1 INTRODUCTION

1.1 Background

The Department of Civil Engineering in the University of Port Harcourt was established in 1983 to run degree programme in Civil Engineering. Later in 2002, Environmental Engineering programme was introduced and the name of the Department was consequently changed to "Department of Civil and Environmental Engineering". The philosophy and objective of the Department remains essentially the same, namely to train Civil Engineers and Environmental Engineers and hence provide the high level technical manpower needed in both the public and private sectors of the economy. The Department soon grew rapidly both in academic and supporting staff strength to become one of the best staffed Civil and Environmental Engineering Departments in the Nigerian University System; with specialization in all the traditional areas of the Civil Engineering discipline. Although some of the founding staff have left for greener pastures, the Department still remains one of the best staffed in the country with its new breed of advanced/experienced staff and young/dynamic staff who are passionate in lecturing and research and either have obtained degrees from renowned universities or are currently studying.

The Department is committed to acquiring the necessary research and training facilities with the assistance of the university and other reputable sponsors. It presently has six laboratories. These are:

i. Soil Mechanics/Geotechnical Engineering Laboratory
ii. Structures Laboratory
iii. Highway/Transportation Laboratory
iv. Fluid Mechanics/Hydraulics Laboratory
v. Environmental/Public Health Laboratory

vi. Survey Studio

In our drive for excellence, and keeping up with state-of-the-art technological advances of the century and beyond, the Department has continued to provide the necessary environment for promoting the acquisition of basic background in Civil Engineering/Environmental Engineering and to prepare students to accept ultimately the complex responsibility of professional leadership.

1.2 Vision, Mission Statement and Core Values

The vision of the Department is to be the best Civil Engineering Department in Nigeria.

Our mission is to train civil engineers, who will provide the high level technical human resources needed in the national economy. We intend to achieve this by:

- Teaching and training our students to acquire the technical competence for the design development, testing and production of facilities, works, systems, devices, and products that are of benefit to mankind;
- Providing facilities for teaching and research and human capacity development; and
- Designing our curriculum to meet the needs of industry and society at large.

Our core values are:

- ❖ Excellence in teaching, learning, and research
- ❖ Self-reliance
- ❖ Spirit of enquiry
- ❖ Fairness
- ❖ Entrepreneurship

- ❖ Global Best Practice

1.3 Philosophy and Objectives

The Department of Civil and Environmental Engineering in the Faculty of Engineering at the University of Port Harcourt has as its primary function the education and training of students to have the technical competence for the design development, testing and production of devices, systems, and products that are of benefit to mankind. The graduates should have an interest in, and capability for, the application of engineering principles to real life problem solving. The Department has established a foundation for continuing education and for maintaining competence in solving new problems as they arise. Accordingly, the Department provides in addition to residence education, programmes in research, development and continuing engineering education.

Our undergraduate programme(s) address the pressing societal needs and also meet the standards set by the Council for the Regulation of Engineering in Nigeria (COREN). In the language of our former Dean of the Faculty, Professor Chi U. Ikoku, our undergraduate programme(s) are designed to give the students a degree which is both internationally respectable and individually flexible. Thus, to stand the test of time, our programme(s) have the following features:

i. Common foundation years;

ii. Workshop practice/technology, laboratory work, and tutorial;

iii. Broad-based Engineering and interaction between students and professionals;

iv. Special skills and in-depth study in a particular area of the programme through optional or elective courses;

v. Adequate knowledge in areas of Engineering Management, Economics and Law;

vi. Emphasis on design, fabrication, installation, and maintenance of products and adaptation of exogenous technology to solving local problems;

vii. Emphasis on computer –assisted engineering;

viii. Projects in final year on which the students work alone under supervision.

The Department of Civil and Environmental Engineering is also committed to the provision of quality Civil Engineering and Environmental Engineering Education aimed at impacting Civil Engineering and Environmental Engineering Competence and Development of skills to both staff and students at all levels.

The Department has the objective of turning out Graduates of Civil Engineering/Environmental Engineering Profession who would be found worthy both in character and in learning. To train Civil engineering/Environmental engineering Students to have interest in the capability and the application of Civil Engineering/Environmental engineering principles to real problem solving.

1.4 Admission Requirements

The Minimum admission requirements for entry into the 5-year Bachelor of Engineering Degree programme(s) in Civil Engineering and Environmental Engineering are Five 0-Level credits obtained *in not more than two sittings*, which must include English Language, Mathematics, Physics, Chemistry **and** any one of Biology, Agricultural Science, Technical Drawing, Further Mathematics (*preferred*) . Also required is a score in University Matriculation Examination (**UME) and Post UME, which is administered by the University of Port Harcourt,** not below the Cut-Off Point or Minimum score stipulated for English, Mathematics, Physics and Chemistry in **Basic Studies** for the Year in question.

1.5 Structure of Programme(s)

The programme(s) currently run in the Department are: Civil Engineering and Environmental Engineering. Both programmes span for five Academic calendar years (comprising a total of ten semesters) of which nine out of the ten semesters are used for formal class room/laboratory studies. The second semester in the fourth year and the two long vacations (at the end of the third and fourth year) is used for industrial training. At the fifth year of studies, students are assigned research 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.

2 ACADEMIC AND SENIOR TECHNICAL STAFF

2.1 Past/Present Deans/Provost

S/N	NAME	PERIOD	DESIGNATION
1	Engr. Prof. Chi U. Ikoku	1983 – 1999	Dean
2	Engr. Prof. Y. O. Beredugo	1999 – 2000	Acting Dean
3	Engr. Prof. I. L. Nwaogazie	2000 – 2002	Dean
4	Engr. Prof. A. O. Kuye	2002 – 2004	Dean
5	Engr. Prof. C. Umezuruike	2004 – 2005	Dean
6	Engr. Dr. A. Dosunmu	2005 – 2006	Acting Dean
7	Engr. Prof. D. P. S. Abam	2006 – 2008	Dean
8	Engr. Prof. D. Appah	2008 – 2009	Dean
9	Engr. Prof. J. U. Okoli	2009 – 2011	Dean
10	Engr. Prof. S. U. Ejezie	2011 – 2013	Dean
11	Engr. Prof. D. Appah	2013 - 2015	Provost
12	Engr. Prof. O. M. O. Etebu	2015 - Date	Dean

2.2 Past/Present Heads of Department

S/No	Name	Period	Designation
1	Dr. M. B. Ebong	1984 – 1987	Ag. Head
2	Dr. I. L. Nwaogazie	1987 – 1989	Ag. Head
3	Dr. J. O. Arumala	1989 – 1991	Ag. Head
4	Dr. S. U. Ejezie	1991 – 1993	Ag. Head
5	Dr. M. B. Ebong	1993 – 1997	Ag. Head
6	Dr. T. G. Leton	1997 – 2001	Ag. Head
7	Dr. E. O. Duru	2001 – 2003	Ag. Head
8	Dr. S. U. Ejezie	2003 – 2005	Ag. Head
9	Dr. E. O. Duru	2005 – 2007	Ag. Head
10	Dr. P. O. Omotosho	2007 – 2010	Ag. Head
11	Prof. S. U. Ejezie	2010 – 2011	Head
12	Prof. T. G. Leton	2011 – 2012	Head
13	Engr. T.C. Nwofor	2012 - 2014	Ag. Head
14	Dr. I. E. Iwegbue	2014	Ag. Head
15	Dr. D. B. Eme	2015 - Date	Ag. Head

2.3 Academic Staff

S/N.	Name	Qualification	Field of Specialization	Designation/ Date of First Appointment
1	Nwaogazie, I. L.	B.Sc, Civil Eng; M.Sc, Water Res (Kansas); Ph.D (Oklohoma State); FNSE; R. Engr (2455)	Hydrology/Water Resources and Mathematical Modeling	Professor 20th Oct. 1983
2	Ejezie, S. U.	B.Sc (Ibadan); MS (Cornell); Ph.D (Carmegie-Mellon); FNSE; FNICE; FNGA; R.Engr (8436); V-P Africa ISSMGE	Soil Mechanics and Geotechnical Engineering	Professor 1st Aug. 1978
3	Leton, T. G.	B.Sc (UNN); M.Sc (Strathclyde); Ph.D (Leeds); MNSE; R.Engr (6667)	Public Health and Environmental Engineering	Professor 9th Aug. 1983
4	Johnarry,Tonye N.	BSc Civil Eng. (UNILAG) MSc Highway	Structural Engineering	Professor 5th Oct. 2012

S/N.	Name	Qualification	Field of Specialization	Designation/ Date of First Appointment
		Engineering (The City University London) PhD Structural Eng. (Strathclyde University, Glasgow) MNSE R.Engr 1900		
5	Oguara, Telimoye M.	BSc Civil Eng(ABU) MSc Civil Eng-Construction Management (University of Washington, Seattle) Graduate Programme in Transportation Planning (Cornell University, Ithaca) PhD Civil Eng-Highway Eng (University of Washington, Seattle) FAEng, FNICE, FNSE, MASCE R.Engr 2071	Transportation and Highway Engineering	Professor 10th Jan. 2013
6	Iwegbue, I. E.	B.Sc, (Lagos); M.Sc, Ph.D (Manchester); MNSE; R.Engr (COREN) 3646	Structural Engineering	Senior Lecturer 11th Dec. 2009
7	Atuboyedia, T. J.	M.Tech, Ph.D (RSUST); MNSE; MASCE; CHIT; R.Engr 5487	Transportation and Highway Engineering	Senior Lecturer 1st Jun. 2010
8	Ugbebor, J. N.	B.Sc (UNIPORT); M.ENG (UNIPORT); M.Sc (UNIPORT); Ph.D (UNN)	Environmental Issues and Pollution Control; Safety in the Oil and Gas Industry	Senior Lecturer 10th Nov. 2008
9	Nwankwoala, Hycienth Ogunka	B.Sc (UNIPORT) M.Phil (RUST) Ph. D (UNIPORT)	Environmenta /Applied Hydrogeology	Senior Lecturer 15th Oct. 2006
10	Tse, Akaha Celestine	B.Sc (ABU) M.Sc (UNIPORT) Ph.D (UNIPORT)	Engineering Geology	Senior Lecturer 15th May, 1997
11	Eme, D. B.	B.Tech; M.Tech (RSUST)	Highway and Transportation	Senior Lecturer 8th Feb. 2008

S/N.	Name	Qualification	Field of Specialization	Designation/ Date of First Appointment
		Ph.D (UNN); R.Engr (COREN) 14231	Engineering	
12	Nwofor, T. C.	B.Tech; M.Tech; PhD (RSUST) R.Engr (COREN) 16307	Structural Engineering	Senior Lecturer 8th Feb. 2008
13	Nwaobakata, C.	B.Tech; M.Tech (RSUST); Ph.D (UNN); R.Engr (COREN) 13346	Highway and Transportation Engineering	Senior Lecturer 10th Nov. 2008
14	Momoh, Y.	B.Sc (UNIBEN); M.Sc (UNIPORT); PhD (UNIBEN)	Bioenergy, Biofuels, and Bio-remediation	Senior Lecturer 15th May 2006
15	Nwankwo, C. A.	B.Sc (EKPOMA); M.Sc (UNILAG); M.Eng (UNIPORT); Ph.D (Leeds)	Bioremediation of Contaminated Land and Groundwater, Water Sanitation and Health	Lecturer I 15th May 2006
16	Ugwoha, E.	B.Tech (RSUST); M.Sc (Newcastle); Ph.D (Nottingham)	Fate and Transport of Contaminants in the Environment	Lecturer I 30th Jan. 2014
17	Raheem, K. A.	B.Sc; M.Sc (Lagos)	Surveying	Lecturer I 18th Mar. 1997
18	Udeh, N. U.	B.Sc (ESUT); M.Eng (UNIPORT) Ph.D (UNN)	Water Quality and Bioremediation	Lecturer I 10th Nov. 2008
19	Sule, S.	B.Sc (ABU); M.Eng (UNN) R.Engr 27606	Structural Engineering	Lecturer I 8th Feb. 2008
20	Membere, E. A.	B.Sc (UNIPORT); M.Sc (Newcastle)	Environmental Chemistry	Lecturer I 10th Nov. 2008
21	Henshaw, E. T.	B.Eng, MEng Civil Eng (UPH)	Water Resources Engineering	Lecturer II 2nd Jun. 2010
22	Ikebudu, C. F.	B.Eng, MEng Civil Eng (UPH)	Water Resources Engineering	Lecturer II 2nd Jun. 2010
23	Ogbodo, M. C.	B.Eng, Civil Eng (UPH), MEng (Unilag)	Structural Engineering	Lecturer II 2nd Jun. 2010
24	Nnenanya, F. E.	B.Eng, Civil Eng (UPH), MSc Soil Mechanics (Imperial College London)	Soil Mechanics and Geotechnical Engineering	Lecturer II 2nd Jun. 2010
25	Amah, V. E.	B.Eng (UNIPORT); M.Eng (UNIPORT)	Noise Pollution and Air Quality	Assistant Lecturer 30th Jan. 2014

2.4 Technical Staff

Name	Rank/Designation/ Date of First Appointment	Qualifications, Dates Obtained Membership of Professional Association	Duties Performed/Courses Taught
Osamudiamen, O. P.	Technologist I 2nd Jun. 2010	HND (Civil) 2006	Civil Eng. Lab. I (Soil & Geotechnical Engineering)
Yobe, K. B.	Technologist I 1st Jul. 2010	OND (Civil) 2005 HND (Civil) 2008	Civil Eng. Lab. II (Structures)
Geremene, M.	Technologist I 1st Jul. 2010	OND (Civil) 2005 HND (Civil) 2008	Civil Eng. Lab. III (Hydraulics)
Dawa, Friday B.	Field Supervisor 30th Sep. 1987	WASC 2008	Supervision of all field courses
Chukwunda, Donatus S.	Lab. Supervisor 21st Jan. 1987	WASC 1978 A/L 1982	Supervision of all laboratory courses
Adah, Joyce Chikweri	Head Lab Attendant 3rd Sep. 2012	WAEC 1996/98	Cleaning and care of laboratory equipment
Worlu, Nkem Rachael	Lab Attendant 3rd Sep. 2012	NECO 2002	Cleaning and care of laboratory equipment
Nwadigwu, Chidinma	Head Lab Attendant 18th Dec. 2013	NECO 2008	Cleaning and care of laboratory equipment
Osimini, Nyebuchi	Head Lab Attendant 18th Dec. 2013	NECO 2000	Cleaning and care of laboratory equipment

2.5 Administrative Non-Teaching Staff

Name of staff	Rank/Designation Date of First Appointment	Qualifications, and Dates Obtained	Duties Performed
Ms. Florah Ada Wachukwu	Admin Officer 19thSep. 2011	BSc 2008	Administrative
Mrs. E. A. Deeyor	Personal Secretary II 19th Aug. 1977	B.Ed. Business Studies (Secretarial) 1999	Secretarial function
Mr. Tamana Bum Wilfred	Clerical officer 22nd Aug. 1996	SSCE 2008	Clerical function
Mrs. Grace Amaehula	Caretaker 13th Jul. 1995	FSLC	Cleaning/Messenger
Mr. MkpaBaridoo	Caretaker 9th Nov. 1998	FSLC 1982	Messenger

3 ACADEMIC POLICIES

3.1 Highlights

The following extracts have been taken from the document "Statement of Academic Policies, University of Port Harcourt 1996". This document was issued first in 1977, revised in 1983 to reflect the reorganization from a School system to a Faculty system; and revised in 1990 to reflect changes in line with the NUC Minimum Academic Standards. The present revision reflects changes made by Senate in 1995. Students are advised to familiarize themselves with this document.

