA 203	Statistics for Physical Sciences and Engineering I	2

16/18**Second Semester**

Course No.	Title	Units
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Major Courses

CHM 222	General Organic Chemistry II	2
CHM 232	Analytical Chemistry	2
CHM 252	Chemical Process Principles	2
CHM 272	Practical Physical Chemistry I	2
CHM 274	Practical Inorganic Chemistry I	2

Required Ancillary Courses

MTH 206	Advanced Mathematics VII	2
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General Studies Courses

GSP 208	Nigerian People and Culture	2
GSP 202	Issues in Peace and Conflict Resolution studies	2

Electives

A minimum of 2 units combination from the following courses approved by the Department.

BCH 201	General Biochemistry 1	2
MTH 208	Advanced Mathematics VIII	2
PHM 241	Pharmacognosy 1	1
PHY 262	Introduction to Atomic and Nuclear Physics	3
PHY 292	Practical Physics	2
STA 206	Statistics for Physical Sciences and Engineering	1

16/18**THIRD YEAR****First Semester****Course No.****Title****Units****Major Courses**

CHM 301	Inorganic Chemistry I	2
CHM 311	Physical & Structural Chemistry I	2
CHM 321	Organic Chemistry I	2
CHM 351	Chemical Process Calculations	2
CHM 373	Practical Organic Chemistry II	2
CHM 371	Practical Inorganic Chemistry II	2
CHM 381	Chemical Industry and Environment	2
CED 341	Introduction to Entrepreneurship	2

Required Ancillary Course

COS 201	Computer Programming I	2
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Electives

A minimum of 2 units combination from the following courses approved by the Department:

CHM 383	Polymer Chemistry	2
MCB 321	Environmental Microbiology	2
PHY 351	Electronics	2
PHY 361	Quantum Mechanics I	3
BCH 311	Biological Macromolecules	2
PHM 341	Pharmacognosy II	3
GER 101	Elementary German I	2
FRE 101	Elementary French I	2
RUS101	Elementary Russian I	2

20/21**Second Semester****Course No.****Title****Units****Major Courses**

CHM 302	Inorganic Chemistry II	2
CHM 312	Physical & Structural Chemistry II	2
CHM 314	Physical & Structural Chemistry III	2
CHM 322	Organic Chemistry II	2
CHM 324	Organic Chemistry III	2
CHM 352	Chemical Process Technology I	2
CHM 372	Practical Physical Chemistry II	2
CHM 374	Applied Spectroscopy	2
CED 342	Business Development and Management	2

Electives

A minimum of 2 units combination from the following courses approved by the Department:

PHY352	Electronics	2
PHY 362	Quantum Mechanics	3
PHM 344	Phytoevaluation	2
ECO 102	Principles of Economics	2

GER 102	Elementary German II	2
FRE. 102	Elementary French II	2
RUS 102	Elementary Russian II	2
		<u>18</u>

FOURTH YEAR

First Semester

Course No.	Title	Units
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Major Courses

CHM 401	Advanced Inorganic Chemistry I	2
CHM 411	Advanced Physical Chemistry I	2
CHM 421	Advanced Organic Chemistry I	2
CHM 431	Modern Analytical Techniques	2
CHM 451	Chemical Process Technology II	2
CHM 471	Practical Industrial Chemistry	2
CHM 461	Seminar	2

Required Ancillary Course

ME 481	Technology Development Policy	2
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Electives

A minimum of **6** units combination from the following courses recommended by the Department:

CHM 483	Colour Chemistry & Technology I	2
CHM 485	Cement & Fertilizer Industry	2
CHM 403	Modern Synthetic Methods in Inorganic Chemistry	2
CHM 423	Modern Synthetic Methods in Organic Chemistry	2
CHM 487	Pharmaceutical Industry	2
CHM 483	Paper and Pulp Industry	2
CHM 489	Oils, Fats Detergents & Cholo-Alkali Industries	2
MCB 452	Industrial Microbiology	2
PHM 441	Physiochemical analysis	2

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Second Semester

Course No.	Title	Units
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Major Courses

CHM 402	Advanced Inorganic Chemistry II	2
CHM 412	Advanced Physical Chemistry II	2
CHM 422	Advanced Organic Chemistry II	2
CHM 452	Chemical Process Technology III	2
CHM 492	Research Project	6

