UNIVERSITY OF AGRICULTURE AND ENVIRONMENTAL SCIENCES,

UMUAGWO, IMO STATE

STUDENTS' BMAS HANDBOOK

FOR

B. ENG DEGREE PROGRAMME IN CIVIL ENGINEERING DEPARTMENT

2025

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1.0 Introduction

1.1 History and Background of the University, Faculty, and Department

The University of Agriculture and Environmental Sciences (UAES) in 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. It is officially recognized as the 49th State University in Nigeria and the 171st in the Federation by the National Universities Commission (NUC) in 2019. The university is authorized to offer 29 programs under five faculties, including the Faculty of Engineering. The establishment of this University was a direct response of the Government of Imo State to the burning need for more credible tertiary Institutions needed to address the yearnings of the teeming youths of Imo State and the broader South-Eastern Nigeria desiring for qualitative third level education.

Engineering is the application of scientific knowledge to optimize the utilization of natural resources for the benefit of humanity. It involves using mathematics to solve problems and is globally recognized as a profession. Aspiring students who wish to pursue a career in engineering must consider why they want to be an engineer and what qualities are required to become one.

Being an engineer provides an opportunity to solve significant problems faced by communities, local governments, cities, countries, and the world at large. However, not everyone is suitable for studying engineering. A genuine curiosity to solve problems, combined with a strong command of mathematics and physical sciences, is necessary to excel in this field. There are various branches of engineering to cater to different interests and nurture engineers with specialized knowledge in their chosen field.

The Faculty of Engineering at the University of Agriculture and Environmental Sciences, Umuagwo, currently offers six engineering departments of engineering: Agricultural and Biosystems Engineering, Chemical Engineering, Civil Engineering, Electrical and Electronic Engineering, Petroleum Engineering, and Mechanical Engineering. The faculty's blueprint allows for potential growth in programs to meet emerging challenges and societal needs.

Civil Engineering was introduced with the admission of the 2021/2022 admission session. The curriculum for the Civil Engineering program includes several general and elective courses at each level of study. For example, at the 100 level in the first semester, there are 11 general courses and 1 elective course. In the second semester, there are 12 general courses and 1 elective course. The number of general courses varies across different levels, with some levels also including specific courses related to Civil Engineering, such as STW (short-term work) courses. The curriculum is designed to prepare graduates for engineering roles in the civil engineering. Elective courses are offered to provide students with a broader understanding of various disciplines.

Vision of the University

The vision of the **University of Agriculture and Environmental Sciences** is 'to become a leader in the discovery, dissemination and application of new knowledge in areas of Agriculture and Environmental Sciences for the development of self and of society'.

Vision of the Faculty of Engineering

The vision of the **Faculty of Engineering** is 'to become a global leader in providing discovery, dissemination and application of new and Innovative ideas in areas of Engineering and Technology to shaping the future of our students, host community and society at large.'

Mission of the University

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

Mission of the Faculty of Engineering

The mission of the **Faculty of Engineering** is 'to provide excellent and conducive atmosphere for teaching, learning, research, and community service delivery through the application of up-to-date technology that shall be renowned, distinguished and attractive nationally and internationally to guarantee continuous improvement our systems.

The National Anthem of Nigeria

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.

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.

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.

UAES Anthem

1st Stanza

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 boundaries of race, creed and gender.

Refrain:

UAES!!! Eagles of the world
Brilliant and bright, we'll always shine
We pledge to lead by excellence
UAES!!! Eagles of the world.

2nd Stanza

Mother Nature! We care and cherish you, "A gift to us from the Creator"
We pray for light and wisdom, to preserve, protect and sustain thee
May we grow each day in knowledge, intuition and moral strength
That through all our efforts, innovations and discoveries
The earth will be renewed, and become a better place.

1.2 Vision, Mission, Philosophy and Objectives of the Department of Civil Engineering

Vision of Civil Engineering Department

To be a global leader in Civil Engineering education, research, and innovation, driving technological advancements and shaping the future of students, the host community, and society through the discovery, dissemination, and application of cutting-edge engineering solutions.

Mission of Civil Engineering Department

To provide a conducive environment for teaching, research, and innovation, equipping graduates with technical expertise, leadership skills, and entrepreneurial mindset to drive technological advancements, industrial growth, and societal development.

The department aims to adopt state-of-the-art teaching and research techniques in a broad-based training of Civil Engineering programmes, so as to raise engineers who would apply knowledge of technical, basic physical- biological sciences for conversion of raw materials and design of plants for advancing industrialization and capacity building in indigenous technology, economy and societal human relations of our host community and the nation at large. The specific objectives of the department include:

i. To produce competent and vibrant Civil Engineering graduates with the requisite skills needed to efficiently impact on both local and international technological quests.
ii. To produce Civil Engineering graduates who are able to transform the basic knowledge of Engineering into entrepreneurial concepts and make them self –reliant.
iii. To develop and train research oriented graduates who will have capacity to train others.
iv. To train high quality academics and industrial manpower that will play a leading role in the development of their immediate communities and the nation at large.

Programme Educational Objective (PEOs)

The Bachelor of Engineering (B.Eng) degree in Civil Engineering aligns with the vision and mission of University of Agriculture and Environmental Sciences. 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. Graduates are expected to be able to attain the following objectives within the first five (5) years of graduation from the University. The PEO's of the program are:

PEO1: Engineering Design and Innovation:

Graduates will be proficient in designing and supervising Civil Engineering projects—such as buildings, roads, bridges, water supply and waste management systems—ensuring safety, sustainability, and alignment with national development goals.

PEO2: Infrastructure Development and System Implementation:

Graduates will excel in the planning, development, and maintenance of civil infrastructure systems, supporting industrial growth, urban development, and environmental resilience.

PEO3: Technological Advancement and Construction Techniques:

Graduates will lead innovation by developing and applying advanced construction techniques, sustainable materials, and smart infrastructure systems, promoting entrepreneurship and local construction industry growth.

PEO4: Operation, Maintenance, and Performance Optimization:

Graduates will acquire expertise in operating, maintaining, and optimizing civil infrastructure systems to enhance serviceability, durability, and adaptability in various environmental contexts.

PEO5: Adaptation and Localization of Engineering Solutions:

Graduates will develop the ability to tailor global civil engineering practices and technologies to suit local needs and environmental conditions, promoting self-reliance and national development.

PEO6: Critical Thinking, Professional Judgment, and Leadership:
Graduates will demonstrate critical thinking, ethical decision-making, and leadership capabilities, enabling them to take responsibility for planning and executing complex engineering projects.
PEO7: Project Management and Resource Optimization:
Graduates will be equipped with managerial and entrepreneurial skills to effectively manage human resources, finances, construction materials, and equipment for efficient and sustainable project delivery.
PEO8: Enhancing Indigenous Technology and Problem-Solving Capacity:
Graduates will contribute to the advancement and application of indigenous engineering knowledge and technologies, strengthening the nation's capacity to solve infrastructure and environmental challenges.