The last section of this Chapter: General Remarks, has been included to alert the fresh student on the implications of the new grading system in relation to his/her final degree classification, and the virtue of and reward for hard work, honesty and abstinence from vices: examination malpractice and cultism.

3.2 Entry Requirements

Credit passes at the SSCE, WASC/GCE O-level, NECO in English, Mathematics, Chemistry, Physics and any one of Biology, Agric. Science, Technical Drawing, and Further Mathematics (*preferred*).

The minimum admission requirements for entry into the 5-year Bachelor of Engineering Degree programmes are five O-level credits which must include English Language, Mathematics, Physics, and Chemistry.

3.3 Registration of Courses

Every student is required to register for all courses during the time stipulated which is usually within the first week of resumption, except where otherwise indicated. Students who cannot register

during the specified time may however, register later but all registration exercise must be completed within the time allowed for late registration.

Course registration is the responsibility of the student's parent Department. The Head of Department signs for all the courses registered.

In registering students, the parent Department should ensure that students re-register for all previously failed courses in which the programme requires a pass and meet the prescribed requirements for each course registered; furthermore, that the total credit units registered are not less than 15 nor more than 24 per semester.

Any registration completed after the time specified will be null and void, and will not be credited to the student even when he/she has taken and passed the examination in the course. Students are not allowed to sit for examinations in courses for which they have not previously registered. Such actions are fraudulent and culprits will be appropriately disciplined.

Any genuine request for late registration must be made in writing to the Head of Department, and a late registration fee, whose amount is reviewed each year in line with the cost of living, must be paid to the Bursary. Forms for late registration will be given out only when the appropriate receipt is documented on the Form.

Application for adding or dropping a course must be made on the prescribed Add/Drop Form and certified by the Registrar after obtaining the approval of the Head of Department concerned, not later than four weeks before the examination in each term. Any change of course made by altering the Registration Form will be null and void.

3.4 Grading System

The following system of Grade Points shall be used for all Faculties:

Mark/Score	New Students*		Mark/Score	Old Students**	
	Letter Notation	Grade Point (GP)		Letter Notation	Grade Point (GP)
70% & above	A	5.00	70% & above	A	5.00
60 – 69	B	4.00	65 – 69	B+	4.50
50 – 59	C	3.00	60 – 64	B	4.00
45 – 49	D	2.00	55 – 59	C+	3.50
40 – 44	E	1.00	50 – 54	C	3.00
0 – 39	F	0.00	45 – 49	D+	2.50
			40 – 44	D	2.00
			30 – 39	E	1.00
			29% & below	F	0.00

***** *New students are those in the first year of the degree programme by October 1990 and after.*

****** *Old students are those enrolled in second or higher level courses by October 1990 having completed at least the first year of the degree programme.*

Students are obliged to sit for examinations in all registered courses. Any student who fails to sit for a course examination without satisfactory reason earns the grade of "F".

3.5 Computation of Grade Point Average

Every course carries a fixed number of Credit Units (CU); one Credit Unit being when a class meets for one hour every week for one semester, or three hours every week in the laboratory, workshop or field. Quality Points (QP) are derived by multiplying the Credit Unit for the course by the Grade Points (GP) earned by the student: that is, in a course with 3 Credit Units in which a student earned a B with 4 Grade Points, the Quality Points are: 3 x 4 = 12.

Grade Point Average (GPA) is derived by dividing the Quality Points for the semester by the Credit Units for the semester: that is, in a semester where the student earned 56 Quality Points for 18 Credit Units, the GPA is 56 ÷ 18 = 3.11.

Cumulative Grade Point Average (GPA) is derived by adding the Total Quality Points (TQP) to date and dividing by the Total Credit Units (TCU) to date: that is, if the TQP are 228 and the TCU are 68, the CGPA is: 228 ÷ 68 = 3.35.

Detailed example of how to calculate GPA and CGPA is as presented in the Tables below.

Typical Example for GPA and CGPA Computation

First Year, Semester One

Course Code	Credit Units (CU)	Letter Grade	Grade Point (GP)	Quality Points (QP)	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA)
APC 100	3	B	4	12	$QP_1 = 66$	$TQP = QP_1 = 66$
APC 101	2	C	3	6		
APC 102	1	C	3	3	$CU_1 = 17$	$TCU = CU_1 = 17$
APC 103	4	B	4	16		
APC 104	5	A	5	25	GPA = 66 ÷ 17 = 3.88	CGPA = 66 ÷ 17 = 3.88
APC 105	2	D	2	4		
Total	17			66		

First Year, Semester Two

Course Code	Credit Units (CU)	Letter Grade	Grade Point (GP)	Quality Points (QP)	Grade Point Average (GPA)	Cumulative Grade Point Average (CGPA)
APC 106	5	E	1	5	$QP_2 = 48$	$TQP=QP_1+QP_2$ = 66+48=114
APC 107	4	D	2	8		
APC 108	5	B	4	20	$CU_2 = 20$	$TCU=CU_1+CU_2$ = 17+20=37
APC 109	3	F	0	0		
APC 110	3	A	5	5	GPA = 48÷20=2.40	CGPA=114÷37 = 3.08
Total	20			48		

NB: The procedure is repeated for the 2nd, 3rd, 4th, and 5th years, giving rise to CGPA computation at graduation.

The following points are noteworthy for GPA-CGPA computation:

i. Grades obtained in all approved courses of a student's prescribed programme, excluding audited courses, shall be used to compute the GPA.

ii. Where a student has registered more than the allowed number of free elective courses, only the grades obtained in the allowed number of elective courses, chosen in the order of registration, will be used in computing the CGPA.

iii. Where a student was registered for a course but the result is unavailable, due to no fault of the student, no result will be recorded for that course and the student will re-register for it in the next academic year.

iv. When a student transfers from one Faculty to another, only the grades obtained in the new prescribed programme of study will be used to compute the CGPA. Courses which were completed before the change of programme and which are not part of the new prescribed programme will be treated as audited courses.

3.6 Continuation, Probation and Withdrawal

The essential points on the subject matter are as highlighted below:

i. Continuation Requirement

The continuation requirement in the University is a CGPA of 1.00 at the end of every academic year.

ii. Probation

Probation is a status granted to a student whose academic performance falls below an acceptable standard. A student whose Cumulative Grade Point Average (CGPA) is below 1.00 at the end of a particular year of study earns a period of probation for one academic year.

iii. Limitation of Registration

Students on probation may not register for more than 18 units per semester. The purpose of the restriction is to give the students a chance to concentrate on improving their performance and thus raising their CGPA.

iv. Warning of Danger of Probation

Students should be warned by their Department if at the end of any semester their GPA falls below 1.00.

v. Repeating Failed Course Unit(s)

Subject to the conditions for withdrawal and probation, a student must repeat the failed course unit(s) at the next available credit units carried during that semester does not exceed 24, and the Grade Points earned at all attempts shall count towards the CGPA.

vi. Temporary Withdrawal from Study

A student may apply for temporary withdrawal from study for a period of one year which may be renewed up to a maximum of 2 years.

vii. Withdrawal

A student whose Cumulative Grade Point Average is below 1.00 at the end of one year's probation shall be required to withdraw from the programme.

3.7 Auditing of Courses

Students may attend a course outside their prescribed programme. The course shall be recorded in their transcript only if they have registered for it with the approval of the Head of their Department and Dean of their Faculty and taken the prescribed examination. An audited course shall not be used in calculating the CGPA.

3.8 Academic Advisers

Every student is attached to an Academic Adviser who is a member of the academic staff and who will advise him/her on academic affairs as well as on personal matters. Academic advisers are expected to follow their student's academic progress and provide counseling to them. It is the duty of the Head of Department to assign an Academic Adviser to each student at the beginning of each session. Academic Advisers should give clear information on the notice boards or on their office doors about appropriate times and places at which they will be available to students who wish to consult them.

3.9 Classification of Degrees

The degree shall be awarded with 1st, 2nd Upper, 2nd Lower, or 3rd Class Honours, or as a Pass degree. The Cumulative Grade Point Average (CGPA) for these classes shall be:

Class of Degree	Cumulative Grade Point Average (CGPA)	
	New Students*	Old Students*
1st class	4.50 – 5.00	4.60 – 5.00
2nd class Upper	3.50 – 4.49	4.00 – 4.59
2nd class Lower	2.40 – 3.49	3.00 – 3.99
3rd class	1.50 – 2.39	2.60 – 2.99
Pass	1.0 – 1.49	2.00 – 2.59

Old and New Students are as defined in Section 3.4

3.10 General Remarks

All the students admitted into the 1st year of the Faculty of Engineering programmes must have met the entry requirements, and thus, eligible to pursue the available careers in the Faculty. However, experience has shown that many of these students relax their efforts in the early years of study, apparently assuming that, like the practice in the primary and secondary schools, they would make up the lost efforts in their later years of study. This assumption is false in the Nigerian University System.

Here, at the University of Port Harcourt, every registered course (except officially dropped):

i. requires a minimum of 70% attendance to lecture/tutorial (L) and/or laboratory/practice (P);
ii. must be continuously assessed through assignments, tests, etc.;
iii. must culminate in an examination, and
iv. must have a grade returned for every student who registered for it, which must comprise of at least 30% from the continuous assessment and 70% from the examination.

Each course in the programme contributes towards the Cumulative Grade Point Average (CGPA) with its weight (credit units). In the Faculty of Engineering, the weights for courses may be 1, 2 or 3 credit units as the case may be, except for the final year project whose weight is 6 credit units.

Most top job opportunities in the industry are usually reserved for graduates with excellent or very good degree classification (1st class or 2nd class upper division). For example, to be qualified to become a Lecturer in the University, one's first degree must not fall below 2nd class upper division. And to qualify for admission into a post-graduate degree programme at the University of Port Harcourt, one's first degree must not fall below a 'high' 2nd class lower division (that is, his/her final CGPA must not be below 3.00).

In terms of the letter grades earned in all courses offered in a given academic programme of study, 1st class, 2nd class upper division and 'high' 2nd class lower division simply mean, respectively:

i. The *1st class* is equivalent to the attainment of at least 'A', 'B' average (a minimum final CGPA of (5+4)/2 = 4.50) during the course of study. To achieve this, one must earn very few 'Cs', say, two or three and more 'As' than 'Bs' in all the courses. Earning even one 'E' grade and/or Ds can be fatal.
ii. The *2nd class upper division* is equivalent to the attainment of at least 'B', 'C' average (a minimum final CGPA of (4+3)/2 = 3.50) during the course of study. To achieve this, one must earn very few 'Ds', say, two or three, many 'As' and 'Bs'. Earning few 'Es' and 'Ds' can be fatal.
iii. The *'high' 2nd class lower division* is equivalent to the attainment of an average grade of 'C' (a minimum final CGPA of 3.00) during the course of study. To achieve this, one must be an average student throughout the programme of study.

Therefore, for the ambitious student, hard work begins from year 1 and spans through year 5. Few low grades can thwart his/her ambition. However, one should always be true to his/her abilities, and not resort to cheating to claim what does not belong to him/her. Appendix A presents some of the penalties for a false ambition (Examination Malpractice).

Students are therefore advised to completely avoid vices (such as secret cultism and examination malpractice) that will ultimately put them out of course and disrepute. They are rather encouraged to be obedient, humble and law-abiding and to act in such a manner as to achieve their primary purpose of advancing their education.

4. CURRICULUM

4.1 Course Structure

The Bachelor of Engineering (B.Eng) in Civil Engineering and Environmental Engineering programmes is for five years. The course structure is mainly divided into Basic Engineering Courses and Core Civil Engineering/Core Environmental Engineering Courses. The Basic Engineering Courses covers courses taken in years one to five. These courses are professional Engineering courses mainly from within the Faculty of Engineering. The core Civil Engineering and Environmental Engineering Courses are taken from years two to five. There are also university wide courses/General Studies Courses and Science Courses taken in years one and two. The common courses (Science,General Studies and Basic Engineering courses) are foundation courses to all Engineering disciplines. The student undertakes three-month industrial training in their third year and six-month industrial training in year four. During the industrial training period, the students are supervised by both lecturers and industry-based supervisors. At their final year, they conduct a research project (with topics drawn from different fields of specialization in civil

engineering and environmental engineering) and submit a report on it.

