UNIVERSITY OF AGRICULTURE AND ENVIRONMENTAL SCIENCES, UMUAGWO, IMO STATE

DEPARTMENT OF CHEMICAL AND PETROLEUM ENGINEERING

Student Handbook

2021-2026

UNIVERSITY OF AGRICULTURE AND ENVIRONMENTAL SCIENCES, UMUAGWO, IMO STATE

www.uaes.edu.ng

STUDENT HANDBOOK

FOR

B.ENG DEGREE IN PETROLEUM ENGINEERING

DEPARTMENT OF CHEMICAL AND PETROLEUM ENGINEERING

1.1 Vision Statement of the University

The vision of the University is to become a leader in academia, research and technology transfer in Nigeria and beyond, particularly, in the areas of Agriculture and Environmental Sciences; create a community and an environment for learning and learners; to deploy technology effectively and produce morally sound graduates of distinction and exemplary character.

1.2 Mission Statement of the University

The mission statement of the University of Agriculture and Environmental Sciences, Umuagwo, Imo State, is to provide excellent and conducive environment for teaching, learning, research, and service that shall be renowned, distinguished and attractive nationally and internationally.

1.3 Philosophy and Objectives of UAES

1.3.1 Philosophy

Overall declining standards of education, discipline and morality in our country informed the decision of Imo State government to establish the University of Agriculture and Environmental Sciences, Umuagwo to leverage on education as a tool for social transformation.

The philosophy of the University is thus encapsulated in the University Motto: 'Knowledge, Innovation and Excellence for Human Well-being'; and the central themes that embody this philosophy include, but not limited to:

i. become a leader in academia, research, and technology transfer in Nigeria and beyond, particularly, in the areas of Agriculture and Environmental Sciences.
ii. create a community and a serene environment for teaching and learning
iii. use current and futuristic technologies in teaching so that students can favourably compete with peers anywhere in the world; and
iv. produce morally sound graduates of distinction and exemplary character.

1.3.2 Objectives

The law establishing the University has outlined its objectives aimed at meeting its vision and mission. The objectives of the University are to:

i. provide a wide range of quality learning opportunities for undergraduate and postgraduate students without distinction of race, creed, sex, religion or political

conviction that will enhance their best intellectual, social, economic and personal development;

ii. provide academic, professional and vocational training of high quality in a way as to enrich and improve the state, national and international human resource capabilities and assist its graduates to contribute to the common good of society;

iii. foster academic research, which contributes to human knowledge and the vitality of the institution;

iv. encourage thoughtful and responsible staff and student participation in local, state, national and international affairs;

v. maintain the highest academic standards in respect of University degrees and other awards and preserve and protect their reputation and integrity;

vi. evolve academic programmes to suit the changing social and economic needs of society through continuous review of curricula and development of new programmes to respond to societal and technological changes in Nigeria and the world in general and Imo State in particular;

vii. advance human culture and improve human life through the development, refinement and dissemination of knowledge and to prepare competent graduates to meet the development needs of Imo State in particular and Nigeria in general; and

viii. relate its activities to the social, cultural and economic needs of the people of Imo State and Nigeria.

1.4 The National Anthem of Nigeria

Stanza One

Stanza 1
Nigeria we hail thee,
Our own dear native land,
Though tribe and tongue may differ,
In brotherhood, we stand,
Nigerians all, and proud to serve
Our sovereign Motherland.

Stanza 2
Our flag shall be a symbol
That truth and justice reign,
In peace or battle honour'd,
And this we count as gain,
To hand on to our children
A banner without stain.

Stanza 3

O God of all creation,
Grant this our one request,
Help us to build a nation
Where no man is oppressed,
And so with peace and plenty
Nigeria may be blessed.

1.5 The National Pledge

I pledge to Nigeria my Country

To be faithful, loyal and honest

To serve Nigeria with all my strength

To defend her unity

And uphold her honour and glory

So help me God.

1.6 UAES Anthem

Stanza One

University of Agriculture and Environmental Sciences

The home of knowledge, innovation and excellence

The pride of the eastern heartland and star of the nation

We create a better tomorrow by grooming scholars and leaders

Beyond the boundaries of race, creed and gender.

Refrain:

UAES!!! Eagles of the world

Soaring in heights of excellence

We are Great Innovators, yes! We are UAES!!! Eagles of the world (2ce)

Stanza Two

Mother Nature! We care and cherish thee,

A gift to us from the Creator

We pray for light and wisdom

To preserve, protect and sustain thee

That each day we may grow in knowledge, intuition and moral strength

And through all our efforts, innovations and discoveries,

The earth will be renewed, and become a better place.

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2.0 Introduction

2.1 History and Background of the Department

University of Agriculture and Environmental Sciences (UAES), Umuagwo is a public University established by an Act of Imo State Parliament Law No. 4 of 2019 and Amended Law No. 7 of 2020, official Gazette No. 20, Vol. 44. The University is approved and licensed by the National Universities Commission (NUC) as the 49th State University in Nigeria and 171st in the Federation, in 2019, to run 29 programmes under five Faculties and one of it is the Faculty of Engineering.

Engineering is the application of science for the optimum conversion of the resources of nature for the uses and benefits of mankind. It also applies mathematics to solving problems. Engineering is one of the few vocations recognized worldwide as a profession. Any aspiring student who wants to make a career in engineering profession must ask himself/ herself these two questions: "why be an engineer?" and what does it take to be an engineer?" The first question needs to be explained to him/her in such a manner that would enable him/her appreciate what an engineer does. As an engineer, you get a chance to solve important problems confronting your communities, local government areas, cities, countries and the world today.

And for what it takes to be an engineer, it is important to state that not any kind of person can study engineering. Curiosity to solve problems makes you a great engineer with proper command for mathematics and physical sciences. There is a specific branch of engineering for every interest so as to nurture engineers of requisite knowledge in any chosen branch. Here at the Faculty of Engineering, University of Agriculture and Environmental Sciences, Umuagwo, Imo State, we presently have five branches or departments in engineering namely: Chemical and Petroleum Engineering, Mechanical Engineering, Civil Engineering, Electrical and Electronic Engineering, and Water and Irrigation Engineering (later changed to Agricultural and Biosystems engineering). Considering the blue prints of the Faculty, there is every opportunity for our programmes to grow in number and strength to meet new challenges and societal needs.

The Chemical and Petroleum Engineering Department was established to meet the growing needs for manpower in the chemical, process and allied industries and the oil and gas industry. The Department commenced with the admission of 2021/2022 set of students with approval to run two programmes for awards of B.Eng. Chemical Engineering and B.Eng. Petroleum Engineering. Both programmes have essentially the same courses at Levels 100 but they are separated from second semester year two from where they delve into their core

courses. Electives are also provided to enable students acquire broader knowledge of the disciplines. Thus, the curriculum is designed such that graduate of the Department is prepared for engineering duties in the Chemical, petroleum and allied industries. A background in Chemical and Petroleum engineering provides a great foundation for jobs in management with oil, gas, and geothermal enterprises as well as oil and gas investments.

2.2 Philosophy of Petroleum Engineering Programmes

To adopt state-of-the-art teaching and research techniques in a broad-based training of Petroleum Engineering programme with an outlook of producing competent graduates who shall distinctly stand as technical and economical driving forces in advancing industrialization and capacity building in indigenous technology, economy and societal human relations of our host community and the nation at large. Our graduates shall possess entrepreurial skills in the creation of jobs and valued service delivery for the existing jobs.

2.3 Aim of Petroleum Engineering Programme

The primary aim of the programme is to equip the graduates with skills, knowledge, and competencies in-tandem with the realization of national needs and aspirations vis-à-vis industrial development and technological emancipation.

2.4 Objectives of Petroleum Engineering Programme

The benchmark statements give the minimum academic standards required to meet these needs and to produce graduates in Petroleum Engineering with sufficient academic background and practical experience who would be able to rise to the challenges of a developing economy.

2.4.1 Programme Educational Objectives (PEOs)

The Bachelor of Engineering (B.Eng) degree in Petroleum Engineering aligns with the vision and mission of the University of Agriculture and Environmental Sciences (UAES). The program is designed to produce graduates who contribute to national development, foster an environment that promotes scientific and engineering knowledge, and address real-world challenges in both the developing economy and globally. The programme's educational objectives have been structured for Petroleum Engineering graduates to fulfil stakeholders' satisfaction or needs. These stakeholders include industry advisors, professional bodies (COREN/NUC/SPE etc.), academic staff, employers, students. Alumnis will be consulted in next review. The Petroleum Engineering Programme Education Objectives (PEOs) are;

PEO1: To train Petroleum Engineers with the required qualities and capabilities to counteract the ever-increasing demands of not only the Nigerian Petroleum industries but also those of the general Nigerian socio-economic sectors including the academic and international market.

PEO2: To provide edge-cutting training by adding value to services that motivates students to achieve their full potential using global best practices in realization of the National Policy on Industrialization and Self-Reliance.

PEO3: To stimulate the interest of students in research through contact with teachers and mentors who are active in research

PEO4: To design engineering projects and supervise their implementation.

PEO5: To promote, stimulate and motivate students to target attainment of highest standards of achievements in the general engineering field through close affiliation with the existing petroleum producing, servicing and processing companies which will serve as the training ground for exposure to contemporary problems and hands-on methods of solving them.

The specific objectives of the programme include to:

1. Conduct investigations into complex petroleum engineering problems and produce viable solutions that optimize the use of our local resources;
2. Outline the dynamics of both the local and global oil and gas industry;
3. Adapt and adopt exogenous technology in order to solve peculiar engineering problems in the Nigerian oil and gas industry;
4. Design petroleum engineering projects and supervise their implementation;
5. Exercise original thought, good professional judgment and responsibility for the execution of oil and gas projects in a manner that guarantees sustainable development;
6. Show familiarity with all the materials, codes, components, machines, equipment, production techniques and systems in the oil and gas industry;
7. Manage people, fund, materials and equipment;
8. Have good knowledge of the ethics of the engineering profession and application;
9. Work alone or in a team, especially a multidisciplinary team, and also have good oral and written communication skills; and
10. Develop lifelong learning ability for continuous self-improvement.

2.5 Programme Outcomes

Programme Outcomes describe the knowledge, skills and attitude that students are expected to acquire upon graduation. The programme outcomes were developed putting into consideration the programme educational objectives. Specifically, the programme ensures that graduates attain the following graduate attributes:

PO1: Engineering Knowledge	Solve developmental and complex engineering problems through applied knowledge of mathematics, science, engineering fundamentals and Petroleum Engineering principles.
PO2: Problem Analysis	Identify and formulate, research literature and analyse developmental and complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3: Design/ Development of Solutions	Advance solutions for developmental or complex engineering problems and design systems, components or processes that meet specified needs with appropriate consciousness for public health and safety, cultural, societal and environmental peculiarities.
PO4: Investigation	Investigate into developmental or complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO5: Modern Tool Usage	Create, select and apply appropriate techniques, resources and modern engineering and ICT tools, including prediction, modelling and optimization to developmental and complex engineering activities, with an understanding of the limitations.
PO6: The Engineer and Society	Apply informed reasoning through contextual knowledge which includes Humanities and Social Sciences to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PO7: Environment and Sustainability	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
PO8: Ethics	Imbibe ethical principles and commit to professional responsibilities and norms of engineering practice, including adherence to the COREN Engineers Code of Conducts.
PO9: Individual and Team Work	Function effectively as an individual, a member or as a leader in diverse teams and in multi-disciplinary settings.
PO10: Communication	Communicate effectively on developmental or complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11: Project Management	Demonstrate knowledge and understanding of engineering, management and financial principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
PO12: Lifelong Learning:	Recognize the need for, and have the preparations and ability to engage independent and lifelong learning in the broadest context of technological and social changes.

