



IGBINEDION UNIVERSITY, OKADA
DEPARTMENT OF CIVIL ENGINEERING
GENERAL ABDULSALAMI A. COLLEGE OF ENGINEERING

**CIVIL ENGINEERING PROGRAMME
HANDBOOK**

**FOR UNDERGRADUATE PROGRAMME
IN CIVIL ENGINEERING**

2024/2025 SESSION

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FORWARD BY THE DEAN

This handbook for the undergraduate programme in Civil Engineering provides comprehensive information on the structure, philosophy and operations of the College of Engineering. It also includes extracts from the University's academic regulations governing undergraduate degree programmes.

The handbook presents details on the history, aims, and objectives of the College and the Civil Engineering Department as well as other essential academic and administrative matters. It further outlines the course descriptions and expectations of Civil Engineering

The College of Engineering offers eight (8) degree programmes under six departments, namely:

- **Chemical/ Petroleum Engineering Department**
- **Civil Engineering Department**
- **Electrical and Computer Engineering Department**
- **Mechanical Engineering Department.**
- **Mechatronics Engineering Department**
- **Environmental Engineering Department**

All the programmes are fully accredited by both the National Universities Commission (NUC) and Council for the Regulation of Engineering in Nigeria (COREN). This handbook which is periodically reviewed in line with NUC and COREN guidelines will serve as a valuable resource to students, staff and other stakeholders. It is intended to guide students of Civil Engineering in understanding the academic and professional standards required for the successful completion of their programme and to provide general information about the College of Engineering as a whole.

Engr. Prof. Rowland. U. Azike
Dean, Gen. A. A. College of Engineering
Igbinedion University Okada.

INTRODUCTION BY HEAD OF DEPARTMENT

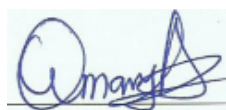
The Department of Civil Engineering, Igbinedion University, Okada, was established in September 2002 (2002/2003 academic session) with an initial student intake of about fifteen (15) and a pioneering staff strength of two (2). Since its inception, the Department has grown steadily in both student enrolment and academic capacity, in line with the National Universities Commission (NUC) and Council for the Regulation of Engineering in Nigeria (COREN) benchmarks.

Over the years, the Department has made remarkable progress in teaching, research, and professional training, producing graduates who have distinguished themselves in various sectors of the economy. Many of our alumni are gainfully employed in reputable engineering firms, government agencies, construction companies, and research institutions, both within and outside Nigeria, while others have advanced into postgraduate studies or entrepreneurial ventures.

The Department is well-equipped with modern facilities, including lecture halls, well-furnished laboratories and workshops, computer and internet resources, surveying and materials testing equipment, as well as access to the University's Central Library, which houses a rich collection of Civil Engineering textbooks, journals, and reference materials. These facilities are complemented by a team of qualified academic and technical staff who are dedicated to maintaining high academic standards and ensuring that students receive a blend of theoretical knowledge and practical exposure. In addition, the Department places strong emphasis on Industrial Training (SIWES), fieldwork, and professional development activities such as seminars, conferences, and design exhibitions. These initiatives expose students to real-life engineering practices and prepare them for professional registration with bodies such as COREN, NSE, NICE and APWEN.

Our Civil Engineering curriculum is periodically reviewed and updated in accordance with the NUC (CCMAS) and COREN guidelines, ensuring that it remains relevant to the needs of , industry, modern society and the engineering profession. The Department is fully accredited by both NUC and COREN.

This Handbook for Undergraduate Students is prepared to serve as a comprehensive guide for students, staff, and other stakeholders who may wish to obtain detailed information about the structure, content, and policies governing the Civil Engineering Programme at Igbinedion University. It outlines the philosophy, objectives, course descriptions, academic regulations, and other important information to help students navigate successfully through their academic journey. As you go through your training in this Department, I encourage you to uphold the values of discipline, integrity, hard work, and innovation. Civil Engineering remains a noble profession that contributes immensely to national development, and I am confident that your time here will prepare you to play a meaningful role in building a better society.



Engr. Dr. (Mrs.) Maryann O. Ezugwu FNSE, FNICE
Head, Department of Civil Engineering
Igbinedion University Okada.

CHAPTER ONE

INSTITUTIONAL INFORMATION

1.1. Brief History of Igbinedion University Okada

Igbinedion University, Okada marks the realisation of the dream of Chief (Sir) Dr. Gabriel Osawaru Igbinedion, the Esama of Benin Kingdom, to bequeath to future generations of Nigerians, a university education of international standard where the academic calendar is faithfully run without interruption. The Planning Committee was inaugurated on 13th March 1995, comprising distinguished scholars and seasoned University administrators whose responsibilities, amongst others, included the formulation of the Academic Brief for the actualisation of the Igbinedion University project. The members of the Committee were: Chief (Dr) Sir G. O. Igbinedion JP, (proprietor/ Chairman), Late Pa S. I. Omorogbe, JP (Vice Chairman), Prof. T. M. Yesufu, Late Amb. (Dr.) A. I. Guobadia, Mr. Frank I. Imouokhome, Late Prof. P. N. Egharevba, Mr. Bright Igbinedion, Late A.O. Eghobamien Esq (Member/Legal Adviser), Late Prince R. A. Williams JP (Member/Secretary). The Committee's dedication to duty and resolute determination to provide a unique platform for higher education in Nigeria resulted in the presentation of Certificate No. 01, dated 20th April 1999, to Chief Igbinedion on 10th of May 1999 shown in plate 1.1.



Plate 1.1.: Certificate of Operation as a Private University

1.2. Academic History

The University commenced its academic programs in the 1999/2000 session in five Colleges: Arts and Social Sciences, Business and Management Studies, Health Sciences, Law and Natural and Applied Sciences. The foundation students arrived in Okada on Friday, 15th October 1999. Since then, the University has, without interruption, upheld its resolve to return tertiary education to the internationally accepted calendar of September to June. The College of Engineering commenced its program in the 2002/2003 session. The College of Health Sciences continues to be an area of popular demand. The College of Pharmacy and B.Sc Nursing commenced in the 2004/2005 session. The Igbinedion University Teaching Hospital, administered by a Management Board inaugurated on 12th January 2003, oversees the affairs of the Hospital. As part of its objectives to train and produce job providers, Igbinedion

University has packaged entrepreneurial and skills acquisition modules to expose students sufficiently to be "fit for the world of work". In addition, a community service programme was introduced in the 2009/2010 session. Under the programme, all second-year students across the Colleges are required to undertake a practical development programme in a chosen area and community in and around the university community/town. The student population has grown steadily from 111 at inception in the 1999/2000 session to over 5000 in 2022/2023, while the staff strength has increased from 55 in 1999/2000 to 751, made up of 280 Teaching staff and 471 non-teaching staff. Academic programmes in Medicine, Pharmacy, Law, Arts and Social Sciences, Business and Management Studies, Natural and Applied Sciences, and Engineering, which are mature, are re-accredited, from time to time, by the Nigerian Universities Commission and the relevant professional bodies.

1.3. Vision, Mission and Core Values of the University

VISION, MISSION, MOTTO, AND CORE VALUES OF THE UNIVERSITY	
University Vision To be a centre of academic excellence through teaching, research, and knowledge production in response to contextualized national and global needs	
University Mission To pursue excellence in teaching, research, and scholarship through the provision of world-class facilities and opportunities for education, training, and employment to all those able to benefit without any form of discrimination.	
Our Core values: SITER • Scholarship • Integrity • Team spirit • Enterprise • Responsiveness	MOTTO Knowledge and Excellence-Igbinedion University as a veritable citadel of learning strives for the best and believe in nothing short of the best.

1.4 Igbinedion University Smart Campus

Igbinedion University, Okada is a smart campus University as we currently pride ourselves as the leading campus, driving all our activities on an ICT platform. The management has recently signed an MOU with MTN Nigeria to provide additional internet Bandwidth of 80 Mbps. This is to further improve on the existing 155mbps Bandwidth provided by GLO Nigeria within the Campus. The University currently has six (6) ICT Academies that provide various IT professional training for both staff and students of the University to upskill and be more proficient. These Academies are: Cisco Academy, Huawei Academy, Amazon Cloud Web Services, Mikrotik Academy, Microsoft Imagine Academy, Oracle Database Academy. The University has also fully integrated digital tools for classroom teaching and research and provided more platforms for its students to become globally competitive. The ICT unit has continuously provided training and retraining for staff to keep them updated with new trends in ICT applications and tools for efficient service delivery. Plate 1.2 is the ICT academy in Igbinedion University Okada.



Plate 1.2: ICT Academy in Igbinedion University, Okada

1.5. University Foundational Day

Following the presentation of the Certificate No. 001 to establish Igbinedion University to Sir Chief (Dr.) Gabriel Osawaru Igbinedion on 10th May 1999, the date 10th May has been adopted as the University's foundation day. Consequently, the maiden celebration was marked in May 2005 and at the same period in subsequent years.



Sir Chief (Dr.) Gabriel Osawaru Igbinedion
(Proprietor/Founder)
Honourable Chancellor,

1.6. Collaborations and Linkages

The University is in partnership with a number of bodies. These include, amongst others, the following:

International

Liverpool John Moores University, UK
Arden University, United Kingdom,
Lancaster University, United Kingdom
East Carolina University, U.S.A.
University of Missouri, U.S.A.
Gaia Education, Findhorn, Forres, Scotland
Germany
Newcastle Aerodrome (NA), Ireland
Austria- African Research Network
Ryokuku University, Japan
African Union- African Scientific
Research Innovation Council (AUASRIC)
DC
UN Sustainable Solutions Network (SDSN)
Ukraine Ivano-Frankivsk National Technical
Lviv University of Business & Law, Ukraine
Hakkaido University,
Intel, Amazon

, Manchester Metropolitan University, UK
Westminster University, United Kingdom
University of Leeds, Leeds, UK
Howard University, Washington, U.S.A.
American Consulate: Window on America
Otto-Von-Guericke Uni of Magdeburg,

, Zurich Elite Business School (ZEB), Zurich
, Delaware State University, Dover, U.S.A.
British Council
African Research Innovation Partnership (ARIP)
Global Partnership for Education, Washington
DC
V.N. Karazin Kharkiv National University,
University of Oil and Gas, Ukraine
Across Atlantic University, United Kingdom
Japan. Microsoft
CISCO

Mikrotik
The Organisation for Women in Science for the Developing World (OWSD)

HUAWEI Technology Co., Ltd

Continental

Austria-Africa UniNet	All Nations University, Ghana
African Union STRC	University of Sierra-Leone
University of Fort Hare, South Africa,	University of KwaZulu-Natal, South Africa(SA)
Vaal University of Technology, SA	Association of African Universities
University of Mpumalanga, South Africa,	Kenyatta University, Kenya
Coalition for Dialogue on Africa (CoDA)	, African Development Bank

National

Rosula Foundation, Nigeria Kaduna	National Water Resources Institute,
Chartered Institute of Bankers of Nigeria (CIBN)	Chartered Institute of Taxation (CITN)
Association of National Accountants (ANAN)	Cutix PLC
GLOBACOM	Nig. Comsat Ltd, Abuja
Natural Eco Capital Ltd, Lagos,	Ehizua Hub Limited, Lagos
Nigerian Communication Commission (NCC)	WootLab Innovations, Abuja
C40, Lagos	, Nigerian Army
Safety Signature Limited, Lagos	Edo State Polytechnic, Usen
Federal Ministry of Science, Technology & Innovation, Abuja	
Advanced Space Technology Application Laboratory, Uyo	
Institute of Chartered Accountants of Nigeria (ICAN)	
MEMMCOL-Momas Electricity Meter Manufacturing Company Limited	
Federal Institute of Industrial Research, Oshodi (FIIRO)	

1.7. Philosophy and Objectives of the University

Igbinedion University Okada was established on 20th April 1999 as the first Private University in Nigeria with a vision “To become a centre of academic excellence through teaching and research activities responsible for communal and global human needs.”

The University has, amongst others, a philosophy encapsulated in its mission statement:

- 1 To be among the best and most successful Universities in the country.
- 2 To provide overall service and good value for money in the University education sector.
- 3 To excel in anticipating, responding quickly and competitively to students’ needs and staff development.
- 4 To maintain a growth that responds to overall global expansion and challenges in teaching and research.
- 5 To provide quality programmes, University graduates whose certificates open all doors to upward economic and social mobility.
- 6 To expand our research activities globally by creating linkages and collaborations amongst leading Universities and research institutions worldwide.
- 7 To regularly seek to maintain the acquisition of knowledge and excellence.
- 8 To operate a competency-driven scheme, which allows staff to acquire new skills, improve knowledge based and remain competitive in their areas of specialisation.
- 9 To regularly survey the environment to identify areas of need with a view to contributing to the community and registering a significant presence nationally and worldwide.

From the vision and mission of Igbinedion University Okada, the following are central University’s goal:

- i. Best and most successful University.
- ii. Good value for money in the University education sector
- iii. Excel in anticipating, responding quickly and competitively to students' needs and staff development.
- iv. Responsive growth to overall expansion and challenges in teaching and research.
- v. Run quality academic programmes and issue certificates that open all doors to upward economic activities
- vi. Creation of linkages and collaborations network amongst leading Universities and research Institutions
- vii. Regular maintenance of the University Motto: "Knowledge and Excellence".
- viii. A regular survey of the University environment, identification of areas of need and contribution to the University community.
- ix. Registration of significant presence nationally and worldwide

The Objectives of Igbinedion University are:

1. To train qualified personnel imbued with the spirit of service and development.
2. To offer wide opportunities for higher education to all persons who can benefit from it without distinction of race, religion, sex or political conviction/persuasion.
3. To train scientists, engineers, doctors, teachers, economists, lawyers and other professionals, including specialists in the field of humanities and to conduct research in Science and Technology.
4. To research problems relating to the development of the national economy, sciences and technology and culture, as well as to advance knowledge;
5. To train teachers and academic research staff for the Universities and other higher educational institutions
6. To promote scientific knowledge and disseminate its results for socio-economic benefits
7. To undertake any other activities appropriate for a university of the highest standard.

1.8. Organisation and Administration of the Igbinedion University Okada.

The organisation and administration of Igbinedion University, Okada, consist of the following bodies;

- a. **The Visitor:** The Chairman of the Board of Regents is the Visitor of the University
- b. **The Board of Regents:** The Board of Regents is the trustees of the University
- c. **The Governing Council:** The Governing Council of the University is responsible for the determination of the policies, the development and governance of the University, subject only to any general directives that may be given by the Board of Regents.
- d. **The University Senate:** The Senate, in addition to all other powers vested in it, regulates and controls (after considering the views of the Colleges concerned) all teaching, courses of study and research and the conditions qualifying for admission into the various degrees and other distinctions of the University.

Chancellor: The Chancellor/Visitor of the University is appointed by the Board of Regents, heads the University and chairs Convocation.

Pro-Chancellor: The Pro-Chancellor is the Chairman of the Governing Council and holds office for three years' subject to a renewal for a final term of three years.

Principal Officers

- a) **Vice Chancellor:** Is the Chief Academic and Executive Officer of the University and who in the absence of the Chancellor, confer degrees and other academic titles and distinctions of the University.

- b) **The Deputy Vice Chancellor:** Assist the Vice Chancellor in his duties and acts in the place of the Vice Chancellor, when the Vice Chancellor is, for any reason, absent or otherwise unable to perform his function as Vice Chancellor.
- c) **The Registrar:** Is the Chief Administrative Officer of the University and is responsible to the Vice Chancellor for the day to day administrative work of the University. The Registrar, by virtue of that office is the Secretary to the Governing Council, the Senate, the Congregation and the Convocation of the University.
- d) **The Bursar:** is the chief Financial Officer of the University and is responsible to the Vice Chancellor for the day to day administrative and control of the financial affairs of the University.
- e) **The University Librarian:** is responsible to the Vice Chancellor for the administration and coordination of the Library services of the University.

The organogram of Igbinedion University Okada in Figure 1.1 is showing the hierarchy of academia and administration.

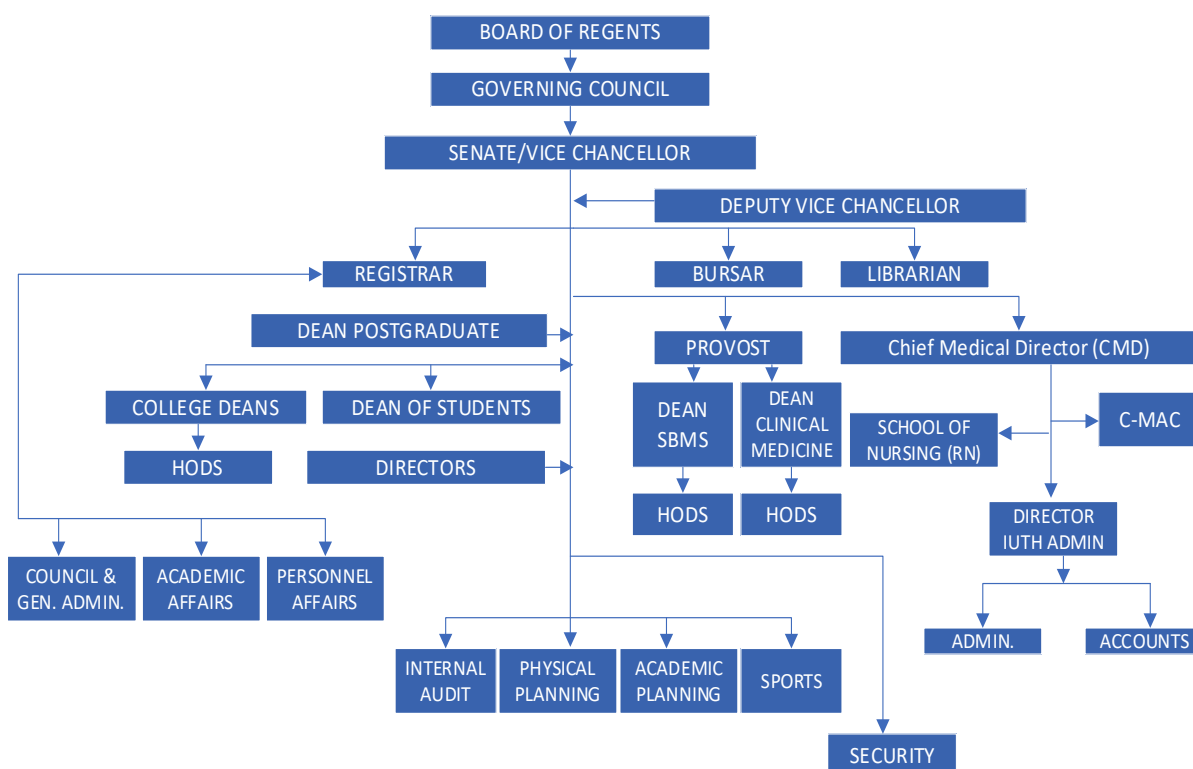


Figure 1.1: Organizational Chart of Igbinedion University Okada.

1.9. Name and Qualification of the Vice Chancellor

Name and Qualification of Vice Chancellor	Prof. Lawrence Ikechukwu Ezemonye, Ph.D., FAS, FNES, FSESS, FWASOT. (Professor of Ecotoxicology and Environmental Forensics and Chairman of the Vice Chancellor Committee of Nigeria.)
Telephone No: Office	08023353847
Email address	vc@iuokada.edu.ng

1.10. Address of the University, Contact and University website

Address of the University:	Igbinedion University, Okada P.M.B. 0006 Benin City, Edo State, Nigeria
Telephone:	052-2600056; 052-254942
Date Founded:	10 th of May 1999
University Website	www.iuokada.edu.ng

1.11 Specific Programmes in the University

The specific programmes in Igbinedion University, Okada are tabulated in Table 1.1.

Table 1.1: Specific undergraduate Programmes in the University.

S/N	SPECIFIC PROGRAMME IN THE UNIVERSITY
COLLEGE OF ARTS & SOCIAL SCIENCES (CASS)	
1	B.Sc. International Relations
2	B.Sc. Mass Communication
3	Geography & Regional Planning
4	B.A English
5	B.A. Theatre Arts
6	B.Sc. Sociology & Anthropology
7	B.Sc. Political Science
8	B.Sc. Economic & Development Studies
COLLEGE OF BUSINESS & MANAGEMENT STUDIES (BMS)	
9	B.Sc. Accounting
10	B.Sc. Banking & Finance
11	B.Sc. Business Administration
COLLEGE OF ENGINEERING	
12	B.Eng. Chemical Engineering
13	B.Eng. Civil Engineering
14	B.Eng. Electrical & Electronic Engineering
15	B.Eng. Mechanical Engineering
16	B.Eng. Petroleum Engineering
17	B.Eng. Computer Engineering
18	B.Eng. Mechatronics Engineering
19	B.Eng. Environmental Engineering
COLLEGE OF HEALTH SCIENCES	
20	M.B.B.S
21	B.Sc. Medical Physiology
22	B.Sc. Nursing
23	B.Sc. Anatomy
24	B.Sc. Med. Laboratory Science
25	B.Sc. Pharmacology
26	Pharm.D. Pharmacy
COLLEGE OF LAW:	
27	LLB Law
COLLEGE OF NATURAL & APPLIED SCIENCES	
28	B.Sc. Computer Science & Information Technology

29	B.Sc. Microbiology
30	B.Sc. Chemistry
31	B.Sc. Biochemistry
32	B.Sc. Industrial Chemistry
33	B.Sc. Software Engineering
34	B.Sc. Cyber Security

1.12. Institutional Academic Calendar

The institutional academic calendar for the 2024/2025 Academic Session is shown in Table 1.2

Table 1.2: 2024/2025 Academic Calendar

ATE	EVENT
FIRST SEMESTER	
Saturday, 28 th September, 2024	Fresh Students Come into Residence
Monday, 30 th September- Friday, 4 th October, 2024	Orientation / One-Stop-Shop Registration for Fresh Students
Tuesday, 1 st October, 2024	National Independence Day/ Public Holiday
Thursday, 3 rd October, 2024	Senate Meeting
Saturday, 5 th October, 2024	Returning Students Come into Residence
Monday, 7 th October, 2024	Lectures Begin for Fresh Students
Monday, 7 th October - Friday, 11 th October, 2024	Registration for Returning Students
Monday, 14 th October, 2024	Lectures Begin for Returning Students
Monday, 21 st October - Monday, 28 th October, 2024	Late Registration Begins for Returning Students
Thursday, 24 th October, 2024	Inaugural Lecture I
Monday, 4 th - Wednesday 6 th November, 2024	Continuous Assessment I
Thursday, 7 th November, 2024	Senate Meeting
Friday, 8 th November, 2024	Students Consultative Forum
Tuesday, 12 th November, 2024	Senior Staff Disciplinary Committee Meeting
Wednesday, 13 th November, 2024	Students Disciplinary Committee
Tuesday, 19 th November, 2024	Inaugural Lecture II
Friday, 29 th November, 2024	Convocation For the Award of First Degrees / Graduation Dinner
Saturday, 30 th November, 2024	Convocation For Award of Higher Degrees/Conferment of Honorary Degrees
Monday, 2 nd December, 2024	Students Consultative Forum
	Deadline for Change of Course
Thursday, 5 th December, 2024	Senate Meeting
Friday, 6 th December, 2024	University Service of Nine Lessons and Carols
Wednesday, 18 th December, 2024	University Closes for Christmas
Monday, 6 th January, 2025	University Reopens/Lectures Resume
Tuesday, 7 th January, 2025	University Day of Prayer

	Senior Staff Disciplinary Committee
Thursday, 9 th January, 2025	Senate Meeting
	Mid-Semester Examinations (This MUST be conducted using the CBT Evaluation System)
Thursday, 16 th January, 2025	University Lecture
Friday, 31 st January, 2025	Submission of the student's Project to Departments (Chapter 1)
Thursday, 6 th February 2025	Senate Meeting
Friday, 14 th February, 2025	Lectures End for the first semester
Monday, 17 th - Friday, 21 st February, 2025	Lecture-free week
Saturday, 22 nd February, 2025	25 th Matriculation Ceremony/Parents Consultative Forum
Monday, 24 th February -Friday 28 th February, 2025	First Semester GST Examinations (Including EPS)
Monday, 3 rd - 14 th March, 2025	First Semester Examination continues
Thursday 6 th March, 2025	Senate Meeting
Friday 14 th March, 2025	First Semester Examination Ends
Monday, 17 th - 21 st March, 2025	One Week Break

SECOND SEMESTER

DATE	EVENT
Saturday, 22 nd March, 2025	Students Return for Second Semester
Monday, 24 th March, 2025	Lectures Begin
Thursday 3 rd April, 2025	Senate Meeting
Monday, 7 th April, 2025	Student Disciplinary Committee
Friday, 18 th April - Monday, 21 st April, 2025	Easter Break
Tuesday, 22 nd April, 2025	Lectures continue
Wednesday, 23 rd April, 2025	Advertisement for Undergraduate/Postgraduate Admissions
	University Lecture
Thursday, 24 th April, 2025	Student Disciplinary Committee
Friday, 25 th April, 2025	Students Consultative Forum
Friday, 25 th April, 2025	Call for Staff Appraisals Exercise
	College Board Meetings
Friday, 25 th April, 2025	Senate Examinations and Ethics Committee on First Semester Examination Results
Thursday, 1 st May, 2025	National Workers Day
Thursday, 8 th May, 2025	Senate Meeting
Monday, 5 th - Friday, 9 th May, 2024	University Inter-Hall Sports
Saturday, 10 th May, 2025	26 th Founder's Day
Monday, 12 th May, 2025 - Friday, 16 th May, 2025	Mid-Semester Examinations CBT (GST, CSP & EPS)

Wednesday, 14 th May, 2025	Briefing of all final year students
	Deadline for Submission of Draft Projects for Similarity Test at IPTTO (All Final Year students)
Tuesday, 20 th May, 2025	Student Disciplinary Committee
Friday, 30 th May, 2025	College Board Meetings
	Deadline for Submission of Final Bound copies of projects to the Departments
Friday, 30 th May, 2025	Second Semester Lectures End
Monday, 2 nd -Friday, 6 th June, 2025	Students Week
Wednesday, 4 th June, 2025	Inaugural Lecture III
Thursday, 5 th June, 2025	Senate Meeting
Monday, 9 th June, 2025 - Monday, 16 th June, 2025	Second Semester GST, EPS & CSP Examinations
Thursday, 12 th June, 2025	Democracy Day/Public Holiday
Tuesday, 17 th June - Monday 30 th June, 2025	Second Semester Examinations for all Colleges (2 weeks)
Monday, 30 th June, 2025	Second Semester Examinations End
Tuesday, 1 st July, 2025	Long Vacation Begins Except for a Category of Students in the College of Health Sciences and Engineering
Thursday, 3 rd July, 2025	Senate Meeting
Monday, 7 th -Friday, 25 th July, 2025	Make-up Examinations Session I
Wednesday, 23 rd July, 2025	College Board Meet to Consider Second Semester Results
Monday, 28 th July 2025 - Friday 15 th August, 2025	Make-up Examinations Session II
Wednesday, 30 th July, 2025	Students Disciplinary Committee
Wednesday, 6 th August, 2025	Senate Exams and Ethics Committee on Sessional Results
Thursday, 7 th August, 2025	Senate Meeting
Monday, 11 th August - Monday, 15 th September, 2025	Industrial Training for Engineering Students
Wednesday, 13 th August, 2025	Senate Meets to Consider Sessional Results
Tuesday, 19 th August, 2025	Students Disciplinary Committee
Thursday, 4 th September, 2025	Special Senate
Tuesday, 9 th September, 2025	Honourable Chancellor's Birthday Lecture
Thursday, 11 th September, 2025	Honourable Chancellor's Birthday
Wednesday, 17 th September, 2025	Senate Exams & Ethics Committee to Consider Make-up Results
Thursday, 18 th September, 2025	Senate Meeting to Consider Make-up Exam Results II
Friday, 19 th September, 2025	University Lecture
Saturday, 27 th September, 2025	Fresh Students come into Residence for the First Semester 2025/2026

NOTES:

1st Semester

15 Weeks of Lecture

3 Weeks of Examination

2nd Semester

15 Weeks of Lecture

3 Weeks of Examinations

4 weeks of Holidays **Key: **** - Tentative Date

CHAPTER TWO

GENERAL INFORMATION ON THE COLLEGE AND CIVIL ENGINEERING PROGRAMME

2.1 General Information on Civil Engineering Programme

The general information about the Civil Engineering programme, including the date of establishment of the programme in the university, as provided in Table 2.1

Table 2.1: General information about the Civil Engineering Programme.