4.2 Schedule of Courses

4.2.1 Civil Engineering Programme

Year One

First Semester				
Course Code	**Course Title**	**L**	**P**	**C**
GES 100.1	Communication Skills in English	3	0	3
GES 102.1	Introduction to Logic & Philosophy	2	0	2
CHM 130.1	General Chemistry I	2	3	3
PHY 101.1	Mechanics & Properties of Matter	3	0	3
PHY 102.1	Physics Laboratory I	0	3	1
MTH 110.1	Algebra and Trigonometry	3	0	3
MTH 120.1	Calculus	3	0	3
ENG 101.1	Engineering Drawing I	1	3	2
Total		**17**	**9**	**20**

Second Semester				
Course Code	**Course Title**	**L**	**P**	**C**
GES 101.2	Computer Appreciation and Application	2	0	2
GES 103.2	Nigerian Peoples and Culture	2	0	2
CHM 131.2	General Chemistry II	2	3	3
PHY 112.2	Electricity and Magnetism	3	0	3
PHY 103.2	Physics Laboratory II	0	3	1
MTH 124.2	Co-ordinate Geometry	3	0	3
ENG 102.2	Engineering Drawing II	1	3	2
ENG 103.2	Engineer in Society	1	0	1
ENG 104.2	Manufacturing Technology/Workshop Practice	1	3	2
Total		**15**	**12**	**19**

Year Two

First Semester				
Course Code	**Course Title**	**L**	**P**	**C**
PHY 216.1	Vibration, Waves and Optics	3	0	3
ENG 201.1	Engineering Mathematics I	3	0	3
ENG 202.1	Engineering Mathematics II	2	0	2
ENG 203.1	Engineering Mechanics	3	0	3
ENG 204.1	Basic Engineering Materials	2	0	2
ENG 210.2	Basic Electrical Engineering	3	0	3
ENG 213.1	Computer Programming for Engineers	2	3	2
Total		**15**	**12**	**18**

Second Semester				
Course Code	**Course Title**	**L**	**P**	**C**
CHM 240.2	Physical Chemistry	3	0	3
ENG 205.1	Engineering Laboratory I	0	9	1
ENG 206.2	Engineering Mathematics III	3	0	3
ENG 207.2	Basic Fluid Mechanics	2	0	2
ENG 208.2	Basic Strength of Materials	2	0	2
ENG 209.2	Basic Thermodynamics & Heat Transfer	3	0	3
ENG 210.2	Basic Electrical Engineering	3	0	3
ENG 211.2	Engineering Laboratory II	0	3	1
ENG 212.2	Community Service	0	0	1
CEG 231.2	Engineering Geology	2	0	2
Total		**18**	**3**	**18**

Year Three

First Semester				
Course Code	**Course Title**	**L**	**P**	**C**
ENG 301.1	Engineering Mathematics IV	3	0	3
ENG 302.1	Technical Writing & Presentation	2	0	2
CEG 311.1	Fluid Mechanics II	3	0	3
CEG 321.1	Strength of Materials II	3	0	3
CEG 323.1	Civil Engineering Materials	2	0	2
CEG 332.1	Soils Mechanics I	2	0	2
CEG 351.1	Principles of Surveying	2	0	2
CEG 352.1	Survey Camp	0	6	2
CEG 381.1	Civil Engineering Laboratory I	0	3	1
Total		**17**	**9**	**20**

Second Semester				
Course Code	**Course Title**	**L**	**P**	**C**
GES 300.2	Fundamentals of Entrepreneurship	2	-	2
ENG 303.2	Engineering Mathematics V	3	0	3
CEG 312.2	Engineering Hydrology	2	0	2
CEG 333.2	Soil Mechanics II	3	0	3
CEG 341.2	Elements of Architecture	2	3	3
CEG 342.2	Theory of Structures I	3	0	3
CEG 353.2	Surveying for Construction	3	0	3
CEG 361.2	Principles of Construction	2	0	2
CEG 382.2	Civil Engineering Laboratory II	0	3	1
Total		**20**	**6**	**22**

Long Vacation		
ENG 300.3	Industrial Training I	Pass/Fail

Year Four

First Semester				
Course Code	**Course Title**	**L**	**P**	**C**
ENG 401.1	Engineering Mathematics VI	3	0	3
ENG 402.1	Engineering Economics	2	0	2
CEG 413.1	Civil Engineering Hydraulics	2	0	2
CEG 443.1	Reinforced Concrete Design	3	0	3
CEG 444.1	Steel and Timber Design	2	0	2
CEG 445.1	Theory of Structures II	2	0	2
CEG 446.1	Civil Engineering Drawing	1	3	2
CEG 461.1	Highway Engineering	3	0	3
CEG 483.1	Civil Engineering Laboratory III	0	6	2
Total		**18**	**9**	**21**

Second Semester and Long Vacation				
Course Code	**Course Title**	**L**	**P**	**C**
ENG 400.2	Industrial Training II	9	-	9
GES 400.2	Entrepreneurship Project	2	-	2
Total		**11**	**-**	**11**

Year Five

First Semester				
Course Code	**Course Title**	**L**	**P**	**C**
ENG 501.1	Professional Practice & Procedure	2	0	2
ENG 502.1	Engineering Management	2	0	2
CEG 5xx.1	Optional Elective	1	3	2
CEG 514.1	Water & Wastewater Engineering	2	0	2
CEG 534.1	Foundation Engineering	2	0	2
CEG 547.1	Reinforced/Prestressed Concrete	2	0	2
CEG 548.1	Civil Engineering Design	1	3	2

CEG 562.1	Traffic and Transportation Engineering	3	0	3
CEG 591.1	Technical Seminar	1	3	2
Total		**16**	**9**	**19**

Second Semester				
Course Code	**Course Title**	**L**	**P**	**C**
CEG 5xx.2	Optional Elective	3	0	3
CEG 515.2	Water Resources Engineering	2	0	2
CEG 516.2	Pollution Control Engineering	2	0	2
CEG 535.2	Geotechnical Structures	2	0	2
CEG 549.2	Structural Analysis	2	0	2
CEG 571.2	Civil Eng. Measurements & Construction	3	0	3
CEG 592.2	Final Year Project	0	18	6
Total		**14**	**18**	**20**

Elective Courses				
Course Code	**Course Title**	**L**	**P**	**C**
CEG 584.1	Computer Aided Design in Civil Engineering	1	3	2
CEG 518.1	River Engineering	2	0	2
CEG 517.2	Design of Drainage Systems	3	0	3
CEG 536.2	Regional Geology	3	0	3
CEG 563.2	Highway Bridges and Culverts	3	0	3

4.2.2 Environmental Engineering Programme

Year One

First Semester				
Course Code	**Course Title**	**L**	**P**	**C**
GES 100.1	Communication Skills in English	3	0	3
GES 102.1	Introduction to Logic & Philosophy	2	0	2
CHM 130.1	General Chemistry I	2	3	3
PHY 101.1	Mechanics & Properties of Matter	3	0	3
PHY 102.1	Physics Laboratory I	0	3	1
MTH 110.1	Algebra and Trigonometry	3	0	3
MTH 120.1	Calculus	3	0	3
ENG 101.1	Engineering Drawing I	1	3	2
Total		**17**	**9**	**20**

Second Semester				
Course Code	**Course Title**	**L**	**P**	**C**
GES 101.2	Computer Appreciation and Application	2	0	2
GES 103.2	Nigerian Peoples and Culture	2	0	2
CHM 131.2	General Chemistry II	2	3	3
CHM 132.2	Principles of Organic Chemistry	3	0	3
PHY 112.2	Electricity and Magnetism	3	0	3
PHY 103.2	Physics Laboratory II	0	3	1
MTH 124.2	Co-ordinate Geometry	3	0	3
ENG 102.2	Engineering Drawing II	1	3	2
ENG 103.2	Engineer in Society	1	0	1
ENG 104.2	Manufacturing Technology/Workshop Practice	1	3	2
Total		**18**	**12**	**22**

Year Two

First Semester				
Course Code	**Course Title**	**L**	**P**	**C**
EVE 201.1	Environmental Engineering Microbiology	2	0	2
PHY 216.1	Vibration, Waves and Optics	3	0	3
ENG 201.1	Engineering Mathematics I	3	0	3
ENG 202.1	Engineering Mathematics II	2	0	2
ENG 203.1	Engineering Mechanics	3	0	3
ENG 204.1	Basic Engineering Materials	2	0	2
ENG 210.1	Basic Electrical Engineering	3	0	3
ENG 212.1	Community Service	0	3	1
ENG 213.1	Computer Programming for Engineers	2	3	2
Total		**20**	**6**	**21**

Second Semester				
Course Code	**Course Title**	**L**	**P**	**C**
EVE 202.2	Public Health Engineering & Radiology	2	0	2
EVE 203.2	Environmental Engineering Chemistry	2	0	2
EVE 204.2	Environmental Pollution and Ecology	2	0	2
ENG 205.1	Engineering Laboratory I	1	3	1
ENG 206.2	Engineering Mathematics III	3	0	3
ENG 207.2	Basic Fluid Mechanics	2	0	2
ENG 208.2	Basic Strength of Materials	2	0	2
ENG 209.2	Basic Thermodynamics & Heat Transfer	3	0	3
ENG 211.2	Engineering Laboratory II	1	3	1
CEG 231.2	Engineering Geology	2	0	2
Total		**20**	**6**	**20**

Year Three

First Semester				
Course Code	**Course Title**	**L**	**P**	**C**
EVE 301.1	Environmental Resources & Sustainability	2	0	2
ENG 301.1	Engineering Mathematics IV	3	0	3
ENG 302.1	Technical Writing & Presentation	2	0	2
CEG 311.1	Fluid Mechanics II	3	0	3
CEG 321.1	Strength of Materials II	3	0	3
CEG 323.1	Civil Engineering Materials	2	0	2
CEG 332.1	Soils Mechanics I	2	0	2
CEG 351.1	Principles of Surveying	2	0	2
CEG 352.1	Survey Camp	0	6	2
CEG 381.1	Civil Engineering Laboratory I	0	3	1
Total		**19**	**9**	**22**

Second Semester				
Course Code	**Course Title**	**L**	**P**	**C**
GES 300.2	Fundamentals of Entrepreneurship	2	0	2
EVE 302.2	Fundamentals of Biological Treatment	2	0	2
ENG 303.2	Engineering Mathematics V	3	0	3
CEG 312.2	Engineering Hydrology	2	0	2
CEG 333.2	Soil Mechanics II	3	0	3
CEG 342.2	Theory of Structures I	3	0	3
CEG 353.2	Surveying for Construction	3	0	3
CEG 361.2	Principles of Construction	2	0	2
CEG 382.2	Civil Engineering Laboratory II	0	3	1
Total		**20**	**3**	**21**

Long Vacation		
ENG 300.3	Industrial Training I	Pass/Fail

Year Four

First Semester				
Course Code	**Course Title**	**L**	**P**	**C**
EVE 401.1	Pollution Transport in Water & Soil	2	0	2
ENG 401.1	Engineering Mathematics VI	3	0	3
ENG 402.1	Engineering Economics	2	0	2
CEG 413.1	Civil Engineering Hydraulics	2	0	2
CEG 443.1	Reinforced Concrete Design	3	0	3
CEG 444.1	Steel and Timber Design	2	0	2
CEG 446.1	Civil Engineering Drawing	1	3	2
CEG 461.1	Highway Engineering	3	0	3
CEG 483.1	Civil Engineering Laboratory III	0	6	2
Total		**18**	**9**	**21**

Second Semester and Long Vacation				
Course Code	**Course Title**	**L**	**P**	**C**
ENG 400.2	Industrial Training II	0	18	9
GES 400.2	Entrepreneurship Project	2	0	2
Total		**2**	**18**	**11**

Year Five

First Semester				
Course Code	**Course Title**	**L**	**P**	**C**
ENG 501.1	Engineering Professional Practice & Procedure	2	0	2
ENG 502.1	Engineering Management	2	0	2
CEG 534.1	Foundation Engineering	2	3	2
CEG 584.1	Computer Aided Design in Civil Engineering	2	0	2
EVE 5xx.1**	*Elective*	2	0	2
EVE 501.1	Environmental Engineering Design	2	0	2
EVE 502.1	Environmental Risk Assessment & Management	2	0	2
EVE 503.1	Environmental Engineering Seminar	0	0	1

EVE 504.1	Environmental Engineering Laboratory	1	0	1
EVE 506.1	Wastewater Treatment	2	0	2
EVE 512.1	Water Treatment & Supply Engineering	2	0	2
Total		**19**	**3**	**20**

****NOTE:** Please choose any one of the three available elective courses for this semester below.

Second Semester				
Course Code	**Course Title**	**L**	**P**	**C**
CEG 517.2	Design of Drainage System	2	0	2
CEG 571.2	Civil Eng. Measurements & Construction	3	0	3
CEG 5xx.2**	*Elective*	2	0	2
EVE 505.2	Air Quality, Environmental Noise & Vibration	2	0	2
EVE 508.2	Solid & Hazardous Waste Management	2	0	2
EVE 510.2	Environmental Assessment / QC & Safety	2	0	2
EVE 508.2	Final Year Project	0	18	6
Total		**13**	**18**	**19**

****NOTE:** Please choose any one of the two available elective courses for this semester below.

Elective Courses				
Course Code	**Course Title**	**L**	**P**	**C**
CEG 518.1	River Engineering	2	0	2
EVE 507.1	Marine Outfall Design	2	0	2
EVE 513.1	Environmental Information Systems	2	0	2
EVE 509.2	Solid Waste Landfill Design	2	0	2
EVE 511.2	Fundamentals of Irrigation Engineering	2	0	2

4.3 Course Contents for Civil Engineering and Environmental Engineering Programmes

4.3.1 General Studies Courses (GES)

GES 100.1: Communication Skills in English (3 Credits)

Study skill and methods including use of language and use of the library. Listening comprehension skill. Reading skills. Using grammar in reading and writing. Writing skills. Examination techniques.

GES 101.2: Computer Appreciation and Application (2 credits)

History of computers. Generations and classification of computers. IPO model of a computer. Components of a computer system hardware and software. Programming languages, organization of data. Data capture techniques. Introduction to computer networks. Software and its application. Use of keyboard as an input devices. DOS, windows, word processing, spread sheets. Application of computers in medicine, social sciences, humanities, education and management sciences.

GES 102.1: Introduction to Logic and Philosophy (2 credits)

The nature, definition and branches of philosophy. Philosophy and other disciplines. Nature and branches of philosophy. Periods in the history of philosophy. Philosophy and national development. Types of argument and reasoning. Inferences.

GES 103.2: Nigerian Peoples and Culture (2 credits)

The concept of culture. Pre-colonial cultures and languages of Nigeria. Principles of kinship, descent and marriage in Nigeria cultures. Nigerian development in Nigeria. Religion in Nigerian culture. Culture, environment and health practices in Nigeria.

GES 300.2: Fundamentals of Entrepreneurship (2 credits)

The course discusses the concept, history and the development of entrepreneurship; the entrepreneur qualities and characteristics; the entrepreneur and business environment; identifying business opportunities; starting and developing new business ventures; legal forms of business ownership and registration; types of business ownership; feasibility studies; role of small and medium scale enterprise (SME) in the economy; role of government on entrepreneurship; business location and layout; accounting for SME; financing SME; managing of SME; marketing in SME; risk management of SME; success and failure factors of SME; prospects and challenges of entrepreneurship and intrapreneurship, ethical behaviour in small business.

GES 400.2: Entrepreneurship Project (2 credits)

The course focuses on engaging the student in individual or group project to select product(s) or service(s), conduct a feasibility study, design and develop the product/service, design its manufacturing system and marketing strategies, and determine the modalities for establishing and operating an enterprise based on the product/service. It is expected that the knowledge and experience gained in the Entrepreneurship Project would evolve in the desire and capability of the students for self-employment as small-scale-industry (SME) entrepreneurs. Pre-requisite: GES 300.2.

4.3.2 Sciences Courses [CHEMISTRY (CHM), PHYSICS (PHY), MATHEMATICS/COMPUTER SCIENCE (MTH)]

CHM 130:1: General Chemistry I (3 credits)

Basic principles of matter and energy from the chemist's point of view. A broadly based course suitable for students from various schools as well as those from the faculty of sciences. Topics to be

covered will include atomic theory and molecular structure stoichiometry, the periodic classification of the elements, atomic structure, chemical bounding, properties of gases, solids, liquids and solutions, chemical equilibrium, ionic equilibria, chemical thermodynamics, electro-chemistry and chemical kinetics (includes laboratory sessions).