2.6 General Administration of the Department

The Departmental administration is led by the Head of Department (HoD) who is answerable directly to the Dean, Faculty of Engineering. The Departmental governing committees comprises of the Departmental board, quality control and assurance, and research team, industrial collaboration and student welfare and advisory committee.

2.6.1 Petroleum Engineering Programme Staff

The Departmental staff for Petroleum Engineering programme consists of academic, technologist and administrative staff.

Petroleum Engineering Programme Academic Staff

Name of Staff, Designation and Responsibility	Qualification and Specialization
Engr. Dr. O. E. Umeagukwu (Senior Lecturer/Acting Head of Department) *E-mail: cpe@uaes.edu.ng*	Ph.D. (NAU) M.Eng (COOU) B.Eng (COOU) Chemical Engineering Processes
Engr. Prof. Kevin C. Igwilo (Visiting Lecturer)	Ph.D. (FUTO) M.Eng (UNIPORT) B.Eng (UNIPORT) Petroleum Engineering
Engr. Prof. Nkemakolam. C. Izuwa (Sabbatical Lecturer)	Ph.D (FUTO) M.Eng (UNIPORT) B.Eng (FUTO) Petroleum Engineering
Engr. Dr. Ubong U. Isang (Senior Lecturer)	Ph.D. (UNIPORT) M.Eng (UNIPORT) B.Eng (UNIPORT) Production Engineering and Flow Assurance
Engr. Dr. Kingsley K. Ihekoronye (Senior Lecturer)	Ph.D. (ATBU) M.Eng (FUTO) B.Eng (FUTO) Reservoir Engineering
Engr. Vivian C. Amaefula (Lecturer I)	M.Eng (FUTO) B.Eng (FUTO) Petroleum Engineering
Engr. Chukwudi M. Ohaegbulam (Lecturer I)	M.Eng (FUTO) B.Eng (FUTO) Production & Completion Engineering
Engr. Afam A. Nwude (Lecturer II)	M.Eng (FUTO) PGD (UNIPORT) B.Eng (FUTO) Petroleum and Gas Engineering
Esther U. Manuemelula (Assistant Lecturer)	M.Eng (FUTO) B.Eng (EBSU) Geology and Geophysics

Petroleum Engineering Programme Technical Staff

Name	Designation	Qualification
Chukwuebuka F. Dike	Technologist I	M.Eng (FUTO) B.Eng (FUTO)
Stanley. C. Nwanekezi	Technologist II	B.Eng (FUTO)

Petroleum Engineering Administrative Staff

S/N	Name	Designation	Qualification
1	Udueze Jovita	Higher Executive Officer/ Secretary	HND
2	Agu Emmanuel	Higher Executive Officer	HND
3	Emeka Chidiebere Victor	Administrative Officer	B.A
4	Emegi Paschal	Clerical Officer	WAEC
5	Chibuezie Metu	Messenger	FSLC

2.7 Career Opportunities

Petroleum engineers have diverse career opportunities in the oil and gas sector, industrial sector, educational sector, research fields, consultancy firms and private entrepreneurships. But to be employed in any of these institutions, students must acquire the required skills in these fields of study such as a good degree, good communication skills, computer skills etc.

2.7.1 Petroleum Engineers

Petroleum Engineers design and develop effective and efficient methods for extracting oil and gas from deposits onshore or offshore. Petroleum Engineers major employers are in oil and gas extraction, mining, coal products manufacturing, engineering services etc. Some of the job titles for Petroleum Engineers includes; Reservoir Engineer, Production Engineering, Completion Engineers, Drilling Engineers etc.

2.8 Admission Requirements

a. Candidates willing to apply to the undergraduate programme in Petroleum engineering should have five credit passes in Chemistry, Physics, Mathematics, English language and Biology (or agricultural science) at WAEC and or NECO at not more than two sittings. Every other admission requirements into the Department will be moderated by the University as may be stipulated by JAMB.

b. Direct Entry requirements: Holders of National Diploma (ND) and Higher National Diploma (HND) certificates with minimum of upper credit passes are eligible for admission into year two/three depending on attainment of the requisite academic preparation. Please note, the applicant must meet the basic UTME entry requirement specified in 2.8a

2.9 Petroleum Engineering Programmes Structure

The programme is structured to have five academic calendar years (of ten semesters) of which nine of the ten semesters are actually used for requisite training in class room/laboratory studies. One semester (in the fourth year) and the two long vacations (at the end of second and third year) are used for industrial training known as Students' Industrial Work Experience Scheme. At the fifth year of studies, students are assigned research project topics and design project topics which they are expected to defend at the end of the tenth semester under an external examiner not below the rank of a Professor of repute in Petroleum Engineering.

3.0 Registration of Courses

Students are advised to register their courses online as stated below:

i. Students who have been offered provisional admission are to pay acceptance fee at any of the designated banks and collect an evidence of payment/ e-tranzact pin from the bank.

ii. Students are to log on to www.uaes.edu.ng and fill a profile form, register their acceptance fee online with the e-tranzact pin collected from the bank and print out their acceptance letter.

iii. With a copy of their online acceptance letter, students can obtain their temporary matriculation number from the admission officer.

iv. Students with their temporary matriculation number are to proceed to any designated bank to pay school fees and collect e- transact pin from the bank.

v. Students are to log on to www.uaes.edu.ng to update their profile details, register their school fees online with the e-tranzact pin collected from the bank and print their school fees online payment slip.

vi. Students are to print out copies of completed profile (registration) form and submit to the Department.

vii. Students are to continue to log on to www.uaes.edu.ng to register their courses online.

viii. Students are to wait for their courses to be approved by their Academic Class Advisers.

ix. Academic Class advisers are to log on to www.uaes.edu.ng daily to check on student registration and approval/disapproval needs and as well give the Head of the Department regular report on the status. Please note, every student must know his/her class adviser.

x. Once courses are approved, students are to print out the approved copy and send copies to the department while keeping some copies to themselves.

3.1 Late Registration of Courses

i. Late registration commences for the returning (old) students after two weeks of resumption.

ii. Late registration commences for new students (fresh students) four weeks after matriculation.

3.2 Adding and Dropping of Courses

i. A student who wishes to add or drop a course(s) shall do so not later than four weeks from the date of registration.

ii. A student may use Add and Drop form duly completed to effect the amendment in his/her registration course form on payment of prescribed fee each Add and Drop form used.

iii. A student shall first register the courses he/she failed during the previous session before registering courses for the current session.

3.3 Change of Degree Programme

i. A student who has been offered an admission into the department shall not be allowed to change his/her degree programme until he/she completes at least two academic sessions in the University. Official application form for change of degree programme may be obtained from the School Registry on payment of the prescribed fee.

ii. Where a student is officially permitted to change his/her degree program, the change may prolong the length of period he/she will stay in the University.

iii. Courses already taken in the former department which are relevant to the new department, including University courses and General studies courses, shall be credited to him/her regardless of her level of attainment in such courses. The remaining courses shall appear in the student's official academic records but shall not be taken into account in computing the student's CGPA for graduation. The responsibility to decide on the relevance or otherwise of the course already taken shall rest with the Head of Department.

iv. The student shall attach his/her session results and the original receipt for the payment of his/her application form for change of degree programme.

v. The student shall in addition meet the admission entry requirements of the programme he/she is changing to prior to his/her entry into the University. Copies of the relevant certificate must be attached. Such student seeking transfer must have taken the relevant subjects in the UTME which includes English Language, Mathematics, Physics, Chemistry and Biology or any other agricultural science subjects.

vi. The student shall collect from the new Faculty officer, a change of degree approval letter stating the new programme, approved year of study and the courses for which waivers have been granted.

vii. All change of Degree Programme applications shall be presented to the Committee of Deans for consideration and approval.

3.4 Matriculation

3.4.1 Requirement for Matriculation

Matriculation is to formally admit the student into the University and it is only for student who has obtained the matriculation number and such a student must have paid all the necessary fees for the Faculty and the Department. At the matriculation arena, the student swears to the University Oath of Allegiance and made to sign the matricula.

3.4.2 Orientation

At the beginning of each session, the Department usually organizes an orientation programme for new students. This is in addition to the orientation programme that is organized by both the Faculty and University. The purpose of the programme is to acquaint the new students with the Departmental facilities and staff. Students will also freely interact with lecturers and are encouraged to ask questions on anything they may like to know about the department and its programmes.

4.0 Student's Welfare

There is a student welfare and advisory committee constituted by the Department to cater for the students.

4.1 Handling of Academic Grievances and any other Student's Complaints

Immediate attention is given to every complaints made by students. All academic grievances and any other student's complaints are documented and handed over to the appropriate committee through the Head of the Department for Departmental matters and through the Dean of Faculty when it has to with omitted results, errors in computation of CGPA, correction of wrong grades etc. However, the students also have the right to petition the school Board or Senate when they feel they are not served justice with the decision of the Departmental or Faculty Board.

4.2 Students Academic Advising

The Department is also saddled with the responsibility of counseling the students. Each of the levels will have Class advisers who are appointed by the Head of the Department. Each student is advised and encouraged to reach the class adviser first on any issue (s) bordering such a student.

4.3 Class Period and Attendance

4.3.1 Duration of Classes, Class Attendance and Absence from Class

There is always a timetable that indicates period for each of the courses. While each lecture is expected to commence as scheduled and end 10 minutes before end of the scheduled period, seminars, tutorials, practical and workshops shall continue as long as scheduled.

Attendance to lectures, laboratories, workshop and tutorials is mandatory. Only a student who has been properly registered for a course and whose name appears on the official class list for that course shall be allowed into a class. A student who absents from prescribed course lecture for more than three weeks during any one semester without permission of the Senate

or the Vice-Chancellor acting on behalf of the Senate, that semester may not be included as part of the scheme or study which the student is required to complete.

5.0 Withdrawal from the University

5.1 Voluntary Withdrawal

Student who wishes to withdraw from the University shall write to the Registrar through the Dean of the Faculty and Head of his/her Department, seeking for approval of the Senate and upon approval, such withdrawal shall not exceed one academic year. Below are further guidelines regarding withdrawal from the University:

i. For fresh students, the written notice of withdrawal shall be given not later than two weeks after matriculation. For old students, the notice shall be given not later than four weeks after the beginning of the semester.
ii. Any student withdrawing from the University shall be required to complete a form giving a brief statement of the reason(s) and the effective date of leaving. The form shall be obtained from the Registrar.
iii. The student may retain grades carried for the semester examinations preceding the date of voluntary withdrawal.
iv. For such a student to re-admitted into the University, he/she is to write a formal application to the Registrar through his/her Head of Department and Dean of Faculty and has to receive official clearance from the Registrar.
v. It is the responsibility of the Senate to prescribe conditions such a student must fulfil before he/she resumes the programme after the period of withdrawal.