Electives

A minimum of **2** units combination from the following courses recommended by the Department:

CHM 424	Chemistry of Natural Products	II	2
CHM 454	Polymer Chemistry and Technology		2

CHM 486	Chemistry of Coal and Coal Products	2
CHM 482	Colour Chemistry & Technology II	2
CHM 484	Extraction Metallurgy	2
CHM 488	Sugar & Fermentation Industry	2
		<u>16</u>

THREE YEAR PROGRAMME (DIRECT ENTRY)**SECOND YEAR**

First Semester

Course No.	Title	Units
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Major Courses

CHM 201	General Inorganic Chemistry	2
CHM 211	General Physical Chemistry	2
CHM 221	General Organic Chemistry I	2
CHM 273	Practical Organic Chemistry I	2

Required Ancillary Courses

MTH 207	Advanced Mathematics VII	2
PHY 251	Electromagnetism	2
COS 101	Introduction to Computer Science	2

General Studies Courses

GSP 207	Logic, Philosophy and Human Existence	2
GSP 201	Basic Concepts and theory of Peace	2

Electives

A minimum of 2 units combination from the following courses approved by the Department:

ECO 101	Principles of Economics I	2
GEO 103	Basic and Applied Geology for Environmental, Physical and Social Sciences	3
BCH 201	Introductory Microbiology	3
STA 203	Statistics for Physical Sciences and Engineering I	2

16/18**Second Semester**

Course No.	Title	Units
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Major Courses

CHM 222	General Organic Chemistry II	2
CHM 232	Analytical Chemistry	2
CHM 252	Chemical Process Principles	2
CHM 272	Practical Physical Chemistry I	2
CHM 274	Practical Inorganic Chemistry I	2

Required Ancillary Courses

MTH 206	Advanced Mathematics VII	2
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General Studies Courses

GSP 208	Nigerian People and Culture	2
GSP 202	Issues in Peace and Conflict Resolution studies	2

Electives

A minimum of 2 units combination from the following courses approved by the Department.

BCH 201	General Biochemistry 1	2
MTH 208	Advanced Mathematics VIII	2

PHM 241	Pharmacognosy 1	1
PHY 262	Introduction to Atomic and Nuclear Physics	3
PHY 292	Practical Physics	2
STA 206	Statistics for Physical Sciences and Engineering	1

16/18**THIRD YEAR****First Semester****Course No.****Title****Units****Major Courses**

CHM 301	Inorganic Chemistry I	2
CHM 311	Physical & Structural Chemistry I	2
CHM 321	Organic Chemistry I	2
CHM 351	Chemical Process Calculations	2
CHM 373	Practical Organic Chemistry II	2
CHM 371	Practical Inorganic Chemistry II	2
CHM 381	Chemical Industry and Environment	2
CED 341	Introduction to Entrepreneurship	2

Required Ancillary Course

COS 201	Computer Programming I	2
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Electives

A minimum of 2 units combination from the following courses approved by the Department:

CHM 383	Polymer Chemistry	2
MCB 321	Environmental Microbiology	2
PHY 351	Electronics	2
PHY 361	Quantum Mechanics I	3
BCH 311	Biological Macromolecules	2
PHM 341	Pharmacognosy II	3
GER 101	Elementary German I	2
FRE 101	Elementary French I	2
RUS101	Elementary Russian I	2

20/21**Second Semester****Course No.****Title****Units****Major Courses**

CHM 302	Inorganic Chemistry II	2
CHM 312	Physical & Structural Chemistry II	2
CHM 314	Physical & Structural Chemistry III	2
CHM 322	Organic Chemistry II	2
CHM 324	Organic Chemistry III	2
CHM 352	Chemical Process Technology I	2
CHM 372	Practical Physical Chemistry II	2
CHM 374	Applied Spectroscopy	2

CED 342 Business Development and Management 2

Electives

A minimum of 2 units combination from the following courses approved by the Department:

PHY352	Electronics	2
PHY 362	Quantum Mechanics	3
PHM 344	Phytocvaluation	2
ECO 102	Principles of Economics	2
GER 102	Elementary German II	2
FRE. 102	Elementary French II	2
RUS 102	Elementary Russian II	2
		<u>18</u>

FOURTH YEAR

First Semester

Course No.	Title	Units
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Major Courses