CHM 131.2: General Chemistry II (3 Credits)
Application of the principles of chemical and physical change to the study of the behaviour of matter and the interaction between matters. Course content includes the chemistry of representative elements and their common compounds with emphasis on gradation of their properties-brief chemistry of the first series of transition elements, general principles of extraction of metals; introductory nuclear chemistry (includes lab session).

CHM 240.2: Physical Chemistry (3 Credits)

Introduction to basic physical chemistry. The emphasis is on the properties of gases, the three laws of thermodynamics and the principles of chemical kinetics and electrochemical cells.

PHY 101.1: Mechanics and Properties of Matter (3 Credits)

Topics covered in this course will include the following: motion in one dimension, motion in a plane, work and energy, conservation laws, collisions, solid fraction, rational dynamic, equilibrium of rigid bodies oscillations, gravitation, fluid statics and fluid dynamics. Surface tension, elasticity and viscosity. Pre-requisite: WASC credit in physics, PHY 300 or equivalent.

PHY 102.1: Physics Laboratory I (1 Credits)

Laboratory exercises drawn from PHY 101.1

PHY 112.2: Electricity and Magnetism (3 Credits)

This is an introductory course on electricity and magnetism. Topics covered will include the elastic field. Gauss law. Electric potential, capacitors and dielectric, current and resistance, electromotive force and circuits, the magnetic field, Ampere's law, Faradays law of induction.

PHY 103.2: Physics Laboratory II (1 Credits)

The experiments carried out in this course will cover areas discussed in PHY 112.2. These experiments includes verification of the laws of electricity. Measurement of the electrical properties of conductors; D.C. and A.C circuit properties, series and parallel resonant circuits; transformer characteristics; and other electrical circuit problems.

PHY 216.1: Vibration, Waves and Optics (3 Credits)

This course is an introduction to oscillations and waves phenomena. Topics covered will include vibrations and waves, types of waves, sound waves and wave optics.

MTH 110.1: Algebra and Trigonometry (3 Credits)

Elementary notion of set, subset, union. Intersection, complements; ven diagram. Real numbers, integers. Rational and irrationals, mapping of a set. Real functions and their compositions. Quadratic functions. Cubic function. Roots of quadratic and cubic functions. Partial fractions. Equations with complex roots. Complex number, geometric representation of complex numbers. Demoirvers, series and sequences. Principles of mathematical induction. Binomial theorem. Trigonometric function of angles. Circular functions. Addition theorems. Double and half angles.

MTH 120.1: Calculus (3 Credits)

Function of a real variable, graphs, limits and idea of continuity. The derivation as limit of rate of change. Techniques of differentiation. Methods of change. Techniques of differentiation: methods of integration. Definite integrals. Application of areas, volumes.

MTH 124.2: Coordinate Geometry (3 Credits)

Straight lines, circles, parabola, ellipse, hyperbola. Tangents, normal. Addition of vectors. Scalar and vector products. Vector equation of a line and plane. Kinematics of a particle. Components of velocity and acceleration of a particle moving in a plane. Force, momentum, laws of motion. Under gravity, projectiles, resisted particle motion, elastic, string, simple pendulum impulse. Impact of two smooth sphere, and a sphere on a smooth sphere. Addition of vectors.

4.3.3 Engineering Science Courses (ENG)

ENG 101. 1: Engineering Drawing I (2 Credits)

Introduction to drawing instruments, scales, drafting aids and their proper use. Size of paper and drawing layout. Dimensioning, line work and lettering. Geometrical constructions and engineering graphics. Development of geometric figures and intersection of solid and curves. Introduction to projections.

ENG 102.2: Engineering Drawing II (2 Credits)

Orthographic projections in first and third angles. Isometric projection; sections and sectioning, auxiliary views and staggered sectioning. Freehand sketching. Conventional practices with simple examples, including threads and threaded fasteners, cam profile and assembly drawing from detailed components. Pre-requisites ENG 101.1.

ENG 103.2: Engineer-in-Society (1 Credit)

History of engineering and technology and the philosophy of science. Development of the engineering industry up to the present dat. Safety and health at work. The role of engineers in nation building. Food production, housing, transportation, employment opportunities, energy supply, communication and social infrastructure, etc. The choice of Engineering solutions and decision-making process, risk analysis, etc. lectures by invited professionals

ENG104.2: Manufacturing Technology /Workshop Practices (2 Credit)

Manufacturing methods with metal materials (cold and hot workings) such as deep drawing; wire drawing; spinning and rolling; extrusion. Machine-tool manufacture (turning, milling and shaping, etc., metal-casting; manufacture of plastic products (moulding and blowing). Use of hand tools, bench work and measuring instruments. Fitting and joining processes (soldering, brazing) wood-working and machinery. Surface finishes, forging etc.

ENG 201.1: Engineering Mathematics I (Mathematics Analysis) (3 Credits)

Functions of several variables: functions of 2,3 or more variables, partial derivatives, differential, total differentials, application to approximate computations. Higher-order partial derivatives and differentials. Differentiation of composition, and implicit functions several variables. Exterma and conditional extremum. Change of variables. Multiple integrals: double and triple integrals, analysis in Cartesian coordinates, change of variable to polar, cylindrical, and spherical coordinates, curvilinear coordinates, application to problems of mechanics. Integral dependent on parameters, improper integrals, line integrals, green's formula, conditions for independence of line integral on path, application of problems of mechanics and thermodynamics. Surface integrals, fluid flux across a surface, properties, Stroke's formula. Fluid theory, vector field and vector

lines. Applied series: expansion of power series, application of Taylor's series, Fourier series orthogonal system of functions, the Parseval's relation. Hilbert space, orthogonality with weight function, Fourier integral, Fourier transformation, applications. Special functions, gamma, beta, error, Bessel, legendre and hypergeometric functions. Introduction to analytic functions, Cauchy-Riemann equations, conformal mappings. Pre-requisite: MTH 120.1; ENG 202.1: Engineering Mathematics II

ENG 202.1: Engineering Mathematics II (Linear Algebra & Analytic Geometry) (2 Credits)

Surfaces and curves in space, cylinders, cones, and surfaces of revolution. First and second-order algebraic surface, ellipsoids, hyperboloids and paraboloids. Systems of linear equations. Determinants, minors and cofactors, evaluation methods. Vectors space, linear spaces, Euclidean space, orthogonality, change of basis, inverse matrix, eigenvectors and eigenvalues of matrix, rank. Linear mapping, symmetric, bilinear and quadratic forms. Differentiation and integration of matrices. Application of matrix algebra pre-requisite MTH 110.1 and 124.1.

ENG 203.1: Engineering Mechanics (Statics and Dynamics) (3 Credits)

Basic concepts and principles of mechanics, equilibrium of particles in 2 and 3 dimensions, moment and couple, system of forces, equilibrium of rigid bodies, friction wedges, screw, wheel bolts and statically determinate structure-beams, trusses, frames and mechanics. Linear and curvilinear motions, acceleration, kinetics of parties, Newton's second law, impulse, momentum, impact and restitution, work, energy, power and efficiency. Pre-requisite: PHY 101.1 and MTH 120.1

ENG 204.1: Basic Engineering Materials (2 credits)

Atomic and crystal structure, crystal imperfections and impurities in solids. Fundamentals of crystallography. Atomic vibration and diffusion. Mechanics properties engineering and true stress strain curves, ultimate strength, ductility, impact strength, hardness. Electrical properties-conductivity, semi-conductivity and super conductivity. Optical and magnetic properties of materials. Simple phase diagrams of alloys, with emphasis on the iron-iron carbide system. The relationship between structure and properties. Creep, fatigue. Heat treatment processes. Stability of materials in the services environment corrosive media, sub-zero and elevated temperature, irradiation. Basic criteria for the selection of materials for engineering applications. Engineering properties of wood, concrete, ceramics, polymers and non-ferrous metals and alloys. Pre-requisite: CHM 131.2 and MATH 124.2

ENG 205.1: Engineering Laboratory I (1 Credit)

Assigned laboratory exercises to reflect the basic engineering courses in applied mechanics, materials science, fluid mechanics, strength of materials. Thermodynamics and heat transfer. Guidance on specific experiments and calculation will be provided by the various lecturers.

ENG 206.2: Engineering Mathematic III (Differential Equations) (3 Credits)

Ordinary differential equations; first-order equation, examples of Engineering model, equations with variables separable, Bernoulli's equation; exact equations; the envelops of a family of curves, singular solutions, Clairaut's and Lagrange's equations, orthogonal and isogonal trajectories. Second-and higher-order equations and system of first order equations, first integrals. Linear equations, general theory, boundary value problems. Euler's equations, geometrical and physical interpretation of solutions. Operators and the operator method of solving equations, system of linear equations.

Operational calculus, Laplace transforms theory and application to initial-value problems. Introduction to partial differential equations elliptic, hyperbolic and parabolic equations. Pre-requisite: MTH 120.1 and 124.2

ENG 207.2: Basic Fluid Mechanics (2 Credits)

Fluid properties, fluids statics, principles of fluid flow and applications, flow measurements. Real fluid flow, curvilinear flow (two-dimensional).Dimensional analysis and similitude. Pipe flow and friction factors. Boundary layers and drag. Pre-requisite: PHY 101.1 and ENG 211.1

ENG 208.2: Basic Strength of Materials (2 credits)

Force equilibrium free body diagrams, centroids and second moment of area. Concept of stress and stain; stress diagram. Axially loaded members, composite bars; temperature stresses; relation between elastic constants. Thin cylindrical spherical and conical pressure vessels, cylindrical shells with rings, torsion of circular shaft and power transmission of shafts. Axial force, shear force and bending moment diagrams. Pure bending of beams, bending stresses in composite beams, shearing stresses in beams, complex stresses; principal stresses. Pre-requisite: ENG 211.1

ENG 209.2: Basic Thermodynamics and Heat Transfer (3 Credits)

Engineering thermodynamics: basic concepts definitions, thermodynamic properties; the thermodynamic system units; equations of state for perfect and real gases, and gas mixtures, thermodynamics work and heat; the first law of thermodynamic, energy equations and analysis; basic thermodynamic, energy equations and analysis; basic thermodynamics and introduction to irreversible relations; the second law of thermodynamics and introduction to irreversible processes. Heat transfer basic concepts, heat transfer modes and rate processes. Fourier's law of heat

conduction; Newton's of cooling; Stephan-Boltzmann law of thermal radiation and configuration factor algebra; stationary heat conduction in simple geometries and composite bodies; correlational equations for convective heat transfer, boiling and condensation; heat transfer by combined modes; insulation and intensification of heat transfer; electrical and triple analogies; introduction to heat exchangers. Pre-requisite: PHY 101.1

ENG 210.2: Basic Electrical Engineering (3 Credits)

Circuit elements (R,L,C) DC and AC circuits and signal electrostatics and electromagnetism, basic circuit laws and theorems. Three phase circuits, power and power factor. Electrical and electronic measurements and measuring instruments.Introduction to machines.Introduction to electronics; semi-conductor. Pre-requisite PHY 101.1

ENG 211.2: Engineering Laboratory II (1 Credit)

Assigned laboratory exercise to reflect the basic engineering course in electrical/electronics. Guidance on specific experiments and calculations will be provided by the lecturer.

ENG 212.2: Community Services (1 Credit)

Civil work beneficial to the university community and its environs including but not limited to farming, road building and maintenance, landscaping, planting of flowers and hedges, grass-cutting and general cleaning of campus and its environs. Concreting and laying of seating and footpath slabs.

ENG 213.1: Computer Programming for Engineers (2 Credits)

Computers, computing and engineering, algorithms, flour chart and pseudo code. Computer languages, programming in Fortran77 or later versions. Debugging techniques. Computer code security. Laboratory: hands-on experience on computer through the use of

compliers to run programs and to solve simple analysis problems in fluid, the thermodynamics, heat transfer and electrical systems.

ENG 300.3: Industrial Training I (0 Credit: Pass or Fail)

The practical exposure of the student through direct participation in the work of an industry, to real like working condition. During the training, the student acquires a familiarity with engineering works, organization. Physical layout, and the flow of information, materials and operations. This information is expected to complement and integrate the student's classroom instruction and laboratory/workshop exercise. Duration: 3 months.

ENG 301.1: Engineering Mathematics IV (Probability and Statistics) (3 Credits)

Theory of probability: motivation, probability models, probability axioms, combinatorial problems. Conditional probability, independence of events, Bernoulli trials. Discrete and continuous random variables, mass, distribution, and generating functions, random vectors, independent random variables, exponential distribution, reliability, failure density, hazard function, some important distributions, functions of two random variables, transform methods, computation of means time to failure, inequalities and limit theorems. Conditional distribution and expectation, stochastic process, Bernoulli, Poisson, and renewal processes, availability analysis, random incidence. Instruction to discrete and continuous Markova chains. Measures of central tendency. Statistical inference, parameter estimation, hypothesis testing. Regression, correlation and analysis of variance. Elements of experimental design. Pre-requisite: ENG 201.1

ENG 302.1: Technical Writing and Presentation (2 Credits)

Data gathering and presentation. Technical correspondence; letter of inquiry and replies, letter of application and memoranda. Illustrating technical writing using tables, graphs, diagrams, equations and

appendices. Report writing: progress reports, proposals, students project, thesis and dissertations, oral and visual presentations. Computer –aided technical writing and presentation; words processing and words-processing software packages.

ENG 303.2: Engineering Mathematics V (Numerical Methods and Computer Application) (3 Credits)

Review of the number systems and error analysis. Numerical schemes, error analysis, computer algorithms and program for the solution of the following problems of linear equations, determinants and matrix eigenvalue problems; approximations; data fitting, orthogonal polynomials, least-squares, splines and fast Fourier transforms; differentiations and integration; difference equation; differential equations by Rubge-Kutta and other methods; boundary-value problems in ODE. Introduction to the finite-difference method for partial differential equations. Pre-requisite: ENG 202.1 & ENG 206.

ENG 400.2: Industrial Training II (9 Credits)

The practical exposure of the student through direct participation in the work of an industry, to real like working condition. During the training, the student acquires a familiarity with engineering works, organization. Physical layout, and the flow of information, materials and operations. This information is expected to complement and integrate the student's classroom instruction and laboratory/workshop exercise. Students give a presentation of their experience and submit a report at the end of the training. Duration: 6 months.