5.2 Unauthorized Withdrawal

A student who withdraws from the University without approval of the Senate for one academic year, may not be considered for readmission until his/her case has been considered on its merit by the Departmental/Faculty Board and approved by Senate.

5.3 Withdrawal for Academic Reasons

It is expected that every student admitted into the University maintains acceptable academic standards. Every student is also expected to maintain a minimum Grade Point Average for his/her year of study. The University through the Registrar shall send a letter of warning to any student who obtains a Cumulative Grade Point Average (CGPA) of 1.00 and a withdrawal letter shall be given to any student with a Cumulative Grade Point Average (CGPA) of less than 1.00.

5.4 Withdrawal for Health Reasons

A student may withdraw or be asked to withdraw on reasons of ill health but has to be certified by the Director of Health Services of the University. Such a student shall be readmitted into the University on once he/she produces a valid medical report from an approved Medical Officer and to be certified by the Director of Health Services.

5.5 Withdrawal based on Disciplinary Action

A student who is suspended on disciplinary grounds, may not be readmitted unless with the consideration and approval of the Senate.

5.6 Financial Obligation after Withdrawal

Student who withdraws from the University for any reason whatsoever shall be required to clear any outstanding debts before he/she may be considered for readmission.

5.7 Time Limit for Re-Admission

A student who withdraws from the University for any reason and who is not re-admitted within a period of three (3) consecutive academic sessions from the date of his/her withdrawal, may not be credited with course(s) taken prior to withdrawal should he/she returns to the University. The Head of Department may however make a general assessment

of the student's knowledge of the course(s) taken prior to withdrawal and recommend the year of entry on readmission.

6.0 Examination Offences

i. If any candidate is suspected of cheating; receiving from or assisting other candidates or infringing any other examination regulations, a written report of the circumstance shall be submitted by the Chief Invigilator to the Dean of the Faculty offering the course within 24 hours of examination session. The candidate concerned shall be allowed to continue with examination, unless he/she behaves in such a manner as to disturb other students or peace of the invigilators.

ii**.** Any student suspected under regulation 6(i) above, shall be required to submit to the Chief Invigilator, a written report immediately after the said course and failure to make a report shall be regarded as a breach of discipline.

iii. Upon being informed that any candidate has committed a breach of any of this regulation, the dean shall send report to the Faculty Board of Studies. The Faculty board of studies shall investigate through Examination Malpractice Panel the alleged offence and report to the Senate at the time the examination result of such candidate is considered. The Senate shall determine the penalty for each offence.

iv**.** Any candidate found infringing 6(i) shall on approval of the Senate be:

a. Expelled from the University, and

b. Handed over to the Police for prosecution under the appropriate law/decrees.

6.1 Absence from Examination

i. Candidate must present themselves for such University examination in courses which they have registered. Under these regulations, candidates who fail to do so for reasons other than illness or accident shall be deemed to have failed the examination.

ii. Misreading of the examination time table shall not be accepted as a satisfactory explanation for absence.

iii. Whenever a student is prevented by ill health from taking an examination, the candidate shall notify the Registrar through an application in writing through the Head of Department and the Dean of the Faculty, and shall submit a medical certificate issued or validated by the Director of Health Services of the University within one month of the examination.

iv. Such an application shall be processed to the Senate through the relevant Department Board of studies and School Board of Studies. Where successful, the Senate may approve that the student takes the examination at the next available opportunity as a first attempt.

6.2 Departmental Examination Board

Departmental Board of Examiners comprises:

i. The Head of Department

ii. Not less than 2 and more than 6 others comprising the most senior academic members of the Department representing the specialties in the Department.

iii. The Departmental Examination Officer shall be a member/secretary.

6.2.1 Functions of Departmental Examination Board

i. To moderate all question papers of the Department

ii. To approve the Departmental examination results with the course lecturers in attendance

iii. To advise the Head of Department on the appointment of External examiners.

iv. To undertake such other matters as may be referred to it by the Head of Department in accordance with the University standard.

6.2.2 Appointment of External Examiners

The Department in agreement with the University laid down rules for appointment of an external examiner nominates an external examiner who shall be appointed by the Senate.

6.2.3 Functions of External Examiner

i. The External Examiner shall moderate all final year or professional examination question papers before the examination and shall send any comment on them to the Head of Department.

ii. The External Examiner shall mark or re –mark all such portions of candidate's scripts as he/she deems fit.

iii. The External Examiner shall participate in the determination of the results of all final year students.

iv. The External Examiner shall be requires to submit to the Vice-Chancellor or report on the result of the examination together with general comments on the work of the Department.

v. A person appointed as an External Examiner shall satisfy the following four conditions:

a. Must be external to the University

b. Must have had adequate experience in the University Academic work.

c. Must have high academic standing.

d. Must be fit to sign all Degree results before they are presented to the Faculty Board.

6.2.4 Setting of Examination Question Papers

i. Each lecturer shall be required to submit his/her questions as directed by the Departmental Board of Examiners, for the proposed examination for each course taught, through the Head of Department.

ii. Question papers for the first and second semester examinations in final year courses shall be submitted to the External Examiner for moderation.

6.2.5 Examination Ethics

The Department of Chemical and Petroleum Engineering deems it fit to always enforce strict examination ethics during quiz and examinations, as enshrined in the University student's hand book. Every student of the Department is expected to refrain from committing any examination misconduct. The following actions are examination considered as misconduct by the University:

i. Use of any material like book, printed – paper etc meant to help the student in the examination hall.
ii. Giving any kind of assistance during an examination.
iii. Refusing to stop writing at the end of an examination.
iv. Refusing to surrender any suspected incriminating material.
v. Impersonation
vi. Being caught with leaked examination questions.
vii. Leaving the examination hall with the hope of coming back into the hall without permission from the invigilator(s).
viii. Speaking to another student during the course of an examination.
ix. Smoking or making noise during the course of examination.
x. Committing any other offence not specified here but which are connected with examination in the University.
xi. The punishment or penalty meted for the various offences very but ranges from instant expulsion, rustication from the University for some years. All students are encouraged and advised to refrain from examination malpractices in the University.

6.3 Review of Examination Scripts of Aggrieved Students

i. A student aggrieved about his/her grading shall in the first instance, petition the Registrar through the Head of Department. The Registrar shall refer the petition to the Faculty Board through the Dean of the Faculty for a review of student's answer script.

ii. For examinations in final year courses, the recommendation of the Faculty Board shall be sent to Senate through the Senate Committee on Examination for ratification.

iii. A student applying for review shall be required to pay the prescribed fees.

iv. Photocopies of the scripts to be reviewed, with all comments of the original marker removed, shall be forwarded for review such that:

a. Non – final year courses to be assigned to two internal examiners. In both cases, the reviewers shall not have participated in the original marking of the scripts.

v. Time limit for the submission of petition for review of scripts by the aggrieved student shall be as follows:

a. Final year courses: Two months from the date the results are officially published by the Registrar's Office.

b. For Non – Final year courses: Two months from the date the results (date stamped) are published in the Department.

c. The grade awarded in the review exercise shall supersede the earlier grade.

6.4 Classes of Degree

All degree courses (required, restricted elective, unrestricted elective and general studies) undertaken by the student as well as the successful completion of Industrial attachment, shall count toward the evaluation of his/her degree. The class of shall thereafter be determined as follows:

Class of Degree	Cumulative Grade Point
1st Class Honours	4.50 – 5.00
2nd Class Honours (Upper Division)	3.50 – 4.49
2nd Class Honours (Lower Division)	2.40 -3.39
Third Class Honours	1.50 – 2.29
Fail	0.00 – 1.49

7.0 Grading System

The mark obtained in each course is made up of continuous assessment of 30% and the end of semester examination of 70%.

7.1 Grade Point (GP)

The mark scored in each course (continuous assessment score plus the end of semester examination score) has an equivalent letter grade of A – F and each letter grade has a corresponding numerical value of 5.00 to 0.00 called Grade Point (GP).

Grading System

Marks (%)	Letter Grade	Grade Points (GP)
70 - 100	A	5.00
60 – 69	B	4.00
50 – 59	C	3.00
45 – 49	D	2.00
40 -44	E	1.00
0 – 39	F	0.00

7.2 Grade Point Average (GPA)

i. The academic performance of a student in any semester shall be measured with the Grade Point Average (GPA). The maximum value is 5.00 and the minimum is 0.00.

ii. Quality Point (QP), the product of the credit unit and grade point of each course defines the Quality Point for that course.

iii. Grade Point Average (GPA) – sum of Quality Point divided by Total Credit units for all the courses registered in the semester.

Grading System (First Semester)

Course Code	Course Title	Student Score (%)	Course Credit Unit (CU)	Letter Grade	Grade Point	Quality Point (QP)
GST 101	Communication in English I	70	2	A	5.00	5.00*3 = 15
GST 103	Logic, Philosophy & Human Existence	60	2	B	4.00	4.00*2=8
MTH 101	Elementary Mathematics I	50	3	C	3.00	3.00*3 = 9
PHY 101	General Physics I	30	3	F	0.00	0.00*3= 0
CHM 101	General Chemistry I		3	A	5.00	5.00*3 = 15
CSC 101	Introduction to Computer		3	C	3.00	3.00*3 = 9
ENG 101	Workshop Practice I		1	B	4.00	4.00*1=4
ENG 103	Engineering Drawing I		1	B	4.00	4.00*1=4
CHM 107	General Chemistry Laboratory I		1	D	2.00	2.00*1=2
PHY 107	General Physics Practical I		1	E	1.00	1.00*1=1
AGR 101	Farm Practice I		1	A	5.00	5.00*1=5
GST 105	Communication in French I		1	C	3.00	3.00*1=3
			22			**76**

Calculation of Grade Point Average (GPA) for the semester is done by:

= TQP divided by TCU

= 15+8+9+0+15+9+4+4+2+1+5+3=76

=76/22 = 3.45

Grading System (Second Semester)

Course Code	Course Title	Student Score (%)	Course Credit Unit (CU)	Letter Grade	Grade Point	Quality Point (QP)
GST 102	Communication in English II	70	2	A	5.00	5.00*2 = 10
GST 104	Nigerian, People & Culture	60	2	B	4.00	4.00*2=8
GST 106	Use of Library, Study Skills and Information Communication Technology	50	2	C	3.00	3.00*2 = 6
MTH 102	Elementary Mathematics II	40	3	E	1.00	1.00*3= 3
PHY 102	General Physics II	60	3	B	4.00	4.00*3= 12
CHM 102	General Chemistry II	55	3	C	3.00	3.00*3= 9
EMT 102	Environmental Studies & Public Health	70	0	A		3.00*0= 0
ENG 102	Workshop Practice II	50	1	C	3.00	3.00*1= 3
ENG 104	Engineering Drawing II	57	1	C	3.00	3.00*1= 3
CHM 108	General Chemistry Laboratory II	60	1	B	4.00	4.00*1= 4
PHY 108	General Physics Laboratory II	61	1	B	4.00	4.00*1= 4
AGR 102	Farm Practice II	30	0	F	0.00	0.00*0= 0
MTH 104	General Mathematics III	75	2	A	5.00	5.00*2= 10
GST 108	Communication in Igbo II	50	1	C	3.00	3.00*1= 3
			22			**75**

GPA = 75/22 = 3.41

7.3 The Cumulative Grade Point Average (CGPA)

i. The Cumulative Grade Point Average (CGPA) is the measure of the student's overall academic performance at any given period in the Programme.

ii. Cumulative Grade Point Average is normally computed at the end of each session as an up-to date weighted mean of the grade points, where the weights are the course credit units.

iii. The Grade Point earned at the end of all semester examinations shall count towards the CGPA (Cumulative Grade Point Average). Cumulative Grade Point Average (CGPA) is the sum of all Quality Points divided by sum of all credit units for all courses registered/repeated so far in the student's academic programme.