Title of Programme /Sub-Discipline/ Discipline to be Accredited:	Civil Engineering
Name of Faculty/School/College in which the programme/sub-discipline/discipline to be accredited is offered:	General Abdulsalami Abubakar College of Engineering, Igbinedion University, Okada.
Date of Establishment of Department	September 2002 (2002/2003 SESSION)
Name and Qualification(s) of Dean of Faculty/or College/School.	Engr. Prof. Rowland U. Azike, Ph.D. 2016 (Chemical Engineering) UNIBEN
Dean's COREN Registration Number	R66,468
Telephone Number of Dean	08035035446, 08151677871
and qualification(s) of the Head of the Department offering the programme to be accredited.	Engr. Dr (Mrs.) Maryann O. Ezugwu, FNSE Ph.D. 2018 (Water Resources and Environmental Engineering) UNIBEN
COREN Registration Number	R22944
Telephone Number of HOD	08038757355
Departmental email address	civilengineering@iuokada.edu.ng

2.2. History of Accreditations (Years of Accreditation)

The Civil Engineering Department has been getting full NUC and COREN Accreditation since its inception. The programme has been reaccredited in 2009, 2014, and 2019 as stated in Table 2.2.

Table 2.2: Accreditation History of Civil Engineering Programme

S/N	Year of Accreditation	Status of Previous Accreditation
1	July, 2009	Full accreditation
2.	September, 2014	Full accreditation
3.	September, 2019	Full Accreditation

2.3 Brief Background of The Civil Engineering Department

The Department of Civil Engineering program at Igbinedion University, Okada began its undergraduate programme in September 2002 (2002/2003 session) with an initial student intake of about 15 and a staff strength of two (2). Over the years, the population has increased. The Department currently has thirteen (14) members of staff. Nine (9) are full-time teaching staff; one (1) is a part-time lecturer; and four (4) are technologists. The present number of teaching staff (9) to the number of students (71) ratio is 1. 8

The Department has produced a total number of 229 (two hundred and twenty-one) graduates from 2006/07, when it graduated the pioneer set to 2023/2024 (with a B. Eng. Degree in Civil Engineering). Many of them work with reputable engineering companies. Quite a good number are doing their graduate studies overseas. The Department is making moderate, steady and consistent development progress. The post-graduate programme has kicked off in the 2022/2023 academic session in the following areas of specialisation: Water Resources / Environmental, Structures, Highway and Transportation and Geotechnical Engineering.

The Department is equipped with basic facilities, including office furniture and facilities, classrooms, lecture halls, laboratories and workshops, libraries, IT and Internet facilities, etc. The University is steadily providing more laboratory/workshop facilities, especially in the following areas of specialization of the department: Water Resources / Environment; Structures; Materials; Geo-technics; Survey and Geoinformatics, Transportation and Highway Engineering, etc. The Central Library has many Civil Engineering books and journals. Besides, Civil Engineering students are computer literate and exposed to IT and Internet facilities. The students also do their industrial training in reputable engineering-based establishments. The members of staff seriously engage in various development and capacity-building. They attend and participate in engineering seminars, conferences, publish articles in journals and undertake postgraduate studies (M. Eng. and PhD programs).

The Department is very proud of Mr. Thomas Oluwafemi Olumide, who became the first student to get first-class honours (with a CGPA of 4.69) in the department in the 2012/2013 academic session. Besides, the Department has had other first-class honours.

All existing courses (100-500 levels) have always been revised and updated in compliance with NUC Benchmark Minimum Academic Standards (BMAS), now CCMAS and COREN.

2.4. Administration of College and The Department

The college administrative head is the Dean, with departmental heads of various programmes. The organizational structures for the college and the Civil Department are shown in Figures 2.1 and 2.2, respectively. Decision-making is usually collective. Departmental Heads of Programmes, college officers, and Deans of the Colleges are members of the Senate Council of the University. Observations, information, and other relevant matters/issues with members of staff are first considered at the departmental level. The college board, comprising all the college staff headed by the Dean, also deliberates on matters brought forward by the departments and then resolves the issues or presents them before the Senate Council for consideration, approval, and expedited actions where necessary.

The Vice-Chancellor and the University management team also schedule meetings with academic and non-academic staff every session for a general discussion concerning the university (called a congregational meeting). Creative and constructive ideas are welcomed by members of staff from time to time. The Deputy Vice-Chancellor also holds meetings with course advisers to discuss trivial matters and possible solutions to students' academic performance. In general, members of staff are involved in administration, decision-making, and policy governing the University.

Other decision-making committees are also established at the college and at the departmental level, which make appropriate recommendations where necessary to the Senate Council. They include the following committees: Appointment and Promotion Committee, Disciplinary, Finance, Awards and Prizes Committee, Welfare Committee, Sports Committee, Strategic Planning Committee, Curriculum, Examinations Time Table Committee, SIWES / Industrial

Training Committee, Students' Advisory Committee, ICT Committee, Research and Publications Committee, Seminar and Project Coordinating Committee etc.

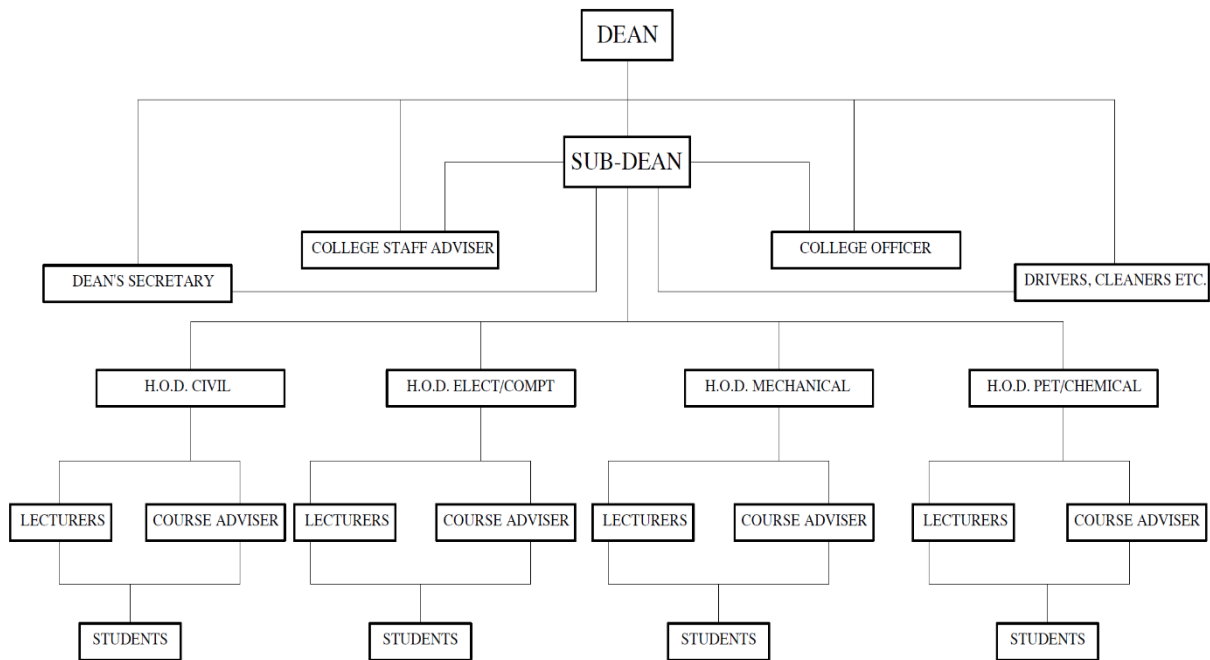


Figure 2.1: Organizational Structure of Gen. Abdulsalami A. College of Engineering.

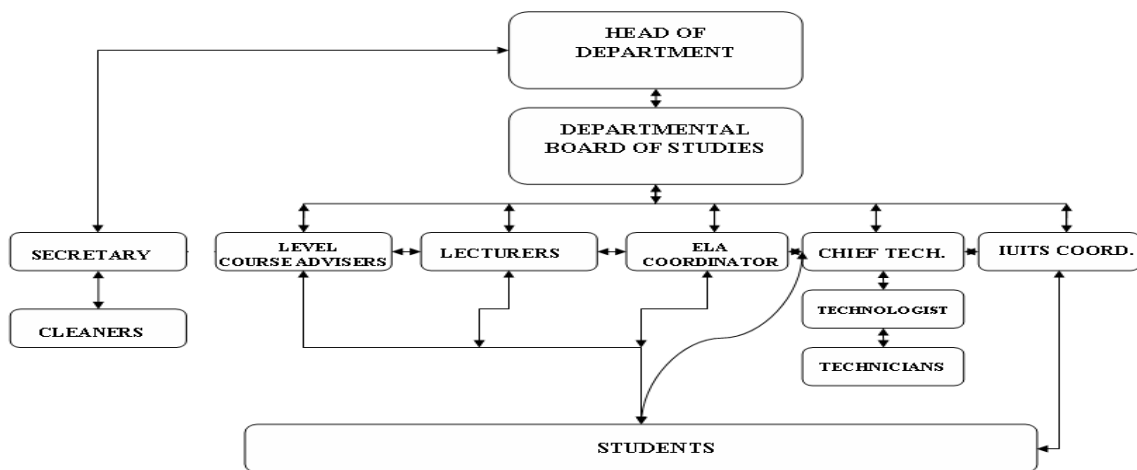


Figure 2.2: Organizational Structure of the Civil Engineering Department

ELA COORDINATOR = Engineering Laboratory Coordinator, CHIEF TECH = Chief Technologist
 IUTS COORD = Igbiniedion University Industrial Training Scheme Coordinator,

The official head is the Head of Department as shown in figure 2 above. The head of department runs all the administrative activities in the department in conjunction with departmental staff. Decision-making is usually collective; taken at the Departmental Regular meetings and Board of Studies meeting. Members of staff are given the opportunity to air their opinions and other matters at the meetings regarding welfare, progress, complaints etc.,

2.5 Vision and Mission of College and the Department

2.5.1 College Vision and Mission

College Vision.

The vision of the college is to become one of the best in any Nigerian University with national and international acclaim. A college where the advancement of engineering and technology is continuously dynamic. Its graduates will become very capable and environmentally friendly engineers who would be very relevant in the public and private sectors of the economy, contributing to rapid industrialization and development of Nigeria.

College Mission.

The Mission is to develop a national resource that will provide solutions to continue to support the development of Nigeria, its economic diversification to make it responsive to the needs of government, industry, and society.

2.5.2 Departmental Vision and Mission

Department Vision.

The vision of the department is to become one of the top and a leading Civil Engineering department with national and international acclaim producing innovative, knowledgeable and highly skilled Civil engineers who excel in designing, constructing and managing infrastructural projects, hence contributing to rapid industrialization, social responsibility, sustainability and development of Nigeria and the global community.

Department Mission.

The departmental mission is to educate, train, empower, and inspire civil engineering students with the knowledge, skills, values, and standards necessary to design and build sustainable, resilient, and innovative infrastructure solutions that are beneficial to the development of national and global communities with their economic diversification.

Thus, the department will:

1. Provide the state-of-the-art technological and engineering training that prepares the graduates for responsibilities at their workplace.
2. Produce qualified and competent Civil Engineers in such areas of specialization as Structural Engineering, Water Resources Engineering, Foundation (Geotechnical) Engineering, and Construction Management etc.
3. Engage in appropriate research activities and, hence, produce the most sought-after engineers by all employers of labour, postgraduate schools, and research institutes.
4. Establish industry-institution linkages for mutually beneficial relationships
5. Strive to become a Centre of Excellence in Engineering and Technology in Nigeria, where the expertise and facilities to accelerate the pace of industrial development can be provided.

2.6 Philosophy and Objectives of Civil Engineering Programme

2.6.1 Philosophy

The philosophy of the Civil Engineering programme at Igbinedion University Okada, in line with the minimum academic standards set by the NUC and COREN. It is anchored on the belief that engineering education should produce graduates who possess sound scientific knowledge, strong analytical skills, high academic and ethical standards with adequate practical background and exposure to self-employment as well as being of immediate value to industry and the nation in general. The programme has four intervening Industrial-Training periods to enable the engineering graduates to acquire the necessary skills to solve local problems. Pursuant to the general philosophy, therefore, the programmes have been designed to incorporate the following features:

1. Common courses at the 100 and 200 levels for all engineering students
2. 4 weeks industrial training workshop practical at the end of the 2nd semester 100 level examinations for all engineering students.
3. Workshop practice (up to 300 levels) and laboratory work for all engineering students.
4. Interaction between students and professionals through regular seminars
5. A final year research project where the student works alone under an academic supervisor
6. The opportunity to have in-depth study of a specific area of the programme from a wide selection of optional courses.
7. Adequate knowledge in engineering management and entrepreneurship

Through a balanced combination of theory, laboratory work, design projects, industrial exposure and research, the programme aims to develop engineers who are resourceful, entrepreneurial and capable of solving real-life engineering problems within the Nigerian and global contexts.

2.6.2 Objectives:

The main goal and objectives of the Civil Engineering training is in consonance with the realization of national desires and needs with respect to industrial development and high technological attainment. Consequently, the objectives of the Civil Engineering programmes are for the graduates to

1. To design, engineering projects and supervise their construction and implementation.
2. To design components of Civil Engineering Systems and Works – Structures, Water Resources Systems, etc.
3. To design, materials mix proportions (quality control) to achieve a high standard work.
4. To install and maintain complex engineering systems to enable them to perform optimally in the Nigerian environment;
5. To adapt, adopt and improve on exogenous technology in order to enhance construction techniques and the use of local raw materials to solve local engineering problems.
6. To be able to exercise original thought, have good professional judgment and be able to take responsibility for the execution of important assignments and tasks;
7. To be a good manager of people, money, material, plants, equipment and projects.
8. To improve indigenous technology for the deployment of solutions to local problems.
9. To develop the necessary skills, creative ability, attitudes and expertise consistent with engineering design, communication and construction of engineering works and projects;

10. To inculcate a responsible attitude towards demands made by the practice of engineering and risk implications of design and construction and to inculcate a maintenance culture in the use of engineering artefacts;

2.7. The Programme Educational Objectives (PEOs) of Civil Engineering Programme in Igbinedion University Okada

Programme Educational Objectives are expected outcomes in terms of knowledge, skills, and attitudes of Civil engineering students of Igbinedion University Okada (IUO) 3 – 5 years after graduation. It is what the Civil Engineering programme prepares the civil engineering graduates of IUO for their careers and professional accomplishments.

The current PEOs of Civil Engineering Programme in Igbinedion University Okada are hinged on knowledge and technical expertise, problem solving and critical thinking, communication and collaboration, professionalism and ethics, commitment to sustainable development, lifelong learning and adaptability driven by mission and vision, program goals and objectives, industrial needs and trends, stakeholders' expectation, innovation and research, etc. Table 2.3 is the five (5) PEOs of the Civil Engineering Programme of Igbinedion University, Okada, and the attributes of graduates from the PEOs.

Table 2.3: PEOs of Civil Engineering Programme in Igbinedion University, Okada.

PEO	Description	Attributes from the PEO
PEO1:	Produce graduates who utilize fundamental and essential knowledge of Civil engineering principles to analyse, create, design, and execute civil engineering projects and possess the necessary skills and training for private and public sector involvement.	Knowledge and Technical Expertise
PEO2:	Graduates will recognize, define, and address complex and intricate civil engineering challenges by employing critical thinking, creativity, collaboration, and analytical abilities and skills.	Problem-solving and Critical Thinking
PEO3:	Prepare graduates who can clearly convey technical details and collaborate with diverse teams to achieve project aims and objectives.	Communication and Collaboration
PEO4:	Graduates will demonstrate professionalism, uphold integrity, and adhere to ethical standards in their work, considering the social, environmental, and economic effects and impacts of their projects.	Professionalism and Ethics
PEO5:	Graduates will engage in continuous professional development, keeping up with new technologies, innovations, advanced design, and trends while adjusting to the evolving demands and challenges within the Civil engineering sector globally.	Lifelong Learning, innovation, and Adaptability

2.8. Programme Outcomes (POs) of Civil Engineering.

Programme Outcomes are the narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills and attitude that the students acquire while progressing through the programme specifically,

the programme should demonstrate that the students have acquired the following Graduate Attributes associated with the corresponding POs.

A graduate of an engineering programme is expected to have the following attributes as listed in the Table 2.4 adopted from OBE COREN BMAS.

Table 2.4: Description of Programme Outcomes (POs)

PO	DESCRIPTION
PO1:	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2:	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3:	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4:	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5:	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6:	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7:	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8:	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9:	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10:	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11:	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12:	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2.9 Students Statistics and Academic Performance.

2.9.1 Student Population in the Department from Inception to Date.

The student population from the inception of the program has been summarized in Table 2.5. Some transferred to another institution due to financial constraints of the sponsor during the academic period, while some were advised to transfer to other departments due to poor academic performance.

Table 2. 5: Student Population from inception.

Academic Year	LEVELS					Full – Time Enrolment
	100 Level	200 Level	300 Level	400 Level	500 Level	Total
2002 / 2003	15	-	-	-	-	15
2003 / 2004	34	9	-	-	-	43
2004 / 2005	15	32	8	-	-	55
2005 / 2006	20	12	22	8	-	62
2006 / 2007	10	17	8	18	6	59
2007 / 2008	16	12	08	05	17	58
2008 / 2009	26	10	08	06	07	57
2009 / 2010	32	24	04	07	04	71
2010 / 2011	17	38	23	03	08	89
2011 / 2012	21	20	38	22	04	105
2012 / 2013	10	14	20	30	21	95
2013 / 2014	19	16	17	17	28	97
2014 / 2015	15	20	20	18	15	88
2015 / 2016	15	15	20	18	18	86
2016 / 2017	5	13	15	17	14	64
2017 / 2018	9	5	13	15	17	59
2018 / 2019	19	14	6	14	16	69
2019 / 2020	11	21	12	6	14	64
2020 / 2021	4	11	14	13	6	48
2021 / 2022	14	9	10	13	13	59
2022 / 2023	15	16	7	8	13	59
2023/2024	19	19	14	7	8	67
2024/2025	13	19	18	14	7	71

2.9.2. Graduated Students by Session

The department graduated its first (pioneer) set of students in the 2006/2007 academic session. A summary of graduate number of students over the years is given in Table 2.6. The majority of the graduate students, upon completion of their NYSC, are undergoing their postgraduate studies abroad, while others have gotten good jobs in reputable companies.

Table 2.6: Graduated Student from 2006/2007–2023/2024

Academic Session	No. of graduates
2006 / 2007	6
2007 / 2008	17
2008 / 2009	7
2009 / 2010	4
2010 / 2011	8
2011 / 2012	4
2012 / 2013	21
2013 / 2014	28
2014 / 2015	15
2015 /2016	18
2016 / 2017	14
2017 / 2018	17
2018 / 2019	16
2019 / 2020	14
2020 / 2021	6
2021 / 2022	13
2022 / 2023	13
2023/2024	8
Total	229

2.9.3 Distribution of Class of Degrees:

The Distribution of Classes of Degree is given in Table 2.7.

Table 2. 7: Distribution of the Classes of Degrees

Class of Degree	No. of Graduates
1 st Class	17
2 nd Class Upper	107
2 nd Class Lower	105
3 rd Class	7
Pass	-
Total	236

2.10 About the Civil Engineering Profession

Civil Engineering is one of the oldest and most fundamental branches of engineering. It is the discipline that deals with the planning, design, construction, maintenance, and management of the physical and naturally built environment. This includes structures such as buildings, roads, bridges, dams, airports, railways, harbours, drainage systems, and water supply facilities that form the backbone of modern civilization. Civil Engineers play a central role in shaping the infrastructure and environment upon which society depends. Their work ensures the safety, sustainability, efficiency, and resilience of the facilities and systems that support daily human activities. The profession combines scientific principles, mathematical analysis, and creative design to solve practical problems related to the use of land, water, and materials.

Civil Engineering practice is broad and encompasses various specialized areas, including: **Structural Engineering:** Design and analysis of load-bearing structures such as buildings and

bridges. **Geotechnical Engineering:** Study of soil and rock mechanics to support foundations and earthworks. **Transportation Engineering:** Planning and design of transportation systems, roads, and traffic management. **Water Resources and Environmental Engineering:** Management of water supply, drainage, irrigation, and wastewater treatment systems. **Highway and Pavement Engineering:** Design and maintenance of durable road networks. **Construction Engineering and Management:** Supervision, scheduling, and cost control of construction projects.

In Nigeria, the practice of Civil Engineering is regulated by the Council for the Regulation of Engineering in Nigeria (COREN), while professional development and networking are promoted through the Nigerian Society of Engineers (NSE) and other specialized professional bodies such as Nigerian Institution of Civil Engineers (NICE), the Association of Professional Women Engineers of Nigeria (APWEN). Civil Engineers are expected to uphold the highest standards of integrity, ethics, and responsibility, ensuring that their designs and decisions prioritize public safety, environmental sustainability, and economic efficiency. As technology advances, the modern Civil Engineer must also embrace innovation, digital tools, and sustainable engineering solutions to meet the growing needs of society.

At Igbinedion University, the Department of Civil Engineering is committed to training competent, creative, and ethical engineers who can contribute effectively to nation-building, infrastructure development, and environmental stewardship—both within Nigeria and globally.

CHAPTER THREE

ACADEMIC INFORMATION

3.1. Admission Requirements (UTME and Direct Entry) to Civil Engineering Programme,

The basic requirement and process for admission to the Civil Engineering programme are as follows:

3.1.1 Admission Requirements for UTME

Candidates seeking 100-level admission into the Civil Engineering programme for a Bachelor of Engineering Degree (B. Eng. in Civil) should possess passes at the credit level or higher, in the Senior Secondary School Certificate Examination (SSCE) or General Certificate of Education (GCE) 'O' Level in five subjects, including English Language, Mathematics, Physics, Chemistry, and additional subsidiary subject in not more than two sittings plus an acceptable pass in the Universities Matriculation Examinations (UME), where applicable. Equivalent passes in examinations conducted by NECO and NABTEB are also acceptable. Minimum of 5 years for B.Eng. in Civil engineering.

3.1.2 Direct Entry Requirement

Candidates are expected to possess five credits, including English Language, Mathematics, Physics, Chemistry, and an additional subsidiary subject. Results at O'level and A'level must be obtained in at least two sittings. National Diploma certificates (OND and HND) from approved universities or colleges of technology or Polytechnics with a minimum grade of upper credit level are eligible for admission to 200L and 300L, respectively. By Direct Entry, minimum of 3/4 years for B.Eng. in Civil engineering.

3.2. Policies and Processes for Student transfer and Credit transfer/exemption

The policies and processes in place in Igbinedion University Okada for programmes are in accordance with the basic standards established by NUC and COREN. It ensures a smooth transfer of students from one related programme to another, thereby facilitating their academic progress. Some of the policies and processes are as follows:

3.2.1 Inter-University Programme Transfer policy

Admission can be given to candidates who may wish to transfer from another university but within the same programme at 300L and shall be credited with only those courses deemed relevant to the programme already passed before their transfer. Other relevant credentials approved by the university's senate are also applied. Candidates possessing acceptable transcripts of Diplomas, or Degrees or yet to complete their academic programmes in other recognised academic institutions are normally transferred or admitted to the 200 level.

3.2.2 Internal University transfer program policies

Students within a related field, such as within an engineering discipline, are also permitted to transfer within the university. However, the application process, including the form and submission of required documents, must be done at the beginning of the session, with approval obtained. The department evaluates the application and either approves or rejects it based on established criteria.

3.2.3 Exemption from courses.

Students are granted exemptions for General Studies (GST) only if there is evidence that the courses have already been taken in a previous institution.

3.6 Academic Standing, Probation and Withdrawal from the Programme

Academic Standing is a measure of a student's overall academic performance at the end of each academic session, determined by the Cumulative Grade Point Average (CGPA). It reflects the extent to which a student has met the minimum academic requirements prescribed by the University. At Igbinedion University, Okada (IUO), academic standing is classified as follows in accordance with the Senate-Approved Academic Regulations of Igbinedion University, Okada.

(a) Good Academic Standing:

A student shall be regarded as being in Good Academic Standing if he or she obtains a Cumulative Grade Point Average (CGPA) of **1.50** and above at the end of an academic session. Such a student is considered eligible to continue in the programme and to proceed to the next level of study.

(b) Poor Academic Standing:

A student whose CGPA falls below **1.50** shall be regarded as being in Bad Standing. This indicates unsatisfactory academic progress and may attract one or more of the following academic actions in accordance with university regulations. Academic warning is issued to notify the student of the need for significant improvement.

(c) Probation

The student is permitted to continue studies on probation for a specified period to improve academic performance. Probation is a status granted to a student whose academic performance fall below an acceptable standard. A student whose CGPA is < 1.5 or more than 10 outstanding courses (University Senate Decision) at the end of a particular year of study earns a period of probation for one academic session. Such a student may be allowed to register for courses at the next higher level in addition to his/her failed courses and ensure a maximum of 18 credit units per semester is not exceeded. Secondly, the pre-requisite courses for the higher-level courses must have been passed.

(d) Withdrawal:

A student whose CGPA is < 1.5 at the end of a particular period of probation has to withdraw from the programme and transfer to another programme within the university incommensurate with his or her academic ability and capacity.

Students are strongly advised to maintain steady academic commitment and to seek guidance from their Academic Adviser or Departmental Course Coordinator whenever they experience academic challenges. Sustained effort and proper time management are essential to maintaining good academic standing and ensuring successful completion of the programme.