PROGRAMME OUTCOMES (POs)
The Programme Outcomes (POs) represent the goals that students are expected to achieve upon graduating from the Civil Engineering Programme at University of Agriculture and Environmental Sciences. Upon completion of the programme, graduates are expected to demonstrate the following POs as an engineering programme accredited by COREN. The POs are as follows>
1. **Apply Engineering Knowledge:** Utilize mathematics, science, engineering fundamentals, and specialization knowledge to solve complex engineering and developmental challenges;
2. **Problem Identification and Analysis:** Identify, research, and analyze complex engineering problems using principles of mathematics, natural sciences, and engineering sciences;
3. **Engineering Design and Solutions:** Develop and implement engineering solutions, designing systems, components, or processes that meet societal, environmental, and safety requirements;
4. **Investigative and Research Skills:** Conduct investigations using research-based knowledge, experimental design, data analysis, and information synthesis to reach valid conclusions;
5. **Modern Tools and ICT Application:** Use appropriate techniques, resources, and modern engineering/ICT tools, including modelling, prediction, and optimization, while understanding their limitations;
6. **Societal and Human Context Awareness:** Assess societal, health, safety, legal, and cultural factors relevant to engineering practice using knowledge from Humanities and Social Sciences;
7. **Sustainability and Environmental Impact:** Understand the role of engineering solutions in environmental and societal contexts and apply principles of sustainable development;
8. **Professional Ethics and Responsibility:** Uphold professional ethics, responsibilities, and the COREN Engineers Code of Conduct in all engineering practices;
9. **Teamwork and Leadership:** Function effectively as an individual, team member, or leader in diverse and multi-disciplinary environments;
10. **Effective Communication:** Communicate technical information clearly through reports, documentation, presentations, and instructions to both engineers and the general public;
11. **Engineering and Project Management:** Apply engineering, management, and financial principles to projects as a member or leader in a multidisciplinary setting;

12. **Lifelong Learning and Adaptability:** Recognize the need for independent, continuous learning and adaptation to technological and social advancements.

1.3 Admission Requirements

a. Candidates willing to apply to the undergraduate programme in Civil 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 requirement 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 1.3.a.

1.4 Civil Engineering Programme Structure

The department 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 third and fourth 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 Civil Engineering for each of the two disciplines.

2.0. List of Staff

2.1 List of Academic Staff

S/N	Name	COREN No.	Rank/Designation/Salary Scale/Date of First Appointment	Tenured	Qualifications, Dates Obtained, Membership of Professional Associations	Area of Specialization
1	Engr. Prof. Joachim **Osuagwu**	R.7,930	Professor 03/02/2025	Sabbatical	B.Eng (1989). M.Eng (2006), Ph.D (2012), MNSE, FNIWE	Civil Engineering (Water Resources and Environmental Engineering)
2	Engr. Dr. Hyginus Emeka **Opara**	R7,046	Reader 02/11/2023	Adjunct	B.Eng. (1989), M.Sc (2006), M.Eng (2014), Ph.D (2015), FNSE, FNICE, MAPM,	Civil Engineering (Construction Engineering)

					MNIProcE	
3	Engr. Dr. Ignatius Chigozie **Onyechere**	R25,598	Senior Lecturer 02/11/2023	Adjunct	B.Eng. (2007), M.Eng (2013), Ph.D (2019), MNSE, MNICE	Civil Engineering (Structural Engineering)
4	Engr. Dr. Evans Chukwudi Paulinus **Ohaji**	R12,216	Senior Lecturer 07/08/2024	Full-time	B.Eng (1995), M.Eng (2000), Ph.D (2019), MNSE	Civil Engineering (Water Resources and Environmental Engineering)
5	Engr. Uchechi George **Eziefula**	R30,389	Lecturer I 01/11/2021	Full-time	B.Eng (2006), M.Eng (2015), Ph.D (in view), MNSE, MNICE, M.ASCE	Civil Engineering (Structural Engineering)
6	Engr. Michael Chizobam **Uwaezuoke**	R33,912	Lecturer I	Full-time	B.Eng (2011), M.Eng, Ph.D (in view), MNSE	Civil Engineering (Highway and Transportation Engineering)
7	Engr. Chioma Lilian **Udoha**	R47,510	Lecturer II	Full-time	B.Eng (2006), M.Eng (2012), Ph.D (in view), MNSE	Civil Engineering (Water Resources and Environmental Engineering)
8	Engr. Liberty Utibe-Abasi **Stephen**	R74,590	Lecturer II 22/9/2022	Full-time	B.Eng (2016), M.Eng (2020), Ph.D (in view), MNSE, MNIGE	Civil Engineering (Geotechnical Engineering)
9	Engr. Declan Onyekwere **Uwaoma**	R69,332	Lecturer II 22/9/2022	Full-time	B.Eng (2008, M.Eng (2016), Ph.D (in view), MNSE	Civil Engineering (Geotechnical Engineering)

2.2. List of Technical Staff

S/No	Name	Qualifications	Rank/Designation	Sex
1.	Vivian Chinyere **Ibeh**	ND, HND	Technologist I	F
2.	Ugochi **Ezike**	B.Tech	Technologist I	F
3.	Francis Akarachi **Nwapu**	B.Eng	Technologist II	M
4.	Ifang Ubong **Asukwo**	ND, HND	Technologist II	M
5.	Enyinnaya **Nnamdi**	B.Eng	Technologist II	M
6.	Nathaniel Obinna **Obiechi**	B.Eng	Technologist II	M

2.3. List of Administrative Support Staff

S/No	Name	Qualifications	Rank/Designation	Sex
1.	Nwobi, Chigemezu C.	HND	Higher Executive Officer	M

			20/12/2024	
2.	Nwosu, Gift Nmesoma	SSCE	Clerical Officer 20/12/2024	F
3	Okorie, Chimezirim	FSLC	Messenger/Cleaner 26/04/2022	M

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-transact 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-transact 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 –transact 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 that 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 matriculation document.

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

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

Immediate attention is given to every complaint 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 time – table 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(1) 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(1) 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 standards.

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 required to submit to the Vice-Chancellor a report on the results 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 Civil 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 grading scheme for each course consists of continuous assessment, which accounts for 30% of the final mark, and the end-of-semester examination, which carries a weightage of 70%. For courses with practical components, the grading breakdown is as follows: Practical - 20%, continuous assessment - 20%, and the end-of-semester examination - 60%.

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) as in the Table 1.

Table 1: 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.

Table 2a: Grading System (First Semester)

Course Code	Course Title	Student Score (%)	Course Credit Unit (CU)	Letter Grade	Grade Point	Quality Point (QP)
MTH 101	General Mathematics I	70	3	A	5.00	5.00 × 3 = 15
GST 101	Communication in English I	60	2	B	4.00	4.00 × 2 = 8
CSC 101	Introduction to Computer	50	3	C	3.00	3.00 × 3 = 9
PHY 101	General Physics I	30	3	F	0.00	0.00 × 3 = 0
			11			**32**

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

= TQP divided by TCU

= 15+8+9+0

= 32/11 = 2.91

Table 2b: Grading System (Second Semester)

Course Code	Course Title	Student Score (%)	Course Credit Unit (CU)	Letter Grade	Grade Point	Quality Point (QP)
MTH 102	General Mathematics II	70	3	A	5.00	5.00 × 3 = 15
GST 102	Communication in English II	60	2	B	4.00	4.00 × 2 = 8
CHM 102	General Chemistry II	50	3	C	3.00	3.00 × 3 = 9
PHY 102	General Physics II	40	3	E	1.00	1.00 × 2 = 2
			11			**34**

GPA = 34/11 = 3.10

7.3 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 First and Second Semester (Tables 2a and 2b)
= (32+34)/ (11 +11) = 66/22 = 3.00
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