CGPA for the session (First and Second Semester)

= (76+75)/ (22 +22) = 151/44 = 3.43

iv. The Final Cumulative Grade Point Average (FCGPA) calculated at the end of a student's academic programme, shall determine the class of degree he/she shall be awarded.

7.4 Professional Associations

There is a professional association for students in the department to belong, where they are kept abreast of happenings in the profession at seminars, conferences, workshops etc: The two main professional associations are: Nigerian Society of Chemical Engineers (NSChE) and Society of Petroleum Engineers (SPE), UAES Chapter.

8. 0 Secret Cult and its Activities

Secret cult associations and activities are banned by the University. Any student found or discovered to belong to any secret society will be expelled from the University.

9.0 Reports and Oral Presentation

9.1 Format for Research Thesis

The Preliminary Pages are to be arranged in this order:

(i) Title

(ii) Certification

(iii) Dedication

(iv) Acknowledgment

(v) Abstract

(vi) Contents

(vii) List of Tables

(viii) List of Figures/Charts

1.0 Introduction - Chapter 1

This consists of:

(i) Background Information

(ii) Problem Statement

(iii) Objectives

(iv) Justification of Study

(v) Scope of Study

2.0 Literature Review - Chapter 2

3.0 Methodology or Materials and Method – Chapter 3

This comprises of materials, apparatus, the description of the study area, sample, design, procedure for data collection and analysis.

4.0 Results and Discussion - Chapter 4

5.0 Conclusion and Recommendations - Chapter 5

References (Harvard or APA Style)

Appendices (if any)

10.0 The Curriculum

10.1 Global Course Structure

10.2 Petroleum Engineering Course Schedule and Course Content

Year	GST	Basic Science	General Engineering	Petroleum Engineering	Peculiar University Courses	SIWES	Total
1	12	25	4	-	1	-	42
2	6	9	22	4	1	2	44
3	2	-	13	23		2	40
4	-	-	2	20	-	11	33
5	-	-	-	36	-	-	36
Total	**20**	**34**	**41**	**83**	**2**	**15**	**195**

10. 3 Faculty of Engineering Courses

Course Code	Course Title	L	T	P	Unit
ENG 101	Workshop Practice I	0	0	1	1
ENG 102	Workshop Practice II	0	0	1	1
ENG 103	Engineering Drawing I	0	0	1	1
ENG 104	Engineering Drawing II	0	0	1	1
ENG 201	Workshop Practice III	1	0	1	1
ENG 202	Workshop Practice IV	1	0	1	1
ENG 203	Engineering Drawing III	0	0	1	1
ENG 207	Introduction to Engineering Materials I	2	0	0	2
ENG 208	Introduction to Engineering Materials II	1	0	1	2
ENG 213	Engineering Mechanics I	1	0	1	2
ENG 214	Engineering Mechanics II	1	1	0	2
ENG 218	Introduction to Electrical/Electronic Engineering	1	1	1	3
ENG 209	Engineering Thermodynamics I	2	1	0	3
ENG 217	Engineer in Society	1	0	0	1
ENG 212	Engineering Economy	1	1	0	2
ENG 216	Computer Programming for Engineering	1	0	1	2

	Applications				
ENG 305	Strength of Materials I	1	1	1	3
ENG 307	Engineering Mathematics I	2	1	0	3
ENG 308	Engineering Mathematics II	2	1	0	3
ENG 309	Fluid Mechanics I	2	1	0	3
ENG 313	Engineering Report Writing & Presentation	1	1	0	2
ENG 405	Engineering Management & Law	2	0	0	2

10.4 Petroleum Engineering Programme Courses

First Semester 100 Level

Course Code	Course Title	L	T	P	U
MTH 101	General Mathematics I	2	1	0	3
PHY 101	General Physics I	2	1	0	3
CHM 101	General Chemistry I	2	1	0	3
CSC 101	Introduction to Computer	2	1	0	3
GST 101	Communication in English I	1	1	0	2
AGR 101	Farm Practice I	0	0	1	1
GST 103	Logic, Philosophy and Human Existence	2	0	0	2
ENG 101	Workshop Practice I	0	0	1	1
ENG 103	Engineering Drawing I	0	0	1	1
CHM 107	General Chemistry Laboratory I	0	0	1	1
PHY 107	General Physics Laboratory I	0	0	1	1
	Total	**11**	**5**	**5**	**21**
	Elective				
GST 105	Communication in French I	1	0	0	1
GST 105	Communication in Igbo I	1	0	0	1

Second Semester 100 Level

Course Code	Course Title	L	T	P	U
MTH 102	General Mathematics II	2	1	0	3
PHY 102	General Physics II	2	1	0	3
CHM 102	General Chemistry II	2	1	0	3
ENG 102	Workshop Practice II	0	0	1	1
ENG 104	Engineering Drawing II	0	0	1	1
EMT 102	Environmental and Public Health	0	0	0	0
GST 102	Communication in English II	1	1	0	2
AGR 102	Farm Practice II	0	0	0	0
GST 104	Nigerian, People & Culture	2	0	0	2
GST 106	Use of Library, Study Skills and Information Communication Technology	2	0	0	2
CHM 108	General Chemistry Laboratory II	0	0	1	1
PHY 108	General Physics Laboratory II	0	0	1	1
MTH 104	General Mathematics III	2	0	0	2

	Total	**13**	**4**	**4**	**21**
	Elective				
GST 108	Communication in French II	0	0	1	1
GST 108	Communication in Igbo II	0	0	1	1

First Semester 200 Level

Course Code	Course Title	L	T	P	U
MTH 205	Elementary Differential Equations	2	1	0	3
STA 201	Introduction to Statistics	2	1	0	2
GST 201	Introduction to Entrepreneurial Skills	2	0	0	2
AGR 201	Farm Practice III	0	0	0	0
EMT 201	Occupational Safety	0	0	1	1
ENG 201	Workshop Practice III	0	0	1	1
ENG 203	Engineering Drawing III	0	0	1	1
ENG 207	Introduction to Engineering Materials I	2	0	0	2
ENG 209	Engineering Thermodynamics I	2	1	0	3
ENG 213	Engineering Mechanics I	1	1	0	2
ENG 217	Engineer in Society	1	0	0	1
GST 203	History and Philosophy of Science	2	0	0	2
	Total	**14**	**4**	**3**	**20**

Second Semester 200 Level

Course Code	Course Title	L	T	P	U
MTH 202	Mathematical Methods III	2	1	0	3
PET 204	Basic Geology	2	0	0	2
ENG 202	Workshop Practice IV	0	0	1	1
ENG 208	Introduction to Engineering Materials II	1	0	1	2
ENG 212	Engineering Economy	1	1	0	2
ENG 216	Computer Programming for Engineering Applications	1	0	1	2
ENG 214	Engineering Mechanics II	1	1	0	2
ENG 218	Introduction to Electrical/ Electronic Engineering	1	1	1	3
PET 202	Introduction to Petroleum Engineering	2	0	0	2
GST 202	Peace Studies and Conflict Resolution	2	0	0	2
	Total	**10**	**5**	**6**	**21**
SIW 200	Second Year Long Vacation SIWES	0	0	2	2

First Semester 300 Level

Course Code	Course Title	L	T	P	U
ENG 309	Fluid Mechanics I	2	1	0	3
ENG 305	Strength of Materials I	1	1	1	2
ENG 307	Engineering Mathematics I	2	1	0	3
ENG 313	Engineering Report Writing & Presentation	1	1	0	2
PET 301	Drilling Technology I	2	1	0	3
PET 313	Petroleum Geology	2	0	1	3
GST 301	Introduction to Entrepreneurship Studies	1	0	1	2
PET 315	Petroleum Engineering Laboratory I	1	0	1	2
	Total	**11**	**5**	**3**	**20**

Second Semester 300 Level

Course Code	Course Title	L	T	P	U
PET 302	Drilling Fluids Technology	2	0	2	4
PET 304	Reservoir Engineering	2	1	0	3
PET 306	Petroleum Production Engineering I	2	1	0	3
PET 310	Heat and Mass Transfer	2	1	0	3
ENG 308	Engineering Mathematics II	2	1	0	3
PET 316	Petroleum Engineering Laboratory II	1	0	1	2
	Total	**10**	**4**	**2**	**18**
SIW 302	Third Year Long Vacation SIWES	0	0	2	2

First Semester 400 Level

Course Code	Course Title	L	T	P	U
PET 401	Drilling Technology II	2	0	1	3
PET 403	Reservoir Engineering II	2	1	0	3
PET 405	Petroleum Production Engineering II	2	0	1	3
PET 407	Well Logging	2	1	0	3
PET 409	Applied Geophysics in Petroleum Exploration	2	1	0	3
PET 411	Oil Pollution and Control	2	1	0	3
PET 413	Petroleum Engineering Laboratory III	1	0	1	2
ENG 405	Engineering Management & Law	1	1	0	2
	Total	**11**	**5**	**2**	**22**

Second Semester 400 Level

COURSE CODE	COURSE TITLE	L	T	P	U
SIW 402	Fourth Year Long Vacation SIWES	0	0	11	11
	Total	0	0	11	11

First Semester 500 Level

Course Code	Course Title	L	T	P	U
PET 501	Drilling Technology III	2	1	0	3
PET 505	Reservoir Modelling & Simulation	2	1	0	3
PET 507	Project I	0	0	3	3
PET 519	Petroleum Economics	2	1	0	3
PET 521	Natural Gas Engineering	2	1	0	3
	Elective I	2	1	0	3
	Total	**10**	**5**	**3**	**18**
	Available Electives				
PET 511	Petroleum Transportation and Storage	2	1	0	3
PET 513	Offshore Operations	2	1	0	3
PET 517	Multi – Phase Flows in Pipes	2	1	0	3

Second Semester 500 Level

Course Code	Course Title	L	T	P	U
PET 502	Reservoir Engineering III	2	1	0	3
PET 504	Petroleum Production Engineering III	2	1	0	3
PET 506	Enhanced Oil Recovery	2	0	0	2
PET 508	Project II	0	0	3	3
PET 510	Seminar	0	0	1	1
	Elective II	2	1	0	3
	Elective III	2	1	0	3
	Total	**10**	**4**	**4**	**18**
	Available Electives				
PET 512	Process Technology	2	1	0	3
PET 516	Computer Application to Petroleum Engineering	2	1	0	3
PET 518	Nigerian Oil Mining Law	2	1	0	3