3.7 Duration of the Civil Engineering Programme.

The duration of the Civil Engineering programme, in conjunction with satisfaction of all other university requirements and regulations for each entry is summarized in Table 3.1. Generally,

the maximum duration of the programme should not exceed 150% of the normal training period for the programme. No student is awarded a degree without attaining the minimum stipulated years of training.

Table 3.1: Duration Period for Civil Engineering Programme

Type of Admission	Minimum (years)	Maximum (years)	Degree Qualification
UTME	5	7	B. Eng
A LEVEL/Direct Entry	4	6	B. Eng
OND	4	6	B. Eng
HND	3	5	B. Eng

Each academic session or year is divided into two semesters: First semester and Second Semester. Each semester normally comprises 15 weeks of teaching and two weeks of examination.

3.8 Levels of Study

The Civil Engineering Programme consists of five levels (100-500levels) with structured courses as follows in Table 3.2

Table 32: Levels and Units involved in Training.

Level	Focus/Theme	Key components	Unit in Charge of Training in IUO
100	Foundational Year	Basic Sciences, Mathematics, general studies and introduction to engineering	Colege of Natural and Applied Sciences (CNAS)
200	Basic Engineering	Core Engineering Sciences and fundamental Civil Engineering courses begin	College of Engineering, GST unit/ Civil Engineering Department
300	Applied Civil Engineering	Structural Analysis, materials, surveying and hydraulics	Civil Engineering department
400	Professional Development	Advanced Design, geotechnics, environmental, transportation, SIWES	College/Department
500	Integration and Research	Capstone design projects, seminars and professional practice	College/department

3.6. Course System and Credit Load Requirement

The department operates the course credit unit system in accordance with Igbinedion University and NUC guidelines. All courses are assigned units. Units are loads attached to a course. A credit unit load is equivalent to one hour of lecture per week. Two hours of tutorials or three hours of laboratory practical or design work is also 1unit. Students must register for a minimum of 18 units and maximum of 24 credit units each semester as approved by NUC, COREN and the university. The minimum total number of credit units required for graduation is typically **180** according to CCMAS. To graduate, a student must pass all compulsory courses, complete SIWES and present an approved final year project duly supervised.

3.9 Course Categories and Grouping.

For the B. Eng. degree in Civil Engineering programme, courses are listed in the following categories in Table 3.3:

Table 3.3: Course Nomenclature and their Description

Course Nomenclature	Description
Core or compulsory or required Courses (C):	These are courses that students must compulsorily take and pass for the award of Bachelor of Engineering in Civil Engineering
Elective Courses (E):	These are courses which are chosen by a student according to interests. It may be within or outside the college. A student may graduate without passing the course provided the minimum credit for graduation has been attained.
Optional course	A course which students can take based on interest and may count towards the minimum credit unit required for graduation.
Pre-requisite Course:	A course which a student must take and pass before taking a particular course at a higher level.

Courses in the programme are group as follows

- (a) **General Studies (GST):** Communication, ICT, Entrepreneurial studies
- (b) **Basic Sciences and Mathematics:** Physics, Chemistry, Mathematics, Statistics
- (c) **Engineering Core courses:** Mechanics, Thermodynamics, Fluid Mechanics, Strength of Materials
- (d) **Civil Engineering Core Courses:** Structural Engineering, Geotechnical Engineering, Highway and Transportation Engineering, Water Resources and Environmental Engineering, Hydraulics and Design
- (e) **Industrial Training (SIWES)**
- (f) **Final year Project :** A supervised research and design project in the 500level.

:

3.10 Registration Procedure and student Workload

At the beginning of every session, all students are expected to register for all their courses for that session using online registration via their student portal as required by the University's Examinations and Records Unit of the Registry. This must be done not later than two weeks after the resumption of the new academic session, which begins with the first semester. Late registration attracts a fee, which is determined by the university. They must register for a minimum of 18 credits per semester and 36 credits per session. Failed courses must be registered first before the student's current level courses. The maximum number of credits for a session must, however, not exceed 48 credits.

3.9 Program delivery and assessment methods

The program delivery and assessment methods are implemented to enhance and support the development of intellectual, practical skills and ensure the attainment of the POs by graduates in the Civil Engineering programme. It prepares them for successful careers in the field. Program delivery and assessment methods encourage problem solving and critical thinking, provide opportunities for group work, develop communication, presentations, teamwork skills, written assignments, practical skills and the ability of students to apply theoretical knowledge in the course of learning while still in school.

3.9.1. Program Delivery Methods

The program delivery method includes the following, though not limited to it

(a) Classroom Lectures

This is the main delivery method for all the courses where lecturers interact with students to provide guidance, knowledge, teaching, etc. on the subject matter. This equips the students with the fundamental and foundational knowledge as well as a theoretical framework for further use, where and when necessary. The students are encouraged and motivated to actively participate in lecture delivery by making and suggesting their own ideas on the subject. The expansion of knowledge on the subject matter depends solely on the course lecturer, if need be, such as engaging in site visits to buttress a subject area. Class work and assignments, individually or group-wise are also implemented in this method to encourage originality, creativity, innovation, collaboration, investigation and solutions to problems.

(b) Presentations

Presentation in this method of delivery can be project presentation, paper presentations, subject presentations, seminar etc., to build students' confidence and improve skills in communication, collaboration, problem solving, learning, etc. The use of PowerPoint presentations and animation tools to impart insight into the subject is encouraged. Presentations also illustrate ideas and concepts in graphic form. Video presentations are also encouraged to effectively communicate the subject matter and develop students' mindset towards actualising any targeted goals.

(c) Design –

In some courses, modern tool usage, such as software like AutoCAD, ORION, etc, is employed in the teaching methods to empower students to meet the fast-changing engineering world and industrial challenges. The students are thus exposed to different tools for design and solving complex engineering problems.

(d) Assignments –

Students are encouraged to think critically and apply ideas to practical issues through assignments. Students improve their retention of information and strengthen their grasp of the course subject by working on assignments. Assignments frequently call for students to conduct research and analyze data, honing their capacity to assess sources and make judgments. Assignments assist students in setting priorities, managing their time, and maintaining organisation. Through practice with similar questions and situations, assignments can help students become ready for tests and assessments. Students are encouraged to work independently, take charge of their education, and hone their self-directed learning abilities through assignments. Students' capacity to successfully express complicated ideas may be developed through assignments that require them to show their work. It addresses PO2, PO3 and PO9.

(e) Case Studies –

Case studies provide a practical setting for students to apply their theoretical knowledge to solve practical problems, thus making the learning process more engaging and relevant. Analysing case studies assists students to think critically, evaluate data and proffer solutions to complex engineering problems, identify key issues and also draw logical conclusions with

recommendations. It helps them to develop decision-making skills through the information and data obtained. It motivates and encourages their communication skills to relay ideas effectively, and exposes them to real-life challenges which must be addressed without compromising standards and ethics. It relates students to the project, society and the environment, thereby aligning with PO6, PO7 and PO11.

(f) Problem-based learning (PBL)

This is another educational learning approach where students are exposed to real-world challenges and problems, and they are required to provide solutions to tackle the problem more especially in groups; however, individual reports may be assessed to evaluate their level of independent thinking and logical conclusion. This empowers students to take an active role. The problems are mostly complex and open-ended, encouraging students to think outside of box and provide solutions. It also builds their teamwork skills as well as self-learning. It addresses PO2, PO3, PO9, PO10 and PO12.

(g) Seminar –

This assists student to research on a particular subject matter or topic and write a well-detailed report for submission and presentation. It expands the collective knowledge scope of students in the relevant field. Attainment of PO9, PO10, PO11 and PO12 are quite achievable within this scope.

(h) Industrial Training and Visit –

Industrial training and visits give the students opportunities to explore working environments, principles and ethics. Site visits or field visits drive theoretical knowledge down to practical exposure. It aligns with PO1, PO6, PO7 and PO8

(i) E- Learning Resources-

Videos and E-learning material are also used to give students exposure and retention skills, and knowledge to address any issue.

(j) Industry Guest Lecturing:

Since 2022, the college has been engaging industrialists to provide lectures on industry practices and trends. This helps to meet industrial needs.

(k) Tutorials:

This method relaxes the teaching atmosphere by allowing students to interact more with the course lecturer. It offers opportunities for relevant questions related to a particular course to be addressed. It also broadens the student's knowledge and better understanding. It can be handled by anybody familiar with the subject matter.

(l) Laboratory session-

The civil engineering programme has laboratory courses expanded from 200L to 500L in each semester to enable students to perform experiments on practical courses to drive knowledge down to the roots. Laboratory work demonstrates how theory can be verified by experiments through the interpretation of results. Experiments are normally done in groups of five (5) so students learn to work in teams. This aligns with PO9. The laboratory commitment chart (timetable) for the current and the previous semester is shown in Table.

3.9.2. Assessment Methods Involved

The assessment method employed to support the development of the range of intellectual and practical skills and attainment or achievement of the POs in the programme is in line with NUC and COREN standards and is as follows

- (a) **Written Exams:** This method helps to assess the theoretical knowledge and students' understanding. It gives a basis or scale of assessment and grading.
- (b) **Assignments:** This is a kind of periodic monitoring of students' level of understanding while delivering the course. It helps to increase their critical thinking, communication, collaboration and team skills in solving problems.
- (c) **Laboratory Reports:** students are allowed to perform experiments in courses and provide data, analyse the data and form their conclusions. Reports are graded based on what the students have technically presented in the report booklet. The theoretical knowledge is put into practice.
- (d) **Presentation and Group Work:** This method encourages teamwork, communication and collaboration skills.
- (e) **Quizzes and Class Test:** This helps to assess the students' understanding of the course delivery and materials. The student performances enable the course lecturer to evaluate his or her delivery efficiency and students' understanding and follow-up in the course.
- (f) **Projects:** This is mostly employed in the final year to enable students to research complex engineering problems and offer solutions for the benefit of mankind and society.

3.10 Academic Regulations, Evaluations and Grading System

3.10.1. Evaluation of Student work (Continuous Assessment and Examination)

The Department complies fully with the regulations of the NUC in conducting standard tests (quizzes) and examinations. Continuous assessments are done through essays, tests and practical exercises. Scores from continuous assessment normally constitute 30% of the full marks for courses which are primarily theoretical. For courses which are partly practical and partly theoretical, scores from continuous assessment constitute 40% of the final marks. For courses that are entirely practical, continuous assessment is based on the student's practical work or reports and constitutes 100% of all the marks. In addition to continuous assessment, examinations for every course are normally given at the end of each semester in which it is offered. First semester courses are examined at the end of first semester and the same for second semester courses. All courses are graded based on 100 marks as stipulated in Table 3.4.

Table 3.4: Distribution of marks (continuous assessment and examination weighting)

S/No,	Components	Allocated Marks (%)
1.	Class Attendance	5 %
2.	Assignment (homework)	10%
3.	Tests (Quizzes)	15%
	Total CA	30%
4.	Final Examination	70%
	TOTAL MARKS	100%

In addition, attendance (physical presence) of the student at lectures is very important, and the class register is strictly kept as well as checked by the university authorities before the semester examination. A student must have an attendance score of 75 % to be eligible to sit and write semester examinations.

Students are graded on each course based on a 100 % scale. The percentage, pass scores and attributed letter grades to the grade point value is also stipulated in Table 3.5.

Table 3.5: Percentage score and the letter grade with value point

% Scores	Letter Grade	Grade point on 5 point scale
70 - 100	A	5
60 – 69	B	4
50 – 59	C	3
45 – 49	D	2
0 – 44	F	0

A student who fails a course (with a letter grade F) carries that course over to the next academic session with the same credit units. And the failed course must be registered first before current level courses. Questions are marked in line with a prepared marking scheme. A conference marking is allowed, for proper vetting and cross checking of answer scripts.

3.10.2 Student Course Evaluation and feedback

(a) Student Course Evaluation Form by the University

There is an established mechanism to enable students to evaluate courses delivered to them at the end of each semester, which is an integral component of the course credit system to improve on the effectiveness of course delivery, updates on lecture materials, use of effective teaching aids and tools to maximize the impact of knowledge on students and students' academic performance. In order to achieve effective learning, students are permitted to evaluate courses that are being taught by the departmental lecturers without any victimization. Absolute confidentiality is maintained throughout the exercise, which is carried out by an academic planning unit, chaired by the Director, Academic Planning. Students are expected to be truthful and judge fairly without being biased. Students are not required to write their names on the evaluation forms.

(b) Student Course Evaluation Form by the Department

At the end of every semester, students are required to complete a Course Evaluation Form for each course taken. This form provides an opportunity for students to offer constructive feedback on the content, teaching methods, learning environment, and overall course delivery. The primary purpose of the Course Evaluation is to enhance the quality of teaching and learning within the Department. The feedback gathered helps lecturers and the Department to identify areas of strength and aspects needing improvement in course content, instructional materials, assessment methods, and classroom engagement. Completion of the form is confidential, and students are encouraged to be honest and objective in their responses.

The information collected is analyzed by the Department and used solely for academic improvement and curriculum development. Active participation in course evaluation is a vital component of maintaining high academic standards and ensuring continuous improvement in the learning experience. Students are therefore expected to fill out the evaluation form promptly and responsibly at the designated time each semester.

Appendix A is the Sample of Student Course Evaluation for the University and Appendix B is the Sample of Student Course Evaluation for the Department

3.10.3. Internal and External Examiner System.

a) Setting & Moderation

Examination Questions as applicable, are set by the course lecturers and are internally moderated by the Departmental board of examiners which comprises all academic staff. The internal moderated exam questions for 500L are further sent out to the external examiner accompanied with the model solutions/marking scheme for vetting and moderation. Final year courses and projects are assessed by the external examiner to certify the overall performance of the graduating students.

b) Conduction of Exams:

Examinations are conducted in large halls with students sitting with two space(s) in between. The Departmental examinations officer is in charge of exam materials while members of staff are involved in exams invigilation.

3.10.4. Processing and Issuance of Results:

Results are prepared by level advisers and considered by the Departmental and College board of studies respectively before presentation to the Senate for consideration and approval. The approved results are then communicated to students through their course level advisers. There is provision for ratification and correction where necessary.

3.10.5 Graduation Requirement

For a student to qualify for graduation from the programmes, such a student must have passed all the prescribed courses in addition to satisfactorily meeting the Industrial Training requirements, and all general studies courses of the University. Such a student must have also met the minimum number of years and not exceeded the maximum number of years required for graduation. The class of the Bachelor of Engineering Degree is determined by the final cumulative grade point average earned by the graduating student.

3.10.7 Classification of Degree

The degree classification awarded to graduating students, according to the CGPA (Cumulative Grade Point Average) recommended by the NUC, is presented in Table 3.6

Table 3.6: Degree Classification according to NUC guidelines.

CGPA	Class of Degree (5 point scale)
4.5 – 5.00	First Class
3.5 – 4.49	2 nd Class Upper Division
2.4 – 3.49	2 nd Class Lower Division
1.5 – 2.39	3 rd Class Lower Division
1.0 – 1.49	Pass.

Thus, the candidate, Mr. XYZ, who finished up with a CGPA of 3.81, has earned second class upper division on a 5-point scale.

3.10.8. Calculation of Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA)

The CGPA for a student at a particular level is a total of cumulative value points obtained from courses divided by the cumulative credits for those courses. Table 3.7 is a 200L student result who has finished first semester in 200L

Table 3.7. Calculation of CGPA for a 2001 student in the Department

100L FIRST SEMESTER RESULT		1	2	3	4	5 = 1 * 4
COURSE	COURSE	CREDIT	REGULAR		GRADE	VALUE
CODE	TITLE	UNIT	SCORE	GRADE	POINT	POINT
MTH111	ALGEBRA & TRIGONOMETRY	3	72	A	5	15
MTH112	CALCULUS	3	26	F	0	0
CHM111	PHYSICAL CHEMISTRY	3	53	C	3	9
CHM112	ORGANIC CHEMISTRY	2	76	A	5	10
PHY111	MECH. PROPERTIES OF MATTER	2	19	F	0	0
PHY112	GENERAL PHYSICS	2	40	F	0	0
PHY113	THERMAL PHYSICS	2	46	D	2	4
GST111	COMMUNICATION IN ENGLISH	2	66	B	4	8
GST112	LOGIC, PHILOSOPHY & HUMAN	2	58	C	3	6
GST113	NIGERIAN PEOPLES & CULTURE	2	76	A	5	10
TOTAL SEMESTER UNIT		23		TOTAL VALUE POINT		62
GPA		62/23 = 2.00		C G.P.A		62/23 = 2.00
100I SECOND SEMESTER RESULT						
COURSE	COURSE	CREDIT	REGULAR	LETTER	GRADE	VALUE
CODE	TITLE	UNIT	SCORE	GRADE	POINT	POINT
MTH121	VECTOR, GEOMETRY &PHYSICS	3	68	B	4	12
MTH122	ORDINARY DIFF. EQUATION	3	72	A	5	15
CHM121	INORGANIC CHEMISTRY	2	63	B	4	8
CHM122	GENERAL LAB. CHEMISTRY	2	65	B	4	8
CHM123	ORGANIC CHEMISTRY	2	51	C	3	6
PHY100	PRACTICAL PHYSICS	1	58	C	3	3
PHY121	ELECTROMAGNETISM	2	58	C	3	6
PHY122	MODERN PHYSICS	2	56	C	3	6
PHY123	OPTICS VIBRATION & WAVES	2	72	A	5	10
GST121	USE OF LIB. STUDIES, SKILLS & IT	2	61`	B	4	8
GST122	COMMUNICATION IN ENG. II	2	86	A	5	10
GST123	COMMUNICATION IN FRENCH	2	65	B	4	8
IUITS 102	IUO INDUSTRIAL TRANING SCHEME	1	60	B	4	4
TOTAL SEMESTER UNIT		26		TOTAL VALUE POINT		104
GPA		104/26 = 4.00				
100L SESSIONAL UNIT		49		100L VALUE POINT		166
CUMULATIVE G.P.A		166/49 = 3.39				
200LEVEL EXAMINATION RESULT FOR FIRST SEMESTER						
COURSE	COURSE	CREDIT	REGULAR	LETTER	GRADE	VALUE
CODE	TITLE	UNIT	SCORE	GRADE	POINT	POINT
EMA201	ENGINEERING MATHS I	3	30	F	0	0
ECP201	COMPUTER & COMPUTING	2	47	D	2	4
ENS211	ENGINEER IN SOCIETY	1	46	D	2	2
CVE211	STRENGTH OF MATERIALS I	2	66	B	4	8
EEE211	ELECTRICAL ENGINEERING	2	23	F	0	0
MEE221	ENGINEERING DRAWING I	2	25	F	0	0
MEE251	THERMODYNAMICS	2	37	F	0	0
MEE271	MANUFACTURING TECH.	2	53	C	3	6
ELA201	ENG. LAB & WORKSHOP PRACTICE	3	37	F	0	0

GST211	HISTORY OF SCIENCE AND PHILOLOPHY	2	51	C	3	6
TOTAL SEMESTER UNIT		21	TOTAL VALUE POINT		26	
	GPA	26/21 = 1.24				
Cumulative Credits 49 +21 =		70	Cumulative Value point = 166 + 26 = 192			
	CGPA 192/70 =	2.74				

At the end of this semester, this 200L student with 2.74 is in second class lower and still has opportunities and more semesters to improve on his results. Therefore, students are advised to improve on their performance as the first class or class of degree is not determined by final year result, rather a cumulative result from 100L.

3.11: Examination Regulations and Conduct.

3.11.1 Regulation governing conduct of examination and instructions to Students:

1. Students must wear their **IDENTITY CARDS** on them as a condition to sit and write examinations and also bring along a copy of **ON-LINE REGISTRATION printout**. Names are not allowed on the answer script, otherwise the script will be cancelled.
2. Students must attend punctually at the time assigned to their papers and must be ready to be admitted into the examination hall five minutes before the examination is due to start. Students shall not be permitted in any circumstances to enter the examination hall more than ten minutes before the time appointed for the commencement of the examination. Students arriving more than half an hour after the examination has started shall be admitted only at the discretion of the chief invigilator.
3. Similarly, save with the special permission of the chief invigilator, students may not leave the examination hall during the first and the last half an hour of the examination outside these periods, candidates, with the permission of the invigilator, may leave the room temporarily, and then only if accompanied by an attendant.
4. Students must bring with them to the examination hall their own ink, pens and pencils and any materials which may be permitted by these regulations but they are not allowed to bring any other books or papers.
5. While the examinations are in progress **communication between students is strictly forbidden, and any candidate found to be giving or receiving irregular assistance may be required to withdraw from the examination and/or penalized after.**
6. Silence must be observed in the examination hall. The only permissible way of attracting the attention of the invigilator is by the candidate raising his/her hand.
7. Students are not allowed to smoke in the examination hall.
8. **Students are informed that medical attention can be obtained if necessary.**
9. **The use of scrap paper is not permitted.** All rough work must be done in the answer books and crossed neatly through supplementary answer books, even if they contain only rough work. Must be tied inside the main answer book.
10. Students are advised in their own interest to write legibly and to avoid using ink. The answer must be written in English except as otherwise instructed. The answer to each question must be started on a separate sheet of paper.
11. Before handing in their scripts at the end of the examination, students must satisfy themselves that they have inserted at the appropriate places their examination numbers and the numbers of the questions they answered.
12. It will be the responsibility of each candidate to hand in his script to the invigilator before he leaves the hall. Except for the question paper and any material they may have

brought with them students are not allowed to remove or mutilate any paper or material supplied by the University.

3.11.2 Regulation governing the Conduct of examinations and instructions to Staff.

1. All members of staff are to wear their **IDENTITY CARDS** while invigilating examination.
2. The organization of invigilation shall be the responsibility of the Time Table Committee in conjunction with the College Deans and HODs. They shall select suitable examination halls and draw up a list of invigilators from members of staff of each College at least a week before the commencement of examination.
3. There shall be a Chief Invigilator for each examination session comprising a listed number of papers.
4. There shall be in each hall, two invigilators for the first fifty candidates or less and one additional invigilator for every 100 candidates or part thereof. There shall be one attendant in each hall, due provision being made for the presence of male and female candidates.
5. All invigilators shall be at the examination with all the examination question papers and answer scripts.
6. For each examination, the Examiners of the respective papers shall be present at the examination for the first thirty minutes to address all matters that may arise and should submit a written situation report on the conduct of the examination to the Chief Invigilator.
7. The student shall not be allowed to bring paper, including blotting papers into the examination hall. They should normally enter the examination hall only with pen, ink, pencil, eraser, ruler and other materials such as mathematical instrument which may be allowed in the examination hall.
8. Bags, books, lecture files, and all other students' properties must be left outside the examination hall.
9. Invigilator shall inspect the hall and search all candidates before they are seated for the examination to ensure that no student has on him/her any unauthorized materials.
10. Exam officers must make available exam malpractice forms to Invigilators for conduction of any exam and any report of exam misconduct should get to exams & records, the Registrar's office not later than 24 hours of occurrence.

3.11.3 Examination Misconducts and Sanctions.

Examination misconduct and sanctions are tabulated in table 3.8. Students are advised to avoid anything that in hindering their academic pursuit in this great institution.

Table 3.8: Examination Misconducts

S/N.	MISCONDUCT	SANCTION
a.	Bringing in unauthorized materials such as: notes, scraps, electronic aids, etc. into the examination hall.	Rustication for one academic session.
b.	Impersonation: is assuming or taking another person's identity for the purpose of writing an examination of that person. (i) Impersonator is the person who holds himself or herself out as being another person so as to write an examination for that other person. (ii) Impersonatee is a person who procures another person to write an examination for him or her.	(i) If the impersonator is a student of the University, expulsion of the student from the University. (ii) If the impersonator is not a student of the University, he or she may be handed over to the Police. (iii) for an impersonate expulsion from the University
c.	Unauthorized communication during an examination, such as: passing written information in an examination hall,	Rustication for one academic session for first offender and expulsion from the

	orally receiving information from another person within or outside the examination hall, receiving electronic messages from within or outside an examination hall, etc.	University for any such subsequent offence by the same student.
d.	Refusal to submit oneself to physical search by an invigilator of the same sex, such as: (i) failure to present the University identification card; (ii) Bursary receipts; (iii) examination form; (iv) unruly behaviour at the entrance into the examination hall; etc.	Denial of entrance into the Examination hall or forfeiture of the examination
e.	Unauthorized possession of university examination answer script(s)	Rustication for one academic semester.
f.	Smuggling of examination script(s) containing already answered questions into the examination hall or attempting to submit same.	Expulsion from the university
g.	Bringing dangerous weapons into the examination hall, such as: gun, knife, cutlass, axe, dangerous chemicals, corrosive materials, or any other object,	Expulsion from the university
h.	Mutilation or replacement of any answer script or paper officially supplied with any other unofficial answer script.	Expulsion from the university.
i.	Forgery or mutilation of university identification card, bursary receipt(s), examination form or any other university examination document.	Expulsion from the university.

Note: A female invigilator is present in every examination hall for the enforcement of physical search on female students suspected to be armed with illegal materials which aid undue advantage during examination.

3.12. Industrial Training (SIWES) Regulations and Requirments

Engineering education is incomplete without industrial attachment being part of the degree programme. The NUC recommends a minimum duration of 40 weeks (one semester and 3 long vacations) for industrial attachment. The objective of the attachments is to expose the students to a working environment where they can relate theory to practice and enhance their communication and human relations skills. The following practical training scheme: Igbinedion University Okada Engineering Equipment Training (IUO-EET) are carried out by the college and Igbinedion University Industrial Training Scheme (IUIITS 302 and 402) are done in industries:

i. IUO-EET 102 AND 202

This is an intensive four-weeks in house practical training in the various workshops within the college and around the campus. It commences two weeks after the end of the sessional examinations for 100 level and 200 level Engineering students. During this period, the students are exposed to workshop practices that may be encountered in the mechanical, machine, sheet metal, automobile, welding, carpentry, civil and electrical engineering workshops.

ii. IUIITS 302

The attachment takes place at the end of the 300 level session examinations for 12 weeks of the long vacation. Again, college staffs are expected to visit the trainees for on-the-spot assessment of their progress.

iii. - IUIITS 402

The attachment, which begins at the end of the first semester examinations, at the 400 level of the programme, is the final exposure to industrial practice before the completion of the Bachelor of Engineering degree programme. It lasts for 24 weeks. It is expected that during the training, the student is exposed to his/her chosen end degree.

For the Grading and Assessment of Industrial Training, there is a combination of Continuous Assessment (CA) by the supervising college staff that visited the students on training, and the grading of the logbooks and final written reports of each student at the end of each training attachment. The designated officer of the establishment must properly authenticate such logbooks and reports where the students served. 300level and 400level students are expected to present their industrial experience report and presentation to departmental panel for grading

3.13. Final Year Project and Thesis

A project is an extremely important part of the Engineering Degree programme. Although lectures and laboratory experiments are designed to improve the learning process, projects supplement this process by placing the student on the path of independent thinking. The student will be required to carry out independently a small project which would enable him to develop his thought processes, creativity, problem-solving ability, initiative, and attitude to work.