The following Professional Associations exist for students in the department to belong, where they are kept abreast of happenings in the Profession at seminars, conferences, workshops etc:

i. The Nigerian Society of Engineers
ii. The Nigerian Institution of Civil Engineers

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 section consists of the following:

(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 Format for Civil Engineering Project Design Report

Preliminary Pages

(i) Title
(ii) Certification
(iii) Dedication
(iv) Acknowledgment
(v) Abstract
(vi) Table of Contents
(vii) List of Tables
(viii) List of Figures
(ix) List of Plates

1.0 Introduction - Chapter 1

2.0 Literature Review - Chapter 2

3.0 Materials and Methods - Chapter 3

4.0 Results and Discussion - Chapter 4

5.0 Summary and Conclusions - Chapter 5

References

Appendix (if any)

10.1 Format for Undergraduate Seminar Preparation and Presentation

The seminar report shall follow the same format as the research report. Emphasis will be placed on the presentation of the seminar report by the student and so each student is expected understand his/her work as the grading will be made on:

* Composure
* Technical
* Content of presentation
* Ability to answer question
* Use of visual aids

11.0 THE CURRICULUM

11. 1 Faculty of Engineering Courses

Course Code	Course Title	L	T	P	Unit
ENG 101	Workshop Practice I	0	0	1	1
ENG 102	Engineering Drawing 1	0	0	1	1
ENG 103	Workshop Practice II	0	0	1	1
ENG 104	Engineering Drawing II	0	0	1	1
ENG 201	Workshop Practice III	0	0	1	1
ENG 202	Workshop Practice IV	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 208	Introduction to Engineering Materials II	1	0	1	2
ENG 209	Engineering Thermodynamics I	2	1	0	3
ENG 212	Engineering Economy	1	1	0	2
ENG 213	Engineering Mechanics I	1	0	1	2
ENG 214	Engineering Mechanics II	1	1	0	2
ENG 216	Computer Programming for Engineering Applications	1	0	1	2
ENG 217	Engineer in Society	1	0	0	1
ENG 218	Introduction to Electrical and Electronic Engineering	1	1	1	3
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 and Law	2	0	0	2
ENG 407	Research Methods in Engineering	2	0	0	2

11.2 All Courses offered by Civil Engineering Students by Level and Semester

100 LEVEL FIRST SEMESTER (SEMESTER 1)

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
PHY 107	General Physics Practical I	0	0	1	1
CHM 101	General Chemistry I	2	1	0	3
CHM 107	General Chemistry Practical I	0	0	1	1
CSC 101	Introduction to Computer	2	0	1	3
ENG 101	Workshop Practice I	0	0	1	1
ENG 103	Engineering Drawing I	0	0	1	1
GST 101	Communication in English I	1	1	0	2
GST 103	Logic, Philosophy and Human Existence	2	0	0	2
AGR 101	Farm Practice I	0	0	1	1
GST 105	ELECTIVE	1	0	0	1

	TOTAL	**12**	**5**	**5**	**22**

ELECTIVES (The student chooses one of the following courses)
GST 105: Communication in French I
GST 105: Communication in Igbo I

100 LEVEL SECOND SEMESTER (SEMESTER 2)

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
PHY 108	General Physics Practical II	0	0	1	1
CHM 102	General Chemistry II	2	1	0	3
CHM 108	General Chemistry Practical II	0	0	1	1
ENG 102	Workshop Practice II	0	0	1	1
ENG 104	Engineering Drawing II	0	0	1	1
GST 102	Communication in English II	1	1	0	2
GST 104	Nigerian Peoples and Culture	2	0	0	2
GST 106	Use of Library, Study Skills and Information and Communication Technology	2	0	0	2
AGR 102	Farm Practice II	0	0	0	0
EMT 102	Environment and Public Health	0	0	0	0
GST 108	ELECTIVE	1	0	0	1
	TOTAL	**12**	**4**	**4**	**20**

ELECTIVES (The student chooses one of the following courses)
GST 108: Communication in French II
GST 108: Communication in Igbo II

200 LEVEL FIRST SEMESTER (SEMESTER 3)

COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**U**
MTH 205	Linear Algebra I	2	1	0	3
STA 201	Introduction to Statistics	2	1	0	3
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 201	Introduction to Entrepreneurial Skills	2	0	0	2
GST 203	History and Philosophy of Science	2	0	0	2
AGR 201	Farm Practice III	0	0	0	0
EMT 201	Occupational Safety	1	0	0	1
	TOTAL	**15**	**4**	**2**	**21**

200 LEVEL SECOND SEMESTER (SEMESTER 4)

COURSE CODE	COURSE TITLE	L	T	P	U
GST 202	Peace Studies and Conflict Resolution	2	0	0	2
MTH 202	Elementary Differential Equation I	2	1	0	3
ENG 202	Workshop Practice IV	0	0	1	1
ENG 208	Introduction to Engineering Materials II	1	1	0	2
ENG 212	Engineering Economy	1	1	0	2
ENG 214	Engineering Mechanics II	1	1	0	2
ENG 216	Computer Programming for Engineering Applications	1	0	1	2
ENG 218	Introduction to Electrical and Electronic Engineering	1	1	1	3
CVE 202	Civil Engineering Materials	1	1	1	3
CVE 204	Elements of Architectural and Civil Engineering Drawing	1	0	1	2
	TOTAL	**11**	**6**	**5**	**22**

SIW 200	Second-Year Long-Vacation SIWES	**0**	**0**	**2**	**2**

300 LEVEL FIRST SEMESTER (SEMESTER 5)

COURSE CODE	COURSE TITLE	L	T	P	U
GST 301	Introduction to Entrepreneurship Studies	1	0	1	2
ENG 305	Strength of Materials I	1	1	1	3
ENG 307	Engineering Mathematics I	2	1	0	3
ENG 309	Fluid Mechanics I	2	1	0	3
ENG 313	Engineering Report Writing and Presentation	1	1	0	2
ACE 301	Engineering Surveying and Photogrammetry	1	1	1	3
ACE 303	Soil Mechanics I	2	0	1	3
CVE 321	Civil Engineering Hydrology	1	1	0	2
	TOTAL	**11**	**6**	**4**	**21**

300 LEVEL SECOND SEMESTER (SEMESTER 6)

COURSE CODE	COURSE TITLE	L	T	P	U
ENG 308	Engineering Mathematics II	2	1	0	3
ACE 302	Hydraulics	1	0	1	2
ACE 304	Engineering Geology	1	1	0	2
ACE 306	Theory of Structures	1	1	1	3
CVE 302	Strength of Materials II	2	1	0	3
CVE 322	Introduction to Public Health Engineering	1	1	0	2
CVE 334	Design of Structures I	2	1	0	3
	TOTAL	**10**	**6**	**2**	**18**

SIW 300	Third-Year Long-Vacation SIWES	**0**	**0**	**2**	**2**

400 LEVEL FIRST SEMESTER (SEMESTER 7)

COURSE CODE	COURSE TITLE	L	T	P	U
ENG 405	Engineering Management and Law	2	0	0	2
ENG 407	Research Methods in Engineering	2	0	0	2
CVE 407	Engineering Mathematics and Statistics	2	1	0	3
CVE 411	Soil Mechanics II	1	1	1	3
CVE 431	Structural Analysis I	2	1	0	3
CVE 433	Design of Structures II	2	1	0	3
CVE 451	Civil Engineering Surveying	1	1	1	3
CVE 461	Civil Engineering Practice	1	1	0	2
CVE 471	Introduction to Highway and Transportation Engineering	1	1	0	2
	TOTAL	**14**	**7**	**2**	**23**