CHM 401	Advanced Inorganic Chemistry I	2
CHM 411	Advanced Physical Chemistry I	2
CHM 421	Advanced Organic Chemistry I	2
CHM 431	Modern Analytical Techniques	2
CHM 451	Chemical Process Technology II	2
CHM 471	Practical Industrial Chemistry	2
CHM 461	Seminar	2

Required Ancillary Course

ME 481	Technology Development Policy	2
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Electives

A minimum of 6 units combination from the following courses recommended by the Department:

CHM 483	Colour Chemistry & Technology I	2
CHM 485	Cement & Fertilizer Industry	2
CHM 403	Modern Synthetic Methods in Inorganic Chemistry	2
CHM 423	Modern Synthetic Methods in Organic Chemistry	2
CHM 487	Pharmaceutical Industry	2
CHM 483	Paper and Pulp Industry	2
CHM 489	Oils, Fats Detergents & Cholo-Alkali Industries	2
MCB 452	Industrial Microbiology	2
PHM 441	Physiochemical analysis	2
		<u>18</u>

Second Semester

Course No.	Title	Units
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Major Courses

CHM 402	Advanced Inorganic Chemistry II	2
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CHM 412	Advanced Physical Chemistry II	2
CHM 422	Advanced Organic Chemistry II	2
CHM 452	Chemical Process Technology III	2
CHM 492	Research Project	6

Electives

A minimum of **2** units combination from the following courses recommended by the Department:

CHM 424	Chemistry of Natural Products	II	2
CHM 454	Polymer Chemistry and Technology		2
CHM 486	Chemistry of Coal and Coal Products		2
CHM 482	Colour Chemistry & Technology II		2
CHM 484	Extraction Metallurgy		2
CHM 488	Sugar & Fermentation Industry		2
			<u>16</u>

COMBINED HONOURS DEGREE

General Information

The Faculty as a group runs several interdisciplinary B.Sc. degree programmes. Some departments from the Faculties of Biological and Social Sciences also participate in a few of these programmes. Each combined programme offers courses in two subject areas as well as relevant ancillary courses from other disciplines and the School of General Studies. The Dean is the head of the Administrative Department of Combined Physical Sciences (CPS). However, there are no other academic staff in that department. Therefore each student of CPS is normally required to choose one of the two academic departments involved in his/her combination of subjects as a base department. The base department, which shall be within the Faculty will co-ordinate the student's academic programmes and provide general and academic counseling.

Degree Offered

The Faculty offers courses leading to the B.Sc (Hons) degree in two subjects the following combinations are approved.

- *A. Chemistry and Botany
 - B. Chemistry and Microbiology
 - *C. Chemistry and Zoology
 - D. Chemistry and Mathematics
 - E. Chemistry and Physics
 - F. Computer Science and Mathematics.
 - G. Computer Science and Physics
 - H. Computer Science and Statistics (Regular, HR, and Sandwich, HS)
 - I. Geology and Physics
 - J. Mathematics and Economics
 - *K. Mathematics and Geography
 - L. Mathematics and Physics
 - M. Mathematics and Statistics
 - N. Statistics and Economics
- *Currently not available**

Philosophy, Objectives, and Scope

The degree, for which honours may be awarded on the same basis for degree taken in single subjects, provides in general; the ideal training for candidates who proceed to postgraduate studies and research or professional careers in any inter-disciplinary fields of pure and applied science. For instance, the degree in chemistry Mathematics, or in Chemistry and Physics would be ideal for students looking forward to a research career in molecular physics, theoretical chemistry, or chemical spectroscopy, while the degree in Geology and Physics would provide an excellent background for a career in pure and applied geophysics and petroleum geology. Also, a degree in Mathematics and Geography, successful career in those aspects of Geography. A degree combining computer Science with Mathematics, Physics or Statistics enable the students to apply the modern and powerful tool of the computer to his/her specific area of study.

Duration of Course/Programme

Students are admitted to a combined programme as entrance examination or direct entry candidates for a four-year or a three-year programme respectively. However, the sandwich course in computer Science/Statistics for direct entry students lasts for 5 long vacations periods.

Entry Requirements

In addition to the University's minimum entry requirements the following conditions must be met:

(i) JME Candidates

Credits at the Senior Secondary Certificate Examination or equivalent in the two subjects to combined. Where both subjects are not offered at the O'Level, candidates must satisfy the entry requirements for both subjects. Candidates combining Mathematics and Geography should in addition possess credit in English language in SSCE or its equivalent.