The nature of the project may be one or more of the following:

- a. Developing a theory for solving a problem
- b. Developing computational procedures for solving a problem
- c. Setting up an experiment to demonstrate an established theory.
- d. Building a working system from established plans and testing the system
- e. Developing a design routine for a device, constructing it (if required for the project) and testing it
- f. Investigating specific problems which may arise in governmental institutions, industrial firms, and other private corporation bodies in the country.
- g. Investigating causes of failure of any specific plant or device and suggesting remedies, if any.

The examination regulation stipulates that “project and thesis” would carry marks equivalent to two 2-hour papers in the final examination. For the purpose of doing this, an oral examination will be held in which the student will be required to defend his project.

3.13.1 How to Select a Project:

A project should normally be chosen from fields related to the specific subject selected by the student for the final year degree examination. In selecting a topic for a project, it is expected that the student goes through the subject titles of papers (in the field of interest) published during the last ten years in engineering journals. A student, first of all, goes through the subject headings as listed in “Civil Engineering Abstracts” or “Applied Science and Technology Index”. The specific journal in which the paper of interest is published is then consulted and all references listed in the paper collected. A likely project to be undertaken by any student is subject to review by the supervisor. Supervisor(s) are assigned to a student based on the student area of interest. The student would then prepare a rough outline of the proposed project and submit it to the supervisor. The supervisor, after establishing the feasibility of the project, would give the final go-ahead or possibly suggest something different, or modification in which the supervisor himself is interested. The ideal situation is one where the chosen project coincides with a supervisor’s area of interest. For this reason, members of staff are requested to design projects in their areas of research interest. Students can then choose their project from a list of such project topics. Whenever practicable, students should know their projects long before the beginning of the session.

3.13.2 Basic precepts regarding Engineering Projects:

Two of the most important aspects of a project include the preparation and organization. Preparation and organization are of the utmost importance in writing projects for easy understanding. Preparation requires a careful reading of the instructions and collateral material (references, manuals, etc.), a clear understanding of each step involved in the required procedures before the actual execution of the project, and often a written planned programme (rough outline of proposed, degree to be investigated, preliminary calculations, etc.) Organization is a guiding principle to be followed throughout the preparation, execution and reporting of a particular thing. A good organization entails the neat construction or design of a model that may be easily visualized and checked, systematic entering of data with descriptive headings and entering of all relevant information regarding equipment used.

3.13.3. Writing Project

A student should aim at finishing his project at about the middle of the second semester, and submit the typed and bound copies of the project two weeks before the beginning of second semester examinations. The time schedule should be roughly as follows:

Selection and Discussion of Project topics	3 weeks
Project Write-up (Chapter 1 – 3)	6 weeks
Presentation of Project Proposal	1 week
Practical Work/Laboratory experiment connected with the project.....	(1 st Semester Holiday)
Completion of Project write-up	4 weeks
Supervisor's review of the project	3 weeks
Correction of the Project work	2 weeks
Project Defense	1 week
Correction and Binding of thesis	3 weeks

3.13.4. Organization of Thesis:

Project format and organization are outlined in the Departmental project guideline format and are available in the Department.

3.13.5 Quality Control on student Project, dissertation and thesis.

All projects are subjected to plagiarism tests. Supervisors and students are strongly advised not to plagiarize, 30% is pegged for undergraduate projects and any project above the recommended similarity index percent is not acceptable.

3.13.6 Binding and Number of Copies Required

A minimum of four hard copies of the project is required, after all the corrections have been affected and certified by the supervisor. Situations where the student had a co-supervisor, the required number of hard copies will be five. The projects copies are taken to the University library publishing press unit for binding.

3.13.7. Assessment of Project Work

A student project is assessed by a panel of examiners (lecturers in the Department) and external examiners. The assessment is in three (3) stages.

The 1st (preliminary) stage involves discussion of project topics. The student appears before the examiners to present his project topic and proposal. This stage ensures that projects are not duplicated in the Department. And the student is rightly instructed with better clarity on his project work. No mark is allotted.

2nd Stage: The student is expected to appear before the panel with a project write-up covering chapters 1-3. At this stage, the student must have gotten indebted knowledge of his project work as well as reference materials. So, he is expected to present his work stating the problem, objectives and method of execution, including the laboratory/practical experiments to be carried out.

The panel of examiners scores the students based on the following

Chapter 1 – 15mks	References – 10mks
Chapter 2 – 15mks	Presentation – 20mks
Chapter 3 – 15mks	Dressing – 10mks
Ability to Answer Question – 15mks	

The 3rd stage takes place in the 2nd semester before the panel of examiners and external examiner when the student must have completed the project. It may also be noted that there is a supervisor's score of 100% for the project, which is added to obtain an average score for a student project. The project supervisor is the only person perhaps who knows as much as a student about the problem involved in a particular project. Therefore, his opinion will carry reasonable weight in assessing the project assessment exercise. The supervisor is expected to consider the following in assessing the project. The level of supervision or guidance he has been able to give you; the level of achievement you attained during the project with or without his guidance; your ability to solve the problems posed by the project and how much of his was through your own effort; Whether you kept a day-to-day record (in the log-book) of the progress made and whether you discussed with him from time to time any problems you been confronted with.

The members will assess the student on the following:

- Understanding of the subject you investigated
- Ability to answer questions (and explain points) on the work you have done.
- Project presentation and layout.
- Student may further be interviewed by the external examiner, or whenever a review of the grading by the supervisor and the panel becomes necessary.

Some of the Project's topics undertaken in the Department are Listed in Appendix B

CHAPTER FOUR

STUDENT SUPPORT AND DEVELOPMENT

4.1 Handling of Academic Grievances:

Academic grievances are handled by the Head of Department and the appropriate course level adviser. In addition, the university has a guidance and counselling unit for each faculty in addition to servicom unit for each college. Students are free and encouraged to visit that unit for any problem affecting and challenging their stay and academic pursuit in school. They can also do it anonymously. The servicom unit addresses with immediate effect matters or challenges raised by the writer (student/staff).

4.2 Student Advising and Mentorship System

Each level is assigned a lecturer that is charged with the responsibility of advising students on courses to register for, during any academic session, in line with the NUC maximum credit to be registered for in a session. The course level adviser provides counsel and advice to students on academic issues and courses offered. They also prepare student's results for college and Senate consideration and approval. The names of the level course advisers are provided in Table 4.1 .

Table 4.1: Names of Course Advisers in Civil Engineering Department

S/N	LEVEL	NAMES OF STAFF	Phone Numbers
1.	100	Engr, Daniel Ogheneochuko	07068870937
2.	200	Engr.(Mrs.) Faith Akhimien	08029324843
3.	300	Engr. Celestine Uzoka	08074837339
4.	400	Engr. Imarhiagbe Eghosa Akugbe	08039204677
5.	500	Engr. Dr. (Mrs.) Maryann O. Ezugwu	08038757355

4.3 Student Health Well-being

The university has a health clinic facility equipped with modern hospital equipment, doctors, nurses, medical laboratory scientists and hospital attendants within the student and staff residential area for immediate attention to health challenges. Students' hospital cards are issued at the beginning of a new academic session during registration to enable them to use the clinic when the need arises without payment. Staff cards are obtainable at the clinic. Students are advised to keep their clinic cards very well and use them when the need arises.

4.4 Guidance and Counseling of Students

The university has a guidance and counseling unit for each faculty in addition to servicom unit for each college. Students are free and encouraged to visit that unit for any problem affecting and challenging their stay and academic pursuit in school. Or might as well put in writing anonymously and submit to servicom unit who addresses with immediate effect matters or challenges raised by the writer (student/staff). Level course advisors are also involved in guiding and advising the students properly.

4.5 Handling of Behavioural Misconduct of Students

Reports of other unethical or unruly behaviour and attitudes, misconduct relating to interpersonal relationships and others by students/lecturers are handled by a university

disciplinary committee comprising of the Dean, student affairs with other constituted members of staff. These misconducts and sanctions are outlined in the student code of conduct. Students are free to make their reports without any victimization and such reports are subject to investigation and necessary actions are taken when proven.

4.6 Student support

Igbinedion University supports students from matriculation to graduation and beyond. This is in accordance with the university's mission to fully empower students through knowledge and entrepreneurship for the world of work and productivity. The main elements of the support policy are as follows: The university established a system of incentives to motivate outstanding students and encourage those who perform below average. The incentives include rewards and prizes (university prizes, Vice Chancellor's Awards and Dean's list, etc.) for students who excel in academics, community service and leadership. Students who perform poorly are placed on special and remedial programmes to enable them to improve. Scholarships and bursaries are also given to deserving students who distinguish themselves or become disadvantaged because of being indigent, loss of parents or inability to meet financial obligations to the university. The students' self-empowerment programme which is elaborated below provides one of the more innovative instruments of student support.

The University's Human Help support Unit counsels and assists students to improve and overcome challenges of learning, emotional stability and self-actualization. The student placement unit collaborates with employers to ensure that our graduating students get competitive jobs before they graduate. Graduating students who distinguish themselves academically, especially those who made first class honors or its equivalent are offered automatic employment or scholarships by the university to support their academic growth and development. The university also offers teaching and non-teaching jobs to its graduates with a view to ensuring that alumni become an integral part of the future development of their alma mater.

4.7 Student Self-Empowerment Programme (SSEP)- Entrepreneurship and Innovation.

Students are also exposed to the concept of entrepreneurship with a view to self-employment. **SSEP** was launched at IUO's 8th Matriculation Ceremony on 13th January, 2007 with the following objectives: to make students creators and agents of wealth through individual and collective self-help initiatives; strengthen their knowledge of and competencies in a wide variety of income generating entrepreneurial endeavors instill the virtues of dignity of labour and in line with the overall vision of the university make products of IUO better able to cope with the challenges of daily living. Students are trained in the following areas

- Animal Husbandry (Fishery)
- Tailoring/ Fashion Design (Beads, Hand Fans, Gele, Hair Fascinators)
- Cosmetics and Toiletries, Block Molding
- Bakery and Confectionery, Technology and Creativity
- Desktop Computer Operation and Business Centre
- Automobile Driving, Hair Cure, Manicure and Pedicure
- Music (Voice Training, Electronic Keyboard; Drums, Guitar, Percussion, Wind and String Instruments)
- Catering, Cakes and Events Coverage.

In addition, the entrepreneur and skill acquisition centre also houses the Igbinedion University, Okada Hub, which was established by the university in partnership with the Ehizua Hub to promote and foster digital and technological innovation and entrepreneurship while bridging the financial and digital divides. This will give students access to an affordable and high-quality education. It is a platform for students to develop innovative skills, grow into innovators, where their ideas will become patented products. The partnership's flagship hub was signed in the first quarter of 2023 on Airport Road, Benin City, Edo State. The hub's features include a cutting-edge virtual studio, a smart classroom, co-working space, a game room, multimedia studio and a sizable indoor lobby with exquisite design. Students can offer two months short courses in software development, cybersecurity, data analytics, cinematography, photography and video editing.

4.8 Student Associations and Professional Bodies

In line with the Department's mission to produce well-rounded, professionally competent, and socially responsible engineers, students are encouraged to engage actively in student associations and professional bodies. Participation in these organizations provides valuable exposure to professional ethics, leadership, teamwork, and technical advancement and key qualities required for success in the engineering profession.

The following associations are recognized and supported by the Department of Civil Engineering:

1. **Nigerian Institution of Civil Engineering Students Affiliate (NICESA):** The Nigerian Institution of Civil Engineering Students Association (NICESA) is the official student arm of the Nigerian Institution of Civil Engineers (NICE), a division of the Nigerian Society of Engineers (NSE). NICESA serves as a platform for Civil Engineering students to: Interact with professional engineers and industry experts, Participate in seminars, workshops, and industrial visits, Develop leadership, innovation, and project management skills, Promote professionalism and excellence in civil engineering practice. Membership in NICESA is open to all students of the Department of Civil Engineering. Plate 4.1 is a cross-section of students with HOD at NICE conference, PH 2024.



Plate 4.1: Students at NICE Conference, PH, 2024

2. **American Society of Civil Engineers (ASCE) – Student Chapter** The ASCE Student Chapter at Igbinedion University Okada connects students with global standards and

innovations in Civil Engineering. It offers opportunities for professional growth through: Access to international journals, webinars, and competitions. Collaboration with global peers and mentors. Exposure to current trends and technologies in engineering practice. Participation in ASCE nurtures globally minded engineers prepared for international engagement.

3. **Association of Professional Women Engineers of Nigeria (APWEN) – Student Collegiate Chapter**

The APWEN Student Chapter is dedicated to promoting, mentoring, and supporting female engineering students to excel in their chosen fields. Its core activities include mentorship programs, outreach campaigns, technical talks, and leadership development. Through APWEN, female students are inspired to overcome barriers, embrace innovation, and contribute meaningfully to national development. Membership is open to all female students in the Department.

4. **Nigerian Universities Engineering Students Association (NUESA).** The Nigerian Universities Engineering Students Association (NUESA) serves as an umbrella body uniting engineering students across Nigerian universities. Within the College, NUESA focuses on: Building collaboration among students of various engineering disciplines. Organizing educational, social, and innovation-based activities Promoting leadership, unity, and professional ethics among engineering students.

Students are strongly encouraged to register and participate in the College and departmental association during their studies. Such involvement: develops interpersonal communication, and leadership skills; Provides exposure to professional networks and mentorship; Enhances understanding of engineering practice and ethics; Bridges the gap between theoretical knowledge and practical experience. Active participation in these associations is recognized by the Department as an important component of holistic student development.

Therefore, the Department of Civil Engineering remains committed to nurturing competent and socially responsible engineers through a blend of academic excellence and professional engagement. Students are therefore encouraged to take full advantage of these associations as platforms for learning, leadership, and lifelong professional growth. Through active participation, our students not only strengthen their technical abilities but also build the confidence and character required to contribute meaningfully to national and global development.

4.9 Security and Safety

Permanent fencing of campuses and staff/students' residential areas with excellent access control are provided, guided and maintained. Security Service Provider (Sheriff Deputies) is also part of the university security agency charged with the responsibility of controlling and guarding administrative offices, laboratories, school properties and student /staff residential areas. They also maintain peace and order within the university. As part of management measures to strengthen security on campus, all staff and students are advised to ensure that they wear/carry their identity (ID) cards on campus. Furthermore, management has reintroduced the use of car stickers and tallies to check and monitor vehicular movements in and out of the university. All staff and students are enjoined to take issues of personal security seriously and report any threat to life and or security infractions to the following numbers

0802 359 9991 - Dean of Students affairs

0815 454 4318 – Chief Security Officer
0706 560 6675 – Deputy Chief Security Officer

In conclusion, the department encourages students to dress in a corporate manner (in line with the Senate Decision) while attending lectures. Students are encouraged to use the library/ICT facilities during their free period. **Students should ensure they obtain their password from the ICT unit to enable them to have access to internet resources and e-library books subscribed by the university for their academic purposes.** The university monitoring committee, headed by Rev Sr. Rosemary Ifeyinwa Unigwe ensures that lectures are delivered accordingly in line with the lecture time table. There is also a quality assurance committee for each college chaired by the Vice Chancellor's representative, Dean, HODs, and course advisers for effective and efficient delivery of lectures.

4.10 Electronic Library (E-books Resources)

Igbinedion University, Okada Library has windows of opportunity to access EBSCOHost and Research4LIFE database e-content (including e-books and e-journals resource materials). ICT provides good internet facilities for browsing and accessing the library resources. Training is always offered to members of staff and students from time to time regarding the use of library database resources. Email and passwords are created by the ICT unit to enable both staff and students have access to the e-library and other internet resources which are within the university. The Igbinedion University Library is subscribed to almost all the well-known online resource providers in all disciplines. These include;

EBSCO Host

Website: <http://search.ebscohost.com>

Research4life (which grants access to HINARI, AGORA, OARE, ARDI and GOALI).

Website: login.research4life.org

Social Science Research Network

Website: <https://www.ssrn.com/index>

Directory of Open Access Books (DOAB)

Website: <https://www.doab.org>

TEAL

Use I. P. Address 172.16.0.4

Register using your e-mail address – preferably your university e-mail address.

LEGALPEDIA

Use I. P. Address = 172.16.1.55:7757/LEGAPEDIA/P/home.aspx

HEINONLINE

Website: <http://heinonline.org/HOL/Welcome>

OMICS INTERNATIONAL JOURNAL

<https://www.omicsonline.org/scientific-journals.php> 22

JOURNAL OF PHYSICAL MATHEMATICS

<http://www.omicsonline.com/open-access/physical-mathematics.php>

ADVANCES IN MATHEMATICAL PHYSICS

<http://www.hindawi.com/journals/amp/contents/>

AMERICAN JOURNAL OF COMPUTATIONAL MATHEMATICS

<http://www.scirp.org/journal/ajcm/>

ARMENIAN JOURNAL OF MATHEMATICS

<http://www.flib.sci.am/eng/journal/Math/index.html>

AMERICAN JOURNAL OF ECONOMICS AND BUSINESS ADMINISTRATION

<http://thescipub.com/journals/ajebea>

INTERNATIONAL JOURNAL OF MANAGEMENT SCIENCES AND BUSINESS RESEARCH

<http://www.ijmsbr.com/volume-1-issue-1-2/>

BRITISH JOURNAL OF MARKETING STUDIES

<https://www.eajournals.org/journals/british-journal-of-marketing-studies-bjms/>

JSTOR

Website: www.jstor.org

E-REPOSITORY (For e-books, e-journals and e-reports)

Use I. P. Address = 10.10.21.50:8080

Directory of Open Access Journal (DOAJ)

Website: <https://www.doab.org>

ADVANCES IN PURE MATHEMATICS

<http://www.scirp.org/journal/apm/>

HIKARI

<http://www.m-hikari.com/journals.html>

EUROPEAN JOURNAL OF ACCOUNTING, AUDITING AND FINANCE RESEARCH
<https://www.eajournals.org/journals/european-journal-of-accounting-auditing-and-finance-research-ejaaf/>
INTERNATIONAL JOURNAL OF HUMANITIES AND SOCIAL SCIENCE
<http://www.ijhssnet.com/index.php/archives.html>
JOURNAL OF EMERGING TRENDS IN EDUCATIONAL RESEARCH AND POLICY STUDIES (JETERAPS)

<http://jeteraps.scholarlinkresearch.com/listofissues.php>

INTERNATIONAL JOURNAL OF HUMAN RESOURCE MANAGEMENT AND RESEARCH

<http://journals.indexcopernicus.com/issue.php?>

BOOKBOONS

www.bookboons.com

B-ok.xyz

Website: <http://b-ok.xyz>

Book Finder

Website: <http://en.bookfi.net>

SCOPUS

<https://www.hindawi.com/ai/scopus/following>

OPEN (OPEN ACCESS PUBLISHING IN EUROPEAN NETWORKS)

<http://www.oapen.org/content/>

OAJSE (OPEN ACCESS JOURNAL SEARCHENGINE)

http://oajse.com/subjects/computer_science.html

JOURNAL OF MATHEMATICS AND STATISTICS

<http://thescipub.com/journals/jmss>

ANNALS OF MATHEMATICAL LOGIC

<http://www.sciencedirect.com/science/journal/>

INTERNATIONAL JOURNAL OF BUSINESS AND ADMINISTRATION RESEARCH REVIEW

<http://ijbarr.com/index.php/archive.html>

EUROPEAN JOURNAL OF BUSINESS AND INNOVATION RESEARCH

<http://www.eajournals.org/journals/european-journal-of-business-and-innovation-research-ejbir/>

ASIAN JOURNAL OF BUSINESS EDUCATION

<http://www.afbe.biz/main/>

AMERICAN JOURNAL OF BUSINESS EDUCATION (AJBE)

<http://www.cluteinstitute.com/ojs/index.php/AJBE/issue/archive>

INTERNATIONAL BUSINESS AND MANAGEMENT (CS Canada)

<http://www.cscanada.net/index.php/ibm/issue/archive>

MANYBOOKS

(Manybooks provides over 28,000 free e-books for your PDA, Ipod, or eBook reader.)

www.manybooks.net

GUTENBER

www.gutenberg.org

E-LIBRARY BOOKS

www.e-library.net/free-ebook.htm

E-BOOK DIRECTORY

www.e-bookdirectory.com

BIBLIOMANIA

www.bibliomania.com

PLANETBOOKS

www.planetbook.com

LIBRARY VOX BOOKS

www.librivox.org

DIGITAL LIBRARY BOOKS

www.digital.library.upenn.edu/books/

Username and password are obtainable from the University.

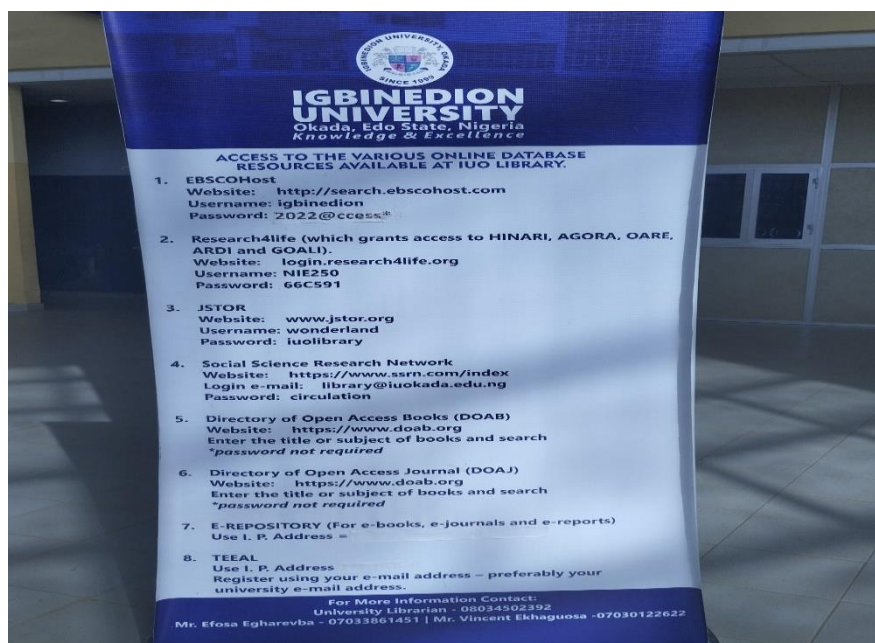


Plate 4.2: E-Library Online Data base Flex

4.11 Computing and Information Technology Systems (ICT Facilities)

The Civil Engineering Departmental office is equipped with basic Information and Communication Technology (ICT) facilities. Also, each lecturer has a personal computer. The departmental and staff computers are also connected to a wireless internet network of the university operated by the ICT. The students have access to computers in the department while they receive further training in the University Computer Laboratory. Browsing sites are available in the ICT, offices, hostels, hot spots are also available. This enables students / staff with laptops to access the internet. The investment and commitment made towards the digitization of Igbinedion University Campus has recorded some level of progress. The University IT academy is set up and open for all students of Igbinedion University to get certification in at least one IT program. There are five academies.

- CISCO-Academy,
- Huawei-Academy,
- Microsoft-Imagine Academy,
- Amazon-Cloud Web services,
- Mikrotik-Academy).

The academy offers different certification courses ranging from:

Networking, Cybersecurity, Cloud Security, Programing, Data analysis, Application Development, IT Essentials (System Technician), Big Data, Basic Desktop Application and Appreciation, Cloud Computing

Training Structure: The university has made it mandatory for all 100 - 400level students to be trained and get certified in basic IT skills, which leads to the integration of GST114 as a general course that trains them on both technical and software applications. For all 200 to 300 level students, they are expected to pick at least a certification program of their choice which they will be trained in, at a very subsidized cost. The training is tailored to teach and expose the students to various areas of IT as it's applicable to their profession. The student is expected to interface with the academy at least twice a week for hand-on practical which last for 3 hours. The training is streamlined in such a way that it does not conflict with their lectures. In addition, the IT academy accommodates students from the university who want to embark on their

Student Industrial Work Experience Scheme (SIWES) with the academy. ICT has a building that houses some of the facilities and academies as shown in Plates 4.3 – 4.5 below.



Plate 4.3 Cyber Security Simulation laboratory



Plate 4.4: ICT Academy Training Center



Plate 4.5: Olorogun (Dr.) Oskar C.J. Ibru, ICT Building, Igbinedion University Okada

CHAPTER FIVE

ACADEMIC CONTENT

5.1 Introduction

In addition to the philosophy and objectives of the university with a vision to become a centre of academic excellence through teaching and research activities responsive to communal and globalized human needs, the purpose of, B. Eng. (Civil Engineering) degree programme is to produce competent Professional Civil Engineers by familiarizing students with the basic theoretical and practical tools and techniques required for excellent performance in their future engineering practice.

Engineering is the application of principles of fundamental sciences, engineering, economics, computer technology, and human relations to practical situations in the fields dealing with processes and equipment in which matter is treated to produce something that is beneficial to society and humanity. Training in engineering requires the provision of knowledge, skill and understanding of these principles, for the planning, optimum design, construction, operations of new processes with due consideration to the environment, expansion and or revision of existing ones and assessment of performance of processes and equipment. It is on this premise that the program has been structured.

The program is broken into five (5) levels: 100 level, 200 levels, 300 level, 400 level and 500 level.

- i. **100 Levels and 200 Levels:** 100 and 200l are basic / fundamental levels of all engineering programmes. Engineering students take common courses at these levels with their counterparts in other Departments of the College with one additional basic course from a particular programme of study for the 200 levels in second semester.
- ii. **300; 400; and 500 Levels:** At these levels, the students take more core departmental courses in their respective programmes, in addition to relevant courses offered by the college. The detailed course structure is presented in various sections below.
- iii. **Course Coding:** It is proposed that all courses be coded according to department, level and semester. Thus, the Civil Engineering Department codes for all the courses are **CVE (BMAS) and CEE(new CCMAS)**, while other departments have their own codes and other units codes are as shown below;

Entrepreneurial Studies	-	EPS
University General Studies	-	GST
Community Service Development	-	CSP

- iv. **Level Code for Courses:** The level codes for course are as follows:

100 levels - 1	300 level- 3	500 level - 5
200 levels - 2	400 level- 4	

- v. **Semester Codes:** Semester codes are as follows:

First Semester	-	1 or any odd number
Second Semester	-	2 or any even number

For example, the full course code for a 200 level course, offered in the Department in the first semester, is of the form: CVE 211; where, 2 represents the level, 1 is the number assigned by the Department to track the course and 1 represents first semester. Should the same course be available in the second semester, the course code would be CVE212, where the '2' at the end of the figure signifies the second semester.

Note: L = Lecture Hours/Week; T = Tutorial Hours/Week; P = Practical Hours/Week.

- vi. **Course Syllabus:** Course structure for all courses in the Civil Engineering programme at Igbinedion University, Okada are presented in Tables 6.1 – 6.5 for 100L to 500L,

respectively. Levels (100 and 200) are in line with the NUC CCMAS while (300-500I) are in line with NUC BMAS (Benchmark Minimum Academic Standards) and even COREN Outcome Based Education.