Total Credit Units = 195

10.5 Petroleum Engineering Programme Course Description

MTH 101: GENERAL MATHEMATICS 1 (3 Units)

Sets: Definition of a set, finite and infinite sets, equality of sets, subsets, union and intersection of sets, universal set, complements, empty (or null) set, Venn diagram. Symmetric difference, power sets and De-Morgan theorems. Inclusion-Exclusion principle. Some Properties of number systems: Natural numbers, integers, rational numbers, irrational numbers and real numbers. Order relations in the set of real numbers. Open and closed

intervals on the real number line: Closed, open, and half closed (open) intervals. Complex Numbers: Definition of a complex number, addition, multiplication and division of complex numbers. Geometric interpretation, modulus and conjugation of complex numbers. Polar representation, De- Moivre's theorem, nth roots of a complex number, nth roots of unit element. Coordinate system: Introduction of 2-D coordinate system; Straight lines; Functions and concept of graph of a function. Polynomial functions: Polynomials and factoring; Polynomials and rational function; Partial fractions and Remainder theorems. Horizontal, Vertical and Slant asymptotes; Symmetries of functions; Odd, Even, and Periodic functions; Transformation of functions (Rigid and non-rigid Transformations) [Graphing utility is required]. Exponential and Logarithmic functions: Definition, examples, and graphing (including relevant applications). Sequences and series: Brief introduction to the concept of sequence and series. Inequalities: Solving Inequalities; systems of inequalities. Matrices and determinants: Only introductory treatment required. Permutation and combination: Notion of Factorials, permutation and combination, and simple applications; and applications. Binomial Theorem: Expansion of integral exponents of binomial expressions.

MTH 102: GENERAL MATHEMATICS II (3 Units)

(ELEMENTARY DIFFERENTIAL AND INTEGRAL CALCULUS)

Functions of a real variable: Concept of functions and their domains and ranges; graphs, limit and continuity of functions; continuity of trigonometric and inverse trigonometric functions. Differentiation: Tangent problem: Definition of the derivative (First principle); techniques of differentiation; higher derivatives (with applications such as rates of change, small change and error analysis, related rates, curvature, optimal dimensions, etc.). Integration: Area problem: Integration as the inverse of differentiation; techniques of integration; definite and indefinite integrals (with applications to areas between curves,

volumes, arc length, etc.). Curve Sketching: Use of Calculus to sketch simple curves. Differential equations: Introduction to First order differential equations only.

MTH 104: GENERAL MATHEMATICS III: (2 CREDIT UNITS)

(TRIG ONOMETRY, VECTORS AND GEOMETRY)

Prerequisite – O/Level Mathematics. Trigonometry: Introduction of Trigonometry; Radian and Degree Measures; Trigonometric Functions: The Unit Circle (Applications required). Right Triangle Trigonometry; evaluating trigonometric functions at any angle; graphing: graphs of Sine and Cosine functions; graphs of other Trigonometric Functions. Inverse trigonometric functions and their graphs (Applications and Models). Analytical Trigonometry: Using trigonometry identities; verifying trigonometric identities and solving trigonometric equations; compound-angle formulas and factor formulas; laws of sine and cosine and applications. Vectors: Representations of vectors in 2 dimensions; simple concepts such as components and direction of a vector; basic operations on vectors—addition and scalar multiplication; dot product of vectors (with simple applications such as tension in strings, work done, etc.). Rectangular Coordinates in two-dimensions: Cartesian coordinates, plotting and sketching of simple curves. Geometry of Lines: Inclination of a line; angle between two lines; distance between a point and a line (with relevant applications). Conic Sections: Introduction of conics; detailed exposition on Circles, Parabolas, Ellipses and Hyperbolas, including graphing and applications. Rotation of conics; parametric equations in two dimensions; polar coordinates; graphs of polar equations; and polar equations of conics.

CHM 101: GENERAL CHEMISTRY I (3 Units)

Atoms, molecules and chemical reactions. Modern electronic theory of atoms. Electronic con figuration, periodicity and building up of the periodic table. The Chemistry of selected metals and non-metals. Comparative chemistry of group IA, IIA and IVA

elements. Introduction to transition metal chemistry. Hybridization and shapes of simple molecules. Valence Forces; Structure of solids. Chemical equations and stoichiometry; Chemical bonding and intermolecular forces, kinetic theory of matter. Elementary thermochemistry; rates of reaction, equilibrium and thermodynamics. Acids, bases and salts. Redox reactions and introduction to electrochemistry. Radioactivity

CHM 102: GENERAL CHEMISTRY II (3 Units)

Historical survey of the development and importance of Organic Chemistry; Fullerenes as fourth allotrope of carbon, uses in nanochemistry as nano-tubules, nanostructures, etc. Electronic theory in organic chemistry. Isolation and purification of organic compounds. Determination of structures of organic compounds including qualitative and quantitative analysis in organic chemistry. Nomenclature and functional group classes of organic compounds. Introductory reaction mechanism and kinetics. Stereochemistry. The chemistry of alkanes, alkenes, alkynes, alcohols, ethers, amines, alkyl halides, nitriles, aldehydes, ketones, carboxylic acids and derivatives.

PHY 101: GENERAL PHYSICS I (3 Units)

Space and Time, Units and dimension, Kinematics; Fundamental Laws of Mechanics, statics and dynamics; work and energy; Conservation laws. Elasticity; Hooke's law, Young's shear and bulk moduli, Hydrostatics; Pressure; bouyance, Archimedes' Principles., Surface tension; adhesion, cohesion, capillarity, drops and bubbles. Temperature; heat; gas laws; laws of thermodynamics; kinetic theory of gases. Sound, Applications.

PHY 102: GENERAL PHYSICS II (3 Units)

Electricity and Magnetism: Electrostatics: conductors and current; dielectrics; magnetic field and induction: Maxwell's equation; electromagnetic oscillations and waves. Geometrical Optics: Geometrical methods applied to the optics of mirrors, lenses and prisms. (Pre-requisites: Previous registration PHY 101 and MTH 101).

CSC 101: INTRODUCTION TO COMPUTER (3 Units)

Survey of computers and information processing and their roles in society. This course introduces a historical perspective of computing, hardware, software, information systems, and human resources and explores their integration and application in business and other segments of society. Students will be required to complete lab assignments using the PC's operating system, and several commonly used applications, such as word processors, spreadsheets and graphics presentations applications. Internet and on-line resources, browsers and search engines. Software: Operating Systems, Application Packages

Program: Development; Flow charts and algorithms; Program Objects

BASIC or VISUAL BASIC Fundamentals

GST 101: COMMUNICATION IN ENGLISH I (2 Units)

Effective communication and writing in English, Language skills, writing of essay answers, Comprehension, Sentence construction, Outlines and paragraphs, Collection and organization of materials and logical presentation, Punctuation.

GST 102: COMMUNICATION IN ENGLISH II (2 Units)

Logical presentation of papers, Phonetics, Instruction on lexis, Art of Public speaking and oral communication, Figures of speech, Précis, Report writing.

AGR 101: FARM PRACTICE I (1 Unit)

Students will evaluate factors considered in making choice of farm enterprise and Site selection. Design of Farm layout and Farm infrastructure (farmstead, roads, structures, fences). Design of farm records; Inventory Table; Valuation and management.

AGR 102: FARM PRACTICE II (0 Unit)

Nursery types and practices for vegetable and tree crops production. Budding and grafting of vegetable and tree crops (Types of budding and grafting, Use of budding and grafting implements). Establishment and economics of vegetable and fruit trees production.

GST 105: COMMUNICATION IN IGBO I (1 Unit)

Introduction to language, Igbo language and its orthography, word formation processes, Organs of speech, Spelling rules, Numbers, Tone and tone marking, Punctuations marks and their uses.

GST 108: COMMUNICATION IN IGBO II (1 Unit)

Brief history of the Igbo people and their culture, Igbo grammar – parts of speech and affixation, Syllable structure, Syntactic structure, Figures of speech, Word duplication processes, Essay writing, Introduction to the institutions, traditions and customs of the Igbo people.

GST 105/108: COMMUNICATION IN FRENCH 1 & 11 (1 Unit each)

Introduction to French, Alphabets and numeric for effective communication (written and oral), conjugation and simple sentence construction based on communication approach, Sentence construction, Comprehensive and reading of simple texts.

EMT 102: ENVIRONMENTAL STUDIES AND PUBLIC HEALTH (0 Unit)

Introduction to public health. Public Health definition and key terms (clinical care, determinant, epidemic or outbreak, health outcome, intervention, pandemic, population health, prevention). The purpose of public health. History of public health: sanitation and environmental health, pandemics (e.g., cholera, influenza, polio, HIV, Ebola, COVID-19, etc.). Stakeholders in the field of public health. Disaster response, Prevention through policy (e.g., Bible, tobacco laws, obesity). Public health approach: surveillance, Risk factor identification, intervention evaluation, implementation. Public health core sciences. Individual rights and public health. Vaccination and associated politics. The concept of infectious diseases, non-communicable diseases, mental health, and injuries. Maternal and child health. Sexual and reproductive health and rights, child health. Impact of environment, climate change, and migration on health policy, health systems, and the health of individuals. First Aid administration, Cardiopulmonary resuscitation (CPR): steps, types, etc. The place of food and water. Food and drug regulatory authorities in Nigeria (NAFDAC, SON). Drug abuse. Waste management.

GST 103: LOGIC, PHILOSOPHY & HUMAN EXISTENCE (2 Units)

A brief survey of the main branches of Philosophy Symbolic Logic Special symbols in symbolic Logic – conjunction, negation, affirmation, disjunction, equivalent and conditional statements law of tort. The method of deduction using rules of inference and bi – conditionals qualification theory. Types of discourse, Nature or arguments, Validity and soundness; Techniques for evaluating arguments; Distinction between inductive and deductive inferences; etc. (Illustrations will be taken from familiar texts, Including Literature materials, Novels, Law reports and newspaper publications).

GST 104: NIGERIAN, PEOPLE & CULTURE (2 Units)

Study of Nigerian history, culture and arts in pre-colonial times; Nigerian's perception of his world; Culture areas of Nigeria and their characteristics; Evolution of Nigeria as a political unit; Indigene/settler phenomenon; Concepts of trade; Economic self-reliance; Social justice; Individual and national development; Norms and values; Negative attitudes and conducts (cultism and related vices); Re-orientation of moral; Environmental problems.

GST 106: USE OF LIBRARY (2 Units)

Brief history of libraries; Library and education; University libraries and other types of libraries; Study skills (reference services); Types of library materials, using library resources including e-learning, e-materials, etc.; Understanding library catalogues (card, OPAC, etc.) and classification; Copyright and its implications; Database resources; Bibliographic citations and referencing. Development of modern ICT; Hardware technology; Software technology; Input devices; Storage devices; Output devices; Communication and internet services; Word processing skills (typing, etc.).

CHM 107: GENERAL CHEMISTRY LABORATORY I (1 Unit)

Laboratory experiments designed to reflect the topics taught in CHM 101 and CHM 102 such as qualitative and quantitative chemical analysis, acid-base titrations. Gravimetric analysis. Calculation, data analysis and presentation. Functional group analysis.