(ii) Direct Entry Candidates

As for the courses combined. For the computer Science/Statistics (Sandwich) Programme a candidate shall possess one of the following:

- (a) At least a merit pass in the Diploma in Statistics (Sandwich) Applications (DSCA) of this University or equivalent from a recognized institution;
- (b) Pass in three subjects at HSC or GCE A/L which must include Mathematics or Statistics or Computer Science or Physics; at least a merit level pass in National Diploma in Statistics or Computer Science or Physics.
- (c) At least a merit level pass in National Diploma in Statistics or Computer Science or Physics.

Job Opportunity

Graduates of the Combined Programmes are well-suited for employment in the oil and Petroleum Industries, the Mining Industries, Pharmaceutical companies, and in various areas involving computer, statistics or demographic treatment. They may also work in education, banks and governmental organizations.

ACADEMIC PROGRAMMES

(1) Three year programme for combined students

The three-year programme for direct entry students include the second, third and fourth year of the respective standard four-year programme listed below. In addition to the prescribed second-year course, the direct entry students are required to take G.S. 101 & 102 (Use of English I & II) and elect either G.S. 103 & 104 (Social Science I & II) or G.S. 207 & 208 (Humanities I & II) in their first year of study.

Only the course numbers and course titles are given below; the course contents for each course are given under the appropriate Department.

FOUR-YEAR STANDARD PROGRAMME

DEPARTMENT OF COMBINE PHYSICAL SCIENCES

CHEMISTRY/MICROBIOLOGY - FIRST YEAR

First Semester

Course No.	Title	Units
Major Courses		
CHM 101	Basic Principles of Inorganic Chemistry 2	
CHM 171	Basic Practical Chemistry	2
Required Ancillary Courses		
BIO 151	General Biology I	3
MTH 111	Elementary Mathematics I	3
MTH 121	Elementary Mathematics II	3
General Studies Courses		
GSP 101	Communication in English I	2
GSP 111	The use of Library and Study Skills	2
		<u>17</u>

Second Semester

Major Courses		
MCB 102	Introductory Microbiology	2
CHM 112	Basic Principles of Physical Chemistry	2
CHM 122	Basic Principles of Organic Chemistry	2
Required Ancillary Courses		
BIO 152	General Biology II	3
BIO 154	General Biology Practical	2
MTH 113	Elementary Mathematics III	3
General Studies Courses		
GSP 102	Communication in English II	2
		<u>16</u>

Chemistry/Microbiology - Second Year

First Semester

Course No.	Title	Units
Major Courses		
MCB 201	General Microbiology I	3
CHM 201	General Inorganic Chemistry	2
CHM 211	General Physical Chemistry	2
CHM 221	General Organic Chemistry I	2

Required Ancillary Courses

PHY 111	General Physics for life sciences I	2
PHY 191	Practical Physics	2
COS 101	Introduction to Computer Science	2

General Studies Courses

GSP 207	Logic, Philosophy and Human Existence ²	
GSP 201	Basic Concepts and theory of Peace	2
		<u>19</u>

Second Semester

Course No.	Title	Units
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Major Courses

MCB 202	General Microbiology II	4
CHM 222	General Organic Chemistry II	2
CHM 232	Analytical Chemistry	2
CHM 272	Practical Physical Chemistry I	2

Required Ancillary Courses

PHY 112	General Physics for Life Sciences II	2
PHY 114	General Physics for Life Sciences III	2
COS 304	Computer Applications	3

General Studies Courses

GSP 208	Nigerian People and Culture	2
GSP 202	Issues in Peace and Conflict	2
Resolution studies		
		<u>21</u>

Chemistry/Microbiology - Third Year**First Semester**

Course No.	Title	Units
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Major Courses

MCB 301	Microbial Physiology	2
MCB 331	Pathogenic Bacteriology	4
MCB 341	Immunology and Immunochemistry	4
CHM 301	Inorganic Chemistry I	2
CHM 321	Organic Chemistry I	2
CHM 273	Practical Organic Chemistry I	2

Required Ancillary Course

STA 202	Statistic For Biological Sciences I	2
CED 341	Introduction to Entrepreneurship	2
		<u>20</u>