400 LEVEL SECOND SEMESTER (SEMESTER 8)

COURSE CODE	COURSE TITLE	L	T	P	U
SIW 400	Fourth-Year Second-Semester & Long-Vacation SIWES	**0**	**0**	**6**	**6**

500 LEVEL FIRST SEMESTER (SEMESTER 9)

COURSE CODE	COURSE TITLE	L	T	P	U
CVE 511	Geotechnical Engineering	1	1	0	2
CVE 521	Drainage and Irrigation Engineering	1	1	0	2
CVE 523	Environmental Engineering	2	0	0	2
CVE 531	Structural Analysis II	1	1	0	2
CVE 541	Terotechnology	1	0	1	2
CVE 571	Highway and Traffic Engineering I	1	1	0	2
CVE 597	Civil Engineering Project I	0	0	3	3
	ELECTIVE	2	1	0	3
	TOTAL	**9**	**5**	**4**	**18**

ELECTIVES (The student selects one option from the following courses)

COURSE CODE	COURSE TITLE	L	T	P	U
CVE 517	Advanced Geotechnical Engineering I	2	1	0	3
CVE 527	Advanced Water Resources and Environmental Engineering I	2	1	0	3
CVE 537	Advanced Structural Engineering I	2	1	0	3
CVE 577	Advanced Highway and Transportation Engineering I	2	1	0	3

500 LEVEL SECOND SEMESTER (SEMESTER 10)

COURSE CODE	COURSE TITLE	L	T	P	U
CVE 512	Foundation Engineering	1	1	0	2
CVE 524	Water Resources Engineering	1	1	0	2
CVE 532	Design of Structures III	1	1	0	2
CVE 562	Construction Engineering and Management	1	1	0	2
CVE 572	Highway and Traffic Engineering II	1	1	0	2
CVE 582	Building Services Engineering	1	1	0	2
CVE 584	Computer Applications in Civil Engineering	1	0	1	2
CVE 598	Civil Engineering Project II	0	0	3	3
	ELECTIVE	2	1	0	3
	TOTAL	**9**	**6**	**4**	**20**

ELECTIVES (The student selects one option from the following courses)

COURSE CODE	COURSE TITLE	L	T	P	U
CVE 518	Advanced Geotechnical Engineering II	2	1	0	3
CVE 528	Advanced Water Resources and Environmental Engineering II	2	1	0	3
CVE 538	Advanced Structural Engineering II	2	1	0	3
CVE 578	Advanced Highway and Transportation Engineering II	2	1	0	3

DESCRIPTION OF GENERAL-STUDIES AND UNIVERSITY-WIDE COURSES

MTH 101: GENERAL MATHEMATICS 1 (3 Units)

Number systems. Indices, Surds and Logarithms. Polynomials. Remainder and factor theorems. Polynomial equations. Rational function. Partial fractions. Fields. Ordered fields. Inequalities, Mathematical induction. Permutations and combinations. Binomial theorem. Sequences and series. The quadratic equation and function. Relation between the roots and the coefficients. Complex numbers. Addition, Subtraction, Multiplication and Division. Argand diagram, De-Moivre's theorem N-th roots of complex numbers. Elementary set theory. Venn diagrams and applications. De-Morgan's laws. Trigonometry. Elementary properties of basic trigonometric functions. Addition formulae and basic identities. Sine and Cosine formulae. Half angle formulae. Area of triangle. Solution of trigonometric equations. Inverse trigonometric functions, functions, concepts and notation. Example. Composition. Exponential and logarithmic functions. Graphs and properties. Limits and continuity. Techniques for finding limits. The derivative. Calculation from first principles. Techniques of differentiation. Chain rule. Higher-order derivatives. Extremun problems. Mean-value theorem. Applications. Indeterminate forms and L'Hospital rule. Taylor's and Maclaurin's series. Curve sketching. Integration as the reverse of differentiation, as area, as limit of finite sums. Definite integrals. (pre-requisite: Credit- O'level Mathematics).

MTH 102: GENERAL MATHEMATICS II (3 Units)

Transcendental functions. Hyperbolic functions. Inverse functions. Logarithmic differentiation. Methods of integration, integration of rational functions. Integration by substitution, integration by parts. Improper integrals. Applications. Areas and volumes. Centre of mass. Ordinary differential equations. First order equation, second order homogenous equations with constant coefficients. Applications. Plane analytic geometry. Rectangular Cartesian coordinates. Distance between two points. The straight line. Loci. The circle, parabola. Ellipse and hyperbola. Second degree curves. Plane polar coordinate system. Graphs of plane equations. Plane areas in polar coordinates. Vectors. Vector addition and implications. Products of three or more vectors. Vector functions and their derivatives. Velocity and acceleration. Matrix algebra. Addition and multiplications, transpose. Determinants. Inverse of non-singular matrices, Cramer's rule and application to the solution of linear equations. (Examples should be limited to non- matrices where m3, n3) transformations of the plane. Translation, reflection, rotation, enlargement, shear. Composition of transformations. Invariants, points and lines. (Pre-requisite. Credit O.L. Math)

CHM 101: GENERAL CHEMISTRY I (3 Units)

Atoms, molecules and chemical reactions. Modern electronic theory of atoms. Electronic configuration, periodicity and building up of the periodic table. Hybridisation 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. Properties of gases. Redox reactions and introduction to electrochemistry. Radioactivity.

CHM 102: GENERAL CHEMISTRY II (3 Units)

Physical and chemical equilibrium, elementary electrochemistry and chemical kinetics. Survey of reactions of function groups in aliphatic and aromatic compounds concept of hybrid bonds, Alkanes, alkenes, alkynes, reactions of carbon-carbon multiple bonds; elimination and substitution reactions of alcohols and alkyl halides; addition and elimination reactions in benzene; hydroxyl groups and carbonyl compounds, organic acids, bases and derivatives.

PHY 101: GENERAL PHYSICS I (3 Units)

Two 1-hour lectures, one-hour tutorial and three-hour laboratory per week. Mechanics. Space and time, units and dimensions; Vectors; Kinetics, Newton's Laws; Galilean invariance, statics and dynamics of particles; universal gravitation; work and potential energy; conservation of energy and momentum; right bodies; fluid mechanics. Thermal physics; thermal properties, including elementary thermodynamics and kinetic theory. (Pre-requisite: credit in O.L. Physics and Mathematics and concurrent registration in MTH 101).

PHY 102: GENERAL PHYSICS II (3 Units)

Two 1-hour lectures, one-hour tutorial and three-hour laboratory per week. 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.

GST 101: COMMUNICATION IN ENGLISH I (2 Units)

Use of library. Use of words and sentence construction. Functions of sentences-purpose structure, correct use of verbs (action words), word order and punctuation, Essay/Composition writing. Paragraphs-structure, function, links and style. Exposition description and explanation. Special types of exposition e.g. letter writing, layout of a business letter, technical reports-including terms of reference, drafting and editing of reports.

GST 102: COMMUNICATION IN ENGLISH II (2 Units)

Comprehensive and interpretation-reading efficiency of technical and non-technical material. Note taking; techniques of note taking from reading and from lectures, précis-writing or summarizing methods, technical vocabulary, work formation, use of classical and official terms, special terms, acronyms, new words, choice of correct words, definitions by example, synonym or antonym, analytic or operational definitions; basic-words in fields of specialization, e.g. mechanical, electrical, civil, aeronautical, agricultural, automobile engineering, metallurgy, mathematics.