CHM 108: GENERAL CHEMISTRY LABORATORY II (1 Unit)

Continuation of laboratory experiments designed to reflect the topics taught in CHM 101 and CHM 102. Some of the experiments will have been carried out in CHM 107.

Generally, CHM 107 and CHM- 108 are laboratory courses each running for 15 weeks with weekly sessions of three-hour duration. Each course comprises a set of experiments carefully selected to illustrate principles developed in the corresponding

theory courses and to introduce students to various laboratory equipment and techniques. Laboratory safety and chemical management are integral parts of all experiments. The theory and the corresponding laboratory courses are designed to run concurrently

PHY 107: GENERAL PHYSICS LABORATORY I (1 Unit)

This introductory course emphasizes quantitative measurements, the treatment of measurement errors, and graphical analysis. A variety of experimental techniques will be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, etc., covered in PHY 101 and PHY 102. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

PHY 108: GENERAL PHYSICS LABORATORY II (1 Unit)

This is a continuation of the experiments designed for PHY 101 and PHY 102 some of which have been covered under PHY 107.

GST 203: HISTORY AND PHILOSOPHY OF SCIENCE (2 Units)

Man – his origin and nature, Man and his cosmic environment, Scientific methodology, Science and technology in the society and service of man, Renewable and non-renewable resources – man and his energy resources, Environmental effects of chemical plastics, Textiles, Wastes and other material, Chemical and radiochemical hazards. Introduction to the various areas of science and technology. Elements of environmental studies.

MTH 205: ELEMENTARY DIFFERENTIAL EQUATIONS (3 Units)

Prerequisites: MTH 101 & 102. Derivation of equations from primitive, chemistry biology, geometry, etc., First order equations. Application or first order equations. Second-order linear equations. Fundamental solutions. Linear equations. Methods of dependence and dependence. Wronskian. Properties of solution of linear equations. Methods of Undetermined coefficients and variation of parameters. Applications of second order linear equations. General theory of

n-th order linear equations. Laplace transform. Convolution. Solution of initial-value problems by Laplace transform method. Difference equations

MTH 202: MATHEMATICAL METHODS III (3 Units)

Vectors. Products of vectors. Equations and planes. Vector spaces. Linear dependence and independence. Basis and dimension. Linear transformation, matrices. Operations on matrices. Rank of a matrix. Determinants. Inverse of a matrix. Solutions of systems of linear equations. Cramer's rule. Eigen values and eigenvectors. Similarity to diagonal matrices. Bilinear and quadratic forms. Applications.

STA 201: INTRODUCTION TO STATISTICS (3 Units)

Frequency distribution, measures of location and dispersion in simple and grouped data. Laws of probability. The binomial, poison and normal distributions. Estimation and tests of hypothesis. Analysis of variance and covariance, simple regression and correlation, contingency table and X2 applications. Descriptive statistics, frequency distribution, populations and sample, central tendency, variance data sampling, mean, median, mode, mean deviation, percentiles etc. Probability. Binomial, poison hyper- geometric, normal distributions, etc. Statistical inference intervals, tests hypothesis and significance. Regression and correlation.

EMT 201: OCCUPATIONAL SAFETY (1 Unit)

This course focuses on critical health and safety-related issues in the workplace. Workplace exposures and Injuries, Controls and Recordkeeping. Creation and maintenance of safe and healthy work environment: fire prevention; exposures to blood borne pathogens, chemicals and fumes; personal stress management, preventing workplace violence, improving ergonomics; utilizing safety committees; safety and health training; security; emergency preparedness, and disaster planning. Safety clothing and apparels. Industrial hygiene, workers' compensation, risk management, and business continuity, emergency preparedness,

and creating a culture of safety. Specific Hazards and Risk Management; Business Continuity, and Emergency Planning; Job Hazard Analysis, Incident Investigation and Training; Psychology of Safety; Best Practices of Safety Management; Compliance and Regulatory Issues. Analysis of components of comprehensive health and safety program to protect the employees and avoid costly liability. Workers' Compensation.

AGR 201 FARM PRACTICE III (0 Unit)

Landscaping and floricultural practices. Identification of plants of landscaping and floricultural significance. Design of landscapes. Nursery practices for landscaping and floricultural plants. Lawn establishment and maintenance.

GST 201: INTRODUCTION TO ENTREPRENEURIAL SKILLS (2 units)

Introduction to entrepreneurship and new venture creation; Entrepreneurship in theory and practice; The opportunity, Forms of business, Staffing, Marketing and the new venture; Determining capital requirements, Raising capital; Financial planning and management; Feasibility studies; Innovation; Legal Issues; Insurance and environmental considerations. Possible business opportunities in Nigeria.

GST 301: ENTREPRENEURSHIP SKILLS II (2 Units)

Some of the ventures to be focused upon include the following:

1. Soap/ Detergent, Tooth brushes and Tooth paste making.
2. Photography
3. Bricks, nails, screws making
4. Dyeing/ Textile blocks paste making
5. Rope making
6. Plumbing
7. Vulcanizing

8. Brewing
9. Glassware production/ Ceramic production
10. Paper production
11. Water treatment/ Conditioning/ Packaging
12. Food Processing/Packaging/ Preservation
13. Metal working/ Fabrication Steel and Aluminum door and windows
14. Training industry
15. Vegetable oil/ and Salt extractions
16. Fisheries/ Aquaculture
17. Refrigeration/ Air conditioning
18. Farming(crop)
19. Plastic making
20. Domestic Electrical wiring
21. Carving
22. Weaving
23. Radio/TV repairs
24. Brick laying/ making
25. Bakery
26. Tailoring
27. Iron welding
28. Building drawing
29. Carpentry
30. Leather tanning
31. Interior decoration
32. Printing

33. Animal husbandry (Poultry, Piggery, Goat etc)

34. Metal craft blacksmith, Tinsmith etc

35. Vehicle maintenance

ENG 101: WORKSHOP PRACTICE I (1 Unit)

General use of engineering measuring instruments such as calipers, micrometer screw gauge etc. Introduction to hand tools: practice in wood planers, saws: sander stand pattern making; sampling and sizing techniques of raw materials. Sheet-Metal Work: production of sheet metal product-layout cutting and shaping, gas welding, soldering, brazing, fastening, assembly. Basic wood working principles and tools finishing and evaluation of finished products.

ENG 102: WORKSHOP PRACTICE II (1 Unit)

Industrial safely: Behavior analysis, safely consciousness. Survey of sources of common accidents. Accident prevention and control. Machine-shop Works: Lathe-work, instruction on metal working process, shaping, milling, grinding, drilling and metal spinning, etc. Design of simple jigs and fixtures. Automobile Work: Simple automobile diagnosis and repairs. Electrical workshop practice: convention and application of colour codes and signs, etc. use of the electrical tools, machines etc.

ENG 103: ENGINEERING DRAWING I (1 Unit)

Introduction engineering tools: Planning and layout of Engineering Drawing. Engineering Drawing Concept. Introduction to Dimensioning Types; Dimensioning of circles, holes, radii, tolerance, descriptive Geometry, Freehand sketching. Introduction to Drawing/Drafting software and CAD basic tools. Orthographic multi view projection. Construction of plane shapes using CAD Construction techniques. Presentation of Data and results. Using charts, graphs etc by appropriate Computer Software. Further dimensioning, addition of dimensions to drawing using CAD.

ENG 104: ENGINEERING DRAWING II (1 Unit)

Connections in Engineering Drawing. Introduction to IS Code of Drawing. Conics and Engineering Curves ellipse, parabola, hyperbola, cycloid, trochoid, involutes. Projection of planes and solids (cube, prism, pyramid, cylinder, core and sphere).Projection on auxiliary planes. Isometric projection. Introduction to section drawing a use of CAD Construction techniques. Development and intersection of surfaces. Detail drawing with the addition of machine and surface texture symbols. Simple assembly drawing with suitable fits and a part list and introduction to limits and tolerances. Screw threads, fasteners and springs including keys and key ways.

ENG 201: ENGINEERING WORKSHOP PRACTICE III (1 Unit)

Pre-requisites: ENG 101, ENG 102: Foundry: sand testing, mixing of sands, preparation of moulds, Pattern Making - solid, sweep pattern: hoisting gates and risers. Melting and pouring of metals. Detection of defects. Welding: manual arc welding butt, T-joints, edge preparation, surface cladding, argon arc welding, CO, MIG welding, S.A.

ENG 202: ENGINEERING WORKSHOP PRACTICE IV (1 Unit)

Manufacture of simple engineering/technology products to specifications using machining, foundry, welding and woodworking technologies. Inspection and testing of the manufactured products for accuracy using appropriate equipment and methods.

ENG 203: ENGINEERING DRAWING III (1 Units)

Design and communication drawings: Tolerance and fits, detail drawings, specification of threads, fasteners, springs, size description, machining and welding symbols, dimensions and specifications. Mechanical, chemical, electrical and civil engineering drawings; machine and assembly drawings, piping drawings and process models, welding drawings, electronics drawings.

ENG 207: INTRODUCTION TO ENGINEERING MATERIALS I (2 Units)

Pre-requisites: CHM 102, PHY 102 Review of atomic bonding, classification of engineering materials (metals, ceramics, polymers, composites, semiconductors). Introduction to extractive metallurgy. Elements of crystallography- crystal structures: lattice unit cells, planes and directions, miller indices, inter planar spacing. Packing of shepherds simple cubic, body-centered cubic, face centered cubic, hexagonal close packed structures, atomic packing densities, interstitial sites, sizes and their distribution, imperfections valences and other point defects, line and surface defects. Phase equilibrium and alloy theory, solid solution. Introductory heat-treatment of steels.

ENG 208: INTRODUCTION TO ENGINEERING MATERIALS II (2 Units)

Non-ferrous engineering alloys and their properties. Mechanical properties engineering materials: plastic deformation of a single crystal, stress and strain curves, strain hardening; creep, toughness and fatigue hardness. Principles of mechanical testing mechanism of ductile brittle. Transition in fracture and ITT curves. Physical properties of materials electrical, optical and magnetic properties of materials: Electronic structure and properties. Non-metallic materials: ceramics, structures, properties processing methods and applications. Plastic types, structures, processing and application. Composite - types and properties. Wood as an engineering materials. Softwood, hardwood, structures; Nigerian timbers: strength, properties and tests. Environmental stability of materials: corrosion and corrosion control.

ENG 209: ENGINEERING THERMODYNAMICS I (3 Units)

Fundamental concepts: History of thermodynamics, dimensions, units, system, state, property, process, heat, work, pressure, temperature, zeroth law. First law of thermodynamics: conservation of energy (Joule's experiment), first law, internal energy. Non flow process, enthalpy, steady flow processes. Properties of pure substances P.V.T relations and diagrams Cp, Cv, ideal gas, Thermodynamic Charts and tables. Second law of thermodynamics and heat engine cycles, cannot heat engine and cycle. The second law and

its corollaries. Entropy: reversible and irreversible processes. Clausius inequality, entropy, entropy and irreversibility. Heat engine and pump calculations. Applications of 2nd law to non - flow steady flow, processes. Available and unavailable energy, availability. Gibbs equations.