5.2 100Level Course Courses and Descriptions

Table 5.1: 100 Level Course Structure

First Semester					
Course Code	Course Title	Units	Status	LH	PH
GST 111	Communication in English	2	C	15	45
CHM 101	General Chemistry I	2	C	30	-
CHM 107	General Practical Chemistry I	1	C	-	45
MTH 101	Elementary Mathematics I (Algebra & Trigonometry)	2	C	30	-
MTH103	Elementary Mathematics III (Vectors, Geometry & Dynamics)	2	C	30	-
PHY 101	General Physics I	2	C	30	-
PHY 103	General Physics III	2	C	30	-
PHY 107	General Practical Physics I	1	C	-	45
GET 101	Engineer in Society	1	C	15	-
CEE 101	Introduction to Civil Engineering	2	C	15	45
IUO-GST 113	Use of Library Study Skills and ICT	2	C	30	-
IUO-GST 114	IT Essentials	1	C	15	-
Total 1st Semester Credit unit		20			
Second Semester					
Course Code	Course Title	Units	Status	LH	PH
GST 112	Nigerian People and culture	2	C	30	-
CHM 102	General Chemistry II	2	C	30	-
CHM 108	General Practical Chemistry II	1	C	-	45
MTH 102	Elementary Mathematics II (Calculus)	2	C	30	-
PHY 102	General Physics II (Electricity & Magnetism)	2	C	30	-
PHY 104	General Physics IV (Waves, vibration and optics)	2	C	30	-
PHY 108	General Practical Physics II	1	C	-	45
GET 102	Engineering Graphics and Solid Modelling I	2	C	15	45
STA 112	Probability I	3	C	45	-
IUO-EET 102	Engineering Equipment Training	1	C	15	45
Total 2nd Semester Credit Unit		18			
Total 100Level Sessional Credit Unit		38			

100 Level First Semester Course Contents

GST 111: Communication in English

(2 Units C: LH 15; PH 45)

Course Learning Outcomes

At the end of this course, students should be able to:

1. Identify possible sound patterns in the English Language and notable language skills;
2. Classify word formation processes;
3. Construct simple and fairly complex sentences in English;
4. Apply logical and critical reasoning skills for meaningful presentations;
5. Demonstrate an appreciable level of the art of public speaking and listening; and
6. Write simple and technical reports.

Course Contents

Sounds and sound patterns in English Language (vowels and consonants, phonetics and phonology). English word classes (lexical and grammatical words, definitions, forms, functions, usages, collocations). Major word formation processes; the sentence in English

(types: structural and functional). Grammar and usage (tense, concord and modality). Reading and types of reading, comprehension skills, 3RsQ. Logical and critical thinking; reasoning methods (logic and syllogism, inductive and deductive argument, analogy, generalisation and explanations). Ethical considerations, copyright rules and infringements. Writing activities (pre-writing (brainstorming and outlining). writing (paragraphing, punctuation and expression). post- writing (editing and proofreading). Types of writing (summary, essays, letter, curriculum vitae, report writing, note-making). Mechanics of writing. Information and Communication Technology in modern language learning. Language skills for effective communication. The art of public speaking.

CHM 101: General Chemistry I

(2 Units C: LH 30)

Course Learning Outcomes

At the end of this course, the students should be able to:

1. Define atoms, molecules and chemical reactions;
2. Discuss the modern electronic theory of atoms and write electronic configurations of elements on the periodic table;
3. Rationalise the trends of atomic radii, ionisation energies, electronegativity of the elements, based on their position in the periodic table;
4. Identify and balance oxidation–reduction equation and solve redox titration problems;
5. Draw shapes of simple molecules and hybridised orbitals;
6. Identify the characteristics of acids, bases and salts, and solve problems based on their quantitative relationship;
7. Apply the principles of equilibrium to aqueous systems using LeChatelier’s principle to predict the effect of concentration, pressure and temperature changes on equilibrium mixtures;
8. Analyse and perform calculations with the thermodynamic functions, enthalpy, entropy and free energy; and
9. Determine rates of reactions and its dependence on concentration, time and temperature.

Course Contents

Atoms, molecules, elements and compounds, and chemical reactions. Modern electronic theory of atoms. Electronic configuration, periodicity and building up of the periodic table. Hybridisation and shapes of simple molecules. Valence forces; Structure of solids. Chemical equations and stoichiometry; chemical bonding and intermolecular forces, kinetic theory of matter. Elementary thermochemistry; rates of reaction, equilibrium and thermodynamics. Acids, bases and salts. Properties of gases. Redox reactions and introduction to electrochemistry. Radioactivity.

CHM 107: General Practical Chemistry I

(1 Unit C: PH 45)

Course Learning Outcomes

At the end of this course, the students should be able to:

1. State the general laboratory rules and safety procedures;
2. Collect scientific data and correct carry out chemical experiments;
3. Identify the basic glassware and equipment in the laboratory;
4. State the differences between primary and secondary standards;
5. Perform redox titration;
6. Analyse the data to arrive at scientific conclusions using record observations and measurements in the laboratory

Course Contents

Laboratory experiments designed to reflect topics presented in courses CHM 101 and CHM 102. These include acid-base titrations, qualitative analysis, redox reactions, gravimetric analysis, data analysis and presentation.

MTH 101: Elementary Mathematics I (Algebra and Trigonometry) (2 Units C: LH 30) **Course Learning Outcomes**

At the end of this course students should be able to:

1. Define and explain set, subset, union, intersection, complements, and demonstrate the use of Venn diagrams;
2. Solve quadratic equations;
3. Solve trigonometric functions;
4. Identify various types of numbers; and
5. Solve some problems using binomial theorem.

Course Contents

Elementary set theory, subsets, union, intersection, complements, Venn diagrams. Real numbers, integers, rational and irrational numbers. Mathematical induction, real sequences and series, theory of quadratic equations, binomial theorem, complex numbers, algebra of complex numbers, the argand diagram. De-Moivre's theorem, n th roots of unity. Circular measure, trigonometric functions of angles of any magnitude, addition and factor formulae.

MTH103: Vectors, Geometry and Statistics: (2 Units C: LH 30) **Course Learning Outcomes**

At the end of this course students should be able to:

1. Perform vector addition, scalar multiplication, and calculate scalar and vector products.
2. Use coordinate geometry concepts to solve problems involving points, lines, circles, and conic sections in 2D and 3D spaces.
3. Analyze and interpret statistical data diagrammatically, calculate measures of location and dispersion, and interpret results.
4. Define sample space and events, apply addition law, and use permutation and combination to evaluate probability.
5. Use binomial distribution and calculate linear correlation coefficients, including product-moment and rank correlation.
6. Apply linear regression analysis to calculate and interpret linear regression equations and apply them to real-world problems.
7. Solve problems involving direction cosines, angles between lines and planes, and distance calculations in 3D space.

Course Content

Vector and Coordinate: Types of vectors; points, line and relative vectors. Geometrical representation of vectors in 1 – 3 dimensions. Addition and subtractions, vectors and multiplication by scalar; Components of vectors in 1, 3 dimensions; direction cosines. Linear independence of vectors. Point of division of a line. Scalar and vector products of two vectors. Simple applications. Two-dimensional coordinates geometry; straight lines, angle between two lines, distance between points. Equation of circle, tangent and normal to a circle. Properties of parabola, ellipse, hyperbola. Straight lines and planes in space, direction cosines; angle between line and between lines and planes; distance of a point from a plane; distance between two skew lines. Statistics: Introduction of statistics. Diagrammatic representation of descriptive data. Measures of location and dispersion for ungrouped data. Grouped distribution measures of location and dispersion for grouped data. Problems of grouping.

Associated graphs. Introduction to probability: sample space and events, addition law, use of permutation and combination in evaluating probability. Binomial distribution. Linear correlation; scatter diagram, product-moment and rank correlation. Linear regression.

PHY 101: General Physics I (Mechanics)

(2 Units C: LH 30)

Course Learning Outcomes

On completion, the students should be able to:

1. Identify and deduce the physical quantities and their units;
2. Differentiate between vectors and scalars;
3. Describe and evaluate motion of systems on the basis of the fundamental laws of mechanics; 4. Apply Newton's laws to describe and solve simple problems of motion;
4. Evaluate work, energy, velocity, momentum, acceleration, and torque of moving or rotating objects;
5. Explain and apply the principles of conservation of energy, linear and angular momentum; 7. Describe the laws governing motion under gravity; and
6. Explain motion under gravity and quantitatively determine behaviour of objects moving under gravity.

Course Contents

Space and time; units and dimension, vectors and scalars, differentiation of vectors: displacement, velocity and acceleration; kinematics; Newton's laws of motion (inertial frames, impulse, force and action at a distance, momentum conservation); relative motion; application of Newtonian mechanics; equations of motion; conservation principles in physics, conservative forces, conservation of linear momentum, kinetic energy and work, potential energy, system of particles, centre of mass; rotational motion; torque, vector product, moment, rotation of coordinate axes and angular momentum. Polar coordinates; conservation of angular momentum; circular motion; moments of inertia, gyroscopes and precession; gravitation: Newton's law of gravitation, Kepler's laws of planetary motion, gravitational potential energy, escape velocity, satellites motion and orbits.

PHY 103: General Physics III (Behaviour of Matter)

(2 Units C: LH 30)

Course Learning Outcomes

On completion, the students should be able to:

1. Explain the concepts of heat and temperature and relate the temperature scales;
2. Define, derive and apply the fundamental thermodynamic relations to thermal systems;
3. Describe and explain the first and second laws of thermodynamics, and the concept of entropy;
4. State the assumptions of the kinetic theory and apply techniques of describing macroscopic behaviour;
5. Deduce the formalism of thermodynamics and apply it to simple systems in thermal equilibrium; and
6. Describe and determine the effect of forces and deformation of materials and surfaces.

Course Contents

Heat and temperature, temperature scales; gas laws; general gas equation; thermal conductivity; first Law of thermodynamics; heat, work and internal energy, reversibility; thermodynamic processes; adiabatic, isothermal, isobaric; second law of thermodynamics; heat engines and entropy, Zero's law of thermodynamics; kinetic theory of gases; molecular collisions and mean free path; elasticity; Hooke's law, Young's shear and bulk moduli; hydrostatics; pressure, buoyancy, Archimedes' principles; Bernoulli's equation and

incompressible fluid flow; surface tension; adhesion, cohesion, viscosity, capillarity, drops and bubbles.

PHY 107: General Practical Physics I

(1 Unit C: PH 45)

Course Learning Outcomes

On completion, the student should be able to:

1. Conduct measurements of some physical quantities;
2. Make observations of events, collect and tabulate data;
3. Identify and evaluate some common experimental errors;
4. Plot and analyse graphs; and
5. Draw conclusions from numerical and graphical analysis of data.

Course Contents

This introductory course emphasizes quantitative measurements. Experimental techniques. The treatment of measurement errors. Graphical analysis. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity. (Covered in PHY 101, 102, 103 and PHY 104). However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis, and deduction.

GET 101: Engineer in Society

(1 Unit C: LH 15)

Course Learning Outcomes

At the end of this course, the students should be able to:

1. differentiate between science, engineering and technology, and relate them to innovation;
2. Distinguish between the different cadres of engineering – engineers, technologists, technicians and craftsmen and their respective roles and competencies;
3. Identify and distinguish between the relevant professional bodies in engineering;
4. Categorise the goals of global development or sustainable development goals (SDGs); and
5. Identify and evaluate safety and risk in engineering practice.

Course Contents

History, evolution and philosophy of science. Engineering and technology. The engineering profession – engineering family (engineers, technologists, technicians and craftsmen), professional bodies and societies. Engineers' code of conduct and ethics, and engineering literacy. Sustainable development goals (SDGs), innovation, infrastructures and nation building - economy, politics, business. Safety and risk analysis in engineering practice. Engineering competency skills – curriculum overview, technical, soft and digital skills. Guest seminars and invited lectures from different engineering professional associations.

CEE 101: Introduction to Civil Engineering

(1 Unit C: LH: 15, PH :45)

Course Learning Outcomes

Upon the successful completion of this course, students should be able to:

1. Explain the profession of civil engineering and various branches
2. Discuss roles played by civil engineers in infrastructural development
3. Describe the career opportunities in Civil Engineering field

Course Contents

History of civil engineering. Branches of civil engineering. Roles of civil engineers in government, industry and academia. Allied professionals and their interaction with civil engineers. Career opportunities in civil engineering, professional and regulatory bodies.

IUO-GST 113: Use of Library, Study Skills and ICT**(2 Units C: LH 30)****Course Learning Outcomes**

Upon the successful completion of this course, students should be able to:

1. Utilize library to locate and use various library materials, including e-learning resources, and understand library catalogues and classification systems.
2. Develop effective study skills, use reference services, and understand copyright implications.
3. Use and access database resources, and apply bibliographic citations and referencing techniques.
4. Apply ICT skills for information management by using hardware and software technologies, including input devices, storage devices, and output devices, to manage information.
5. Demonstrate word processing and communication skills by using word processing software, typing skills, and communication services, including internet services, to produce and share information.

Course Content

Brief history of libraries, library and education, University libraries and other types of libraries, study skills (reference services). Types of library materials, using library resources including e-learning, e-materials; etc. Understanding library catalogues (card, OPAC, etc) and classification, copyright and its implications, Database resources, Bibliographic citations and referencing. Development of modern ICT, Hardware technology software technology, input devices, software technology, input devices, storage devices, output devices, communication and internet services, word processing skills (typing, etc).

GST 114: IT ESSENTIALS**(1 Units C: LH: 15)****Course Learning Outcomes**

Upon the successful completion of this course, students should be able to

1. Assemble and configure PC hardware components, including troubleshooting and preventive maintenance.
2. Explain networking fundamentals, configure networks, and apply network troubleshooting techniques.
3. Configure and troubleshoot laptops and other mobile devices, including mobile operating systems.
4. Install and configure Windows, Linux, and OSX operating systems, including mobile operating systems.
5. Explain security threats and apply security best practices to protect computer systems and data.
6. Diagnose and repair common computer problems, including hardware and software issues.
7. Demonstrate professional IT skills and knowledge required of an IT professional, including problem-solving, communication, and collaboration.

Course Content:

Introduction to personal computer hardware, PC assembly, Advanced computer hardware, preventive maintenance and Troubleshooting , Networking concepts, Applied networking , Laptops and other mobile devices, printers, virtualization and cloud computing, Windows installation, windows configuration, mobile, Linux and OSX Operating Systems Security. The IT Professional

SECOND SEMESTER 100LEVEL

GST 112: Nigerian Peoples and Cultures

(2 Units C: LH 30)

Course Learning Outcomes

At the end of this course, students should be able to:

1. Analyse the historical foundation of Nigerian cultures and arts in pre-colonial times;
2. Identify and list the major linguistic groups in Nigeria;
3. Explain the gradual evolution of Nigeria as a political entity;
4. Analyse the concepts of trade and economic self-reliance of Nigerian peoples in relation to national development;
5. Enumerate the challenges of the Nigerian state regarding nation building;
6. Analyse the role of the judiciary in upholding fundamental human rights
7. Identify the acceptable norms and values of the major ethnic groups in Nigeria; and
8. List possible solutions to identifiable Nigerian environmental, moral and value problems.

Course Contents

Nigerian history, culture and art up to 1800 (Yoruba, Hausa and Igbo peoples and cultures; peoples and cultures of the minority ethnic groups). Nigeria under colonial rule (advent of colonial rule in Nigeria; colonial administration of Nigeria). Evolution of Nigeria as a political unit (amalgamation of Nigeria in 1914; formation of political parties in Nigeria; nationalist movement and struggle for independence). Nigeria and challenges of nation building (military intervention in Nigerian politics; Nigerian Civil War). Concepts of trade and economics of self reliance (indigenous trade and market system; indigenous apprenticeship system among Nigerian peoples; trade, skill acquisition and self-reliance). Social justice and national development (definition and classification of law); Judiciary and fundamental rights. Individuals, norms and values (basic Nigerian norms and values, patterns of citizenship acquisition; citizenship and civic responsibilities; indigenous languages, usage and development; negative attitudes and conducts [Cultism, kidnapping and other related social vices]). Re-orientation, moral and national values (The 3Rs – Reconstruction, Rehabilitation and Re-orientation; re-orientation strategies: Operation Feed the Nation (OFN), Green Revolution, Austerity Measures, War Against Indiscipline (WAIC), Mass Mobilization for Self Reliance, Social Justice and Economic Recovery (MAMSER), National Orientation Agency (NOA). Current socio-political and cultural developments in Nigeria.

CHM 102: General Chemistry II

(2 Units C: LH 30)

Course Learning Outcomes

At the end of this course, the students should be able to:

1. Define fullerenes and its applications;
2. Discuss electronic theory;
3. Determine the qualitative and quantitative of structures in organic chemistry;
4. State rules guiding nomenclature and functional group classes of organic chemistry;
5. Determine the rate of reaction to predict mechanisms of reaction;
6. Identify classes of organic functional group with brief description of their chemistry;
7. Discuss comparative chemistry of group 1A, IIA and IVA elements and basic properties of transition metals.

Course Contents

Historical survey of the development and importance of organic chemistry; fullerenes as fourth allotrope of carbon, uses as nanotubules, nanostructures, nanochemistry. Electronic theory in organic chemistry. Isolation and purification of organic compounds; determination of

structures of organic compounds including qualitative and quantitative analysis in organic chemistry; nomenclature and functional group classes of organic compounds. Introductory reaction mechanism and kinetics. Stereochemistry. The chemistry of alkanes, alkenes, alkynes, alcohols, ethers, amines, alkyl halides, nitriles, aldehydes, ketones, carboxylic acids and derivatives. The chemistry of selected metals and non-metals. Comparative chemistry of group IA, IIA and IVA elements. Introduction to transition metal chemistry.

CHM 108: General Practical Chemistry II

(1 Unit C: PH 45)

Course Learning Outcomes

At the end of this course, the students should be able to:

1. State the general laboratory rules and safety procedures;
2. Collect scientific data and correctly carry out chemical experiments;
3. Identify the basic glassware and equipment in the laboratory;
4. Identify and carry out preliminary tests which include ignition, boiling point, melting point, and test on known and unknown organic compounds;
5. Carry out solubility tests, elemental test and functional group/confirmatory test on known and unknown organic compounds which could be acidic/basic/ neutral organic compounds.

Course Contents

Continuation of CHM 107. Additional laboratory experiments to include functional group analysis, quantitative analysis using volumetric methods.

MTH 102: Elementary Mathematics II (Calculus)

(2 Units C: LH 30)

Course Learning Outcomes

At the end of the course, students should be able to:

1. Identify the types of rules in differentiation and integration;
2. Recognise and understand the meaning of function of a real variable, graphs, limits and continuity;
3. Solve some applications of definite integrals in areas and volumes;
4. Solve function of a real variable, plot relevant graphs, identify limits and idea of continuity;
5. Identify the derivative as limit of rate of change and techniques of differentiation and perform extreme curve sketching;
6. Identify integration as an inverse of differentiation and methods of integration and definite integrals.
7. Perform integration application to areas, volumes.

Course Contents

Functions of a real variable, graphs, limits and idea of continuity. The derivative, as limit of rate of change. Techniques of differentiation, maxima and minima. Extreme curve sketching, integration, definite integrals, reduction formulae, application to areas, volumes (including approximate integration: Trapezium and Simpson's rule).

PHY 102: General Physics II (Electricity and Magnetism)

(2 Unit C: PH 30)

Course Learning Outcomes

On completion, the student should be able to:

1. Calculate electric field strength, flux, and forces between charged particles, and apply the inverse square law.
2. Apply Kirchhoff's laws, calculate resistance, power, and potential difference in simple DC circuits.
3. Describe capacitance, energy stored in capacitors, and electromagnetic forces, including electric motors and generators.
4. Apply principles of electromagnetic induction: Students will be able to explain electromagnetic induction, calculate induced e.m.f., and describe energy stored in magnetic fields.
5. Describe simple AC circuits, transformers, and motors, and apply relevant principles.
6. Describe current flow in electrolytes, conduction of electricity through gases, and the photoelectric effect.

Course Content

Electric field: Strength, flux and the inverse square law; electrostatic force between two charged particles; flux model for the electric field. Energy stored in an electric field, electrical potential due to dipole.

Steady direct currents: Simple circuits; potential difference resistance, power, electromotive force, Kirchhoff's laws; potential divider, slide-wire potentiometer, bridge circuits, combining resistances. Capacitors: Capacitance, combination of dielectrics, energy stored, charging/discharging. Electromagnetic effects; electromagnetic forces, electric motors, moving coil galvanometer, ammeter, voltmeter, electromagnetic induction, dynamo.

Alternating currents: Simple A.C. circuits, transformers, motors and alternating currents.

Magnetic field: The field at the center of a current-carrying flat coil of a current carrying solenoid, outside a long solenoid, flux model and magnetic fields. Electromagnetic induction: Induction in a magnetic field; magnitude and direction of induced e.m.f; energy stored in a magnetic field; self-inductance. Electricity and matter: Current flow in an electrolyte, Millikan experiment; conduction of electricity through gases at low pressure, cathode rays; photo-electricity.

PHY104: General Physics IV (Vibrations, Waves And Optics) (2 Unit C: PH 30)

Course Learning Outcomes

On completion, the student should be able to:

1. Describe the velocity and acceleration of a sinusoidal oscillator and apply the equation of motion for simple harmonic motion.
2. Describe the effects of damping and forcing on oscillations, including resonance.
3. Explain the propagation of longitudinal and transverse waves.
4. Describe the formation of images using mirrors and lenses, including microscopes and telescopes.
5. Describe chromatic and spherical aberrations, and explain how to reduce them, as well as describe dispersion by prisms.
6. Explain the relationship between color and wavelength, and describe the principles of spectra.

Course Content

Periodic motion of an oscillator: Velocity and acceleration of a sinusoidal oscillator, equation of motion of a simple harmonic oscillator: damped oscillations; forced oscillations; resonance; propagation of longitudinal and transverse vibrations. Wave and light: Mirrors, formation of images, thin lenses in contact, microscope, telescope; chromatic and spherical aberrations and their reduction, Dispersion by prisms; relations between colour and wavelength; spectra.

PHY 108: General Practical Physics II**(1 Unit C: PH 45)****Course Learning Outcomes**

On completion, the student should be able to:

1. Conduct measurements of some physical quantities;
2. Make observations of events, collect and tabulate data;
3. Identify and evaluate some common experimental errors;
4. Plot and analyse graphs;
5. Draw conclusions from numerical and graphical analysis of data; and
6. Prepare and present practical reports.

Course Contents

This practical course is a continuation of PHY 107 and is intended to be taught during the second semester of the 100 level to cover the practical aspect of the theoretical courses that have been covered with emphasis on quantitative measurements, the treatment of measurement errors, and graphical analysis. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

GET 102: Engineering Graphics and Solid Modelling I (2 Units C: LH 15; PH 45)**Course Learning Outcomes**

At the end of this course, the students should be able to:

1. Have a good grasp of design thinking and be obsessed with the determination to apply such to solving simple every day and also complex problems;
2. Recognise the fundamental concepts of engineering drawing and graphics;
3. show skills to represent the world of engineering objects in actionable solid models, and put such models in a form where they can be inputs for simulation and analyses;
4. Analyse such models for strength and cost;
5. Prepare the objects for modern production and manufacturing techniques of additive and subtractive manufacturing;
6. recognise that engineering is multidisciplinary in the sense that mechanical, electrical and other parts of physical structures are modelled in context as opposed to the analytical nature of the courses they take; and
7. Analyse and master the basics of mechanical and thermal loads in engineering systems.

Course Contents

Introduction to design thinking and engineering graphics. First and third angle orthogonal projections. Isometric projections; sectioning, conventional practices, conic sections and development. Freehand and guided sketching – pictorial and orthographic. Visualisation and solid modelling in design, prototyping and product-making. User interfaces in concrete terms. Design, drawing, animation, rendering and simulation workspaces. Sketching of 3D objects. Viewports and sectioning to shop drawings in orthographic projections and perspectives. Automated viewports. Sheet metal and surface modelling. Material selection and rendering. This course will use latest professional design tools such as fusion 360, solid works, solid edge or equivalent.

STA 112: Probability**(3 Units C: LH 45)****Course Learning Outcomes**

At the end of this course, the students should be able to:

1. Calculate permutations and combinations, and apply these concepts to solve problems.

2. Describe probability concepts, including random variables, probability distributions, and distribution functions.
3. Describe and apply binomial, geometric, Poisson, and normal distributions.
4. Conduct techniques for exploratory data analysis, including visualization and summary statistics.
5. Apply probability distributions to solve real-world problems, including modelling and analysis.

Course Content

Permutation and Combination. Concepts and principles of probability, Random variables. Probability and distribution functions. Basic distribution: binomial, geometric, passion, normal and sampling distributions, exploratory data analysis.

IUO–EET 102 Engineering Equipment Training

(1 Unit; C: PH 45)

Course Learning Outcomes

On completion of the course, students should be able to:

1. describe the relevancies, importance, and specific activities of each engineering discipline to society.
2. demonstrate workshop and laboratory safety protocols, including emergency response procedures.
3. identify, use, and maintain various engineering tools, equipment, and machines.
4. work effectively in teams to design, manufacture, and deliver engineering projects.
5. design and manufacture simple domestic tools, such as hoes, staples, and furniture.
6. perform simple wiring, install software, and couple computer systems.
7. demonstrate fire-fighting safety skills, emergency response procedures, and engineering safety protocols on site.

Course contents:

Introduction to various engineering disciplines. Relevancies, importance and specific activities of each discipline to society. Identification of laboratories for each discipline. Workshop and laboratory safety. Workshop practice and identification of tools, equipment, machines etc. Team collaboration in engineering projects. Manufacturing of simple domestic tools. Introduction to basic elements of building technology. Hardware maintenance. Installation and repair. Electrical power generation and transmission. Renewable energy sources. Engineering drawing. Gas explosion. Oil spillage. Consequences of oil spillage. Environmental cleanup of contaminated land. Fire-fighting safety and skills. Emergency response training for fire fighting. Engineering safety on site. Laboratory Report writing. Visitation to engineering project sites, both within the university, neighborhood and engineering-based establishments. Identification of all engineering tools, equipment, machines and their applications. Manufacturing of simple domestic tools like hoes, staples, simple chairs, tables, and sign posts in engineering workshops. Simple wiring to supply power to an office. Coupling of computer systems and installation of some software. Identification of motor parts and their uses, changing of car tyres, etc.