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/GST 108: COMMUNICATION IN FRENCH I & II (1 Unit each)

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

GST 105/GST 108: COMMUNICATION IN IGBO I & II (1 Unit each)

Igbo language and orthography. Outlining and understanding the word formation processes in Igbo language. Organs of speech. Spelling rules in Igbo. Numbers. Tones and tone marks. Types, importance, and use of punctuation marks. Igbo grammar, parts of speech. Syllable and syntactic structures of the Igbo language. Figures of speech. Essay writing

EMT 102: ENVIRONMENT 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 AND HUMAN EXISTENCE (2 Units)

The nature and scope of economics. The Nigerian Political system: policy and means of production in Nigeria. The structure of the Nigeria economy; aspects of economic and technological dualism; internal migration-rural to urban migration and the informal sector. The role of capital growth and development; public investment Criteria; choice of "Appropriate" or relevant" technology. Human resources development in Nigeria rural utilization, education and manpower development and planning. Agriculture in the development process; land tenure and reform, agricultural technology and the green revolution and integrated rural development. Industrialization; role and type of industry, choice of techniques, impact substitution, and export expansion. The economic role of the government expenditure and taxation; the federal structure, fiscal federalism and revenue allocation; the financial system. Problems of development planning and plan implementation in the Nigeria Federal System of Government. Prospects of the Nigeria economy.

GST 104: NIGERIAN PEOPLES AND 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, STUDY SKILLS AND INFORMATION AND COMMUNICATION TECHNOLOGY (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.

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 201: INTRODUCTION TO ENTREPRENEURIAL SKILLS (2 Units)

Development Entrepreneurship/Intrapreneurship, the Nigerian, creativity and Intellectual rights, technological Entrepreneurship, innovation: Theories and Management, Family business and succession planning, women Entrepreneurship, social Entrepreneurship, business opportunity set and evaluation, introduction to business strategy, introduction to business ethics and corporate governance, relationship between scientific research innovation and products, product invention, timeliness and processes. Practice: Group/individual implementation/manufacture/assembly of selected technological products in simulated production environments, construction of physical models of relevant concepts.

GST 202: PEACE STUDIES AND CONFLICT RESOLUTION (2 Units)

Basic Concepts in peace studies and conflict resolution, Peace as vehicle of unity and development, Conflict issues, Types of conflicts, e.g. Ethnic/religious/political/economic conflicts, Root causes of conflicts and violence in Africa, Indigene/settler phenomenon, Peace building, Management of conflict and security. Elements of peace studies and conflict resolution; Developing a culture of peace, Peace mediation and peace-keeping, Alternative Dispute Resolution (ADR), Dialogue/arbitration in conflict resolution, Role of international organisations in conflict resolution, e.g. ECOWAS, African Union, United Nations, etc.

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 202: ELEMENTARY DIFFERENTIAL EQUATIONS (3 Units)

Prerequisites: MTH 101 &102. Derivation of differential equations from primitive, geometry, physics etc. order and degree of differential equation. Techniques for solving first and second order linear and non – linear equations. Solutions of systems of first order linear equations. Finite linear difference equations. Application to geometry and physics.

MTH 205: LINEAR ALGEBRA I (3 Units)

Prerequisites: MTH 101 & 102. Vector space over the real field. Subspaces, Linear independence, basis and dimension. Linear transformations and dimension. Linear transformations and their representation by matrices – range, null space, rank. Singular and non-singular transformation and matrices. Algebra of matrices.

STA 201: INTRODUCTION TO STATISTICS (3 Units)

Frequency distribution, measures of location and dispersion in simple and grouped data. Laws of probability. Binomial, Poison's and normal distributions. Estimation and tests of hypothesis.

Analysis of variance and covariance, simple regression and correlation, contingency table and X2 applications.

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 Record keeping. 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 301: INTRODUCTION TO ENTREPRENEURSHIP STUDIES (2 Units)

Concept of business and new value creation, introduction to theories of growth, business strategy, sources of capital, principles of marketing, business ethics and social responsibility, opportunity sets and expansion consideration (E-commerce, E-Business E-Trade), the scientist/engineer as an entrepreneur; opportunities and challenges, managing transition (start up, growth), basic accounting literary, feasibility and viability studies including issues in cash flow analysis. Crafting business plans. Corporate governance and change management. Practice: Innovative solution to invention needs chosen by students. Development of new products or processes. Development of business plans and proposals.

DESCRIPTION OF FACULTY COURSES

ENG 101: WORKSHOP PRACTICE I (1 Unit)

General use of engineering measuring instruments, e.g. callipers, etc. Introduction to hand tools, e.g. 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: Behaviour 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 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: 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: WORKSHOP PRACTICE IV (1 Unit)
Pre-requisites: ENG 101, ENG 102. 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)

Prerequisites: ENG 103, ENG 104. 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-centred cubic, face centred 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)

Pre-requisites: CHM 102, PHY 102. 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.

ENG 209: ENGINEERING THERMODYNAMICS I (3 Units)

1. Fundamental concepts: History of thermodynamics, dimensions, units, system, state, property, process, heat, work, pressure, temperature, zeroth law.
2. First law of thermodynamics: conservation of energy (Joule's experiment), first law, internal energy. Non flow process, enthalpy, steady flow processes.
3. Properties of pure substances P.V.T relations and diagrams Cp, Cv, ideal gas, Thermodynamic Charts and tables.
4. Second law of thermodynamics and heat engine cycles, cannot heat engine and cycle. The second law and its corollaries.
5. 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 ELECTRICAL AND ELECTRONIC ENGINEERING (3 Units)

Pre-requisites: MTH 102 & PHY 102. Review of electrostatics and electromagnetism. Transient and steady-state analysis of circuits: network theorems and techniques, passive and active circuits and building blocks, sinusoidal analysis and phases. Transformers; principles and operation of electrical machines, motors, generators, single and poly-phase systems. Introduction to electronic circuits and models: conduction mechanism and junction operation. Device characteristics: properties and applications of diodes, junction transistors and amplifiers. Introduction to integrated circuit technology and digital circuits.

ENG 305: STRENGTH OF MATERIALS I (3 Units)

Pre-requisites: ENG 207 and ENG 208. 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.

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.

ENG 309: FLUID MECHANICS I (3 Units)
Fluid statics: Flotation 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 pi 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 Styles. 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 (multimedia, computer hardware and software applications, etc.). Use of modern software in presentation, e.g., Microsoft Power Point, Corel Draw, Microsoft Word, 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. Organizational structure and behaviour; Engineer to engineering 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. Cost reduction programmes. Depreciation accounting, valuation of assets. Personnel Management: Selection, recruitment and training. Job evaluation. Merit rating. Incentive schemes. Industrial Committees and joint Consultations. Trade Unions and collective bargaining. Industrial Psychology: Individual and group behaviour. The learning process. Motivation and morale. Influence of the Industrial Environment. Resources Management. Materials Management: Purchasing methods. Contracts. Interest formula. Rate of return. Methods of economic evaluation. Selection between alternatives. Tendering evaluation and contract administration. Planning and Decision Making: Forecasting Planning, Scheduling. Production control. Gantt Chart. C.P.M. and PERT. Optimisation. Linear programming as an aid to decision making policies under risk and uncertainties. Transport and Materials Handling: Selection of transport media for finished goods, raw materials and equipment. Faculty layout and location. Work Study and Production Processes: Basic principles of work study. Principles of motion economy. Ergonomics in the design of equipment and process.