ENG 212: ENGINEERING ECONOMY (2 Units)

Introduction of Engineering Economy Engineering economy and the Engineering Process Some fundamental Economic concepts Elementary Selections in economic analysis Interest and interest formulas Calculations of equivalence involving interest. Economic analysis of alternatives Bases for comparison. Decision making among alternatives.

ENG 213: ENGINEERING MECHANICS 1 (2 Units)

Pre-requisites: MTH 101 MTH 102 PHY 101 Basic concepts in static. Static's of particles and rigid bodies in a plane: analysis of forces: distributed forces, flexible cable, and friction static and dynamic. Areas, centroids, masses, centres of gravity, analysis of structures: internal forces, Newton's third law, shearing forces, moments, trusses and frames. The basic free body diagrams. General mathematical principles. Moments of inertia of an area Computer application and simulation in statics.

ENG 214: ENGINEERING MECHANICS II (2 Units)

Newtonian principles of dynamics of particles and rigid bodies applied to one-dimensional and two-dimensional motions: Force system resultants, structure analysis, kinematics and kinetics of particles and rigid body motions: methods of impulse and momentum, linear and angular momentum, work and energy, absolute and relative motion concepts. Computer applications and simulation of engineering mechanics and dynamics.

ENG 216: COMPUTER PROGRAMMING FOR ENGINEERING APPLICATIONS (2 units).

Introduction to C/C++ programming language. The MAIN ( ) function, comment line, types of conversion, constants, expressions. The print function. The Scan function. The assignment statement, formatted input and output statement, arithmetic operators. The IF statement. Comparison operators, logical operators. Nested IF ELSE Statements UNARY operators TERNARY operators. Bitwise operators. Combined operators. Table of priority of C/C++ operators. The WHILE top, the DO WHILE loop, the FOR Loop Statement, NESTED Loops, unconditional program branching. The GO TO Statement, the CONTINUE statement, the BREAK and SWITCH statement. Application of C/C++ programming language to solving engineering problems.

ENG 217: ENGINEER IN SOCIETY (1 Unit)

Science, Technology and Engineering -Definition and Historical Development of Engineering, science and Technology. Role of the Engineer in the Society - in space mission travel, in oil and gas, politics, law, medicine, education, administration, management, utilities, military service, etc. Professional Qualifications - Engineering education qualification registrable as a Professional Engineer with NSE, COREN, Africa Institute of Science and technology (AIST), etc. Professional Practice - professional ethics and conducts, professional registration procedures and engineering professional responsibility, management skills, project management, developing new technologies, tools, machines, computers and systems protecting intellectual property rights and business legal rights, handling and energy resources, fossil, geothermal, nuclear, wind and solar. Safety in Engineering Practice - Control of occurrences of accidents in production industry. Rules and regulations guiding pollution of the environment. Information and Communication Technology (ICT) systems in

engineering practice. Financial management knowledge, human relations management essential in developing the Engineer to promote productivity in any enterprise.

ENG 218: INTRODUCTION TO ELECTRICALAND ELECTRONIC ENGINEERING (3 Units)

Pre-requisites: MTH 102 PHY 102. SI System of unit, E.S and FM Fields: Electric field intensity, potential and potential Difference, magnetic field intensity, flux and flux density, magnetic circuits, inductors. DC circuit Analysis: Kirchoff's Law, Mesh and Nodal Equations, superposition Theorem. Thevenins Theorem, Norton's Theorem, Maximum power transfer, transients (RL and RC) circuits. AC Circuit Analysis: Alternating Current, voltage, frequency, phase angle, maximum RMS and average values of waveforms. Inductive and capacitive reactance. Power in ac circuits, use of complex algebra in the solution of as circuit, Resonance. Transformers and AC/DC Machines: Principles of operation, circuits' models for transformers and machines. Three Phase AC System: Three phase balanced system, Delta/star connections, line and phase voltages and currents. Measurement: Electric currents, voltage, frequency ad power measurements, measurement of resistances, capacitances and inductance. Bipolar and field transistor biasing, dc characteristics, diode characteristics and diode rectification (single phase and three phase). Zener diode and its regulating characteristics.

ENG 305: STRENGTH OF MATERIALS I (2 Units)

Pre-requisite: ENG 226 Elementary concepts in two dimensional theory of elasticity generalized Hooke's law, equations of equilibrium, strain displacement and stress-strain relations. Axial force, shear force and bending moments; simple bending theory, shear and moments diagrams. Torsion; combined torsion and bending. Stresses, transformation of stresses, Mohr's circle. Deflection of beams, elementary buckling of columns.

ENG 307: ENGINEERING MATHEMATICS I (3 Units)

Pre-requisites: MTH 205, MTH 202 Review of ordinary differential equations: Bessel, lagrange Partial differential equations: Engineering applications, Laplace transformations and other transform methods. Series solutions and special function and as gamma function, beta, Gauss functions, Fourier series. Linear Algebra. Elements of Matrices, Determinants, Inverses of Matrices, Theory of Linear Equations, Eigen Values and Eigen Vectors. Analytical Geometry, Coordinate Transformation, Solid Geometry, Polar, Cylindrical and Spherical Coordinates. Elements of Functions of Several Variables, Surface Variables. Ordinary Integrals, Evaluation of Double Integrals, Triple Integrals, Line Integrals and Surface Integrals. Derivation and Integrals of Vectors, The Gradient of Scalar quantities. Flux of Vectors, The Curl of a Vector Field, Gauss, Greens and Stoke's Theorems and Applications. Singular Valued Functions. Multivalued Functions, Analytical Functions, Cauchy Riemann's Equations. Singularities and Zeroes, Contour Integration including the use of Cauchy's Integral Theorems, Bilinear Transformation.

ENG 308: ENGINEERING MATHEMATICS II (3 Units)

Pre-requites: MTH 202, ENG 307 Numerical methods and digital computer methods applied to various engineering problems including matrix inversion, approximation of functions, integration, differentiation-ordinary and partial; and optimization. Applications in engineering, fast Fourier analysis, transportation and other optimization problems, dynamic programming, Monte Carlo simulation of simple engineering components and systems. Introduction to space formulation, analysis and applications. Series solution of second order linear differential equations with variable coefficients. Bessel and Legendre equations. Equations with variable coefficients. Sturn-Louville boundary value problems. Solutions of equations in two and three dimensions by separation of variables. Eigen value problems. Use of operations in the solution of partial differential equations and Linear integral equations. Integral transforms and their inverse including Fourier, Laplace, Mellin and Handel

Transforms. Convolution integrals and Hilbert Transforms. Calculus of finite differences. Interpolation formulae. Finite difference equations. RungeKutta and other methods in the solutions of ODE and PDEs. Numerical integration and differentiation.

ENG 309: FLUID MECHANICS I (3 Units)

Fluid statics: Floatation and Stability. Dynamics of fluid flow - conservation equation of mass and momentum. Enter and Bernoulli equations. Introduction to incompressible viscous flow. Reynold's number. Dimensional analysis - Philosophy. Similitude. Buckingham P1 theorems. Applications. Hydraulic models. Flow measurements. Flow meters, errors in measurement

ENG 313: ENGINEERING REPORT WRITING AND PRESENTATION (2 Units)

Methods and formations involved in and presentation of technical reports. Current technical reports. Current techniques in engineering paper presentation. Communication schemes. Referencing and types of referencing e.g Harvard and Vancouver Methods. Use of internet research methods. Technical presentation (writing and data collection, organization and presentation). Oral presentation of technical ideas. Use of audio visual presentation aids (multi-media, computer hardware and software applications, etc). Use of modern software in presentation such as Microsoft Power Point, Corel Draw, Microsoft Work and others.

ENG 405: ENGINEERING MANAGEMENT AND LAW (2 units)

Engineering Professional Ethics and Conduct. LAW: Definition and specifications: applications of business law to engineering; patents and inventions. Trademarks and copy rights; contract documents; Engineering business-types, the structure and functions of organizations; professional problems-Legal responsibilities, professional liability, role of engineers in law suits.

MANAGEMENT: Organizational structure and behavior; Engineer to engineer manager transition; management functions, - principles and techniques of planning, forecasting, organizing technical activities; project selection and management; leadership, style of

leadership and management. Techniques in engineering management motivated appraisal, participative and control techniques.

PET 202: INTRODUCTION TO PETROLEUM ENGINEERING (3 Units)

Definition of Petroleum Engineering and brief history. The role of petroleum engineers in the industry. Role of development of the petroleum industry and engineering. Raw materials and energy requirements of the petroleum industry. Fundamentals of petroleum Engineering processes.

PET 204: BASIC GEOLOGY (3 Units)

Geology as a science: the earth as a member of the solar system; the structure of the earth: geological timescale and methods of dating. Crystallography and mineralogy; crystals, petrographic microscope; physical properties of minerals useful for recognition; the major minerals groups. Petrology; Igneous rocks, volcanism; metamorphic rocks; sedimentary rocks. Petroleum and Gas. Structural Geology: topographical and geological maps; dip and strike, faults unconformities; overstep and overlap; salt domes and plugs, cap rock.

Physical Geology: physical weathering; organisms; chemical weathering, marine erosion and sediment. Geology of Nigeria.

PET 301: DRILLING TECHNOLOGY I (3 Units)

Techniques for oil well drilling. Drilling rigs; equipment, hoisting, drill string, casting, drill bits. Circulating system, drilling and casing programs. Drilling performance. Offshore drilling rigs.

Fishing: Fishing tools. Objects lost in hole, fishing methods.

PET 302: DRILLING FLUIDS TECHNOLOGY (4 Units)

Functions and composition of drilling fluids. Mud properties testing, classification and chemical analysis. Drilling mud circulations. Control of mud properties. Well completion fluids. Drilling mud performance.

PET 304: RESERVOIR ENGINEERING (3 Units)

Fundamental properties of single and multiple fluid saturated rocks, porosity, permeability, relative permeability, fluid saturations, electrical resistivity capillary pressure, surface forces, wettability, compressibility and correlations between rock properties.

PET 306: PETROLEUM PRODUCTION ENGINEERING I (3 Units)

Properties of oil and Gas: Composition of oil and natural gas; classification of crude oil; natural gas. Well Completion: Tubing; types, tubing equipment, uses of tubing, calculations; use of wirelines, packers-types, uses; multiple zone completion; well heads – casing and tubing hangers; Christmas tree. Cruptive Production: Gas-oil ratio (GOR); productivity index; fluid flow and pressure losses; multiphase formation volume factor (Bt). Perforation: bullet perforation; jet perforation. Artificial Production: Gas lift; pumps.

PET 310: HEAT AND MASS TRANSFER (3 Units)

Modes of heat transfer by conduction, mass diffusion, steady and unsteady state transfer in 1 – D and in 3 –D geometries. Systems with heat source. Heat transfer in extended surfaces. Combined modes: Convection in ducts and over surfaces condensation. Heat radiation – emission, transmission, reflection and absorption. Radiation heat exchange between black and grey bodies. Configuration factor algebra. Heat exchangers LMTD, NTU effectiveness.