ENG 401.1: Engineering Mathematics VI (Mathematical Modelling and Operation Research) (3 Credits)

Basic concept methodology, structures, information support and systems approach. Synthesis, analysis, validation and computer simulation of mathematical methods. Mathematical modelling of

engineering problems at micro, micro and meta-level. Inverse problems; unconstrained and constrained problems. Introduction to operation research. Sensitivity analysis; linear, integer, goal, geometric, dynamic, nonlinear and stochastic mathematical programming. Allocation, routing, searching, project scheduling, sequencing, replacement, inventory, gaming and queuing problems. Computer aided mathematical modelling of engineering systems, processes and operations. Application software packages. Pre-requisite: ENG 206.2, ENG 301.1 & ENG 303.2

ENG 402.1: Engineering Economics (3 Credits)

Scope of engineering investment decisions, compounding, discounting and economic equivalence; cash flow analysis and inflation. Choosing between alternatives; methods for evaluating investments; depreciation, taxes, and cost of capital; comparing alternative investment; replacement analysis budget and budget control, evaluation of public projects. Decision and cost analysis; lease-or-by decisions; economic feasibility study of engineering projects. Computer-aided engineering economics. Pre-requisite: ENG 301.1

ENG 501.1: Professional Practice and Procedures (2 Credits)

Registration of engineering, duties and code of conduct and practice. Ethics, professional responsibilities and practice of Engineering in Nigeria. Typical problems and solutions in various areas of engineering. Engineering projects, planning, feasibility studies and their relevance, guide pre-design survey and stages of engineering design project scheduling. Law: sources and branches of Nigeria law, courts and tribunals. Law of contracts, the engineer as an expert witness. Industrial legislation concerned with incapacity or injury, working conditions, wages, redundancy, trade unions, structure, right and liabilities. Industrial disputes, safety and environmental protection. Pre-requisite: good academic standing.

ENG 502.1: Engineering Management (2 Credits)

Organization structure, goals and functions. Project planning and control. Cost engineering; capital and operating cost estimating, contingencies and allowances. Production forecasts. Phases and constraints, decline functions. Productivity improvement. Purchasing and materials management. Maintenance management. Contract management. Pre-requisite: Good academic standing.

4.3.4 Civil Engineering Courses (CEG)

CEG 231.2: Engineering Geology (2 Credits)

Geological and Mechanical Principles: Geology and (Civil) Engineering, Rock forming minerals, Rock Types and Soil Types, Soil and rock properties. **Geological Structure Analysis:** Geological structures, Plate Tectonics, Geological Time (relative and absolute geological age), Geological Maps and Sections, Discontinuities Analysis (Hemispherical projection). **Processes in Engineering Geology:** Weathering and Soils, Surface Processes (Floodplains and Alluvium, Glacial Deposits, Climatic Variants), Coastal Processes, Groundwater flow. **Geological and Geophysical Site Investigation:** Site Geological Investigation; Boreholes, Airphoto and Remote Sensing. Engineering Geophysics. **Engineering Geology in Practice:** Assessment of Difficult Grounds, Rock Excavation, Tunnel and Underground Spaces, Foundation of Structures (Buildings, Bridges, Roads & Rails and Dams). **Applied Engineering Geology:** Slope Failure and Landslides (Types, Effect of Groundwater, Stabilization, Hazard). Subsidence (Land Subsidence, Mining Subsidence, Subsidence in Karstic Areas), Earthquakes, Rock as Construction Materials (Dimension Stone & Aggregates). **Case Studies:** Nigeria Geology

CEG 311.1: Fluid Mechanics II (3 Credits)

Boundary layer Concepts; Turbulent pipe flow and simple pipeline design problems; Pipe flow systems – pipes in series, parallel and branch pipes; Uniform open channel flow – Flow in partly full pipes, Design of unlined channels; Non-uniform open channel flow – critical flow, rapidly varied flow, gradually varied flow; Hydraulic structures – weirs, culverts, overflow spillways, stilling basins and channel transition.

CEG 321.1: Strength of Material II (3 Credits)

Advanced topics in bending moment and shear force in beams, theory of bending beams, Deflection of beams, Unsymmetrical bending and shear center, Applications, Strain energy, Bi-axial state or stress, Transformation of stresses, Mohr's circle, Failure theories. Springs. Creep. Fatigue fracture and stress concentration. Combined stress in bending and torsion; Elements of the compound and composite cross-sections in bending and compression, thick cylinders. Bending and curved bars of small initial curvature, open-coiled and arrangements of springs. Theory of column; critical load and critical stress; Euler's theory and its limitations; short, medium and long struts.

CEG 323.1: Civil Engineering Materials (3 Credits)

Composition of concrete. Properties of concrete making materials: Portland cement, aggregate, water, admixtures and miscellaneous materials. Design and theodolite traversing. Traverse computations adjustment. Triangulation and trilateration.Principles of leveling and sources of errors.

CEG 332.1: Soil Mechanics I (2 Credits)

General Engineering considerations: Soil description: index properties, phase relationships; origin of soils: process of soil formation; soil classification; soil as construction materials; clay

mineralogy. Water flow in soils: permeability and seepage; flow nets and method of construction of flow nets. Filter and seepage control; Principles of effective stress.

CEG 351.1: Principle of Surveying

Introduction to surveying: Basic definition and classification. The figure and shape of earth's surface. Uses& care of basic surveying instruments. Basic mathematical calculations used in surveying: Concept of Units & scales in surveying measurements. Introduction to plane rectangular co-ordinate systems. Basic Surveying Measurements: Linear& Angular measurements. Distance measurements with Tapes, EDM, Total Station and GPS. Corrections applicable to measured distances. Angle measurement son plane surface with compass, theodolite and total stations. Methods of Horizontal control establishment: Co-ordinates determination by methods of traversing, triangulation, trilateration, intersection, resection and GPS. Height determination by levelling process: Principles & Processes involved in spirit &trigonometrical levelling. Uses & Application of levelling in civil engineering works. Introduction to tacheometry: Distance and height measurements by tacheometric principle.

CEG 352.1: Survey Camp (2 Credits)

This 3-week camp in the field is intended for students studying for the Civil and Environmental degrees respectively. This camp will either take place during the Easter vacation, or immediately after the first semester examination of every session. The aim of the camp is to consolidate on the knowledge and skills learnt in the course CEG 351.1, and to further teach problem solving skills in relation to practical surveying problems, and to equip the student with group work skills and engender tolerance of diversity of opinions. In addition, the course will further equip the students with simple technical report writing skills. The content of the course will be in project form, which will be based on the basic surveying operations

such as traverse, levelling and tacheometry, with the preparation of a site plan or map for civil engineering design. Other tasks may be performed in addition to the above, depending on the resources available and this will vary from year to year. Pre-requisite: CEG 351.1.

CEG 381.1: Civil Engineering Laboratory 1 (1 credit)

Practical in Soil Mechanics and Geotechnical Engineering

CEG 312.2: Engineering Hydrology (2 Credits)

Fundamental theories on hydrological cycle (water balance, atmospheric water, subsurface water, surface water), measurements and data collection. Precipitation analysis, evaporation and evapotranspiration processes, hydrograph analysis, rainfall runoff modelling (unit hydrograph), hydrological flow routing, infiltration, ground water movement (Aquifers; types and properties and properties), hydrological statistics and hydrological design. Flow nets; hydraulic wells; pumping test. Pre-requisite: CEG 311.1.

CEG 333.2: Soil Mechanics II (3 Credits)

Stress distribution in soils: Elastic equilibrium, boundary loads Bousinesq's and Westergard theories; volume change and compressibility; Consolidation; Time rate of consolidation; Consolidation settlement; Mohr circle; stress paths; stresses and strains; shear strength of soils; pore pressure parameters; problems of stability in soil; Introduction to numerical solutions to typical soil mechanics problems. Introduction to earth pressure distribution. Introduction to critical state soil mechanics. Pre-requisite: CEG 332.1.

CEG 341.2: Elements of Architecture (3 Credits)

Introduction – Dimensional awareness, graphical communication, relation to environments. Free hand drawing-forms in terms of

shades, light and shadows. Orthographics; dimetrics, perspective projections; Applications common curve. Elementary Designs.

CEG 342.2: Theory of Structures I (3 Credits)

Introduction to structural analysis; classification of structures; general description of plane frame; joints; supports; stability and determinacy; Basic concepts and assumptions for structural analysis Equilibrium. Analysis of Statically Determinate Structures. Plane trusses. Beams and Frames (Axial force, shear force and bending moment diagrams in beams and frames). Deflections, Method of Superposition, principles of virtual work: principle of virtual displacement; principle of virtual force using energy method in beams, frames and trusses, Influence lines and moving Loads, Analysis of statically indeterminate structures; by the force method (method of consistent deformation) – frames and trusses, Introduction to stiffness method of analysis; slope deflection method; Moment Distribution method, Introduction to matrix methods; 1 DOF systems, trusses. Pre-requisite(s): CEG 321.1, ENG 208.2, ENG 203.1

CEG 353.2: Surveying for Construction (3 credits)

Route location surveys and designs: Review of leveling process and its applications in civil construction works. Longitudinal profiles and cross sections. Grades for roads, sewers, pipeline, bridges, culverts and tunnels. Computation of areas and volumes of earthworks from coordinates. Calculations from mass haul diagrams. Curves & curve designs: Geometry of simple and compound circular curves. Calculations and setting out involving transition curves. Geometry and setting out of vertical curves. Sight distance and slope staking. Use of Digital Terrain Models (DTMs) for route planning and designs. Elements of Hydrographic surveying for civil engineering works involving water borne operations like dredging works, coastal and shore protection works, dams & irrigation schemes, flood

control, etc. Basic Photogrammetry Principles to Civil & Environmental Projects Planning.

CEG 361.2: Principles of Construction (2 credits)

Introduction to Civil Engineering Procedure: Definition and functions of civil engineering procedure. The design and construction terms. Introduction to the principles of civil engineering influence of erection procedure on design. Operation and maintenance of civil engineering facilities. **General Considerations in Civil Engineering:** Site investigation, site organization, materials, temporary works earth works, construction machinery and equipment. **Elements of Construction:** Domestic, industrial and multi-storey buildings, construction of foundations, floors, walls, staircases, roofings and covering frames and space construction, fire protection. Elements of construction, roadwork's, subways, railways, air fields, hydraulic and liquid retaining structure, dams, harbours, docks, jetties etc., Dredging and reclamation, irrigation and river works, pipe lines for water, gas and sewage. Concept of appropriate technology in civil engineering.

CEG 382.2: Civil Engineering Laboratory II (1 Credit)

Practical in Materials and Structures

CEG 413.1: Civil Engineering Hydraulics (2 Credits)

Pipe network analysis, Design of flexible boundary channels; Hydraulic machines; Hydraulic modeling; Unsteady flow – surges in open channels and water hammer analysis; Sediment transport; Hydro power; Introduction to river and coastal engineering; Fundamentals of irrigation engineering. Pre-requisite: CEG 311.1.

CEG 443.1: Reinforced Concrete Design (2 Credits)

Use of codes of practice in use for the design of concrete structures. Design of simple reinforced concrete elements. Continuous reinforced concrete beams, slabs, flat slabs; torsion; eccentrically

loaded short columns and slender columns; calculation of crack width. Design of building frames in reinforced concrete.

CEG 444.1: Steel and Timber Design (3 Credits)

Limit state design of steel structure. Connections; beams and compound beams; plate girders; crane girders; axially loaded stanchions; eccentrically loaded stanchions; crane stanchions; stanchion bases; purlins and sheeting rails; truss and lattice girdle; bracing; detailing; strength properties of timbers; design of timber beams and jots; axially loaded members; hardwood design; plywood design.

CEG 445.1: Theory of Structures II (2 Credits)

Sway in moment distribution; yield line analysis and strip methods for slabs. Plastic methods of structural analysis. Introduction to limit state analysis of reinforced concrete and steel structures. Pre-requisite: CEG 342.2.

CEG 446.1: Civil Engineering Drawing (2 Credits)

Introduction to Civil Engineering Drawing, Basic Civil Engineering Projects for drawing and detailing; Presentation of Civil Engineering Drawing Technical Information and Requirements; Civil Engineering Drawing and Detailing in Structural Engineering, Highway, Geotechnical Engineering, Water Resources, etc.

CEG 461.1: Highway Engineering (3 Credits)

Route location; Geometric design- profile and longitudinal. Highway cross section. Determination of radius. Widths, sight distances, horizontal and vertical curves. Super-elevation and transition curves. Grade separation. Design of interchanges and roadways. Design of rail-road grade intersections. Design of highway drainage structures. Flexible and rigid pavement designs; pavement evaluation and highway maintenance technology.

CEG 483.1: Civil Engineering Laboratory III (2 Credits)

Practical in Fluid Mechanics/Hydraulics and Public Health Engineering.

CEG 514.1: Water and Wastewater Engineering (2 Credits)

Basic microbiology; water pollution parameters; water quality and demand, water treatment units (pre-treatment, coagulation/flocculation, sedimentation, filtration, design of sanitation and wastewater treatment units (VIP, septic tank systems, imhoff tank, waste stabilization ponds). Urban drainage and loads on buried pipes. Pre-requisite: CEG 311.1

CEG 515.2: Water Resources Engineering (2 Credits)

Engineering economics in water resources planning, irrigation and water requirements; hydroelectric power, drainage/flood-damage mitigation; planning for water-resources development. Probably concepts in designs, flood and rainfall drought. Application of rainfall distribution, flow-duration curves, flood routing methods, rating curves surges in open channel and sedimentation in the design of dams/reservoirs. Multipurpose reservoirs storage analysis and examination of the existing Nigerian dams/reservoir designs, operation and management policies. Pre-requisite: CEG 311.2 and CEG 312.2.

CEG 516.2: Pollution Control Engineering (2 Credits)

Wastewater reuse and disposal; sludge treatment and disposal options. Review of solid waste collection treatment and disposal options with emphasis on landfill and windrow composting techniques and the design of simple one chamber incinerators; Health and environmental aspects of solid waste management; introduction of Environmental noise/vibrations standards; Air pollution sources effects and control; Domestic pest impact and control.