Second Semester

Course No.	Title	Units
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Major Courses

MCB 302	Microbial Metabolism	2
MCB 304	Microbial Genetics and Molecular Biology	2
MCB 332	Pathogenic Mycology	2
CHM 302	Inorganic Chemistry II	2
CHM 322	Organic Chemistry II	2
CHM 324	Organic Chemistry IV	2
CHM 372	Practical Physical Chemistry II	2

Required Ancillary Course

STA 205	Statistics for Biological Sciences II	2
CED 342	Business Development and Management	2
		<u>18</u>

Chemistry/Microbiology - Fourth Year

First Semester

Course No.	Title	Units
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Major Courses

MCB 431	Virology	4
MCB 423	Industrial Biotechnology I	2
MCB 321	Environmental Microbiology (Sewage, Water, Pollution)	2
CHM 311	Physical and Structural Chemistry I	2
CHM 373	Practical Organic Chemistry I I	2
CHM 374	Applied Spectroscopy	2
CHM 431	Modern Analytical Techniques	2
CHM 421	Advanced Organic Chemistry I	2
		<u>18</u>

Second Semester

Course No.	Title	Units
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Major Courses

MCB 322	Food Microbiology	4
MCB 424	Industrial Biotechnology II	2
MCB 433	Pharmaceutical Microbiology	3
MCB 452	Analytical Microbiology and	

	Quality Control	4
CHM 312	Physical and structural Chemistry II	2
CHM 422	Advanced Organic Chemistry II	2
CHM 492/MCB492	Research Project	6/4
		<u>21/23</u>

CHEMISTRY/PHYSICS- **First Year****First Semester**

Course No.	Title	Units
Major Courses		
CHM 101	Basic Principles of Inorganic Chemistry	2
CHM 171	Basic Practical Chemistry	2
PHY 121	Fundamentals of Physics I	3
PHY195	Practical Physics II	2
Required Ancillary Courses		
MTH 111	Elementary Mathematics I	3
MTH 121	Elementary Mathematics II	3
General Studies Courses		
GSP 101	Communication in English I	2
GSP 111	The use of Library and Study Skills	2
		<u>19</u>

Second Semester

Major Courses		
CHM 112	Basic Principles of Physical Chemistry	2
CHM 122	Basic Principles of Organic Chemistry	2
PHY 122	Fundamentals of Physics II	3
PHY 124	Fundamental of Physics III	3
General Studies Courses		
GSP 102	Communication in English II	2
		<u>12</u>

Chemistry/Physics- **Second Year****First Semester**

Course No.	Title	Units
Major Courses		
CHM 201	General Inorganic Chemistry	2
CHM 211	General Physical Chemistry	2
CHM 221	General Organic Chemistry I	2

PHY 211	Structure of Matter	3
PHY 221	Mechanics	2
PHY 251	Electromagnetism	2

Required Ancillary Courses

MTH 207	Advanced Mathematics VII	2
COS 101	Introduction to Computer Science	2

General Studies Courses

GSP 207	Logic, Philosophy and Human Existence ²	
GSP 201	Basic Concepts and theory of Peace	2
		<u>21</u>

Second Semester

Course No.	Title	Units
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Major Courses

CHM 222	General Organic Chemistry II	2
CHM 232	Analytical Chemistry	2
CHM 272	Practical Physical Chemistry I	2
CHM 274	Practical Inorganic Chemistry I	2
PHY 241	Waves II	2
PHY 262	Introduction to Atomic and Nuclear Physics	3

Required Ancillary Courses

MTH 206	Advanced Mathematics VI	2
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General Studies Courses

GSP 208	Nigerian People and Culture	2
GSP 202	Issues in Peace and Conflict	
Resolution studies		
		<u>19</u>

Chemistry/Physics**Third Year****First Semester**

Course No.	Title	Units
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Major Courses

CHM 273	Practical Organic Chemistry I	2
CHM 301	Inorganic Chemistry I	2
CHM 311	Physical & Structural Chemistry I	2
PHY 321	Relativity Physics	2
PHY 331	Thermal Physics	3
PHY 351	Electronics	3

Required Ancillary Course

COS 201	Computer Programming I	2
CED 341	Introduction to Entrepreneurship	2
STA 205	Statics for Physical Sciences I	2