PET 313: PETROLEUM GEOLOGY (3 Units)

Petroleum prospecting, uses of geological data, reservoir rocks, reservoir fluids, traps, origin of oil and gas geology of the Niger Delta and Lake Chad Basin. Geophysics.

PET 315: PETROLEUM ENGINEERING LABORATORY I

Drilling fluid and cementing analysis**:** Experiments

1. Determination of mud density using Baroid Mud Balance.
2. Determination of mud viscosity using:
    a. March funnel viscometer
    b. Baroid Rhemeter
    c. Baroid Rotary Viscometer
    d. Fann Viscometer
3. Determination of Shear or Gel Strength of Mud using Shearometer
4. Filtration tests
5. Hydrogen –ion determination using:
    a. Modified Calometric method (such as phydrion dispenser)
    b. Electronic method using glass electrode instrument (such as the Beckman Analytical PH meter).
6. Determination of the Sand Content using Baroid Sand Content test
7. Determination of oil, water, solids, and clay contents using Baroid Oil and Water Retort Kit.
8. Estimation of cation Exchange capacity of clays, Mud filtrate Alkalinites and Lime content.
9. Chloride content determination.
10. Calcium ion content determination.
11. Total Hardness in mud filtrate determination
12. CO_3 sulphate, Magnesium and Sulfide determination.

List of Equipment: Baroid Mud Balance, Marsh Funnes Viscometer and graduated cup, stop watch, Baroid Viscometer, Baroid Rheometer, Fann Viscometer PH meter, sand content set, Oil and Water Retort Kit, Baroid High – Pressure, High Tempressure filter Press, Baroid Standard filter Press, Shearometer.

PET 316: PETROLEUM ENGINEERING LABORATORY II

PVT/Core analysis: Experiments:

1. Grain size Analysis of a Sandstone by sieving methods.
2. Identification of the minerals contained in a Sandstone rock under the Polarizing Microscope.
3. Porosity determination
4. Measurement of permeability

List of Equipment: A sample Splitter, Weighing balance, set of Sieves, Sieve Shaker, Hand Lens, Microscope, Glass slide, Clamp, Michellevy chart, Permeameter.

PET 401: DRILLING TECHNOLOGY II (3 Units)

Pressure Control and Blowout Prevention: The need to control pressure; BOP valves; stack, choke line and choke manifold; choice of BOP system; control of kick; subsurface pressures and mud hydrostatic pressure; data for executing kick control; indications of kick; methods of circulating out a kick – Balanced Bottom Hole Pressure method (BBHP), driller's method; kick when tripping, gas out mud. Cementing: Equipment; hole conditions; volume calculations and rate of circulation; squeeze cementing; cement plug. Fishing: Fishing tolls; objects lost in the hole; fishing methods. Casing Design: Mechanical properties – tension, collapse and burst; designing a casing string.

PET 403: RESERVOIR ENGINEERING II (3 Units)

Reservoir fluid behaviour, PVT analysis, formation volume factors. Estimating reserves; material balance equations. Concepts of fluid flow through porous media, Darcy's law. Steady state and transient fluid flow in reservoirs. Displacement of oil and gas. Reservoir testing and performance analysis. Differential equations for radial flow in a porous medium.

PET 405: PETROLEUM PRODUCTION ENGINEERING II (3 Units)

Surface completion: Gathering systems; service and cleaning systems; design and testing of flow lines. Emulsion problems; oil emulsions; emulsifying agents and de-emulsifiers; Page 50 of 52 choice and dosage of de-emulsifiers. Separation and separators; heat treatment. Dehydration: need for dehydration of gas; dew-point depression; absorption with glycol and absorption with solids.

PET 407: WELL LOGGING (3 Units)

Well logging devices, principles and technology. Electrical, radioactive, acoustic/velocity, caliper, inclinometer, dipmeter and thermometer logs. Well log interpretation. Use of combination logs, cross plots. Production logging. Computer processing of logs. Measurements-while-drilling systems.

PET 409: APPLIED GEOPHYSICS IN PETROLUEM EXPLORATION (3 Units)

The scope of geophysics; solid earth geophysics; the shape of the earth; geomagnetism; marine geophysics; isostacy. Geophysical instruments, field data processing, electrical, seismic, radiometric, etc). Geophysical logging of boreholes. Geophysical prospecting and exploration.

PET 411: OIL POLLUTION AND CONTROL (3 Units)

Causes of oil pollution; blow out, pipeline and flow line leakage, sour –gas production, sea transportation hazards. Need for oil spill prevention and control; impact on the environment ecology. Methods of control; mechanical, chemical and biological methods. Global pollution problems and Government regulations.

PET 413: PETROLEUM ENGINEERING LABORATORY III (2 Units)

Production Engineering

SIW 402: SUPERVISED INDUSTRIAL WORK EXPERIENCE SCHEME (6 Units)

During the students' industrial work experience scheme (SIWES) period, students are attached to oil and gas (E & P companies, service companies etc) and related industries to

gain experience in oil and gas exploration, well drilling, evaluation, completion, testing, reservoir engineering, oil and gas production, processing, manufacturing, research, social services, and the operation and maintenance of machines. In engineering education according to NUC Benchmarkminimum standard (BMAS), industrial attachment is very crucial. The minimum duration of this attachment should be thirty-four (34) weeks (One semester and two long vacations)

PET 501: DRILLING TECHNOLOGY III (3 Units)

Drilling parameters: Choice of drilling program and drilling rig; mechanical parameters and their optimization – drilling bits; hydraulic parameters – mud viscosity, density, filtrate and bit nozzles. Directional Drilling: Uses of directional drilling: deviating tools; vertical profile, horizontal profile; deviation measurements. Offshore Drilling: Underwater BOP stack, marine risers, underwater well head, floater stability; heave compensators.

PET 502: RESERVOIR ENGINEERING III (3 Units)

Water influx; steady-state; pseudo steady – state (Hurst); transient (Van Everdingen and Hurst). Well test: drill-stem tests (DST); Production tests; pressure tests; back-pressure tests on gas wells, productivity tests on oil wells, build-up and draw-down tests on oil wells, coning of water and gas; effects of partial penetration. Secondary recovery; water injection sweep efficiency stiles methods, Dykstra – Parsons method.

PET 504: PETROLEUM PRODUCTION ENGINEERING III (3 Units)

Problem-well analysis: Work over techniques; well stimulation; fracturing and acidising. Sand control: gravel packing; sand consolidation. Pipelines and transportation; maximum pipeline capacity; other transportation systems. Metering of oil and gas; problems associated with flow measurement; flow measurement systems; liquid level controllers.

PET 505: RESERVOIR MODELING AND SIMULATION (3 Units)

Purpose of reservoir simulation. Concepts of Simulation; Darcy's law, fluid in porous media. Reservoir simulation equations. Finite –difference model. Solution of the simulator equations. Matrix of simultaneous equations; Data preparation: fluid data, rock data, production data, flow rate data. Making a simulation study. History matching.

PET 506: ENHANCED OIL RECOVERY (3 Units)

Principles of displacement: rock properties; fluid properties in reservoir; phase behaviour; displacement efficiencies. Gas methods; miscible slug; enriched gas -high pressure lean gas; carbon dioxide; nitrogen and other inerts. Chemical methods; miscellar – polymers; polymer augmented waterflood; permeability alteration; caustic. Thermal methods; steam stimulation; steam drive; in-situ combustion.

PET 507: PROJECT I (3 Units)

Advanced independent investigation of petroleum engineering problems under the supervision of an academic member of staff

PET 508: PROJECT II (3 Units)

Advanced independent investigation of petroleum engineering problems under the supervision of an academic member of staff

PET 510: SEMINAR (1 Units)

The course is designed to expose students to research methodology in petroleum engineering, advances in petroleum engineering techniques and formats for technical paper and report writing and strategies for presentation to technical audience. The course includes overview of research logic, technical progress, introduction to research purposes, writing of proposal and research funding, research literature presentation of result, economics, observations, conclusion, and recommendations. Case studies, paper review, advances in petroleum engineering research, seminars.

PET 511: PETROLEUM PRODUCTS TRANSPORT AND STORAGE (3 Units) (Elective)

Transportation of crude oil: Pipelines; tankers – loading and unloading techniques, offshore loading systems, international regulations on tanker transportation. Custody transfer storage of crude oil tank farm operations – gauging, sampling, quality control, underground storage – caverns, porous rocks. Gas transportation: compressors, piplines; liquefied natural gas transportation. Storage of natural gas; pressure tanks, reinjection in porous rocks, storage in caverns. Storage of LNG.

PET 512: PROCESS TECHNOLOGY (3 Units) (Elective)

Pressure losses in pipes. Pressure losses in armature and fittings. Pumps. Heat exchangers. Nozzle theory and mass transfer. Combustion processes. Heat transfer, Conduction; convection; condensation, heat exchangers. Distillation. Particle fall in liquids cyclones.

PET 513: OFFSHORE OPERATIONS (3 Units) (Elective)

Offshore drilling: Offshore prospecting; offshore rigs; stationary and floating rigs; rig movement and stability; drilling from a floating vessel; subsea BOP stack; marine risers; subsea wellhead. Offshore production: subsea well completion methods; offshore processing equipment and design; loading systems and other transportation. Offshore operations: logistics, contingency planning; oil spill and oil removal.

PET 516: COMPUTER APPLICATION TO PETROLEUM ENGINEERING (3 Units) (Elective)

Use of common statements; subroutines, subroutine cells, linear interpolation formula; Lagrange interpolation, numerical solution to ordinary differential equations, numerical integration, curve fitting, root solving matrices and system of equation, Simpson method, Gauss Seidel and Jacobian methods. Simultaneous solution: relaxation methods and recent reservoir models.

PET 517: MULTIPLE PHASE FLOWS IN PIPES (3 Units) (Elective)

Principles of two phase flow: The general energy equation; Evaluation of friction losses. Single phase Flow. Variables used in two phase flow; flow patterns. Horizontal flow: Horizontal pressure loss prediction methods. Prediction of horizontal flow patterns. Flow through restrictions.

PET 518: NIGERIAN OIL MINING (3 Units) (Elective)

Introduction, licenses, leases and other regulatory arrangements for the exploration and production of petroleum. Joint venture activities in petroleum drilling and production. Fiscal

aspects of the law: Profits Tax, Bonus, Fess and Rents, Royalties, Oil Terminal Dues and other miscellaneous matters. Mineral oil safety Regulation. Oil Pipeline Act.

PET 519: PETROLEUM ECONOMICS (3 Units)

The structure of the petroleum industry; economic geographical impact of oil resources on the economy of oil producing countries; linear programming; refinery economics; oil concessions in Nigeria; government participation; the Nigerian petroleum labour market; marketing and sales calculations; investment analysis; risk analysis and probability; financing, energy crises.

PET 521: NATURAL GAS ENGINEERING (3 Units)

Gas Laws: Properties of Natural gas, phase behavior of natural gas system. Gas from condensate and oil fields; field separation processes; dehydration and sweeting of natural gas; scale problems; gas liquefaction, gas compression, Gas storage. Reservoir performance and reserve estimates. Gas transmission in pipelines – series, parallel etc. Weymouths equation horizontal flow and non-horizontal flow.