ENG 407: RESEARCH METHODS IN ENGINEERING (2 Units)

Introduction to Engineering Research; Types of research; Overview of the research process; Formulating research questions, research objectives; Research Problem statements and Hypothesis Formulation and testing; Identifying research gaps from Literature Review using Sources like: journals, conference papers, patents, databases; Techniques for searching and organizing literature; Referencing tools (e.g., Mendeley, Zotero); Citation styles (APA, IEEE); Research Design and Methodologies such as Quantitative, qualitative, and mixed methods; Experimental design: variables, controls, replication. Case studies, simulations, surveys and questionnaire design; Validity, reliability, and generalizability; Sampling methods; Primary vs. secondary data; Data acquisition tools (sensors, lab instruments, software); Measurement error and uncertainty; Statistical methods (descriptive, inferential statistics); Graphical presentation of data; Research Ethics and Intellectual property rights, patents; Technical Writing and Presentation; Structure of a technical report/thesis. Effective dissemination of research findings: (Oral presentation techniques, mass media, social networks, Newsletters, Poster and PowerPoint presentation); Research proposal writing (Elements of a good proposal); Final report/thesis formatting and submission guidelines; Peer review and feedbacks.

DESCRIPTION OF CIVIL ENGINEERING COURSES

CVE 202: CIVIL ENGINEERING MATERIALS (3 Units)

Concrete Technology – Types of cements, aggregates – properties, Concrete mix. Design, Properties and their determination. Steel Technology – Production, fabrication and properties: corrosion and its prevention. tests on steel and quality control. Timber Technology – Types of wood, properties, and defects. Stress grading, Preservation and fire protection. Timber products. Rubber, plastics; Asphalt, tar, glass, lime, bricks, etc. Applications to buildings, roads and bridges.

CVE 204: ELEMENTS OF ARCHITECTURAL AND CIVIL ENGINEERING DRAWING (2 units)

Introduction – Dimensional awareness, Graphic communication, relation to environments. Free-hand drawing – form in terms of shades, light and shadow. Architectural design principles and elements. Orthographics; dimetrics, perspective projections: Applications. Common curves. Elementary Designs. Elements of structural drawing and detailing; preparation of foundation plan, structural framing, slab and beam/column elevations for reinforced concrete structures. Details of steel joints and fabrication drawings. Computer-aided design and drawing (CADD). Drawing of real-world architectural and civil engineering projects.

SIW 200: SECOND-YEAR LONG-VACATION SIWES (2 Units)

SIW 200 is a Second-Year Long-Vacation Students' Industrial Work Experience Scheme (SIWES) course that aims to provide students with practical work experience and exposure to real-world applications of their academic knowledge. The course is designed to bridge the gap between

theoretical learning and practical implementation by allowing students to work in industries relevant to their field of study during the long vacation period. Evaluation and grading criteria for SIW 200 typically involve assessing the student's performance and progress during the industrial training period. This includes regular reporting, evaluations by supervisors, and submission of a final report or project summarizing the experience gained during the training.
By participating in SIW 200, students have the opportunity to gain practical skills, apply theoretical knowledge in a professional setting, develop workplace etiquette, and enhance their employability. The course aims to foster the students' personal and professional growth by exposing them to real-world work environments, challenges, and responsibilities.

ACE 301: ENGINEERING SURVEYING AND PHOTOGRAMMETRY (3 Units)
Chain Surveying. Compass surveying – Methods; Contours and their uses. Traversing – methods and applications. Levelling – Geodetic levelling – errors and their adjustment. Applications. Tacheometry – Methods; Substance heighting, self-adjusting and electromagnetic methods. Introduction to photogrammetry.

ACE 302: HYDRAULICS (2 Units)
Simulation of complex flow fields using sources, sinks uniform flows and doublets and combinations of vortices. Boundary layer separation, lift and drag. Steady and unsteady flows in open channels. Chezy's formula, Manning's equation, critical and supercritical flow, hydraulic jump and gradually varied flow. Dimension analysis and similitude. Surge waves, Hydraulic modelling techniques, Pipe network analysis, Design of reticulation systems. Unsteady flows in pipes with special emphasis on water hammer and the use of surge tanks. Introduction to Hydraulic machines: Pumps and turbine; their characteristics, specific head, cavitation.

ACE 303: SOIL MECHANICS I (3 Units)
Formation of soils. Soil-water relationship – void ratio, porosity, specific gravity and other factors. Soil composition and classification: Atterberg limits – particle size distribution. Flow in soils – seepage and permeability. Stresses in soils. Earth pressure, Bearing capacity. Laboratory work.

ACE 304: ENGINEERING GEOLOGY (2 Units)
An overview of the role of geology in engineering; Geological structures and mapping. Rocks and minerals. Stratigraphy – time-scale fossils and their importance: special reference to Nigeria. Introduction to geology of Nigeria. Examination of geological processes such as weathering, erosion, sedimentation, and tectonic activity, and their impacts on engineering projects. Geological hazards. Engineering Applications – Water supply, site investigation, slope stability – Dams, Dykes, etc.

ACE 306: THEORY OF STRUCTURES (3 Units)

Analysis of determinate structures: beams and trusses; Structural theorems. Graphical methods: Application to simple determinate trusses. Williot–Mohr diagram. Deflection of statistically determinate structures: double-integration method, Unit-load method, moment-area method. Strain energy methods. Introduction to statistically indeterminate structures.

CVE 302: STRENGTH OF MATERIALS II (3 Units)

Advanced topics in bending moment and shear force in beams. Theory of bending of beams. Deflection of beams. Unsymmetrical bending and shear centre. Applications. Strain energy. Biaxial and triaxial states of stress. Transformation of stresses. Mohr's circle. Failure theories. Springs. Creep and fatigue. Fracture and stress concentration.

CVE 321: CIVIL ENGINEERING HYDROLOGY (2 Units)

Hydrologic cycle. Precipitation, infiltration, evaporation, groundwater, surface run-off, floods and droughts. Physical and statistical analysis related to hydrologic processes. Flood routing techniques. Hydrologic systems analysis. Hydrography analysis. Unit hydrograph theory. Occurrence and distribution of water in nature. Stream gauging. Hydrogeology, Fundamentals of flows in porous media. Equations governing flows in aquifer. Exact and approximate solutions. Flows in layered aquifer systems.

CVE 322: INTRODUCTION TO PUBLIC HEALTH ENGINEERING (2 Units)

Sources of water supply and their exploitation in urban and rural areas. Water uses and factors governing its consumption. Physical, chemical, and biological characteristics of raw water, their determination, and significance. Water-related diseases, mode of transmission, and their control in relation to water supply. Water treatment schemes and plants. Pollution sources and types of pollution. Effects of environmental pollution – the role of humans as agents of environmental pollution. Physical, chemical and biological characteristics of sewage; Need for sewage treatment – as a water pollution, control method; Sewage treatment methods; Suitable technology for excreta disposal; Septic tanks and oxidation ponds. Solid waste collection and disposal methods.