20**Second Semester**

Course No.	Title	Units
Major Courses		
CHM 302	Inorganic Chemistry II	2
CHM 312	Physical & Structural Chemistry II	2
CHM 314	Physical & Structural Chemistry III	2
PHY 292	Practical Physics IV	2
PHY382	An Introduction to Astronomy	3
PHY 362	Quantum Mechanics I	3

Required Ancillary

MTH 208	Advanced Mathematics VIII	2
MTH 241	Mathematics Methods I	3
CED 342	Business Development and Management	2
		<u>21</u>

CHEMISTRY/PHYSICS**- Fourth Year****First Semester**

Course No.	Title	Units
Major Courses		
CHM 321	Organic Chemistry I	2
CHM 374	Applied Spectroscopy	
Or		
PHY 391	Practical Physics V	2
CHM 411	Advanced Physical Chemistry I	2
CHM 431	Modern Analytical Techniques	2
PHY 403	General Physics	2
PHY 421	Analytical Mechanics	3
PHY 451	Electromagnetic Theory	2
PHY 461	Quantum Mechanics II	3
		<u>18</u>

Second Semester

Course No.	Title	Units
Major Courses		
CHM 322	Organic Chemistry II	2
CHM324	Organic Chemistry III	2
CHM 372	Practical Physical Chemistry	2

Or		
PHY 392	Practical Physics VI	3
CHM 412	Advanced Physical Chemistry II	2
PHY 438	Statistical Physics	2
PHY 462	Nuclear Physics	3
CHM 492/PHY 494	Research Project	6/4
		<u>16/19</u>

CHEMISTRY/MATHEMATICS - FIRST YEAR

First Semester

Course No.	Title	Units
Major Courses		
MTH 111	Elementary Mathematics I	3
MTH 121	Elementary Mathematics II	3
CHM 101	Basic Principles of Inorganic Chemistry 2	
CHM 171	Basic Practical Chemistry	2

Required Ancillary Courses

PHY 115	General Physics for Physical Sciences I	3
PHY 116	General Physics for Physical Sciences II	3

General Studies Courses

GSP 101	Communication in English I	2
GSP 111	The use of Library and Study Skills	2

Total Units **20**

Second Semester

Major Courses

MTH 113	Elementary Mathematics III	3
CHM 112	Basic Principles of Physical Chemistry 2	
CHM 122	Basic Principles of Organic Chemistry 2	

Required Ancillary Courses

PHY 118	General Physics for Physical Sciences III	3
MTH 131	Elementary Mechanic I	3

General Studies Courses

GSP 102	Communication in English II	2
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Total Units **15**

Chemistry/Mathematics - Second Year

First Semester

Course No.	Title	Units
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Major Courses

MTH 211	Sets, Logic and Algebra	3
MTH 212	Linear Algebra I	2
MTH 221	Real Analysis I	3
CHM 201	General Inorganic Chemistry	2
CHM 211	General Physical Chemistry	2
CHM 221	General Organic Chemistry I	2
CHM 273	Practical Organic Chemistry I	2

Required Ancillary Courses

COS 101	Introduction to Computer Science	2
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General Studies Courses

GSP 207	Logic, Philosophy and Human Existence ²	
GSP 201	Basic Concepts and theory of Peace	
Total Units		<u>22</u>

Second Semester

Course No.	Title	Units
Major Courses		
MTH 214	Linear Algebra II	2
MTH 222	Elementary Differential Equations I	3
MTH 241	Mathematics Methods I	3
CHM 222	General Organic Chemistry II	2
CHM 232	Analytical Chemistry	2
CHM 272	Practical Physical Chemistry I	2
CHM 274	Practical Inorganic Chemistry I	2
General Studies Courses		
GSP 208	Nigerian People and Culture	2
GSP 202	Issues in Peace and Conflict	2
Resolution studies		
		<u>20</u>

Chemistry/Mathematics - Third Year**First Semester**

Course No.	Title	Units
Major Courses		
MTH 311	Abstract Algebra I	3
MTH 323	Complex Variables I	3
CHM 311	Physical & Structural Chemistry I	2

Required Ancillary Course

COS 201	Computer Programming I	2
CED 341	Introduction to Entrepreneurship	2

Electives

A minimum of 2 courses from the following courses approved by the Department:

GEOL 103	Basic and Applied Geology for Environmental and Physical Sciences	3
GEOL 213	Optical Mineralogy	2
STA 205	Statistics for Physical Sciences and Engineering I	2
CHM 373	Practical Organic Chemistry II	2

16/17**Second Semester**

Course No.	Title	Units
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Major Courses

MTH 223	Introduction to Numerical Analysis	3
MTH 326	Real Analysis II	3
CHM 302	Inorganic Chemistry II	2
CHM 312	Physical & Structural Chemistry II	2
CHM 314	Physical & Structural Chemistry III	2

Required Ancillary

PHY262	Introduction to Atomic and Nuclear Physics	3
CED 342	Business Development and Management	2

Electives

A minimum of 2 courses from the following courses approved by the Department:

COS 202	Computer Programming II	3
GEOL 212	Crystallography and Mineralogy	2
GEOL 141	Earth History	3

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Chemistry/Mathematics - Fourth Year

First Semester

Course No.	Title	Units
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Major Courses

MTH 321	Metric Space Topology	3	
MTH 322	Elementary Differential Equations II		3
MTH 332	Optimization Theory I		2
CHM 321	Organic Chemistry I		2
CHM 374	Applied Spectroscopy		2
CHM 411	Advanced Physical Chemistry I		2
CHM 431	Modern Analytical Techniques		2
CHM 491/MTH451	Research Project		6/4
Total Units			<u>20/22</u>

Second Semester

Course No.	Title	Units	
Major Courses			
MTH 312	Abstract Algebra II	3	
MTH 324	Vector and Tensor Analysis	3	
MTH 325	Complex Variables II	3	
CHM 322	Organic Chemistry II	2	
CHM 324	Organic Chemistry III	2	
CHM 372	Practical Physical Chemistry II	2	
CHM 402	Advanced Inorganic Chemistry II	2	
CHM 412	Advanced Physical Chemistry II	2	
			<u>19</u>

FACULTY OF PHYSICAL SCINECES
DEPARTMENT OF PURE AND INDUSTRIAL CHMEISTRY

ACADEMIC STAFF

S/N	Name	Rank/Designation	Qualification
1	U. C. Okoro	Professor	B.Sc.(Lagos), Ph.D, (Nig.)
2	P. O. Ukoha	Professor	B.Sc., M.Sc., (Nig.), Ph.D (ABU)
3	C. O. B. Okoye	Professor	B.Sc., M.Sc.(Ibadan), Ph.D (Ife)
4	C.O. Okafor	Professor (Emeritus)	B.Sc., (Lond.) Ph.D. (Michigan)
5	E.C. Okafor	Professor (Emeritus)	B.Sc., (Lond.) Ph.D. (Ibadan)
6	L. N. Obasi	Reader	B.Sc., M.Sc., Ph.D (Nig).
7	P. M. Ejikeme	Senior Lecturer	B.Sc.(Port), M.Sc., Ph.D (Nig.)
8	A.E. Ochonogor	Senior Lecturer	B.Sc.(Lagos), M.Sc.(Ibadan), Ph.D (Leeds)
9	J. N. Asegbeloyin	Senior Lecturer	B.Sc.(Cal.), M.Sc., Ph.D (Nig.)
10	I. U. Agbo	Senior Lecturer	B.Sc.(Jos), M.Sc. (Nig.)
11	B. E. Ezema	Senior Lecturer	B.Sc., M.Sc. and Ph.D (Nig.)
12	M. A. Ezeokonkwo	Senior Lecturer	B.Sc.(Cal.), M.Sc., Ph.D (Nig.)
13	O. T. Ujam	Senior Lecturer	B.Sc.,M.Sc.(Nig.) Ph.D (Waikato)
14	J. N. Ihedioha	Senior Lecturer	B.Sc.(NAU), M.Sc. Ph.D (Nig.)
15	N. R. Ekere	Senior Lecturer	B.Sc., M.Sc.(Nig.), Ph.D (FUTO)
16	A.U. Ofoefule	Senior Lecturer	B.Sc., M.Sc., Ph.D. (Nig.)
17	I.S. Eze	Senior Lecturer	B.Ed., M.Sc., Ph.D (Nig.)
18	C.N. Ibeto	Senior Lecturer	B.Sc. (Ibadan), M.Sc., Ph.D (Nig.)
19	V. E. Agabazue	Senior Lecturer	B.Sc., M.Sc. Ph.D (Nig.)
20	J. U. Ani	Senior Lecturer	B.Eng., M.Eng (ESUT), Ph.D (Nig.)
21	N. N. Ukwueze	Senior Lecturer	B.Sc., M.Sc. (Nig.)
22	U. S. Oruma	Lecturer I	B.Sc., M.Sc. (Nig.)
23	E. A. Onoabedje	Lecturer I	B.Sc., M.Sc. Ph.D.(Nig.)
24	G.K. Akpomie	Lecturer I	B.Sc. (Jos), M.Sc., Ph.D(Ibadan).
25	O. C. Okpareke	Lecturer II	B.Sc. (ABSU), M.Sc. (Nig).
26	F. U. Eze	Lecturer II	B.Sc., M.Sc. (Nig.)
27	K. K. Onyia	Lecturer II	B.Sc., (Nig.) M.Sc. (Ibadan)
28	D. I. Ugwu	Lecturer II	B.Sc., M.Sc. (Nig.)
29	C.U. Ibeji	Lecturer II	B.Sc. (Uniben), M.Sc., Ph.D. (Ibadan)
30	C. C. Ezeofor	Assistant Lecturer	B.Sc. (Nig.),M.Sc. (Aberdeen)