5.3 200 Level Course Structure and Description

Table 5.2: 200 Level Course Structure

First Semester 200L					
Course Code	Course Title	Units	Status	LH	PH
CEE 201	Civil Engineering Drawing	2	C	15	45
ENT 211	Entrepreneurship and Innovation	2	C	30	-
GET 201	Applied Electricity I	3	C	30	45
GET 203	Engineering Graphics & Solid Modelling II	3	C	30	45
GET 205	Fundamentals of Fluid Mechanics	3	C	45	-
GET 207	Applied Mechanics	3	C	45	-
GET 209	Engineering Mathematics I	3	C	45	-
GET 211	Computing and Software Engineering	3	C	30	45
IUO-ELA201	Engineering Laboratory I	1	C	-	45
IUO-GST 211	Environment and Sustainable Development	2	C	30	-
Total First Semester Credit Units		25			
Second Semester 200L					
Course Code	Course Title	Units	Status	LH	PH
GST 212	Philosophy, Logic and Human Existence	2	C	30	-
GET 202	Engineering Materials	3	C	45	-
GET 204	Students Workshop Practice	2	C	15	45
GET 206	Fundamentals of Thermodynamics	3	C	45	-
GET 208	Strength of Materials	3	C	45	-
GET 299	SIWES I	3	C	9 WEEKS	
GET 210	Engineering Mathematics II	3	C	45	-
IUO-GST 222	Community Service Programme	0	C	15	-
IUO-ELA202	Engineering Laboratory II	1	C	-	45
IUO-CEE292	Elements of Architectural Design	2	C	15	45
Total Second Semester Credit Units		23			
TOTAL 200L SESSIONAL CREDIT UNITS		47			

FIRST SEMESTER 200L COURSES

CEE 201: Civil Engineering Drawing Course Learning Outcomes

(2 Units E: LH 15; PH 45)

At the end of this course, students should be able to:

1. Draw civil engineering structures by hand sketching
2. Detail civil engineering structures using computer-aided-design software.
3. Identify different building structures such as highways, pipelines, bridges, dams, foundations and so on using appropriate symbols and conventions.
4. Design some structural components using specifications and standard

Course Contents

Drawing and detailing (by hand and using computer-aided-design skills) of civil engineering structures for example building structures, highways, pipelines, bridges, dams, foundations, etc. utilizing standard symbols and conventions, dimensions, notes, titles, etc. Relationship to specifications and standards.

ENT 211: Entrepreneurship and Innovation

(2 Units C: LH 30)

Course Learning Outcomes

At the end of this course, students should be able to:

1. explain the concepts and theories of entrepreneurship, intrapreneurship, opportunity seeking, new value creation and risk-taking.
2. state the characteristics of an entrepreneur.
3. analyse the importance of micro and small businesses in wealth creation, employment generation and financial independence.
4. engage in entrepreneurial thinking.
5. identify key elements in innovation.
6. describe the stages in enterprise formation, partnership and networking, including business planning.
7. describe contemporary entrepreneurial issues in Nigeria, Africa and the rest of the world; and
8. state the basic principles of e-commerce.

Course Contents

The concept of entrepreneurship (entrepreneurship, intrapreneurship/corporate entrepreneurship); theories, rationale and relevance of entrepreneurship (Schumpeterian and other perspectives, risk-taking, necessity and opportunity-based entrepreneurship, and creative destruction); characteristics of entrepreneurs (opportunity seeker, risk-taker, natural and nurtured, problem solver and change agent, innovator and creative thinker); entrepreneurial thinking (critical thinking, reflective thinking and creative thinking). Innovation (The concept of innovation, dimensions of innovation, change and innovation, knowledge and innovation). Enterprise formation, partnership and networking (basics of business plan, forms of business ownership, business registration and alliance formation, and joint ventures). Contemporary entrepreneurship issues (knowledge, skills and technology, intellectual property, virtual office and networking). Entrepreneurship in Nigeria (biography of inspirational entrepreneurs, youth and women entrepreneurship, entrepreneurship support institutions, youth enterprise networks and environmental and cultural barriers to entrepreneurship). Basic principles of e-commerce.

GET 201: Applied Electricity I

(3 Units C: LH 30; PH 45)

Course Learning Outcomes

Students will be able to:

1. discuss the fundamental concepts of electricity and electrical d.c. circuits;
2. state, explain and apply the basic d.c. circuit theorems;
3. explain the basic a.c. circuit theory and
4. apply to solution of simple circuits.

Course contents

Fundamental concepts: Electric fields, charges, magnetic fields. current, B-H curves Kirchhoff's laws, superposition. Thevenin, Norton theorems, Reciprocity, RL, RC, RLC circuits. DC, AC bridges, Resistance, Capacitance, Inductance measurement, Transducers, Single phase circuits, Complex j - notation, AC circuits, impedance, admittance, susceptance.

GET 203: Engineering Graphics and Solid Modeling II (3 Units C: LH 30; PH 45)**Course Learning Outcomes**

Students should be able to:

1. apply mastery of the use of projections to prepare detailed working drawing of objects and designs;
2. develop skills in parametric design to aid their ability to see design in the optimal specification of materials and systems to meet needs;
3. be able to analyze and optimize designs on the basis of strength and material minimization;
4. get their appetites wetted in seeing the need for the theoretical perspectives that create the basis for the analysis that are possible in design and optimization, and recognize/understand the practical link to excite their creativity and ability to innovate; and
5. Translate their thoughts and excitements to produce shop drawings for multiphysical, multidisciplinary design.

Course Contents

Projection of lines, auxiliary views and mixed projection. Preparation of detailed working production drawing; semi-detailed drawings, conventional presentation methods. Solid, surface and shell modeling. Faces, bodies and surface intersections. Component-based design. Component assembly and motion constraints. Constrained motions and animation. Introduction to electronics modeling. Electronics board layout preparation, Component libraries and Schematic design. Parametric modeling and adaptive design. Simulation for material optimization. Designing for manufacturing. Additive and subtractive manufacturing. Production for 3-D printing, Laser cutting and CNC machinery. Arrangement of engineering components to form a working plant (Assembly Drawing of a Plant).

GET 205: Fundamentals of Fluid Mechanics**(3 Units C: LH 45)****Course Learning Outcomes**

At the end of this course, the students should be able to :

1. explain the properties of fluids;
2. determine forces in static fluids and fluids in motion;
3. determine whether a floating body will be stable;
4. determine the effect of various pipe fittings (valves, orifices, bends and elbows) on fluid flow in pipes;
5. measure flow parameters with venturi meters, orifice meters, weirs, etc;
6. perform calculations based on principles of mass, momentum and energy conservation;
7. perform dimensional analysis and simple fluid modelling problems; and
8. specify the type and capacity of pumps and turbines for engineering applications.

Course Contents

Fluid properties, hydrostatics, fluid dynamics using principles of mass, momentum and energy conservation from a control volume approach. Flow measurements in pipes, dimensional analysis, and similitude, 2-dimensional flows. Hydropower systems.

GET 207: Applied Mechanics**(3 Units C: LH 45)****Course Learning Outcomes**

Students will acquire the ability to:

1. explain the fundamental principles of applied mechanics, particularly equilibrium analysis, friction, kinematics and momentum.

2. identify, formulate, and solve complex engineering problems by applying principles of engineering, science, mathematics and applied mechanics.
3. synthesize Newtonian Physics with static analysis to determine the complete load impact (net forces, shears, torques, and bending moments) on all components (members and joints) of a given structure with a load.
4. apply engineering design principles to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

Course Contents

Forces, moments, couples. Equilibrium of simple structures and machine parts. Friction. First and second moments of area; centroids. Kinematics of particles and rigid bodies in plane motion. Newton's laws of motion. Kinetic energy and momentum analyse

GET 209: Engineering Mathematics I

(3 Units C: LH 45)

Course Learning Outcomes

At the end of the course, the students should be able to:

1. solve qualitative problems based on vector and matrix analyses such as linear independence and dependence of vectors, rank etc;
2. describe the concepts of limit theory and nth order differential equations and their applications to physical phenomena;
3. solve the problems of differentiation of functions of two variables and know about the maximization and minimization of functions of several variables;
4. describe the applications of double and triple integration in finding the area and volume of engineering solids, and explain the qualitative applications of Gauss, Stoke's and Green's theorem;
5. explain ordinary differential equations and applications, and develop a mathematical model of linear differential equations, as well as appreciate the necessary and sufficient conditions for total differential equations; and
6. analyse basic engineering models through partial differential equations such as wave equation, heat conduction equation, etc., as well as fourier series, initial conditions and its applications to different engineering processes

Course Contents

Limits, continuity, differentiation, introduction to linear first order differential equations, partial and total derivatives, composite functions, matrices and determinants, vector algebra, vector calculus, directional derivatives.

GET 211: Computing and Software Engineering

(3 Units C: LH 30; PH 45)

Course Learning Outcomes

At the end of the course, the students should be able to:

1. describe and apply computing, software engineering knowledge, best practices, and standards appropriate for complex engineering software systems;
2. develop competence in designing, evaluating, and adapting software processes and software development tools to meet the needs of an advanced development project through practical object-oriented programming exposure taught in concrete terms with a specific modern language – preferable selected from Python, Java or C++;
3. use widely available libraries to prepare them for machine learning, graphics and design simulations;
4. develop skills in eliciting user needs and designing an effective software solution;
5. recognise human, security, social, and entrepreneurial issues and responsibilities relevant to engineering software and the digitalisation of services; and

6. acquire capabilities that can further be developed to make them productively employable by means of short Internet courses in specific areas;

Course Contents

Introduction to computers and computing; computer organisation – data processing, memory, registers and addressing schemes; Boolean algebra; floating-point arithmetic; representation of non-numeric information; problem-solving and algorithm development; coding (solution design using flowcharts and pseudo codes). Data models and data structures; computer software and operating system; computer operators and operators' precedence; components of computer programs; introduction to object oriented, structured and visual programming; use of MATLAB in engineering applications. ICT fundamentals, Internet of Things (IoT). Elements of software engineering.

IUO-ELA 201: Engineering Laboratory

(1 Units C: PH 45)

Course Learning Outcomes

At the end of the course, the students should be able to:

1. Perform laboratory tests and interpret various laboratory tests in engineering disciplines.
2. Apply workshop practices by demonstrating proficiency in workshop practices, including safety protocols and tool usage.
3. Design and construct various masonry bonds, including stretcher bond, English bond, and Flemish bond.
4. Apply plastering and finishing techniques to achieve smooth surfaces.
5. Design and install plumbing/sewage systems including pipes, fittings, and fixtures.

Course Content

Performing Laboratory Tests and doing workshop practice in all the Engineering laboratory and workshops. Civil Laboratory & Workshop practice include the following: Bonding, Stretcher Bond, English Bond, Flemish Bond, Plastering and Plumbing/Sewage Systems

IUO-GST 211: Environment and Sustainable Development

(2 Units C: LH 30)

Course Learning Outcomes

At the end of the course, the students should be able to:

1. Explain human relationship with the environment by describing human origin, nature, and relationship with the cosmic environment.
2. Discuss the role of science and technology in society and their role in serving humanity.
3. Describe renewable and non-renewable energy resources, their uses, and environmental implications.
4. Identify environmental hazards such as chemical, radiochemical, and other environmental hazards, and describe their effects on human health and the environment.
5. Apply knowledge of science and technology to understand and address environmental issues, including waste management and pollution control.

Course Content

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

SECOND SEMESTER 200L COURSES

GST 212: Philosophy, Logic and Human Existence

(2 Units C: LH 30)

Course Learning Outcomes

At the end of the course, students should be able to:

1. know the basic features of philosophy as an academic discipline;
2. identify the main branches of philosophy & the centrality of logic in philosophical discourse;
3. know the elementary rules of reasoning;
4. distinguish between valid and invalid arguments;
5. think critically and assess arguments in texts, conversations and day-to-day discussions;
6. critically assess the rationality or otherwise of human conduct under different existential conditions;
7. develop the capacity to extrapolate and deploy expertise in logic to other areas of knowledge, and
8. guide his or her actions, using the knowledge and expertise acquired in philosophy and logic.

Course Contents

Scope of philosophy; notions, meanings, branches and problems of philosophy. Logic as an indispensable tool of philosophy. Elements of syllogism, symbolic logic—the first nine rules of inference. Informal fallacies, laws of thought, nature of arguments. Valid and invalid arguments, logic of form and logic of content — deduction, induction and inferences. Creative and critical thinking. Impact of philosophy on human existence. Philosophy and politics, philosophy and human conduct, philosophy and religion, philosophy and human values, philosophy and character molding.

GET 202: Engineering Materials

(3 Units C: LH 45)

Course Learning Outcomes

At the end of this course, the students should be able to:

1. demonstrate the role of atoms and molecules (aggregates of atoms) in the building of solid/condensed matter known as engineering materials, the electrons quantum numbers and how the electrons are arranged in different atomic elements, and explain the role of electronic configuration and valence electrons in bonding;
2. define metals, alloys and metalloids, demonstrate mental picture of the solid mineral resources development as a relay race among four ‘athletes’: geologist, mining engineer, mineral processing technologist, process metallurgical engineer, and classify metallurgical engineering into 3Ps: process, physical and production;
3. explain the relationship between structure and properties of materials, characteristics, components and compositions of phase diagrams and phase transformations of solid solutions;
4. define ceramics, glass and constituents of glasses and understand application of ceramics in mining, building, art and craft industries;
5. define and classify polymers as a class of engineering materials and polymeric materials, demonstrate polymerisation reactions, their types and mechanism, and applications of polymers;
6. define properties, types and application of composite materials and fibres (synthetic and natural);
7. define and classify nanomaterials, demonstrate applications of nanomaterials, concept, design and classification of fracture mechanics, corrosion classification, including the five principal ways of controlling corrosion and metal finishing processes such as sherardising, galvanising and anodising; and

8. identify factors affecting the performance and service life of engineering materials/metals and metallography of metals/materials (materials anatomy), which enables metallurgical and materials engineers to prescribe appropriate solutions to test metals/materials fitness in service through structure-property-application relationships.

Course Contents

Basic material science; atomic structure, atomic bonding and crystal structures. Engineering materials situating metals and alloys; metals and alloys, classifications of metals, metal extraction processes using iron and steel (ferrous) and aluminium (nonferrous) as examples, phase diagrams/iron carbon diagrams, and mechanical workings of metals. Selection and applications of metals and alloys for specific applications in oil, aerospace, construction, manufacturing and transportation industries, among others. Ceramics (including glass); definition, properties, structure and classifications of ceramics. Bioactive and glass – ceramics. Toughening mechanism for ceramics. Polymers; definition of polymers as engineering materials, chemistry of polymeric materials, polymer crystallisation, polymer degradation and aging. Thermoplastic and thermosetting polymers and concepts of copolymers and homopolymers. Composites; definition, classification, characterisation, properties and composite. Applications of composites. Nanomaterials; definition, classification and applications of nanomaterials as emerging technology. Processing of nanomaterials including mechanical grinding, wet chemical synthesis, gas phase synthesis, sputtered plasma processing, microwave plasma processing and laser ablation. Integrity assessment of engineering materials; effect of engineering design, engineering materials processing, selection, manufacturing and assembling on the performance and service life of engineering materials. Metallography and fractography of materials. Mechanical testing (destructive testing) of materials such as compressive test, tensile test, hardness test, impact test, endurance limit and fatigue test. Non-destructive test (NDT) such as dye penetrant, x-ray and eddy current.

GET 204: Student Workshop Practice

(2 Units C: LH 15; PH 45)

Course Learning Outcomes

At the end of this course, the students should be able to:

1. identify various basic hands and machine tools, analogue and digital measurement devices and instruments, and acquire skills in their effective use and maintenance;
2. practically apply basic engineering technologies, including metrology, casting, metal forming and joining, materials removal, machine tooling (classification, cutting tool action, cutting forces, non-cutting production) and CNC machining technology;
3. master workshop and industrial safety practices, accident prevention and ergonomics;
4. physically recognise different electrical & electronic components like resistances, inductances, capacitances, diodes, transistors and their ratings;
5. connect electric circuits, understand different wiring schemes, and check ratings of common household electrical appliances and their basic maintenance; and
6. determine household and industrial energy consumption, and understand practical energy conservation measures.

Course Contents

The course comprises general, mechanical and electrical components: supervised hands-on experience in safe usage of tools and machines for selected tasks; Use of measuring instruments (calipers, micrometers, gauges, sine bar, wood planners, saws, sanders, and pattern making). Machine shop: lathe work shaping, milling, grinding, reaming, metal spinning. Hand tools, gas and arc welding, cutting, brazing and soldering. Foundry practice. Industrial safety and accident prevention, ergonomics, metrology. Casting processes. Metal forming processes: hot-working and cold-working processes (forging, presstool work, spinning, etc.). Metal joining processes(welding, brazing and soldering). Heat treatment. Material removal processes.

machine tools and classification. Simple theory of metal cutting. Tool action and cutting forces. Introduction to CNC machines. Supervised identification, use and care of various electrical and electronic components such as resistors, inductors, capacitors, diodes and transistors. Exposure to different electric circuits, wiring schemes, analogue and digital electrical and electronic measurements. Household and industrial energy consumption measurements. Practical energy conservation principles.

GET 206: Fundamentals of Engineering Thermodynamics (3 Units C: LH 45)

Course Learning Outcomes

At the end of this course, the students should be able to:

1. describe basic concepts of thermodynamics, quantitative relations of Zeroth, first, second and third laws;
2. define and explain system, surrounding, closed and open system, control volume and control mass, extensive and intensive properties;
3. calculate absolute and gage pressure, and absolute temperature, calculate changes in kinetic, potential, enthalpy and internal energy;
4. evaluate the properties of pure substances i.e. evaluate the state of the pure substances such as compressed liquid, saturated liquid-vapour mixture and superheated vapour using property diagrams and tables; arrange the ideal and real gas equations of state,
5. formulate the first law of thermodynamics for a closed system i.e. organize the change in energy in the closed systems via heat and work transfer;
6. distinguish heat transfer by conduction, convection and radiation, and calculate the amount of heat energy transferred;
7. calculate the changes in moving boundary work, spring work, electrical work and shaft work in closed systems;
8. apply the first law of thermodynamics for closed systems and construct conservation of mass and energy equations;
9. formulate the first law of thermodynamics to the open systems i.e. describe steady-flow open system, apply the first law of thermodynamics to the nozzles, diffusers, turbines, compressors, throttling valves, mixing chambers, heat exchangers, pipe and duct flow;
10. construct energy and mass balance for unsteady-flow processes;
11. evaluate thermodynamic applications using second law of thermodynamics;
12. calculate thermal efficiency and coefficient of performance for heat engine, refrigerators and heat pumps; and
13. restate perpetual-motion machines, reversible and irreversible processes.

Course Contents

Basic concepts, definitions and laws (quantitative relations of Zeroth, first, second and third laws of thermodynamics). Properties of pure substances: the two-property rule (P-v-T behaviour of pure substances and perfect gases); state diagrams. The principle of corresponding state; compressibility relations; reduced pressure; reduced volume; temperature; pseudo-critical constants. The ideal gas: specific heat, polytropic processes. Ideal gas cycles; Carnot; thermodynamic cycles, turbines, steam and gas, refrigeration. The first law of thermodynamics – heat and work, applications to open and closed systems. The steady flow energy equation (Bernoulli's equation) and application. Second law of thermodynamics, heat cycles and efficiencies.

GET 208: Strength of Materials

(3 Units C: LH 45)

Course Learning Outcomes

At the end of this course, the students should be able to:

1. recognise a structural system that is stable and in equilibrium;

2. determine the stress-strain relation for single and composite members based on Hooke's law;
3. estimate the stresses and strains in single and composite members due to temperature changes;
4. evaluate the distribution of shear forces and bending moments in beams with distributed and concentrated loads;
5. determine bending stresses and their use in identifying slopes and deflections in beams;
6. use Mohr's circle to evaluate the normal and shear stresses in a multi-dimensional stress system and transformation of these stresses into strains;
7. evaluate the stresses and strains due to torsion on circular members; and
8. determine the buckling loads of columns under various fixity conditions at the ends.

Course Contents

Consideration of equilibrium; composite members, stress-strain relation. Generalised Hooke's law. Stresses and strains due to loading and temperature changes. Torsion of circular members. Shear force, bending moments and bending stresses in beams with symmetrical and combined loadings. Stress and strain transformation equations and Mohr's circle. Elastic buckling of columns.

GET 299: Students Industrial Work Experience I

(3 Units C: 9 weeks)

Course Learning Outcomes

SIWES I should provide an opportunity for the students to:

1. acquire industrial workplace perceptions, ethics, health and safety consciousness, interpersonal skills and technical capabilities needed to give them a sound engineering foundation;
2. learn and practise basic engineering techniques and processes applicable to their specialisations;
3. build machines, devices, structures or facilities relevant to their specific engineering programmes and applications; and
4. acquire competence in technical documentation (log-book) and presentation (report) of their practical experiences.

Course Contents

Practical experience in a workshop or industrial production facility, construction site or special centres in the university environment, considered suitable for relevant practical/industrial working experience but not necessarily limited to the student's major. The students are exposed to hands-on activities on workshop safety and ethics, maintenance of tools, equipment and machines, welding, fabrication and foundry equipment, production of simple devices; electrical circuits, wiring and installation. (8-10 weeks during the long vacation following 200 level).

GET 210: Engineering Mathematics II

(3 Units C: LH 45)

Course Learning Outcomes

At the end of the course, the students should be able to:

1. describe physical systems using ordinary differential equations (ODEs);
2. explain the practical importance of solving ODEs, solution methods, and analytically solve a wide range of ODEs, including linear constant coefficient types;
3. numerically solve differential equations using MATLAB and other emerging applications;
4. perform calculus operations on vector-valued functions, including derivatives, integrals, curvature, displacement, velocity, acceleration, and torsion, as well as on functions of several variables, including directional derivatives and multiple integrals;

5. solve problems using the fundamental theorem of line integrals, Green's theorem, the divergence theorem, and Stokes' theorem, and perform operations with complex numbers;
6. apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions of complex variables, as well as the theory of conformal mapping to solve problems from various fields of engineering; and
7. evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula.

Course Contents

Introduction to ordinary differential equations (ODEs); theory, applications, methods of solution; second order differential equations. Advanced topics in calculus (vectors and vector-valued function, line integral, multiple integral and their applications). Elementary complex analysis including functions of complex variables, limits and continuity. Derivatives, differentiation rules and differentiation of integrals. Cauchy-Riemann equation, harmonic functions, basic theory of conformal mapping, transformation and mapping and its applications to engineering problems. Special functions.

IUO-ELA 202: Engineering Laboratory

(1 Unit, PH 45)

Performing Laboratory Tests and doing workshop practice across the entire engineering programme in the College. Civil Engineering Laboratory & Workshop practice include the following; Wood Work, Wood Type, Wood Defects, Joints, Tools For Woodwork

IUO-CEE292 Elements of Architectural Design, (2 Units; Core; LH = 15 PH = 45)

Course Learning Outcomes

At the end of this course, students should be able to:

1. Describe at least six (6) roles of architects in the building industry and at least four (4) basic functions of architecture and the principles of architecture.
2. Identify at least ten (10) standard symbols used in plan drawing and illustrate architectural drawing using simple scales.
3. Describe two (2) methods of free hand drawing and sketching and sketching techniques;
4. Apply graphical communication through techniques and exercises in space forms and relation to environments and basic principles of dealing with orthographic projections, isometric; diametric and perspective projections.
5. Outline at least two (2) techniques for representing building elements and design and principles of architectural measurements, procedures and techniques.
6. Demonstrate at least two (2) practical uses of ARCHICAD software in designing.

Course contents

Introduction of elements of architecture. Origin of architecture. Forms of Architecture. Role of architects in the construction industry. Basic functions of architecture. General principles of architecture. Standard symbols used in drawing. Presentation of an architectural drawing. Dimensional awareness. Free hand drawing and sketching. Basic sketching techniques. Drawing of more complex objects. Graphical communication through techniques and exercises in space forms, relation to environment forms in terms of shades, light and shadow. Basic principles of dealing with orthographic projections; isometric; diametric and perspective projections. Techniques for representing human beings, trees and landscapes and other symbols and representations for building elements, i.e applications and elementary Designs. Construction of common mathematical curves. Techniques for graduation value distinction between flat and curved surfaces. Principle of architectural measurement. Procedures and techniques. Measurement of building works and descriptions. Introduction to computer-aided

design software. Types of available architectural design software. Application of ARCHICAD software in designing.

5.4 300 Level Course Structure and Description.

300 level Civil Engineering Students undertake the common courses (EMA 301 and EMA302, GRE331, EPS311) that are prescribed by the college in conjunction with the departmental courses.

Table 5.3: 300L Course Structure

FIRST SEMESTER					
Course Code	Course Title	Units	Status	LH	P H
EMA 301	Engineering Mathematics III	3	C	45	-
GRE 331	Research Methods & Technical Report Writing	2	C	45	-
CVE 311	Theory of Structures	3	C	45	-
CVE 331	Civil Engineering Hydrology I	2	C	30	-
CVE 341	Soil Mechanics	3	C	30	45
CVE 361	Fluid Mechanics II	2	C	15	45
CVE 391	Building Technology	2	C	30	-
ELA 301	Civil Engineering laboratory Practical I	2	C	-	90
EPS 311	Introduction to Entrepreneurship Studies	2	C	15	45
IUO-GET 313	IUO Upskill Course I AutoCAD	0	C	-	45
	TOTAL CREDIT UNITS	21			

Second Semester

Course Code	Course Title	Units	Status	LH	P H
EMA 302	Engineering Mathematics IV	3	C	45	-
CVE 312	Structural Mechanics I	3	C	45	-
CVE 322	Design of Reinforced concrete Structures I	3	C	45	-
CVE 332	Civil Engineering Hydrology II	2	C	30	-
CVE 342	Engineering Geology	3	C	30	45
CVE 372	Engineering Survey and Geo-Informatics	3	C	30	45
CVE 382	Civil Engineering Materials	3	C	30	45
CVE 392	Terotechnology	2	C	30	-
ELA 302	Civil Engineering laboratory Practical II	2	C	-	90
IUITS 302	Igbinedion Uni. Industrial Training Scheme III	1	C	-	45
IUO-GET 314	IUO Upskill Course II Graphics Design	0	C	-	45
	TOTAL CREDIT UNITS	25			
	GRAND TOTAL CREDIT UNITS	46			

FIRST SEMESTER 300L COURSES

EMA 301: Engineering Mathematics III

(3 Units C: LH 45)

Course Learning Outcomes

At the end of the course, the students should be able to:

1. Demonstrate a clear understanding of the course content, that is, possess a breadth of knowledge in the area covered;

2. Possess an in-depth knowledge upon which a solid foundation can be built in order to demonstrate a depth of understanding in advanced mathematical topics;
3. Develop simple algorithms and use computational proficiency;
4. Write simple proofs for theorems and their applications;
5. communicate the acquired mathematical knowledge effectively in speech, writing and collaborative groups.

Course Contents

Linear Algebra: n-dimensional vectors, addition and scalar multiplication. Linear dependence and independence of set vectors. Matrices: operations of addition, scalar multiplication and product; determinants and their properties; sub-matrices and rank; inverse of a matrix. Theory of a system of linear equations, linear transformation and matrices; Eigenvalues and Eigenvectors of a matrix; Eigenvalues of Hermitian, skew Hermitian and unitary matrices; bilinear quadratic forms. Analytic geometry: Plane polar coordinates, coordinate transformation. Solid geometry and spheres and quadric surface. Spherical polar and cylindrical polar coordinates. Functions of several variables: Mean value theorem of function of several variables, maxima and minima, differentiation under the sign of integration. Jacobians. Numerical Analysis: Numerical differentiation and quadrature formulae. Analytic and numerical solution of ordinary differential equations. Curve fitting and least squares. Further on linear programming (simplex method).