CVE 334: DESIGN OF STRUCTURES I (3 Units)

Fundamentals of the design process. Materials selection. Building regulations and codes of practice. Design philosophy, Elastic design: Limit state design. Design of structural elements in reinforced concrete. Load types and combinations. Characteristic and design strength; Characteristic and design load; Exposure classifications; Considerations in selecting the size of reinforced concrete members and quantity of reinforcement. Design of one-way spanning slabs; Design of singly-reinforced beams. Design of axially loaded columns. Design exercises. Further work using computer-aided design packages.

SIW 300: THIRD-YEAR LONG-VACATION SIWES (2 Units)

SIW 300 is a course designed for third-year students as part of their long-vacation SIWES (Students Industrial Work Experience Scheme) program. SIWES is a structured training program established to provide students with practical work experience in industries related to their field of study. The course is typically undertaken during the long vacation period (about 12 weeks), allowing students to gain valuable industrial training experience while on break from their regular academic studies.

The course focuses on integrating theoretical knowledge gained during the academic years with practical skills and applications in a professional setting. Through their work experience, students will have the opportunity to apply the concepts learned in their academic coursework to real-world situations, enhance their problem-solving abilities, and develop relevant industry-specific skills.

During the SIWES program, students may be assigned to various departments or sections within an organization, depending on their field of study. They will work under the guidance and supervision of experienced professionals, who will provide mentorship and support throughout the training period. Students are expected to actively participate in the tasks and projects assigned to them, observe workplace protocols, and contribute effectively to the organization's goals and objectives.

Upon completion of the SIWES program, students are required to submit a comprehensive report detailing their experiences, challenges faced, and the knowledge gained during the training period. This report is typically assessed by the academic institution to evaluate the student's performance and ensure the program's objectives have been met.

CVE 407: ENGINEERING MATHEMATICS AND STATISTICS (3 Units)

Complex variables – advanced topics, differentiation and integration of complex functions. Cauchy–Riemann equations: Related theorems. Laplace and Fourier transforms – Applications. Introduction to non-linear differential equations: stability and applications. Probability: elements of probability, density and distribution functions, moments, standard distribution, etc. Statistics – Regression and correlation – Large sampling theory. Test hypothesis and quality control.

CVE 411: SOIL MECHANICS II (3 Units)

Mineralogy of Soils. Soil Structures. Compaction and soil stabilisation. Site investigations. Laboratory and Coursework.

CVE 431: STRUCTURAL ANALYSIS I (3 Units)

Indeterminate structural analysis: Energy and virtual work methods, Slope deflection and moment distribution methods. Elastic instability. Simple plastic theory of bending. Collapse loads. Stress-grading of timber, visual mechanical and electronic stress grading of timber.

CVE 433: DESIGN OF STRUCTURES II (3 Units)

Limit state philosophy and design in steel: Elastic and plastic moment designs. Design of structural elements in steel connections and joints. Limit state philosophy and design in timber. Elastic

methods and design in timber. Design of structural elements in timber and timber connectors. Laboratory tests on structural elements in concrete, timber and steel. Computer-aided design of structures.

CVE 451: CIVIL ENGINEERING SURVEYING (3 Units)

Further work on contours and contouring: Methods of contouring, contour interpolation and uses of contour plans and maps. Areas and volumes - calculation of volume from contour lines, calculation of volume by Simpson's rule, calculations of volume from spot heights. Setting out of engineering works. Elementary topographical surveying: Elements of photogrammetry, Photogrammetry equipment and errors of measurement. Sectioning: Principles of sectioning: Longitudinal sections, cross-sections, principles of slope staking, use of sight rails: sewer, drain pipes. Setting out baselines for building, road and railways; pipelines. Curvature correction: Prismodial correction; Calculation of volume curves, Reverse curves. Transition curves. Basic curve using theodolite and tape; Using tape only by defection distance. Principles of transition curves, super-elevation, length of curve. Spiral formula, Calculation of transition curve, setting out transition curve.

CVE 461: CIVIL ENGINEERING PRACTICE (2 Units)

Civil engineering work standards and measurements. Contracts and sub-contracts. Works construction and supervision. Job planning and control – Programme Charts – Bar charts. Critical path methods, etc. Construction machinery and equipment. Applications/Case study: dams, foundations, bridges, highways, industrial buildings, sewage works.

CVE 471: INTRODUCTION TO HIGHWAY AND TRANSPORTATION (2 Units)

Soil engineering aspects of highways. Railways and airfields. Highway materials, design, construction and maintenance; desirable properties and testing of highway materials. Soil factors affecting design of pavements and maintenance. Highway geometrics. Pavement structure and design. Pavement materials and laboratory tests. Transportation functions and development: Transport function, concepts and system. Historical and technological development of transport modes, vehicle performance and flow.

SIW 400: FOURTH-YEAR SECOND-SEMESTER & LONG-VACATION SIWES (2 Units)

SIW 400 is a course designed for fourth-year students as part of their second-semester and long-vacation SIWES (Students Industrial Work Experience Scheme) program. The program typically lasts for 24 weeks.

During the SIWES program, students may be assigned to various departments or sections within an organization, depending on their field of study. They will work under the guidance and supervision of experienced professionals, who will provide mentorship and support throughout the training period. Students are expected to actively participate in the tasks and projects assigned to

them, observe workplace protocols, and contribute effectively to the organization's goals and objectives.
Upon completion of the SIWES program, students are required to submit a comprehensive report detailing their experiences, challenges faced, and the knowledge gained during the training period. This report is typically assessed by the academic institution to evaluate the student's performance and ensure the program's objectives have been satisfied.

CVE 511: GEOTECHNICAL ENGINEERING (2 Units)
Stresses in soils. Consolidation and settlement. Shear strength of soils. Earth pressures. Bearing capacity of soils. Slope stability. Site Investigations.

CVE 512: FOUNDATION ENGINEERING (2 Units)
Site investigations; Field and laboratory measurements. Engineering property of 'soils' for design. Plastic Equilibrium Theory. Design of foundations: Shallow and deep foundation. Types and choice of foundations; Spread footing design; combined footings: mat or raft foundations; Types of piles. Soil properties for pile foundations. Piles in cohesive soils. Piles in cohesionless soils. Single piles and pile groups. Bearing capacity and settlement of pile groups. Negative skin friction. Structural design of footings and earth-retaining walls. In situ testing.

CVE 521: DRAINAGE AND IRRIGATION ENGINEERING (2 Units)
Storage routing. Storage, collectors, and pumps. Methods of overflow protection of large areas. Analysis and design of surface and combined drainage systems. Soil-plan-water relationships. Analysis and design of irrigation systems. Water supplies, water delivery systems and water distribution systems. Groundwater occurrence, hydraulics, well yield. Urban hydrology factor in design of urban drainage facilities, precipitation rate and volumes. Characteristics of urban watershed, peak flow equations, and land drainage. Design of large-scale hydraulic structures: dams, spillways, Stilling Basins. Design of culverts and channel transitions. Reservoir Design Studies. Design of irrigation projects

CVE 523: ENVIRONMENTAL ENGINEERING (2 Units)
The work of the sanitary engineer. Application of basic principles of sanitary engineering and hydraulics to water supply, treatment, design, and distribution. Theory and laboratory evaluation for the design and operation of unit operation and processes in water and waste water, biological water, chemical water: Wastewater collection, treatment, disposal, and design. Solid waste collection, treatment, disposal and design of systems. Non-conventional sewage treatment processes. Determination of the quantity and quality of solid waste: incinerators, solid waste and landfills. Air pollution and control. Noise pollution and management. Management of toxic and hazardous waste. National and international standards and regulations.