CEG 517.2: Design of Drainage Systems (2 Credits)

Introduction: hydraulic design, appurtenances, ventilation of sewers, pipe material. Open channel hydraulics: open channel flows, channel properties, uniform flow equations, empirical equations, rational method. Channels with composite sections, channel design flow in partly full pipes. Design of storm sewers: peak runoff estimate, hydraulic design of storm sewers. Design of Open drains: design approach, conveyance (K), section factor (Z). Design of sanitary sewers: design principle, computation, design of conventional sewer network, design of simplified sewerage system. Loads on buried pipes: strength of rigid pipes, beddings, allowable loads on pipes. Sub-surface drains

CEG 518.1: River Engineering (2 Credits)

Introduction – Mechanics of alluvial rivers, including channel and floodplain features, sediment transport and budgets, channel morphology, and various classification schemes. Ecohydraulics and River Corridor Functions. Watershed and reach scale mechanisms that degrade river systems. Bioremediation techniques of contaminated rivers. Classification review, natural channel design analyses. Time series analyses of flow, sediment, and channel geometry data, and 1D numerical modeling. River and restoration structures, dam removal, risks and uncertainty in manipulating rivers. Socio-cultural influences and ethics of stream restoration, permitting, and discussion effective communication (written and oral). Group design project presentations during final period

CEG 534.1: Foundation Engineering (2 Credits)

Site exploration and characterization; subsurface investigation: drilling geophysical methods. Bearing capacity of soils. Ultimate bearing capacity, allowable bearing pressures. Shallow foundations: Types and uses; analysis and design of shallow foundation- strip footings, pads, mat foundations and basements. Deep foundations;

Analysis and design of piled foundations: methods of minimizing settlements. Pre-requisite: CEG 332.1 & CEG 333.2.

CEG 535.2: Geotechnical Structures (2 Credits)

Earth pressure theories, Rankine, Coulomb. Design and analysis of Geotechnical structures including dams, embankments, slopes, earth retaining walls (sheet pile, cantilevered gravity retaining walls, reinforced earth walls). Cellular cofferdams, caissons. Concept of factor of safety, probabilistic slope stability analysis. Design of deep excavations in soft ground. Introduction to soft ground tunneling, ground movements accompanying tunneling operations, tunnel linning designs, introduction to analysis and design of dynamically loaded machine foundations.

CEG 547.1: Reinforced/Prestressed Concrete Design (3 Credits)

Principles and method of prestressing, prestressing materials and equipment; design for flexure, shear. Torsion; prestress, deflection calculations for prestressed concrete slabs; design of tension and compression members; advantages and disadvantages of prestressed continuous members. Deflection calculations for reinforced and prestressed concrete structures. Pre-requisite: CEG 342.1.

CEG 548.1: Civil Engineering Design (2 credits)

The evolution of civil engineering design philosophies, Design of road Pavements, Design of bridges, Design of culverts, Design of canals, Design of river training Works, Design of sheet piling, Advanced topics in limit state design of structural elements in steel and concrete –: Walls in reinforced concrete buildings, Torsion in concrete, Element assemblies in structural steelwork, Structural detailing; bar bending schedules. Pre-requisite(s): CEG 461.1, CEG 446.1, CEG 445.1, CEG 444.1

CEG 549.2: Structural Analysis (2 Credits)

Matrix methods of structural analysis. Elastic instability. Continuum of plane strain, elastic flat and torsion. Solution of series, finite difference and finite elements.

CEG 562.1: Traffic and Transportation Engineering (3 Credits)

Traffic studies and analysis; traffic legislation. Introduction to traffic devices. Introduction to traffic flow theory, capacity analysis. Urban transportation process; data collection procedures, land use forecasting procedures, traffic generation distribution, assignment and mode choice. Transportation modes (land, air, water). Transportation terminals (airports, harbours, railways) and interaction of the different modes. Pre-requisite. ENG 301.1

CEG 563.2: Highway Bridges and Culverts (3 Credits)

Overview and Introduction – Bridge planning, types, trends, economics, aesthetics, and alternative bridge designs, Bridge Loads, Bridge Deck Analysis Methods, Design of concrete slab bridge decks, Design of slab and beam bridge decks, Design of steel girder bridges, Substructures, Bridge Equipment, Bridge inspection and assessment, hydraulic Design of Bridges, Culvert Design – Hydraulic and structural Design.

CEG 571.2: Civil Engineering Measurements and Construction (3 Credits)

Civil Engineering standard Method of Measurement (SMM); Bill of Engineering Measurements and Evaluation (BEME); work classification –demolition, excavation and earthwork. Tender and contract document. Construction methods and practices, application and limitation; factors involved in selection of plant, equipment and materials; factors affecting equipment output, Introduction to construction methods for common civil Engineering structures such as foundations, buildings, road, bridges, tunnels, drains. Contract

administration. Financial scheduling and management of time. Construction safety and health.

CEG 584.1: Computer –Aided Design in Civil Engineering (2 Credits)

The use of computer aided design packages in Civil Engineering design- hydraulics, structure, geotechnical Engineering, Work Scheduling.

CEG 591.1: Technical Seminar (2 Credits)

The seminar is reserved for the presentation of design and/or Industrial Training Reports. Each student presents a report on some aspect of a design/or in work experience during the Fourth year Industrial Training.

CEG 592.2: Final Year Project (6 Credits)

Each student in the final year carries out an individual project. The choice of the project is made at the end of the fourth year from a list compiled by academic staff of Civil Engineering Department. Alternatively, after consultation with a relevant member of staff, students may carry out a project in an area chosen entire by them. The choice of topic enables the student to study, in depth a field in which he/she is interested. Each student spends at least 6 hours a week on his/her project and is responsible for the planning, design, construction, experimentation, analysis and presentation of a report. Each member of staff acts as a supervisor for three or four final year project. A written report on the project is submitted at the end of the second semester in the final year and this form a basis for a one hour oral examination with the Board of Examiners.

4.3.5 Environmental Engineering Courses (EVE)

EVE 201.1: Environmental Engineering Microbiology (2 Credits)

Introduction to the fundamental aspects of microbiology and biochemistry that are pertinent to environmental engineering and science. Overview of the characteristics of Bacteria, Archaea, unicellular Eukaryotes (protozoa, algae, fungi), and viruses. Cell structure, bioenergetics and metabolism, and microbial genetics. Pathogens; disease and immunity; environmental influences on microorganisms; roles of microbes in the carbon, nitrogen, and sulfur cycles; enzymes; bioremediation, bioenergy, molecular microbiology; and microbial ecology. Water and wastewater microbiology. Degradation metabolism of compounds by microorganisms. Enzyme kinetics. Batch growth kinetics. Recycling of minerals and nutrients.

EVE 202.2: Public Health Engineering and Radiology (2 Credits)

Environment and diseases. Transmission of disease. Vectors, parasites and their control. Principles of toxicology. Epidemiological studies. Development of health criteria. Application to home, work and community environment. Problems associated with radiation; exposure and effects; measurement and protection; radiation as a factor of environmental health. Epidemiology and control of diseases. Biological safety.

EVE 203.2: Environmental Engineering Chemistry (2 Credits)

Scope of Environmental Chemistry. Discussion of important relevant concepts of chemistry, and introduction of basic environmental chemical concepts including pH, alkalinity, hardness, dissolved oxygen, Biochemical Oxygen Demand (BOD), and Chemical Oxygen Demand (COD). Acid-base chemistry and its significance in environmental engineering. Dissolution and precipitation chemistry, and chemical precipitation reactions in water and wastewater treatment. Coordination chemistry, electrochemical reactants,

chemical reactants, solution preparation- Normality, molarity, equivalence etc. Theory of gasses, chemical kinetics, thermodynamics

EVE 204.2: Environmental Pollution and Ecology (2 Credits)

Freshwater ecology, marine ecology, estuarine ecology, stratification of water bodies, terrestrial ecology, eutrophication, natural resources and their management. Functional parts of ecosystem, energy flows, nutrient cycles. Significance of pollution in the ecosystem. Radiation ecology. Air pollution ecology. Global warming potential, GWP. Toxicology and water quality criteria. Microbial ecology

EVE 301.1: Environmental Resources & Sustainability (2 Credits)

Environmental resources – renewable and non-renewable. SUDS and climate change. Peak oil theory. Growth models, resources depletion models, predator-prey model. Concept of sustainable development as a response to global crises of ecology and human development. The role of engineering systems in achieving sustainable development. The problems of sustainability as a challenge to the modern divide between nature and culture.

EVE 302.2: Fundamentals of Biological Treatment (2 Credits)

Reactions and reactors; reaction rates, enzyme reactions, types of reactors (CMR, PFR, fluidized bed, packed bed, sequencing batch) reactors in series; Derivation of basic bio-kinetic coefficient equations; Determination of bio-kinetic coefficients; Design applications of bio-kinetic coefficients – basic design equations for CMR; Design considerations – solids content, organic content, HRT, MCRT, F/M ratio, organic loading, amount of oxygen/air required, power required for oxygenation, sludge production, sludge wasting flow rates, settling quality of sludge and effluent quality.

EVE 401.1: Pollution Transport in Water & Soil (2 Credits)

Sources and composition of surface and subsurface contaminants. Principles of fluid flow and contaminant transport in soil and groundwater systems. Dispersion of pollutants in surface water. Partitioning, sorption and transport phenomenon. Applications for predicting the behavior of subsurface contaminants due to landfills, chemical spills, agrochemical leaching and other sources. Regulatory issues in soil and groundwater pollution. Soil and groundwater monitoring. Soil and groundwater pollution control and remediation technologies. Case studies related to water quality management, waste disposal, and contaminated site remediation.

EVE 501.1: Environmental Engineering Design (2 Credits)

Concepts in engineering design, engineering ethics, principles of project management, environmental legal infrastructure, treatment plant processes, plant hydraulics and sludge handling, application of environmental engineering principles on open ended design problem software application in process selection and design. Tender management, safety and economical considerations in engineering design, cost analysis and project evaluation, detailed design applicable to the problem, completion of a design project in teams with a final report and presentation.

EVE 502.1: Environmental Risk Assessment and Management (2 Credits)

Baseline and environmental sensitivity studies, Concepts of environmental impact assessment. EIA assessment procedure – identification, prediction and evaluation, methodologies, statement and report preparation. Applications of mathematical models to environmental impact assessment cases involving soil, water and air quality problems. Preparation of environmental impact statement. Case studies. Environmental Risk assessment. Principles of developing national environmental quality standards and compliance measures. Concept of environmental loading and prevention of

significant deterioration in ecological balances. Current national and international standards. Principles of developing risk-based land-use planning. Needs analysis for new industrial facilities. Baseline assessment. Social corporate responsibility.

EVE 503.1: Environmental Engineering Seminar (1 Credit)

Introduction to Technical Report Writing. The Content of each Chapter and the Guide Lines to write them. Referencing. General remarks and critique. Presentation Skills. Technical writing and Seminar presentation by students.

EVE 504.1: Environmental Engineering Laboratory (1 Credit)

Statistical Analysis: T-test and ANOVA, Suspended Solid, BOD analysis, COD analysis, Coliforms, Bacteriological analysis, Chlorine Test, Test for phosphorus, Nitrogen and heavy metals, instrumentation.

EVE 506.1: Wastewater Treatment (2 Credits)

Principles of wastewater treatment; Preliminary treatment units; Primary treatment units; Overview of reactions, reactors and bio-kinetic coefficients; Introduction to activated sludge treatment; Trickling filter units; Waste Stabilization ponds, Septic tank systems, VIP; Wastewater treatment plant hydraulics, disposal and reuse of wastewaters.

EVE 507.1: Marine Outfall Design (2 Credits)

Quality criteria for sea water stratification and circulations in sea environment. Microbiological concepts related to marine disposal of wastewater. Pretreatment and data collection in sea environment. Jet and lateral dispersions and the resulting dilutions. Design, construction and maintenance of marine outfalls.

EVE 512.1: Water Treatment & Supply Engineering (2 Credits)

Introduction to water quality and health. Population forecasts. Demand for water. Sources of water; ground and surface water development. Raw water quality and pre-treatment, coagulation and flocculation, sedimentation and flotation, filtration, iron removal, disinfection, iron exchange, water softening and solids handling. Distribution of water and service reservoirs. Pumping. Distribution systems and system appurtenances.

EVE 513.1: Environmental Information Systems (2 Credits)

Elements of photogrammetry and remote sensing. Interpretation from aerial photographs and satellite imageries. Remote sensing imageries: SPOT, Landsat, Mapsat imageries. Data acquisition techniques for building environmental database. Concepts of Geo-spatial Information Systems (GIS) in environmental monitoring. Assessment of desertification, erosion, and flood prone areas using digital information. Spatial relationships, and topology. Spatial and non-spatial data structures and algorithms. Vector and raster database structures. Data capture for raster GIS. Environmental Sensitivity Analysis (ESA) using the raster data model. Environmental database management systems. Data Modelling. Data display and presentation. Introduction to coastal zone management system.

EVE 505.2: Air Quality, Environmental Noise and Vibrations (2 Credits)

Atmosphere and air pollution system; Sources and classification of air pollution; Air quality standards and effects of air pollution on man , plants and structures; Global air pollution concerns; Air quality index, measurement of air pollutants and units; Dispersion of air pollutants, atmospheric stability, introduction to air pollution modelling; removal of particulates and flue gases. Noise sources and characteristics, computation with decibels (dB), human response to sound, types of noise, noise criteria and noise measurements, Effects

of noise on humans and noise prevention and control, humans and structural vibration measurement and standards.

EVE 508.2: Solid & Hazardous Waste Management (2 Credits)

Generation of solid wastes. On-site handling, storage and processing. Collection, transfer and transport of solid wastes. Processing techniques and equipment. Recovery of resources, conversion products and energy. Disposal methods for solid wastes and residual matter: Sanitary landfill, incineration, composting and other techniques. Hazardous waste classification, generation rates, regulations on hazardous wastes, waste minimization, recycling and recovery of hazardous wastes, treatment of hazardous wastes using physicochemical processes, biological processes, and thermal methods. Land storage and disposal of hazardous wastes, site remediation and case studies.

EVE 509.2: Solid Waste Landfill Design (2 Credits)

Introduction; landfill leachate generation, characteristics and volume estimation; contaminant transport in waste ecosystems and landfill liner systems; landfill leachate collection system design; landfill liner system design (clay and geomembrane liners); leachate management methods; landfill cover system design; landfill gas generation, characteristics and volume estimation; landfill gas collection and control systems; computer software applications to design of the major landfill components and landfill process computations.

EVE 510.2: Environmental Assurance / QC & Safety (2 Credits)

Introduction. Principles of quality of materials. Practical considerations in developing QA/QC systems. Various QA/QC guidelines & standards. Scientific approach to QA/QC engineering (5W &H model). Quality aspects of a project/ QC in production processes. Non-destructive test. Concept of reliability and maintainability in QA/QC. Vendor development in QA/QC. Quality

inspection. Benefits of a quality control. Computer Aided Quality Control (CAQC). HSE – critical activities. Potential hazards in the industry. System/process safety. Cost benefit analysis of Hazard management. Risk assessment/controls. Safety policy and laws.

EVE 511.2: Fundamentals of Irrigation Engineering (2 Credits)

Irrigation – fundamental concepts, Introduction, Soil moisture, Crop water requirements, Irrigation efficiency, Effective rainfall, Salinity and leaching requirement, Irrigation methods, Surface irrigation, Sprinkler irrigation, Trickle irrigation, Sub-irrigation , Irrigation canal design.