31	O.L. Alum	Assistant Lecturer	B.Sc. (Nig.), M.Sc. (Nig.)
32	T.N. Alumona	Assistant Lecturer	B.Sc. (Nig.), M.Sc. (Nig.)
33	J.I. Ayogu	Assistant Lecturer	B.Sc. (Nig.), M.Sc. (Nig.)
34	O.A. Odewole	Assistant Lecturer	B.Sc. (Ago-Iwoye), M.Sc. (Ilorin)
35	I.I. Agboola	Assistant Lecturer	B.Tech. (LAUTECH), M.Sc. Lagos)
36	O. D. Okagu	Graduate Assistant	B.Sc. (Nig.), M.Sc. (Nig.)
37	R. N. Ugwuanyi	Graduate Assistant	B.Sc. (Nig.)
38	D. D. Nwibo	Graduate Assistant	B.Sc. (Nig.)
39	C. S. Anyaezu	Graduate Assistant	B.Sc. (Nig.)
40	D.C. Izuogu	Graduate Assistant	B.Sc. (Nig.)
41	C.P. Uzoewulu	Graduate Assistant	B.Sc. (Nig.)
42	E.E. Oyeka	Graduate Assistant	B.Sc. (Nig.)
43	N.C. Okey	Graduate Assistant	B.Sc. (Nig.)
44	C.J. Ezeorah	Graduate Assistant	B.Sc. (Nig.)

NON- ACADEMIC STAFF

	Name	Rank	Qualification
1	E.C. Mbaoji	Chief Technologist	HND(NIST)
2	P.I. Anyaoha	Chief Technologist	HND(NIST)
3	J.I. Ugwu	Chief Technologist	HND(NIST)
4	F.O. Ugwuanyi	Asst. Chief Technologist	HND (NIST)
5	P.O. Dave-Ugwu	Principal Tech.	B.Sc.(Ed. Chm), M.Sc. (Nig)
6	A.M. Chukwuneke	Senior Tech.	B.Sc.(NAU), M.Sc. (Nig)
7	J.O. Didiugwu	Senior Tech.	B. Eng. (Polymer)
8	M.E. Ugwu	Chief Lab. Supervisor	WASC
9	C.I. Ezugwu	Chief lab. Supervisor	WASC
10	E.N. Odo	Assistant Executive Officer	OND
11	F.O. Eze	Cleaner/Messenger	WASC
12	E. Kanu	Higher Tech. Officer II	B.Sc
13	O.H. Ajah	Higher Tech. Officer II	B.Sc
14	E.U. Obinma	Higher Tech. Officer II	B. Engr
15	O.C. Okachukwu	Higher Tech. Officer II	B.Sc
16	P.C. Onyeka	Higher Tech. Officer II	B.Sc
17	P. Kalu	Higher Tech. Officer II	B.Sc
18	E.C. Ugwu	Higher Tech. Officer II	B.Sc
19	O.C. Chinweike	Higher Tech. Officer II	B.Sc. ED
20	F.N. Ugwuoke	Lab. Assistant	SSCE
21	P. Agu	Lab. Assistant	NCE