GRE 331: Research Methods & Technical Report Writing

(3 Units C: LH 45)

Course Learning Outcomes

At the end of the course, the student should be able to:

1. demonstrate the concept of clear writing, common pitfalls and unambiguous language in engineering communication, including technical reporting for different applications and emotional comportment;
2. demonstrate the skills of language flexibility, formatting, logic, data presentation styles, referencing,
3. have an understanding on the use of available aids, intellectual property rights, their protection, and problems in engineering communication and presentation; and
4. demonstrate good interpersonal communication skills through hands-on and constant practice on real-life communication issues for engineers in different sociocultural milieu for engineering designs, structural failure scenarios and presentation of reports.

Course Contents

Principles of communication. Parts of technical reports: Abstract, introduction, Main body. Conclusions and Recommendations, Tables, Figures, Graphs, Illustration, References, Appendices. Writing the first draft. Revising the first draft: Content and structure. Audiences Scientific and Technical Prose: Spelling and Scientific Terminology using numbers and symbols. Data: Statistical analysis of data and display. Software support for various writing and graphic tasks. Use of Microsoft power point. Preparation of curricula vitae, research grant proposals, short talks and poster, and feasibility report. Writing a thesis employed in marine environment.

CVE311: Theory of Structures

(3 Units: Core course; LH = 45)

Learning Outcomes

On completion of the course, students should be able to:

1. Differentiate different types of columns based on BS 8110 and use Euler's theoretical formula to determine the buckling loads of columns under various fixity end conditions for stability and safety of structures.

2. Analyse symmetrical and eccentric loading and bending of columns about one axis (uni-axial bending) and about two axes (bi-axial bending) for the design of structural component sections.
3. Describe types of trusses and frames and calculate force reaction on members both internal and external using method of joints and sections
4. Use Mohr's circle to evaluate normal and shear stresses in a multi-dimensional stress system and
5. Describe creep, fatigue, fracture and stress concentration in machine parts and structural components and suggest preventive approach to guide against their effects for safety.
6. Discuss two (2) types and various forms of Springs, its usefulness and where they are applicable in machine parts and engineering applications.

Course content

Columns: Short columns (struts); Intermediate columns and slender columns. Fully restrained, partially restrained and unrestrained columns. Analysis of Columns: By Euler's Theoretical Formulae and Empirical Methods such as: Gordon Rankine's formula; Johnson's Parabolic and Straight-line formula. Loading and Bending of Columns: Symmetrical and eccentric loading of columns and bending about one axis (uni-axial bending) and bending about two axes (tri-axial bending). Analysis of Trusses and Frames. Determination of degree of indeterminacy or redundancy of trusses and frames. Analysis of Perfect or Statically Determinate Trusses and Frames. Calculation of external support reactions, internal forces (tension and compression) and deformation in bar members, using both analytical methods of joints and method of sections or moment as well as graphical methods. Shear center; unsymmetrical bending; curved beams. Biaxial and Tri-axial state of stress: transformation of stresses; Mohr's circle; Failure Theories. Creep, Fatigue, Fracture and Stress concentration. Springs.

CVE331: Engineering Hydrology

(2 Units: Core course; LH = 30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Explain hydrology, five (5) branches of hydrology, and at least four (4) the functions of a hydrologist;
2. Describe the basic principle of the hydrological cycle and the seven (7) stages in the hydrological cycle;
3. Conduct laboratory experiments using rain gauges and Interpret precipitation data within a catchment or watershed;
4. Analyze and graphically represent average precipitation within a catchment for a certain period
5. Compute missing precipitation data at a particular station using other index stations and adjust inconsistencies in rainfall data of a station;

Course contents

Introduction to Hydrology. Definition of Hydrology. Functions of hydrologists. Branches of hydrology. The hydrological cycle. Stages in hydrological cycles include precipitation; infiltration; and evaporation. Ground water; surface run-off. Precipitation. Forms and types of precipitation. Measurements of rainfall. Analysis of precipitation data.

CVE 341: Soil Mechanics

(3 Units Core course; LH 30, PH 45)

Course Learning Outcomes

At the end of the course, students should be able to:

1. Describe at least five (5) benefits, with regard to safety and economy, of soil compaction and soil investigation before embarking on the design and construction of structures; Conduct practical exercises to soil compaction and soil stabilization
2. Describe at least five (5) laboratory and field equipment to carryout particular soil test and relate soil particle size to flow of water through it.
3. Describe structures with possible seepage problems; Construct at least three (3) standard flow nets each for Sheet pile, Retaining wall and Dam and use flow net to analyse effect of water flow through soil on structures
4. Classify at least five (5) types of soils in Nigeria and the corresponding stress distribution principle required for its evaluation; Outline the steps required in the evaluation of a geotechnical report for foundation assessments;
5. Evaluate at least two (2) recently constructed (within 6 months of construction) buildings in Edo state which are already showing signs of distress (massive cracks) using stress distribution and settlement principles; and describe at least two (2)

Course Content

Definition(s) of Soil: Civil Engineer's definition of Soil: Geologist definition of Soil: Agriculturalist definition of Soil. Nature and Origin of Soil and Rocks: Mineral Content of Soil: Common Types of Soil: Clay, Silt, Loamy Soil, Sand, Gravel, etc. Engineering Properties of Soil: Volumetric Properties of Soil: Void Ratio, e : Porosity(n): Degree of Saturation(S_r). Densities and water Contents of Soil: Soil Densities: Density and Unit Weight: Bulk Unit Weight and Density: Dry Unit Weight and Densities, Specific Gravity of Soil Particles (G_s), Relative Density($R.D$) Relationship between Unit Weights and Densities of Soil.. Moisture Contents(W): Laboratory Test for Moisture Content: Relationship between moisture content: Density; Specific Gravity and Degree of saturation; Cone penetration Test: Consistency Limits or Index Tests of Soils: Shrinkage Limits(SL); Liquid Limit(LL)and Liquidity index(IL); Plastic Limit(PL) and Plasticity Index(PI). Soil Classification (Grading): (i) General Basis for Field Identification and Classification of Soils (ii) Laboratory and In-Situ Classification of Soil (iii) Casagrande Soil Classification System($GW-SW$). Particle Size Distribution/Gradation: Sieve Analysis, Effective Size(D_{10}), Uniformity Coefficient($U.C$) , Hydrometer Test and Analysis for very Fine Soils, Shear Strength of Soils: Laboratory testing for shear strength(shear box test): Soil Friction and Cohesion, Coulomb's Law of Soil Shear Strength: Pore pressure: Mohr's Circle Diagram and Principal Plane for Soil: Soil Strength Envelopes. Soil Water, Permeability and Flow: Flow of Water through Soils and Darcy's Law: Coefficient of permeability, K (ii) Relationship between Permeability and other Soil Physical Properties: Graphical Solution to Seepage Problems- Flow Nets, Flow lines, Equipotential lines, Hydraulic Gradient, Seepage Forces.

CVE361: Fluid Mechanics

(2 Units: Core course; LH = 15. PH=45)

Course Learning Outcomes

On completion of the course, students should be able to:

1. describe different types of heads of liquid in motion, including static head, dynamic head, and total head
2. Explain and apply Euler's equation and Bernoulli's equation for ideal and real fluids, including the assumptions and limitations of each equation.

3. Analyze and solve problems using Bernoulli's equation, including practical applications such as flow through orifices and mouthpieces, and flow over notches and weirs.
4. Evaluate and compare different types of fluid flow, including laminar and turbulent flow, and apply dimensional analysis to solve problems involving fluid dynamics.
5. Design and optimize fluid-based systems, including pipelines, pumps, and turbines, using principles of fluid dynamics, including vortex motion and impulse momentum equation.

Course contents:

Fluid Dynamics: Different types of heads of liquid in motion. Euler's equation, Bernoulli's equation for ideal and real fluid. Practical applications of Bernoulli's equation. Free liquid jet, Impulse momentum equation. Kinetic Energy and momentum equation. Vortex motion. Dimensional Analysis: Dimensional homogeneity, Method of Dimensional analysis, similitude, Buckingham's Pi theorem, Important dimensionless groups in engineering; Reynold's number (Re), Froude's number, Euler's number, Weber number, Mach number. Flow through orifices and mouthpiece: Classification of Orifices, Flow through an orifice, Hydraulic coefficients: coefficient of contraction (C_c), coefficients of velocity (C_v), coefficient of discharge (C_d), coefficient of resistance (C_r). Flow over notches and weirs: Types of notches and weirs, Discharge over rectangular notch or weir, Discharge over triangular notch or weir, discharge over trapezoidal notch or weir, over a stepped notch or weir. Laminar Flow: Characteristics of laminar flow, Reynold's experiment.

CVE391: Building Technology

(2 units: Core course; LH =30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Identify and describe different types of building structures, including residential, institutional, and commercial buildings, and explain their characteristics and requirements.
2. Design a building layout that meets conducive living conditions standards, including natural lighting and ventilation requirements, and demonstrates a thorough understanding of building design principles.
3. Specify and apply basic structural elements of buildings, including floor types, wall types, roof types, and roofing materials, and explain their functions and benefits.
4. Develop a comprehensive construction plan for a building project, including site clearing, excavation, earthworks, and concrete works, that adheres to industry standards and safety regulations.
5. Describe preparation of formwork for concrete casting and differentiate between at least three (3) grades of concrete, concrete batching methods and three (3) types of concrete curing processes.

Course contents

Introduction to Building Structures. Types of building structures: Residential, Institutional buildings, Commercial buildings. Basics of building construction. Building orientation with respect to conducive living conditions. Introduction to basic structural elements of buildings. Floor types, Floor surface finishing. Wall types. Roof types, roofing sheets and ceiling. Aspects of building construction: clearing building project sites with such equipment as: bulldozers; Manual labor; Disposals etc. Preliminary site investigation and tests. Setting out of buildings. Earthworks: excavation and disposal for the substructure; Soil stabilization; haulage of appropriate materials from approved borrow pits; Filling (embankment); compacting; etc. Leveling: Preparation and blinding of the substructure soil surface with plain concrete (grade 10). Concrete works; Making foundation; DPC; Making formworks, batching methods and

casting or constructing such structural elements as columns; beam soffits; Slabs; Walls; Floors; Roofs; Finishing; etc.

ELA 301: Civil Engineering Laboratory Practical

(2 units: LH = 90)

Course Learning Outcomes:

Upon successful completion of the course, students will be able to:

1. Understand the unit operations and processes they have learnt in the classroom and their applications to real time situations, by the opportunity to work with equipment in the laboratory.
2. Apply safety precautions in handling samples, materials, chemicals, and laboratory equipment.
3. Develop good analytical and critical thinking skills needed to analyse data, draw conclusions from their experiments, and interpret data.
4. Develop teamwork skills, learn how to communicate effectively, and collaborate to achieve a common goal.
5. Develop good technical writing skills and learn how to communicate scientific information effectively

Course Content:

Laboratory rules and safety procedures, laboratory reports writing, and data collection from experiments, Demonstration on Soil sampling using the hand auger, Laboratory Experiment on Natural moisture content determination test, Laboratory Experiment on Specific gravity test on engineering soils, Laboratory Experiment on Sieve analysis, Laboratory Experiment on Consistency limits test, Laboratory Experiment on Cement soundness test, Laboratory Experiment on Cement's consistency and setting time test, Laboratory Experiment on Specific gravity test on cement, Laboratory Experiment on pH test on water.

EPS 311: Introduction To Entrepreneurship Studies (2 Units: LH = 15, PH=45)

Course Learning Outcomes:

Upon successful completion of the course, students will be able to:

1. **Identify and evaluate** potential micro-business opportunities relevant to their field of study and local economic environment.
2. **Demonstrate understanding** of the basic theoretical concepts of entrepreneurship, including business planning, resource management, and value creation.
3. **Apply practical skills** gained through demonstrations and hands-on activities to operate small-scale ventures effectively.
4. **Analyze real-world business models** and operations through excursions and field visits to local and regional enterprises.
5. **Develop entrepreneurial competencies** such as innovation, risk-taking, leadership, and decision-making through guided mentoring.
6. **Collaborate with mentors** and business owners to gain insights into the challenges and strategies of running sustainable enterprises.
7. **Create and present a mini-business plan** or prototype venture tailored to their academic discipline and local needs.
8. **Demonstrate awareness of entrepreneurial ethics** and responsible business practices in managing small-scale enterprises.

Course content

This is the practical part of the programme, where students should be exposed to live ventures. This course is in two folds: [A]. Theoretical bits to prepare students for the basics of the

identified micro-business and industries within the university locality or nearby environs. (We propose the first four weeks of the 1st Semester). [B]. The practical bits. This would be done in three different stages: Demonstrations/Exhibitions. Excursions for students, to visit owner – operated businesses – within the locality, neighbouring states – including national and international corporations where possible; such as Technology Incubation Centre (TIC) located in Benin City and; Mentoring scheme, in which mentors from within the university locality and neighbouring communities would be identified, contacted registered as a pool of counselors, to whom graduating students, who wish to participate in the scheme would go for mentoring. Some of the ventures to be focused upon would be tailored along students' primary courses of studies. These would include, but not limited to: Owning/management your clinic/diagnostic laboratory/law firm. Soap/detergent/tooth brushes and toothpaste making firm making of sanitary wares Glassware production/ceramic production. Animal husbandry Dyeing/textile making Brewing. Table water making factories. Plumbing. Vegetable oil and salt extraction factories, Fisheries

IUO-GET 313: IUO Upskill Course I – AutoCAD

(0 Unit: LH 15)

Course Learning Outcomes

By the end of this course, students should be able to:

1. **Navigate the AutoCAD interface** effectively and customize workspaces for specific design needs.
2. **Create accurate 2D technical drawings** using essential drawing and editing tools.
3. **Organize and manage drawings** through the use of layers, blocks, and object properties.
4. **Apply dimensioning and annotation tools** to enhance the readability of technical designs.
5. **Generate print-ready layouts** and export drawings in appropriate formats for real-world use.
6. **Interpret and recreate basic engineering, architectural, and mechanical designs** using AutoCAD conventions.

Course Content

Introduction to AutoCAD: Overview of CAD and its applications, AutoCAD interface and workspace setup, Drawing units and coordinate systems, File management: creating, saving, and organizing drawings. **Basic Drawing Tools:** Line, Polyline, Circle, Arc, Rectangle, Ellipse, Object snaps and tracking, Using dynamic input and grid/snap settings. **Editing Tools:** Move, Copy, Mirror, Rotate, Scale, Trim, Extend, Fillet, Chamfer, Offset and Array commands. **Layers, Properties, and Object Organization:** Creating and managing layers, setting line types, colors, and weights, Layer visibility and object grouping. **Dimensioning and Annotations:** Text styles and multiline text, Dimension styles and applying dimensions, Leaders and hatching, Annotative objects and scaling. **Blocks and Attributes:** Creating and inserting blocks, Using dynamic blocks, defining and editing attributes. **Layouts and Plotting:** Model space vs. paper space, Creating viewports, Plot settings and scale setup, Plotting and exporting PDFs. **Practical Projects and Industry Applications:** Drafting simple building plans, Mechanical part design, Civil/structural detailing, preparing submission-ready drawings, Real-world examples from architecture, civil engineering, and product design

SECOND SEMESTER 300L COURSES

EMA302: Engineering Mathematics IV

(3 Units: Core course; LH = 45)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Expand functions in terms of the Fourier series and apply Fourier series to represent periodic functions using Euler formula to determine coefficient in solving engineering problems such as heat transfer and vibrations, signal processing
2. Use Fourier series to solve partial differential equations, and apply half-range expansions to solve problems in various fields.
3. apply gamma, beta and probability functions to solve integrals problems in engineering field
4. Apply second order differential equations in solving engineering problems and linear second-order equations reducible to constant coefficients, using series solutions and Bessel functions.
5. Use vector calculus operations like gradient, divergence and curl in vector analysis to solve problems in engineering and other fields.

Course Content

Fourier Series: Periodic functions. Euler formula for coefficients in Fourier sine/cosine series of a function. Even and odd functions and their Fourier series. Half range expansion. Theoretical basis of Fourier series. Application to the solution of partial differential equations. Gamma, Beta and probability function (emphasis rather on the applications). Differential Equation: Equations of the form $y'' - f(x, y')$. Linear second order equations reducible to linear equation with constant coefficients. Series solution of differential equation and Bessel functions of first kind; their properties and introduction to applications. Vector Field Theory: Scalar and Vector fields: directional derivative; gradient of a scalar field, divergence and curl of a vector field; del operator. Line, surface and volume integrals. Divergence theorem of Gauss and Stokes's theorem. Green's theorem. Line integrals independent of path and irrotational vector fields.

CVE312: Structural Mechanics I

(3 Units, Core, L = 45)

Course Learning Outcomes

At the end of the course, students should be able to:

1. Analyze determinate structures (beams, trusses, frames) using analytical and graphical methods, and determine the reactions, shear forces, and bending moments.
2. Calculate deformations (slope and deflection) of statically determinate structures using unit load method, moment area method, conjugate beam method, or strain energy methods.
3. Identify and classify statically indeterminate structures, and explain the differences between determinate and indeterminate structures.
4. Analyze simple statically indeterminate structures (continuous beams, encastre beams, propped beams, simple portal frames) using methods such as Clapeyron's Three Moment Theorem, Slope Deflection Equations, or Moment Distribution Method.
5. Apply structural analysis methods to solve complex structural problems, including determining reactions, shear forces, bending moments, and deformations in statically determinate and indeterminate structures.

Course contents

Theory and Analysis of determinate structures: Beams, trusses and frames structures theorem. Analytical and graphical methods. Deformation (Slope and Deflection) of statically determinate structures: Unit load method, moment area method, conjugate beam method, strain energy methods, etc. Analysis of statically indeterminate structures: Introduction to statically indeterminate structures. Analysis of simple statically indeterminate structures: Continuous beams, encastre, propped beams, simple portal frames by such method as Clapeyron's Three

Moment Theorem, Slope deflection equations, Moment Distribution Method (Hardy Cross), Modified Pin Method, etc.

CVE 322: Design of Reinforced Concrete Structures I (3 Units C: LH 45)

Course Learning Outcomes

By the end of this course, students will be able to:

1. Apply design codes and standards (BS 5950, BS 5268) to ensure compliance with building regulations and codes of practice in structural design.
2. Design structural members (beams, columns, slabs, ties, struts, foundations) using limit state design philosophy, considering serviceability and economy.
3. Estimate loads (dead load, live load, design load) accurately for structural design, and apply load calculations to design various structural members.
4. Select and design structural members with various shapes (Universal beams, I-Sections, Joists, Universal Columns, Channel sections, Angle sections) considering their properties and applications.
5. Perform necessary structural checks and verifications on designed structural members to ensure stability, safety, and compliance with design codes and standards.

Course Content:

Basic Concepts and Fundamentals of design process, materials selection, building regulations and codes of practice. Design Codes (BS 5950; 5268). Design philosophy, elastic design: limit state design. Basic serviceability and economy. Estimation of Dead load; Live Load; Design Load. Design of various structural members, namely: beams, columns, slabs, ties, struts, foundation, etc. Consider various shapes of structural members: Universal beams I-Sections; Joists; Universal Columns (H-Sections); Channel sections; Angle (L-Sections); etc; Carrying out necessary checks

CVE332: Civil Engineering Hydrology II (2 Units: Core course; LH = 30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Describe the concept of groundwater hydrology and three (3) types of geologic formations and aquifers suitable for groundwater abstraction.
2. Illustrate hydrograph analysis of runoff in a catchment and Estimate runoff, yield, and flood discharge within an area.
3. Apply flood routing techniques to manage reservoirs and rivers and mitigate flood risks
4. Use hydrological models and data to forecast stream flows, water levels and flood events
5. Use hydrological forecasting to support decision making in fields like water resources management, flood control and emergency response.

Course Content

Groundwater hydrology. Types of geological formations. Physical properties of aquifers, Coefficient of permeability and hydraulic conductivity, Darcy's law. Groundwater movement; steady and unsteady flow to wells in confined and unconfined aquifers. Groundwater exploration, well construction, and pumping. Surface water hydrology. Surface runoff and factors that affect surface runoff. Catchment characteristics. Hydrograph analysis. Unit hydrograph and its application. Reservoir and river routing: Routing equation. Application to flood routing over reservoirs and rivers. Hydrological forecasting. The need for forecasting: a frequency analysis. Physical and Statistical Analysis related to hydrological processes.

CVE 342: Engineering Geology

(3 Units: Core course; LH=30, PH=45)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Explain the fundamental concepts of geology, including the definition, scope, and subdivision of geology, and its relevance to Civil Engineering.
2. Describe the structure and composition of the Earth, including the core, mantle, and crust, and explain the composition of the various layers.
3. Identify and explain geological processes, including exogenic processes (weathering and erosion) and endogenic processes (magma, earthquakes, volcanoes, rifting, and continental drifts).
4. Apply geological knowledge to understand geotectonic processes, including folding, faulting, jointing, and rifting, and explain their effects on the Earth's surface.
5. Analyze the geology of Nigeria, including the basement complex, cretaceous and younger sedimentary rocks, and major soil types, and explain their engineering applications.
6. Evaluate the importance of mineral resources, including fossil fuels, metallic and non-metallic minerals, and explain their role in the economy of Nigeria, with particular emphasis on petroleum.

Course content

Introduction: Definition, scope and subdivision of geology. Aspects of geology and their relevance to Civil Engineering, Brief discussion on the origin and evolution of the planets, the earth and its relations to the sun, and other planets. Structure and Composition of the Earth: The core, the mantle and the crust. Composition of the various layers. Radioactivity and magnetism of some rocks and minerals. Geological processes: Exogenic processes (weathering and erosion) Endogenic processes (Magma – its origin, Crystallization. Differential and solidification into rocks, earth quakes, volcanoes, rifting and continental drifts). Geotectonic Processes: folding, faulting, joining and rifting isostasy, changes in eustatic sea levels, causes and effects transgression and regression. Tectonic and sedimentation, Geological structure and mapping. Rocks and minerals. Stratigraphy – time scale – fossils and their importance: type of fossil unconformities special reference to Nigeria. Introduction to geology of Nigeria, the basement complex, the cretaceous and younger sedimentary rocks, major soil types and their distribution. Engineering Application – water supply, site investigation – Dams, dykes, etc. Mineral Resources of the Earth; definition and physical properties of minerals, mineral types, fossil fuels, organic minerals, non-metallic minerals and rocks, metallic mineral resources of Nigeria with particular emphasis on discussion on petroleum as to its origin, physical state of the hydrocarbons, migration, accumulation and exploitation. Mineral in the economy of Nigeria

CVE 372: Engineering Surveying & Geo-Informatics (3 Units: C; LH = 30, PH=45)

Course Learning Outcomes

By the end of this course, students should be able to:

1. Identify and explain the functions of common traversing instruments such as the theodolite and compass and use hand calculators and basic computer programs to process survey data related to traversing and levelling.
2. Perform and compute the adjustment of ordinary traverses using Bowditch and transit methods. And differentiate between reduced bearings and whole circle bearings and apply them in traverse computations.

3. Apply traverse methods to real-life engineering tasks such as the setting out of tunnels and pipelines using tacheometric methods to determine distances and elevations for inclined line-of-sight situations.
4. Explain and apply trigonometric heightening methods, including reciprocal and simultaneous reciprocal observations.
5. Demonstrate the use of modern survey instruments, such as electronic distance measuring devices and self-reducing tachometers.
6. Understand the basic principles of photogrammetry and remote sensing, and discuss their applications in engineering surveying.
7. Conduct practical field exercises, including chain surveying, compass traversing levelling, sectioning, and theodolite tasks, with appropriate accuracy checks.

Course Content:

Introduction: Traversing – instruments for traversing, theodolite traverses, computation and adjustment of ordinary traverses. Bow ditch and transit methods, reduced bearings and whole circle bearings. Uses of hand calculators and computers writing of basic programme for traverse and levels. Application of traverses to setting out of tunnels, pipelines, etc. Tacheometry methods for inclined line of sights. Substance heightening: study of self-reducing tachometers and electronic distance measuring equipment. Trigonometric heightening – reciprocal and simultaneous reciprocal observations. Introduction to Photogrammetry and remote sensing. Practical work. Chain surveying exercises, compass traverses, running lines of levels and elementary sectioning and theodolite task.

CVE 382: Civil Engineering Materials

(3 Units: C; LH-30, PH = 45)

Course Learning Outcomes

By the end of this course, students should be able to:

1. Explain the manufacturing process of Ordinary Portland Cement, its chemical constituents, types, and uses, and describe the properties of cement.
2. Design and specify concrete mixes, including the selection of admixtures and additives, aggregates, and cement, and explain the effects of these components on concrete properties.
3. Analyse the properties of hardened concrete, including strength, durability, and thermal properties, and apply destructive and non-destructive testing methods.
4. Specify and apply various construction materials, including concrete blocks, engineering bricks, bitumen and asphalt materials, polymers and plastics, ceramic materials, timber and wood, and steel and glass, and explain their properties and uses.
5. Evaluate the environmental impact of construction materials, including the effects of timber logging, and explain the importance of sustainable materials and practices.
6. Select and apply materials for specific construction applications, including road stabilisation, seismic construction, and pipeline materials, and explain their properties and benefits.

Course Contents

Manufacturing or production process of Ordinary Portland Cement; chemical constituents of Ordinary Portland Cement; Types and uses; Properties. Definition of Admixtures and Additives; ; Constituent materials, Types; Negative effects of use in concrete; Difference between additive and admixture. Aggregates: Types and classes; Shapes and surface texture; Gradation of Crushed Aggregate Sizes.; Sieve Analysis; Aggregate Grading Modulus. Types and properties of Concrete, ; Environmental factors affecting workability of fresh concrete; Batching Methods; Fresh Concrete Properties; workability tests; Weakness in fresh concrete; Estimation of thermal stress, strain and contraction and elongation in concrete structures;

Destructive tests and non-destructive tests of Hardened Concrete; Concrete Mix Design and Quality Control. Concrete Block: Constituent materials; Types and Work sizes; Difference between concrete block and clay brick; Manufacturing Process; Properties; thermal conductivity. Engineering Bricks (Clay And Calcium Silicate Bricks): Constituent materials; Types; Production process; Work sizes; Properties; Bricks' Environmental problems. Bitumen and Asphalt Materials: Definition, Constituent materials, Mix Properties, Comparison, Methods of determining Dynamic Viscosity of Bitumen, Weakness of Bitumen-Aggregate Mixes. Polymer and Plastics: Definition, Properties, and classes of main polymer materials used in civil engineering and Main Distribution Pipes; Uses of Unsaturated Polymer; Properties of polymer; Common uses of plastics; Polymer Concrete; Types of polymer concrete and their properties; uses of Polymer Concrete In Construction Works. Ceramic Materials: Types, Properties, Uses. Timber And Wood Technology: Botanical Grouping; Timber Seasoning; Timber Defects; Wood Preservatives Types; efficient utilisation methods of wood by-products; Problems caused by timber logging activities; Problems militating against the saw mill industry. Miscellaneous Materials: Types / Uses of Tiles; Isotropic and anisotropic materials; road stabilisation materials; seismic construction materials. Steel technology: production. glass technology: production – fabrication; properties.