EVE 520.2: Final Year Project (6 Credits)

Each student in the final year carries out an individual project. The choice of the project is made at the end of the fourth year from a list compiled by academic staff of Civil and Environmental Engineering Department. Alternatively, after consultation with a relevant member of staff, students may carry out a project in an area chosen entire by them. The choice of topic enables the student to study, in depth a field in which he/she is interested. Each student spends at least 6 hours a week on his/her project and is responsible for the planning, design, construction, experimentation, analysis and presentation of a report. Each member of staff acts as a supervisor for three or four final year project. A written report on the project is submitted at the end of the second semester in the final year and this form a basis for a one hour oral examination with the Board of Examiners.

APPENDIX A

EXAMINATION MALPRACTICE 1

A.1 Definition of Examination Malpractice

Examination malpractice shall be defined as all forms of cheating, which directly or indirectly falsify the ability of the students. These shall include heating within an examination hall cheating outside an examination hall and any involvement in all examination related offences.

A.2 Cheating Within an Examination Hall/Room

a. Copying from one another or exchanging questions/answers sheets.

b. Bringing in prepared answers, copying from textbooks, notebooks, laboratory specimens and any other instructional aids smuggled into the hall.

c. Collaboration with Invigilator/Lecturer, where it involves the Lecturer-Invigilator providing written/oral answers to a student in the examination hall.

d. Oral/written communication between and amongst students.

e. Bringing in prepared answer written on any part of the body.

f. Receiving information whether written or oral from any person(s) outside an examination hall.

g. Refusal to stop writing at the end, within half a minute in an examination.

h. Illegal removal of answer scripts from the examination hall. Non-submission of answer scripts at end of the examination. A check-off system of students who have actually submitted answer scripts should be devised.

A.3 Another Form of Examination Malpractice

Plagiarism is a form of examination malpractice and should be investigated and punished in the same way as cheating in the examination hall/room. Plagiarism is the use of another person's

work (i.e. in writing term papers, final year project, seminar presentation, etc.) without appropriate acknowledgement both in the text and in the references at the end.

A.4 Punishment for Examination Malpractice

Any student found guilty of examination malpractice after due process shall be dismissed from the University. This decision shall be pasted on all notice boards throughout the university and shall be contained in each Faculty prospectus so as to give it the widest possible publicity.

APPENDIX B

GUIDE FOR UNDERGRADUATE PROJECT REPORT [2]

B.1 Highlight

The Faculty of Engineering with the approval of the Board of Studies in a meeting held in a later part of 1984 commissioned the preparation of this manuscript. This is aimed at achieving uniformity in student final year project documentations. The emphases are directed to the following areas. The order of paging for binding; manner of presenting abstract and acknowledgement; standard format for title and signature page, table of content, conclusion, appendix and references; and general remarks on typing spacing and margins, quality of paper, tables, figures, photographs, equations and total number of pages for the entire text. To meet these "preparation guidelines", students are highly encouraged to work closely with their project supervisors. Final reports must be reviewed and edited for grammatical errors before binding.

B.2 Cover Page

Recommended colour is light green. Must be hard cover of quoto size and should bear in print the title of the project (about 55m from the top) and matriculation number (a double space); the student department, written for example, as:

Department of Electrical/Electronic Engineering
Faculty of Engineering
University of Port Harcourt.

And; finally the month and year of graduation (about 45mm from the bottom), see
Figure B1.

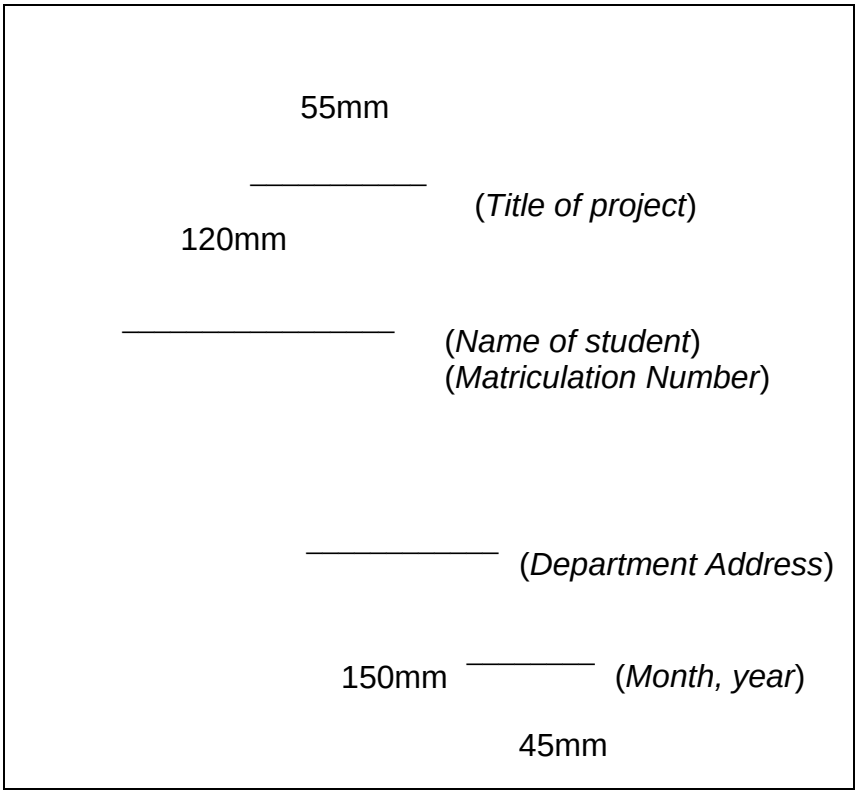

Figure B.1: Sample of a Typical Cover page

B.3 Title Page

This should contain the following items: title of project, name of author, year and some inscription as shown in Figure B.2

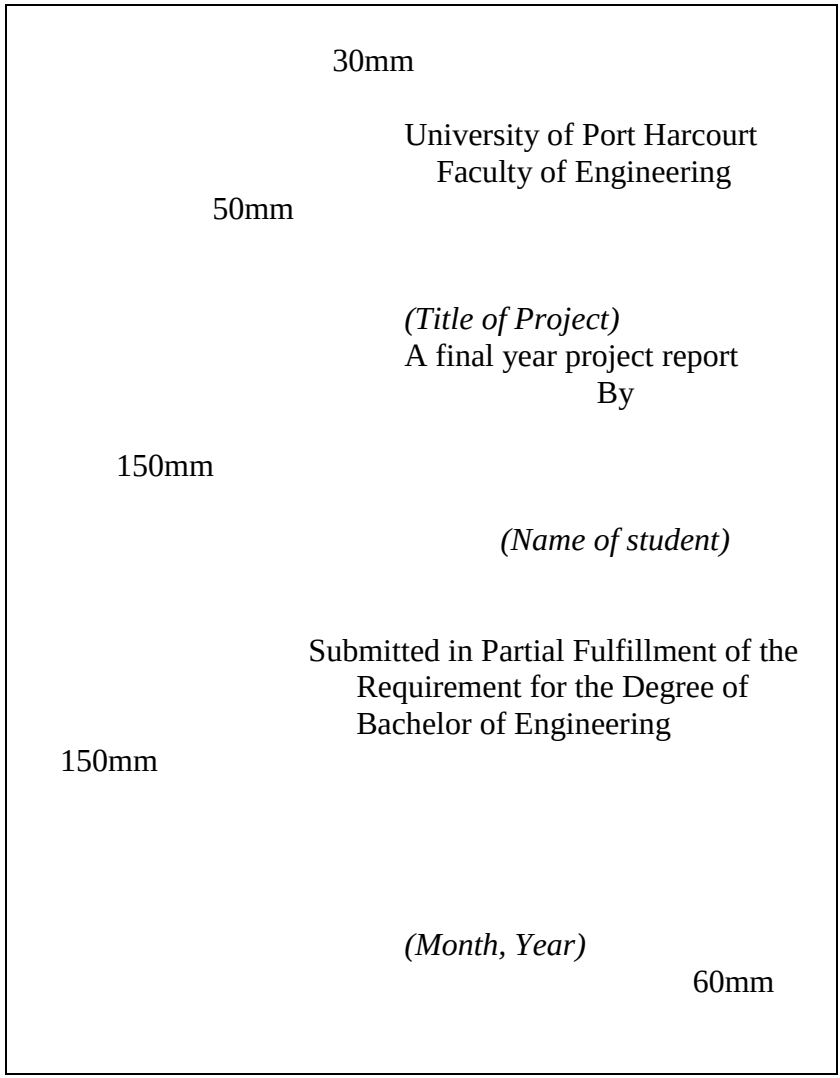

Figure B.2: Sample of a Typical Title Page

B.4 Dedication Page

Where need be, student who wish to dedicate their project report are free to do so. This should be type written at the centre of the page leaving equal spacing above and beneath.

B.5 Signature (Approval) Page

It should be on a special page. Required signature must be obtained after the report has been edited, corrected and approved by the project supervisor, head of department, external examiner and probably the dean of the faculty. The recommended format is shown on the specimen copy in figure B.3

55mm

(Double Spacing)

180mm

We approved the project report of
(Name of student)

_____ _____

(Name of External Examiner) (Name of Project Supervisor)
External Examiner Project Supervisor

_____ _____

(Name of Head of Department)
Head of Department

60mm

Figure B.3: Typical Example of and Approval/Signature Page

B.6 Acknowledgement Page

Number of lines is limited to the range 10 – 12. This should reflect appreciation directed to all those individual who offered significant assistance to the student projects. And where the project is funded

matching grants, allotment grant, faculty or university incentive fund, etc. a note of thanks will be worthwhile.

B.7 Abstract Page.

The abstract writ-up should be a mere summary of the project findings. Description should reflect the scope, method of study and results. A well-written abstract affords the readers a quick overview of the project methodology and what it wishes to accomplish. The entire text needs not be read in order to assimilate the above information. For abstract to be acceptable, it should not exceed 150 words.

B. 8 Table of Contents.

The following standard format is recommended.

Chapter **Page**

Note: Appendix is most appropriate for descriptions of tedious equations or other patient information considered inadequate for the main text (chart, major calculations, etc.).

B.9 Main Body

The main body of the report should be divided into convenient chapters as listed in the table of content. Each chapter can be sub-divided and given appropriate sub-heading. Where applicable, sub-headings and sub-headings can be employed.

Students are highly encouraged to discuss with their project supervisors on relevant style. The recommended format for uniformity sake is:

Chapter 3
3.1 (Sub-heading)
3.1.1 (sub-sub –heading
etc.
etc.
Use Arabic Numbering System

B.10 Conclusion

This should be a summary of the project findings. Significant results should be itemized. Recommended format:
Based on the result of this study, the following conclusion can be drawn:

- Nigerian engineer should register with professional bodies for proper implementation of the code of practice and ethics.
- To enhance engineering research in Nigeria, government as well as private support is vital, etc.

B.11 References

Should conform to the standard format for journals, conference, proceedings, seminars, books, monographs, etc.

Journal

The last name(s) of author (s) should be written first, followed by their initials, title of the paper, year in brackets, abbreviations for the journal name, volume, and the page. Abbreviations for each journal should conform to the standard format for the particular journal. Students are advised to consult the journals to see how they are abbreviated and referenced.

Smith, J.A and Jone, A.K (1982: Combustion of Kerosine. J. Oil and Gas, Vol. 3, pp 210-215.

Book

Authors last names first, followed by their initials, years in bracket, title of book (underlined or printed in bold face), published, city and page.

Example 1

James, B.A (1975): Fluid Mechanics. McGraw-Hill Publishers, New York, p.247.

Example 2

Spiers, H.M., Jr. (1961). Technical Data on Fuel. The British National Committee on Energy, London.

Conference Proceeding

Authors last names first, followed by their initial, year in brackets, title in quotation sign, abbreviations for the proceeding, volume and page.

Example 1
Baker, R.A (1979); "Design of a Digital system", Proc. R. Soc. London, 292, pp. 45-99.

Example 2
Spiff, R.B. (1983): "Furnace Performance". 19th symposium (international) on combustion. The combustion institute, pp. 1021-1036.

4. Report

Should conform to the standard format for the particular type of report (memorandum, technical, etc).

Example
Kofi, A.K (1975): Agip Memorandum Report, No. ANL-031.

5. Seminar

Should include the name of author(s), the title of seminar, the theme of the seminar and the dat.

Example

Adegoke, S.R. (1984): "Role of Management in power Generation". Seminar presented on Electrical Power System, University of Port Harcourt, Port Harcourt.

6. Personal Communication

This concerns information collected through personal interview or oral conversation and can be referenced as follows:

Example

Nwachukwu, C.C (1985): Personal Communication, Department of Management, University of Port Harcourt, Rivers State, Port Harcourt.

7. Referencing in the Text

Referencing in the text serves the purpose of crediting the original source of information cited. In presenting literature review or the body of the report, information. Such as: previous research findings, sources of governing equations to be used, etc. must be referenced. Recommended format: write the surname of the author(s), immediately followed by the year of publication in parenthesis. Some samples popular referencing techniques are presented below.

i) Single Author

(a) The variational principle is based on the works of Rayliegh (1977) and Ritz (1909).

(b) Puls (1928) established a curve of relation…

(c) The method of characteristics is highly suitable for rapidly varied flows (Amein, 1966)

(d) Interested readers are referred to the basic texts on hydrogen (Chow, 1964; viessman, 1972).

NB: If an author has more than one publication, in the same year, to be referenced, use alphabets such as 1984a, 1984b, etc to distinguish them.

ii. Two Authors

(e) Amein and Fang (1969) also used an implicit scheme in solving……

(f) The major criticism of the approach is that it may not yield a general scheme (Desai and Christian, 1977; Oden and Fost, 1973).

iii. Three or more Authors

Name only the first author and use “and other” to replace the rest of the author’s names:

(a) Issacson and other (1954, 1956) investigated……..

(b) The early works of Zienkiewicz and other (1966), Javandel and others (1968).

iv. Personal Communication

Referencing personal communication in the txt is similar to items (i) through (ii) as may be applicable: The field data were provided by Nwachukwu (1985).

NB: in the referencing, all the publications or works reference to in the text must be arranged with the author's surnames and alphabetical order. Also, they should be numbered sequentially using Arabic number system.

B.12 General Remarks

1. **All project documentation** should be limited to 30-50 pages. Sentence should be geared towards explaining an idea or directed to a concept or objective. Flamboyant expression should be avoided.
2. **Drawing:** Major drawings should be on a full page as figure with a title placed beneath. This is where engineering drawing finds significant utility and such skills must be demonstrated. Avoid drawing on stencils.
3. **Quality of Paper:** We suggest quarto (white in colour) because of its availability and low cost.
4. **Typing Margins:** should be double spacing, enough margins should be left at the four adjoining corners of the page. For a chapter page, top margins will ordinarily be 38mm. however, margin to the left side will be about 38mm in all pages to allow enough clearance for binding., whereas 25.4mm suffices as the right side margin.
5. **Table:** all tables and figures should meet the margin specifications or otherwise should appear in the appendix. Suggested title format for tables:

Table 1: Rainfal-Runoff components of flood modelling.