CVE 524: WATER RESOURCES ENGINEERING (2 Units)

Hydraulics of open channels and wells. Drainage. Hydrograph analysis. Reservoir and flood-routing. Hydrological forecasting. Hydraulic structures, such as dams, dykes/levees, weirs, docks and harbours, Spillways, stilling basins, manholes and coastal hydraulic structures, etc. Design considerations. Engineering economy in water resources planning. Application of principle of hydraulic and hydrology to problems in the control, conservation and usage of water, flood control, water supply, irrigation, navigation, and river basic planning. Design of large-scale hydraulic structures. Design of irrigation projects.

CVE 531: STRUCTURAL ANALYSIS II (2 Units)
Plastic methods of structural analysis. Matrix methods of structural analysis. Elastic instability. Continuum of plane strain, elastic flat plates and torsion, solution by series, finite difference, finite element. Yield line analysis and strip methods for slabs.

CVE 532: DESIGN OF STRUCTURES III (2 Units)
Composite design and construction in steel and reinforced concrete. Design of structural foundations. Prestressed concrete design. Modern structural forms. Tall buildings, lift shafts and shear walls, system buildings Design projects.

CVE 541: TEROTECHNOLOGY (2 Units)
Salvaging of structures, repairs, maintenance and demolition. Evaluation of building performance, landscape, project management, engineering services, protection of equipment, management techniques, reliability, installation and maintenance of equipment, minimization of maintenance cost.

CVE 562: CONSTRUCTION ENGINEERING AND MANAGEMENT (2 Units)
Construction practices and professional relations. Earthwork. Construction equipment and techniques. Formwork design, component assembly. Improvement of productivity and construction practices. Safety. Capital outlay and operating cost, project financing, insurance and bonding, contract terms. Solutions to job site and engineering problems in buildings and heavy construction in Nigeria.

CVE 571: HIGHWAY AND TRAFFIC ENGINEERING I (2 units)
Highway planning and traffic surveys. Road pavement characteristics. Simple design method. Construction and maintenance of roads including labour-based methods. Study of Nigerian highways design policies, standard and specifications. Comparisons with international standards, administration and finance. Condition of all transportation media. Transportation planning and economics.

CVE 572: HIGHWAY AND TRAFFIC ENGINEERING II (2 Units)

Roads and Railways traffic analysis and design, including definition and determination of level of service and capacity for different types of roads and railways. Design of traffic control schemes. Planning and management methods for roadways, waterways, runways and railways. Pavement analysis and design methods. Traffic management and design of traffic signals. Parking: geometries design, construction methods, construction materials and laboratory tests.

CVE 582: BUILDING SERVICES ENGINEERING (2 Units)

Engineering study of materials and equipment used in mechanical and electrical services of buildings. Design of building services components. Modern building operations, selection of necessary equipment. Illumination of buildings, comfort, heat loss and gain, air conditioning and climate control, water supply, fire protection, acoustics and sound control, drainage systems, plumbing and sewerage disposal, maintenance and rehabilitation, building failures, shoring, and underpinning scaffolding, elevators, escalators, and building acoustics.

CVE 584: COMPUTER APPLICATIONS IN CIVIL ENGINEERING (2 Units)

Application software in civil engineering analysis and design: highway and transportation engineering, water resources, and structural engineering and project management. Use of computer for matrix operations. Computer-aided drafting/design ACAD commands: points, lines, circle, rectangle, polylines, coral draw software. Use of Microsoft Excel in the preparation of bill of quantities, etc. Programming languages relevant to civil engineering, algorithms and flowcharts

CVE 597 & CVE 598: CIVIL ENGINEERING PROJECT I & II (6 units)

These two courses are examined at the end of the session. For proper guidance of the students, projects will depend on the available academic staff expertise and interest, but the projects are preferably of an investigatory approach. Students are advised to choose projects in the same area as their optional course.

DESCRIPTION OF OPTIONAL CIVIL ENGINEERING COURSES

The optional courses cover a wide range of more advanced topics related to different branches of civil engineering. Students are mandated to choose one course out of four courses in different options (Geotechnical Engineering, Water Resources & Environmental Engineering, Structural Engineering, or Highway & Transportation Engineering) in each semester of the 500 level. These courses are taught at standards typically higher than the Bachelor's degree but below Master's degree expectations. Selected advanced topics in these options are taught to students.

CVE 517: ADVANCED GEOTECHNICAL ENGINEERING I (3 Units)

Engineering geology. Behaviour of rocks and soils in building and engineering construction, foundation, tunnel, dams, and flood control with reference to the importance of the mineral

composition of the earth and rock materials, their geomorphic and geological features and their stress history. Field investigation.

CVE 518: ADVANCED GEOTECHNICAL ENGINEERING II (3 Units)
Earth structures (earth dams) and slope stability, selection of type of dam design construction and control of dams, embankments, and slopes. Principles of dam design, explorations, construction, and materials, stability analysis, deformation prediction, groundwater control, construction procedures and equipment. Initial and long-term stability of earth-retaining structures. Rock mechanics: introduction, mining engineering, and rock excavation, drilling and blasting techniques.

CVE 527: ADVANCED WATER RESOURCES AND ENVIRONMENTAL ENGINEERING I (3 Units)
Qualitative evaluation of water quality management alternatives. Legislation pertaining to drinking water and wastewater. Methods for environmental impact analysis, including oxygen balance, toxicity, enrichment/eutrophication. Water and wastewater treatment process technology, advanced wastewater treatment, water recycling and reuse, and industrial wastewater treatment.

CVE 528: ADVANCED WATER RESOURCES AND ENVIRONMENTAL ENGINEERING II (3 Units)
Fundamental laboratory principles of water chemistry, microbiology and their application to water supply, wastewater treatment, and water and land control.

CVE 537: ADVANCED STRUCTURAL ENGINEERING I (3 Units)
Equations of equilibrium and compatibility, plane stress and plane strain problems. Extensional and classical plate theories. Rectangular and circular plates. Extensional and bending theories of shells. Practical application of plate and shell theories, e.g. bridge decks, cylindrical shells, domes, etc. Introduction to dynamics of structures.

CVE 538: ADVANCED STRUCTURAL ENGINEERING II (3 Units)
Design of water-retaining structures. Tall buildings, lift shafts and shear walls, system buildings. Bridge deck analysis and design. Box girders, Bridge abutments. Design of industrial buildings: single bay, portal frames

CVE 577: ADVANCED HIGHWAY AND TRANSPORTATION ENGINEERING I (3 Units)
Fundamental operational solutions to traffic problems, followed by a theoretical study of traffic stream flow and its parameters: fundamentals of highway signals and marking; signal system types and their design and operation. Studies of intersection gap acceptance flow density relationships,

shockwave phenomena, car-following model, hydrodynamic analysis, acceleration, and noise. Implications of insight of flow theory for design.

CVE 578: ADVANCED HIGHWAY AND TRANSPORTATION ENGINEERING II (3 Units)

Detailed analysis of conventional and emerging public transportation state-of-the-art systems. Brief review of conventional transportation systems, bus rapid systems, demand responsive bus systems, personal rapid transit, dual mode, guide way and automated freeway systems and high-speed rail TACV systems. Review of current transportation administration. Systems research and demonstration programmes.