6 **Equations:** for sake of convenience in referencing, mathematical equations should be numbered consecutively for each chapter, for instance, in chapter 3: mode development ten equations are found and are numbered as follows: 3.1, 3.2, 3.3,…3.10. This numbering techniques has the advantage of associating equations to respecting. For chemical equations (reaction-type-equations), the above numbering techniques apples, in addition to the inclusion of letter "R" before the number.

The format for referencing equations in the text is as follows:

(a) Equation (3.1) implies that……

(b) The computer program solution of Equation (3.8) is facilitated by the use of ……

N/B: Do not abbreviate the equation in the text; for example,
Eqn. (3.1), Eq. (3.1) or (3.1) is unacceptable.

B.13 Order of paging for Binding

The following order should be followed:

1. Title page
2. Dedication page
3. Approval (Signature) page
4. Acknowledgement page
5. Abstract page
6. Table of Content
7. List of Figures
8. List of Table
9. Body (Text)
10. Summary and Conclusion
11. References
12. Appendices

STUDENT'S ACADEMIC RECORDS FOR CIVIL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year One First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
GES 100.1	Communication Skills in English	3			
GES 102.1	Introduction to Logic & Philosophy	2			
CHM 130.1	General Chemistry I	3			
PHY 101.1	Mechanics & Properties of Matter	3			
PHY 102.1	Physics Laboratory I	1			
MTH 110.1	Algebra and Trigonometry	3			
MTH 120.1	Calculus	3			
ENG 101.1	Engineering Drawing I	2			
Total		**20**			

Year One Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
GES 101.2	Computer Appreciation and Application	2			
GES 103.2	Nigerian Peoples and Culture	2			
CHM 131.2	General Chemistry II	3			
PHY 112.2	Electricity and Magnetism	3			
PHY 103.2	Physics Laboratory II	1			
MTH 124.2	Co-ordinate Geometry	3			
ENG 102.2	Engineering Drawing II	2			
ENG 103.2	Engineer in Society	1			
ENG 104.2	Manufacturing Technology/Workshop Practice	2			
Total		**19**			

TCU= **TQP=** **GPA=**

Mark/score	Letter Grade	Grade Point	Grade Description
70 & above	**A**	**5.00**	**Excellent**
60-69	**B**	**4.00**	**Good**
50-59	**C**	**3.00**	**Average**
45-49	**D**	**2.00**	**Satisfactory**
40-44	**E**	**1.00**	**Pass**
0-39	**F**	**0.00**	**Failure**

STUDENT'S ACADEMIC RECORDS FOR CIVIL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Two First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
PHY 216.1	Vibration, Waves and Optics	3			
ENG 201.1	Engineering Mathematics I	3			
ENG 202.1	Engineering Mathematics II	2			
ENG 203.1	Engineering Mechanics	3			
ENG 204.1	Basic Engineering Materials	2			
ENG 210.2	Basic Electrical Engineering	3			
ENG 213.1	Computer Programming for Engineers	2			
Total		**18**			

Year Two Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
CHM 240.2	Physical Chemistry	3			
ENG 205.1	Engineering Laboratory I	1			
ENG 206.2	Engineering Mathematics III	3			
ENG 207.2	Basic Fluid Mechanics	2			
ENG 208.2	Basic Strength of Materials	2			
ENG 209.2	Basic Thermodynamics & Heat Transfer	3			
ENG 211.2	Engineering Laboratory II	1			
ENG 212.2	Community Service	1			
CEG 231.2	Engineering Geology	2			
Total		**18**			

TCU= **TQP=** **GPA=**

STUDENT'S ACADEMIC RECORDS FOR CIVIL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Three First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
ENG 301.1	Engineering Mathematics IV	3			
ENG 302.1	Technical Writing & Presentation	2			
CEG 311.1	Fluid Mechanics II	3			
CEG 321.1	Strength of Materials II	3			
CEG 323.1	Civil Engineering Materials	2			
CEG 332.1	Soils Mechanics I	2			
CEG 351.1	Principles of Surveying	2			
CEG 352.1	Survey Camp	2			
CEG 381.1	Civil Engineering Laboratory I	1			
Total		**20**			

Year Three Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
GES 300.2	Fundamentals of Entrepreneurship	2			
ENG 303.2	Engineering Mathematics V	3			
CEG 312.2	Engineering Hydrology	2			
CEG 333.2	Soil Mechanics II	3			
CEG 341.2	Elements of Architecture	3			
CEG 342.2	Theory of Structures I	3			
CEG 353.2	Surveying for Construction	3			
CEG 361.2	Principles of Construction	2			
CEG 382.2	Civil Engineering Laboratory II	1			
Total		**22**			

Long Vacation		
ENG 300.3	Industrial Training I	Pass/Fail

TCU= **TQP=** **GPA=**

STUDENT'S ACADEMIC RECORDS FOR CIVIL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Four First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
ENG 401.1	Engineering Mathematics VI	3			
ENG 402.1	Engineering Economics	2			
CEG 413.1	Civil Engineering Hydraulics	2			
CEG 443.1	Reinforced Concrete Design	3			
CEG 444.1	Steel and Timber Design	2			
CEG 445.1	Theory of Structures II	2			
CEG 446.1	Civil Engineering Drawing	2			
CEG 461.1	Highway Engineering	3			
CEG 483.1	Civil Engineering Laboratory III	2			
Total		**21**			

Year Four Second Semester and Long Vacation

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
ENG 400.2	Industrial Training II	9			
GES 400.2	Entrepreneurship Project	2			
Total		**11**			

TCU= **TQP=** **GPA=**

STUDENT'S ACADEMIC RECORDS FOR CIVIL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Five First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
ENG 501.1	Professional Practice & Procedure	2			
ENG 502.1	Engineering Management	2			
*CEG 5 .1	Optional Elective	2			
CEG 514.1	Water & Wastewater Engineering	2			
CEG 534.1	Foundation Engineering	2			
CEG 547.1	Reinforced/Prestressed Concrete	2			
CEG 548.1	Civil Engineering Design	2			
CEG 562.1	Traffic and Transportation Engineering	3			
CEG 591.1	Technical Seminar	2			
Total		**19**			

Year Five Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
*CEG 5.2		3			
CEG 515.2	Water Resources Engineering	2			
CEG 516.2	Pollution Control Engineering	2			
CEG 535.2	Geotechnical Structures	2			
CEG 549.2	Structural Analysis	2			
CEG 571.2	Civil Eng. Measurements & Construction	3			
CEG 592.2	Final Year Project	6			
Total		**20**			

*Optional Elective Courses

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
CEG 584.1	Computer Aided Design in Civil Engineering	2			
CEG 518.1	River Engineering	2			
CEG 517.2	Design of Drainage Systems	3			
CEG 536.2	Regional Geology	3			
CEG 563.2	Highway Bridges and Culverts	3			

TCU= **TQP=** **GPA=** **FINAL CGPA=**

Class of Degree _____

STUDENT'S ACADEMIC RECORDS FOR CIVIL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Six First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
Total					

Year Six Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
Total					

TCU= **TQP=** **GPA=** **FINAL CGPA=**

Class of Degree _____

STUDENT'S ACADEMIC RECORDS FOR CIVIL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Seven First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
Total					

Year Seven Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
Total					

TCU= **TQP=** **GPA=** **FINAL CGPA=**

Class of Degree _____

STUDENT'S ACADEMIC RECORDS FOR ENVIRONMENTAL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year One First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
GES 100.1	Communication Skills in English	3			
GES 102.1	Introduction to Logic & Philosophy	2			
CHM 130.1	General Chemistry I	3			
PHY 101.1	Mechanics & Properties of Matter	3			
PHY 102.1	Physics Laboratory I	1			
MTH 110.1	Algebra and Trigonometry	3			
MTH 120.1	Introduction to Calculus	3			
ENG 101.1	Engineering Drawing I	2			
Total		**20**			

Year One Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
GES 101.2	Computer Appreciation and Application	2			
GES 103.2	Nigerian Peoples and Culture	2			
CHM 131.2	General Chemistry II	3			
CHM 132.2	Principles of Organic Chemistry	3			
PHY 112.2	Electricity and Magnetism	3			
PHY 103.2	Physics Laboratory II	1			
MTH 124.2	Co-ordinate Geometry	3			
ENG 102.2	Engineering Drawing II	2			
ENG 103.2	Engineer-in-Society	1			
ENG 104.2	Manufacturing Technology &Workshop Practice	2			
Total		**22**			

TCU= **TQP=** **GPA=**

Mark/score	Letter Grade	Grade Point	Grade Description
70 & above	**A**	**5.00**	**Excellent**
60-69	**B**	**4.00**	**Good**
50-59	**C**	**3.00**	**Average**
45-49	**D**	**2.00**	**Satisfactory**
40-44	**E**	**1.00**	**Pass**
0-39	**F**	**0.00**	**Failure**

ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Two First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
EVE 201.1	Environmental Engineering Microbiology	2			
PHY 216.1	Vibration, Waves & Optics	3			
ENG 201.1	Engineering Mathematics I	3			
ENG 202.1	Engineering Mathematics II	2			
ENG 203.1	Engineering Mechanics	3			
ENG 204.1	Basic Engineering Materials	2			
ENG 210.1	Basic Electrical Engineering	3			
ENG 212.1	Community Service	1			
ENG 213.1	Computer Programming for Engineers	2			
Total		**21**			

Year Two Second Semester

EVE 202.2	Public Health Engineering & Radiology	2			
EVE 203.2	Environmental Engineering Chemistry	2			
EVE 204.2	Environmental Pollution and Ecology	2			
ENG 205.2	Engineering Laboratory I	1			
ENG 206.2	Engineering Mathematics III	3			
ENG 207.2	Basic Fluid Mechanics	2			
ENG 208.2	Basic Strength of Materials	2			
ENG 209.2	Basic Thermodynamics & Heat Transfer	3			
ENG 211.2	Engineering Laboratory II	1			
CEG 231.2	Engineering Geology	2			
Total		20			

TCU= TQP= GPA=

STUDENT'S ACADEMIC RECORDS FOR ENVIRONMENTAL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Three First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
EVE 301.1	Environmental Resources &Sustainability	2			
ENG 301.1	Engineering Mathematics IV	3			
ENG 302.1	Technical Writing & Presentation	2			
CEG 311.1	Fluid Mechanics II	3			
CEG 321.1	Strength of Materials	3			
CEG 323.1	Civil Engineering Materials	2			
CEG 332.1	Soil Mechanics I	2			
CEG 351.1	Principles of Surveying	2			
CEG 352.1	Survey Camp	2			
CEG 381.1	Civil Engineering Laboratory I	1			
Total		**22**			

Year Three Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
GES 300.2	Fundamentals of Entrepreneurship	2			
EVE 302.2	Fundamentals of Biological Treatment	2			
ENG 303.2	Engineering Mathematics V	3			
CEG 312.2	Engineering Hydrology	2			
CEG 333.2	Soil Mechanics II	3			
CEG 342.2	Theory of Structures I	3			
CEG 353.2	Surveying for Construction	3			
CEG 361.2	Principles of Construction	2			
CEG 382.2	Civil Engineering Laboratory II	1			
Total		**21**			

Long Vacation		
ENG 300.3	Industrial Training I	Pass/Fail

TCU= **TQP=** **GPA=**

STUDENT'S ACADEMIC RECORDS FOR ENVIRONMENTAL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Four First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
EVE401.1	Pollution Transport in Water & Soil	2			
ENG 401.1	Engineering Mathematics VI	3			
ENG 402.1	Engineering Economics	2			
CEG 413.1	Civil Engineering Hydraulics	2			
CEG 443.1	Reinforced Concrete Design	3			
CEG 444.1	Steel and Timber Design	2			
CEG 446.1	Civil Engineering Drawing	2			
CEG 461.1	Highway Engineering	3			
CEG 483.1	Civil Engineering laboratory III	2			
Total		**21**			

Year Four Second Semester and Long Vacation

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
ENG 400.2	Industrial Training II	9			
GES 400.2	Entrepreneurship Project	2			
Total		**11**			

TCU= **TQP=** **GPA=**

STUDENT'S ACADEMIC RECORDS FOR ENVIRONMENTAL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Five First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
ENG 501.1	Engineering Professional Practice & Procedures	2			
ENG 502.1	Engineering Management	2			
CEG 534.1	Foundation Engineering	2			
CEG 584.1	Computer Aided Design in Civil Engineering	2			
*EVE 5.1		2			
EVE 501.1	Environmental Engineering Design	2			
EVE 502.1	Environmental Risk Assessment & Management	2			
EVE 503.1	Environmental Engineering Seminar	1			

EVE 504.1	Environmental Engineering Laboratory	1			
EVE 506.1	Wastewater Treatment	2			
EVE 512.1	Water Treatment & Supply Engineering	2			
Total		**20**			

Year Five Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
CEG 517.2	Design of Drainage Systems	2			
CEG 571.2	Civil Engineering Measurements & Construction	3			
*EVE 5.2		2			
EVE 505.2	Air Quality, Environmental Noise & Vibration	2			
EVE 508.2	Solid & Hazardous Waste Management	2			
EVE 510.2	Environmental Assurance / QC & Safety	2			
EVE 520.2	Final Year Project	6			
Total		**19**			

*****

Optional Elective Courses

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
CEG 518.1	River Engineering	2			
EVE 507.1	Marine Outfall Design	2			
EVE 513.1	Environmental Information Systems	2			
EVE 509.2	Solid Waste Landfill Design	2			
EVE 511.2	Fundamentals of Irrigation Engineering	2			

TCU= **TQP=** **GPA=** **FINAL CGPA=**

Class of Degree _____

STUDENT'S ACADEMIC RECORDS FOR ENVIRONMENTAL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Six First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
Total					

Year Six Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
Total					

TCU= **TQP=** **GPA=** **FINAL CGPA=**
Class of Degree _____

STUDENT'S ACADEMIC RECORDS FOR ENVIRONMENTAL ENGINEERING PROGRAMME

Name of Student: _____

Mat. No.: _____

Academic Session: _____

Year Seven First Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
Total					

Year Seven Second Semester

Course Code	Course Title	Credit Unit	Mark	Grade	Quality Point
Total					

TCU= **TQP=** **GPA=** **FINAL CGPA=**

Class of Degree _____

UNIVERSITY OF PORT HARCOURT

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

HANDBOOK

FOR

BACHELOR OF ENGINEERING DEGREE PROGRAMME

2016-2018

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