CVE392 – Terotechnology

(2 units: Core course; LH =30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Explain the concept of Terotechnology, including its definition, goals, benefits, and scope, and apply terotechnological principles to optimize asset performance.
2. Analyse life cycle costs, including residual value and whole life cycle cost, and apply this knowledge to make informed decisions about asset management.
3. Develop strategies for maintenance and repair of structures, including salvaging and pre-demolition processes, and explain the importance of effective maintenance in extending asset life.
4. Plan and execute demolition work, including selecting appropriate methods and techniques, and ensuring safety and environmental considerations are taken into account.

Content

Definition of Terotechnology. Goals of Terotechnology, Benefits of Terotechnology, Scope of Terotechnology. Study of some important terms in Terotechnology – Life Cycle cost, Residual value, Whole life cycle cost. Salvaging of Structures. Maintenance/Repairs. Pre Demolition process, Demolition works

ELA 302: Civil Engineering Laboratory Practical II

(2 Units: PH = 90)

Course Learning Outcomes:

Upon successful completion of the course, students will be able to:

1. Understand the unit operations and processes they have learnt in the classroom and their applications to real time situations, by the opportunity to work with equipment in the laboratory.
2. Apply safety precautions in handling samples, materials, chemicals, and laboratory equipment.
3. Develop good analytical and critical thinking skills needed to analyse data, draw conclusions from their experiments, and interpret data.

4. Develop teamwork skills, learn how to communicate effectively, and collaborate to achieve a common goal.
5. Develop good technical writing skills and learn how to communicate scientific information effectively

Course Content:

Laboratory Experiment on Metacentric height of a floating body, Laboratory Experiment on Bernoulli's theorem verification, Laboratory Experiment on flow measurements, Laboratory Experiment on impact of jet, Laboratory Experiment on flow over notches, Laboratory Experiment on Pelton's wheel turbine, Laboratory Experiment on centre of pressure.

IUITS 302: Igbinedion University Industrial Training Scheme III (1 Units: PH = 45)

Course Learning Outcomes:

Upon successful completion of the course, students will be able to:

1. **Apply theoretical engineering knowledge** to real-world problems in a practical industrial environment.
2. **Demonstrate technical competencies** relevant to the student's field of study through hands-on tasks and professional supervision.
3. **Develop professional skills** such as teamwork, communication, time management, and workplace ethics within an engineering-based establishment.
4. **Document daily activities and learning experiences** accurately in a logbook and compile a comprehensive technical report.
5. **Evaluate and reflect on industrial processes**, identifying opportunities for innovation, efficiency, and continuous improvement.

Course Content:

A 3 month intensive industrial training scheme taken in engineering based establishments.

Students submit logbook and written reports at the end of the exercise.

IUO-GET 314: IUO Upskill Course II Graphics Design

(0 Units: PH = 45)

Course Learning Outcomes

By the end of this course, students will be able to:

1. Demonstrate proficiency in design software such as Photoshop, Illustrator, Canva, and CorelDRAW.
2. Apply design principles including layout, typography, and color theory in creating visually appealing materials.
3. Design brand identities and promotional materials for personal or client-based projects.
4. Edit and manipulate images using advanced techniques to enhance visuals.
5. Develop digital and print-ready graphics suitable for real-world applications.
6. Compile a portfolio of design works demonstrating technical skill and creativity.

Course Content

Introduction to Graphic Design. Definition and importance of graphic design, Overview of design careers and applications, Types of design (branding, editorial, digital, packaging), Elements and principles of design (color, balance, contrast, alignment, etc.). Design Tools and Software. Introduction to Adobe Photoshop and Illustrator, Canva and CorelDRAW basics, Interface navigation and workspace setup, Tools: selection, pen, brush, type, shape, and transform tools. Typography and Color Theory. Font selection and type pairing, Readability and visual hierarchy, Color psychology and choosing palettes, Applying gradients, shadows, and color harmony. Branding and Logo Design. Conceptualizing and sketching logos, Vector graphics and scalability, Designing business cards and brand kits, Real-world case study:

rebranding analysis. Layout Design for Print and Digital Media. **Flyers**, posters, and brochure design, Social media post templates, Banner ads and web design elements, Using grids, margins, and alignment. Photo Editing and Image Manipulation. Cropping, resizing, and retouching, Layer masks and blending modes, Image filters, overlays, and composition, Ethics of image manipulation. Project Management and Portfolio Building. Managing client briefs and design workflow, File formats and export standards (JPG, PNG, PDF, SVG), Building a beginner portfolio and personal brand, Final course project: full visual identity package

5.5 400 Level Course Structure and Description

Table 5.4: 400 Level Course Structure

First Semester 400L					
Course Code	Course Title	Units	Status	LH	PH
EMA401	Engineering Mathematics V	3	C	45	
CVE411	Structural Mechanics II	2	C	30	
CVE421	Design of Steel and Timber Structures	2	C	30	
CVE431	Public Health Engineering	2	C	15	45
CVE441	Soil Mechanics & Foundation Engineering	2	C	15	45
CVE451	Highway & Transportation Engineering I	2	C	30	
CVE461	Hydraulic Structures	2	C	30	
CVE471	Engineering Surveying & Geo-Informatics II	3	C	30	45
CVE481	Civil Engineering Practice & Law	3	C	45	
CVE491	Computer Application In Civil Engineering	2	C	15	45
ELA401	Civil Engineering Laboratory & Practical III	2	C	-	90
IUO CERT411	Career Enhancement and Resilience Training	2	C	30	
	Total	27			
	Second Semester				
IUITS 402	IUO Industrial Training Scheme	6	C	24 WEEKS	
	Total 400Level Sessional Credit Unit	33			

FIRST SEMESTER COURSES

EMA 401: ENGINEERING MATHEMATICS IV

(3Units: C: LH =45)

Course Learning Outcomes

On completion of the course the students should be able to

1. **Describe** Complex variables – advanced topics
2. differentiation and integration of complex functions. Cauchy-Riemann equations: Related theorems.
3. Evaluate Laplace and Fourier transforms problems – applications.
4. Compute Probability related problems, Elements of probability, density and distribution functions, moments, standard distribution, etc. Statistics – Regression and correlation – Large sampling theory.

5. discuss and perform calculations on test, hypothesis and quality control.

Course Content

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

CVE 411 Structural Mechanics II

(2 Units, C: LH 30)

Course Learning Outcomes

At the end of the course, students should be able to:

1. explain and apply Energy and Virtual Works methods for analysis of indeterminate structures.
2. analyze indeterminate structures using the concepts of Slope deflection equations and Moment distribution methods
3. solve typical structural engineering problems following the steps involved in Flexibility and Stiffness methods of structural analysis to ensure structural safety
4. derive from first principle the Euler Buckling critical load for columns with various end conditions and solve practical examples on them
5. apply the theory of bending to determine the collapse loads for structural elements
6. describe the grading of timber

Course contents

Indeterminate Structural Analysis: Energy and Virtual Work Methods. Slope Deflection and Moment Distribution Methods. Introduction to Flexibility and Stiffness Methods. Elastic Instability. Simple Plastic Theory of Bending; Collapse Loads and Collapse Mechanisms. Stress Grading of Timber

CVE 421 Design of Steel and Timber Structures

(2 Units, C: LH 30)

Course Learning Outcomes

At the end of the course, students should be able to:

1. Identify at least four structural steel products and explain the basis of design and state the relevant codes for the design of steel structures, engineering properties of steel and at least three areas of application
2. Analyse and design at least one tension member with bolted and welded connections.
3. Design a simply supported beam and check for bending moment resistance, shear resistance and deflection
4. Design a steel column, truss and stanchion base
5. Describe at least three properties of timber that make them suitable as construction materials and list at least three manufactured timber structural products
6. Analyse and design simple timber components.

Course contents

Basic Concepts and Fundamentals of design process, materials selection, building regulations and codes of practice. Design Codes (BS 5950; 5268). Design philosophy, elastic design: limit state design. Basic serviceability and economy. Estimation of dead loads, live load, design ultimate loads. Design of various structural elements or members, namely: beams, columns, slabs, ties, struts, foundation, etc. Consider various shapes of structural members: Universal beams I-Sections; Joists; Universal Columns (H-Sections); Channel sections; Angle (L-Sections). Carry out necessary checks. Design of Shear Connectors: Gusset plates and; bolts; rivets, connections and joints, etc. Design of Stiffeners, etc. Laboratory tests on structural

elements in Steel. Wind Loading; Incorporating wind loading in design of structural elements such as roofs walls; and tall columns. Analysis and design of laminated beams, I-Beams and other timber components. Properties of timber.

CVE 431 Public Health Engineering

(2 Units: C: LH =15, PH=45)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Describe at least five (5) roles of the civil engineer in public health protection and the principles of engineering applications in public health protection systems.
2. Categorise water-related diseases and modes of disease transmission in humans and characterise water quality parameters using the drinking water standard.
3. Describe at least five (5) water treatment processes used in the treatment of surface water and groundwater.
4. Demonstrate at least three (3) water distribution networks
5. Discuss water pollution and state at least five (5) environmental effects of water pollution.

Course contents

Introduction of public health systems. Management and finance of PHE systems. Water supply systems. Water sources, uses and water characteristics and quality: physical and chemical characteristics of water; their determination and significance. Biological characteristics of water. Structure and growth of microorganisms. Types of waste borne microorganisms (bacteria, Protozoa, virus, spirogyra, algae, fungus, etc). Pathogenic indicator organisms, etc. Phases of bacterial growth; sterilization and culture techniques. Water-borne diseases and control. Water treatment; flow diagram for treatment of surface and groundwater sources, screening, aeration, filtration- Slow sand filters, rapid and pressure filters, sedimentation, flocculation, coagulation, disinfection. Water distribution systems: type of water distribution system, type of distribution system in buildings. Analysis of distribution systems. Water distribution network analysis and design. Maintenance of water systems. Storage tanks and service reservoirs. Mains, pipelines and distribution network. Valves, meters and service pipes. Pumps and pumping stations. Water pollution, environmental effects and controls. Self-purification capacity of rivers and streams. Water laws: drinking water standards, common laws, state water codes, ground water law, federal law, drainage law etc. Determination of total dissolved solids, suspended solids, turbidity, pH value, acidity, alkalinity, hardness, chlorides, oxygen, BOD and COD in a given water sample.

CVE 441 Soil Mechanics

(2 Units: C: LH =15, PH=45)

Course Learning Outcomes

At the end of the course students should be able to:

1. Describe at least five (5) benefits, with regard to safety and economy, of conducting site investigation before embarking on the design and construction of structures; Conduct practical exercise to soil classification in the laboratory.
2. List at least five (5) laboratory and field equipment to carryout particular soil test; Demonstrate at least one (1) good soil report utilizing data from a field book, laboratory data and a borehole log;
3. Identify soil types and appropriately classify them; Conduct laboratory and field soil test with standard procedure; Analyse a soil test report from engineering point of view;
4. Illustrate in general, that soil is porous and permeable in nature

5. Illustrate the movement of water in soil and how it could affect the stability engineering structures (e.g., Dams, Sheet pile and Retaining walls) by such condition as quick sand, uplift.
6. Construct with sketches at least three (3) standard flow net of such engineering structures as sheet pile wall, dam and retaining wall with particular reference to flow lines, equipotential lines and boundary conditions
7. Estimate quantity of seepage, uplift pressure and hydraulic gradient for at least three (3) engineering structures with the aid of well-constructed flow nets.

Course Content

Compaction and Soil stabilization: Laboratory and field methods of compaction. The modified AASHTO and West African Standards in particulate moisture content and dry density relationship, mechanical stabilization, cement stabilisation. Flow of water in soils: Seepage and Permeability, theoretical and practical moment when involving sketching flow and equipotential lines, Constant head, Falling head, Permeameter test. Stresses in Soils. Total and Effective Stress, Pore pressure. Moduli of elasticity, Poisson's ratio. Introduction to Stress Distribution of layered system from Boussinesq's theory, Westergaard theory. Site investigation: Case for site investigation, visual inspection and sub-surface exploration. Design of Retaining walls and Design of Footings such as Single pad, combined footing and raft Foundation.

CVE451 Highway and Transportation Engineering 1

(2 Units, Core, LH 30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Explain the role of transportation engineering in society, including the major disciplines of transportation, and describe the history and planning of highway engineering in Nigeria.
2. Design highway geometric elements, including alignments, cross-sectional elements, pavement surface characteristics, and sight distance, considering factors such as topography, traffic, and design vehicle dimensions.
3. Analyse and design horizontal curves, including super elevation, radius of horizontal curves, and extra widening, and apply transition curves to ensure safe and efficient highway design.
4. Design pavements, including flexible and rigid pavements, considering factors such as pavement layers, materials, and failure criteria, and apply bitumen mix design principles.
5. Apply soil stabilization techniques, including mechanical, lime, cement, and bitumen stabilization, to improve soil properties and construct stable roads.
6. Evaluate the impact of transportation infrastructure on society, including safety, environmental, and economic considerations, and demonstrate a commitment to sustainable and responsible transportation engineering practices.

Course Contents

Introduction to Transportation Engineering: Role of Transportation Engineer, Major Disciplines of Transportation. Introduction to Highway Engineering, History of Highway Engineering, Highway Planning In Nigeria Role of Transportation in Society, Factors Affecting Transportation. Introduction to Geometric Design, Factors Affecting Geometric Design Road Classification and Its Criteria, Design Control and Criteria, Topography, Traffic, Design Vehicle Dimension, Design Speed, Capacity Highway Alignments and Its Requirement, Cross Sectional Elements, Pavement Surface Characteristic, Camber, Kerbs, Right Of Ways, Sight Distance, Types Of Sight Distance, Horizontal Alignment, Design Speed, Horizontal Curve, Analysis Of Super Elevation, Radius Of Horizontal Curve, Extra Widening,

Horizontal Transition Curves, Introduction To Pavement Design, Requirement Of A Pavement, Types Of Pavement, Typical Layers Of A Flexible Pavement, Failure Of Flexible Pavement, Rigid Pavements, Failure Criteria Of Rigid Pavements, Factors Affecting Pavement Design, Bitumen Mix Design, Objective Of Mix Design, Constituents Of A Mix, Types Of Mix, Different Layers In A Pavement, Requirements Of Bituminous Mixes. Soil Stabilization, Definition, Purpose Of Soil Stabilization, Types Of Stabilization Techniques Which Includes Mechanical Stabilization, Soil Lime Stabilization, Soil Cement Stabilization, Soil Bitumen Stabilization And The Construction Of Soil Stabilized Roads

CVE 461: HYDRAULICS STRUCTURES

(2Units: C: LH = 30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Analyze boundary layer characteristics, including boundary layer thickness, displacement thickness, momentum thickness, and energy thickness, and apply the momentum equation for boundary layer.
2. Calculate drag and lift forces on submerged bodies, including spheres and cylinders, and apply dimensional analysis to determine drag and lift coefficients.
3. Apply model laws and similarity principles to hydraulic models, including Reynolds, Froude, Euler, Weber, and Mach model laws, and explain the limitations of hydraulic similitude.
4. Analyze compressible fluid flow, including basic thermodynamic relations, continuity, momentum, and energy equations, and calculate stagnation properties and sonic velocity.
5. Design and analyze open channel flow, including uniform and non-uniform flow, and calculate flow rates and velocities in open channels.
6. Measure and calculate compressible flow through nozzles, venturi meters, and other devices, and explain the behavior of shock waves in compressible fluid flow.

Course Contents

Boundary Layer Theory: Boundary Layer Definitions and Characteristics- boundary layer thickness, displacement thickness, momentum thickness, energy thickness; momentum equation for boundary layer, laminar and turbulent boundary layer, total drag due to laminar and turbulent layers; boundary layer separation and its control. Flow around Submerged bodies- Drag and Lift; force exerted by a flowing fluid on a body; dimensional analysis of drag and lift. Drag on a sphere and cylinder; circulation and lift on a circular cylinder. Hydraulic Models and Analysis: Model (Similarity) laws, Reynolds Model law, Froude Model Law, Euler Model Law, Weber Model Law, Mach Model Law; Types of Models; Scale effect in models and Limitation of Hydraulic Similitude. Compressible flow: Basic thermodynamic relations and process, Basic equation of compressible fluid flow-continuity equation, momentum equation, Bernoulli's or energy equation; Propagation of Disturbances in fluid and velocity of sound- derivation of sonic velocity, bulk modulus, sonic velocity in isothermal and adiabatic process; Mach number; Propagation of Disturbances in Compressible fluid; Stagnation Properties; flow of compressible fluid through a convergent and nozzle. Shock waves; Measurement of Compressible flow; flow of compressible fluid through a venturi meter. Flow in Open Channels: Types of flow in channels; open channel formulae for uniform flow; most economical section of channel; open channel section of constant velocity at all depths of flow; non-uniform flow through open channel; measurement of flow of irregular channels

CVE471: Engineering Surveying and Geoinformatics (3 Units: C; LH = 30, PH=45)

Course Learning Outcomes

Students, upon completion of this course, should be able to:

1. Create and interpret contour plans and maps, using various methods of contouring, including direct and indirect methods, and apply contour interpolation techniques.
2. Calculate areas and volumes of earthwork, including longitudinal and cross-sectional profiling, and determine formation levels for new roads and other sections.
3. Apply setting out techniques for various engineering works, including baselines, sewers, drains, highways, buildings, dams, and bridges, and ensure accurate vertical alignment.
4. Monitor ground and structures, using appropriate techniques and instruments, and interpret data to ensure stability and safety.
5. Apply photogrammetry and remote sensing principles, including aerial and ground photographs, to produce plans, determine heights, and create topographic maps and digital terrain models.
6. Use digital terrain modelling and photogrammetry to solve engineering problems, including contouring, profiling, and planning, and appreciate the applications and benefits of these techniques.

Course Content

Further works on contours and contouring. Various methods of contouring – direct and indirect, contour interpolation issues of contour plans and maps. Areas and Volumes. Longitudinal and cross-sectional profiling formation levels of new roads, cut and fills and various other sections. Determination of areas by approximate methods, area by double mention distance method. Volumes of earthwork – the prismoidal method, Edo – Area rule and the prismoidal correction. Setting Out and Monitoring of Engineering Works: Techniques for various works, baselines, sewers and drains. Highways – horizontal curves, vertical and transition curves. Setting out of building lines and vertical alignment of buildings. Setting out of dams and bridges. Monitoring of ground and structures. Elementary Topographical Survey: Introduction to photogrammetry – aerial and ground photographs, vertical and near vertical photographs and the appropriate geometric relationship, causes of distortions, uses of aerial photographs for the production of plans – by Arundel method and by the use of photogrammetric equipment. Heighting from aerial photographs – application to contouring and profiling. Introduction to remote sensing equipment, image transmission from space, digital imagery. Compilation of topographic maps and plans from data acquired by the Landsat and SPOT satellites. Uses of photogrammetry and remote sensing to the engineers. Digital terrain modeling and applications.

CVE 481: Civil Engineering Practice and Law

(2 Units: C: LH = 45)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Explain civil engineering works standards and measurements and distinguish between the legal, professional and ethical aspects of civil engineering;
2. Identify at least five (5) problems/challenges facing consulting services and the construction industry and Explain at least three (3) parties involved in the civil engineering contract and their roles;
3. Prepare the prequalification of contractors for an engineering project and describe at least five (5) types of contracts; Demonstrate a sample of the Bill of Engineering Measurement and Evaluation (BEME) and Bill of quantities (BOQ);

4. Describe bid or tender types and explain the tender process and explain the various terms associated with civil engineering contracts and practice, such as force majeure, collateral, loan, memorandum of understanding etc;
5. Demonstrate some work and project implementation schedule methods. For example, programme charts – bar charts, Critical Path Methods (CPM); and. state at least five (5) Civil Engineering codes and their applications.

Course Content

Civil Engineering works with standards and measurements. Civil Engineering Quantities. Legal, professional and ethical aspects of engineering. Problems and challenges facing consulting services and the construction industry. Three parties involved in civil engineering contracts. Client (promoter). Category of client. Consultants (Design team). Contractor (construction team). Categories of contractors. Organizational structure of a company. Preparation of the Company prequalification file and brochure. Technical and financial proposals. General introduction to common law and contracts. Types of contracts. BEME (Bill of Engineering Measurement and Evaluation) or BOQ (Bill of Quantities). Bidding (Tender) – Definition of Bid or Tender. Types of tender (bid). The bid evaluation process. Terms associated with civil engineering contracts. Aids memoire, force majeure, variation, As-Built Drawing, Project construction form (PCF), collateral, loan and Grant, Moratorium (Grace period) etc. Agreement and Memorandum of Understanding. Breach of contract and litigation. Work and Project Implementation schedule, Project Management, Job planning and control, Programme charts – Bar charts, critical path methods, project evaluation and review technique (PERT). Civil Engineering codes and standards

CVE491 Computer Applications in Civil Engineering (2 Units, Core, LH=15, PH=45)

Course Learning Outcomes

At the end of the course, the students should be able to:

1. Use the basic civil engineering software for design and analysis of civil engineering structures
2. Differentiate between software used for design and analysis from the ones used for modelling
3. Compare and contrast the drafting of RC using AUTOCAD, ORION and PROTA-steel;
4. Produce model of structures using AUTOCAD, ORION and PROTA-steel;and Produce finishing of structures using ARTLANTIS, LUMION
5. Solve linear equations by plotting graphs using MATLAB
6. Design of RC or steel structures using AUTOCAD, ORION and PROTA-steel.

Course Contents

Basic civil engineering software for design and analysis. Computer application in structural engineering, hydraulic engineering, hydrology, statistics, surveying, highway engineering, individual or group projects on computer solutions of specification problems.

IUO-CERT 411-Career Enhancement and Resilience Training: (2 Units; C. LH = 15)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Use available local and international resources to enhance their studies and professional careers;
2. Demonstrate at least one professional cost-effective knowledge and skill to support their career development;
3. Write a curriculum vitae that meets local and international standards;
4. Develop the ability to grow their passion, hobbies and interest into successful careers;

5. Engage in at least one work experience through a volunteering scheme in their community;
6. Formulate and follow through on personal career development; and
7. Chart a path for personalized growth and development that can impact on society.

Course Contents

Introduction to Career Enhancement and Resilience Training. Career perspectives and opportunities. Problems as opportunities. Self-discovering and career equilibrium. Converting hobbies and interest to passion and profits. The three career E-routes. Understand various career resources. The power of Networking, collaboration and partnership. Career resources of time and skills. Career resources of funding. The fundamentals of career planning. Contemporary issues on skill sets and employability. Global trends in career planning. Exploring global opportunities. Impact of course and profession on SDGs. Examine present and future professional self. Soft skills development.

ELA 401: Civil Engineering Laboratory Practical III

(2 Units, C: PH 90)

Course Learning Outcomes:

The students will be able to:

1. Apply safety precautions in handling samples, materials, chemicals, and laboratory equipment.
2. Develop good analytical and critical thinking skills needed to analyse data, draw conclusions from their experiments, and interpret data.
3. Develop teamwork skills, learn how to communicate effectively, and collaborate to achieve a common goal.
4. Develop good technical writing skills and learn how to communicate scientific information effectively

Course Content

Laboratory Experiment on Compaction test, Laboratory Experiment on In-situ density test, Laboratory Experiment on Permeability test, Laboratory Experiment on Odour test, Laboratory Experiment on Turbidity test, Laboratory Experiment on Taste test, Laboratory Experiment on Colour test, Laboratory Experiment on Sedimentation Demonstration, Laboratory Experiment on Silt content test on sand, Levelling operations in Engineering surveying

5.6 500 Level Course Courses and Descriptions

500 Level Civil Engineering Students undertake the common courses (GRE501, GRE502) that are prescribed by the college in conjunction with the departmental courses.

Table 5.5: 500 Level Course Structure

FIRST SEMESTER

Course Code	Course Title	Units	Status	LH	PH
GRE 501	Engineering Management and Economics	3	C	45	-
CVE 511	Structural Mechanics III	2	C	30	-
CVE 521	Design of Reinforced Concrete Structures II	2	C	30	-
CVE 531	Water Resources and Environmental Engineering	2	C	30	-
CVE 541	Geotechnical Engineering	2	C	30	45
CVE 551	Highway and Transportation Engineering II	2	C	30	-
CVE 561	Hydraulics Structures & Design	2	C	30	-
ELA 501	Civil Engineering Laboratory Practical IV	2	C	-	90
CVE501	Final Year Engineering Project I	3	C	-	135
CVE513	Advanced Structural Engineering I	2	E	30	-
CVE533	Adv. Water Res. and Environmental Engineering I	2	E	30	-
CVE543	Advanced Geotechnical Engineering I	2	E	30	-
CVE553	Advanced Highway and Transport. Engineering I	2	E	30	-
	TOTAL CREDIT UNITS	22			

SECOND SEMESTER

Course Code	Course Title	Units	Status	LH	PH
GRE 502	Engineering Law	3	C	45	-
CVE 512	Structural Mechanics IV	2	C	30	-
CVE 522	Design of Prestressed Concrete Structures	2	C	30	-
CVE 532	Waste Water and Environmental Engineering	2	C	30	-
CVE 542	Foundation Engineering	2	C	30	-
CVE 552	Highway and Transportation Engineering III	2	C	30	-
CVE 582	Construction Engineering	2	C	15	45
CVE 592	Building Services Engineering	2	C	30	-
CVE501	Final Year Engineering Project I	3	C	-	135
CVE513	Advanced Structural Engineering I	2	E	30	-
CVE533	Adv. Water Res. and Environmental Engineering I	2	E	30	-
CVE544	Advanced Geotechnical Engineering II	2	E	30	
CVE554	Advanced Highway and Transport. Engineering I	2	E	30	-
	TOTAL CREDIT UNITS	22			
	GRAND TOTAL CREDIT UNITS	44			

FIRST SEMESTER 500L COURSES

GRE 501: Engineering Management

(3 Units: Core: LH = 45)

Course Learning Outcomes

At the end of the course, students should be able to:

1. Analyze the management environment, including company formation, finance, insurance, and national policies, and understand their impact on business operations.
2. Apply organizational management principles, including span of control, elements of organization, and management by objectives, to design and manage effective organizations.
3. Use financial management tools, including accounting methods, financial statements, costing, and budgeting, to plan and control financial resources.
4. Manage human resources, including selection, recruitment, training, job evaluation, and incentive schemes, to optimize employee performance and satisfaction.
5. Evaluate the economic viability of engineering projects, using methods such as Benefit-Cost Ratio, Internal Rate of Return, and other financial appraisal techniques, to inform investment decisions.

Course Content

The Management Environment - Formation of a company, sources of finance, money and credit. Insurance. National policies, GNP growth rate and prediction. Balance of payments. Legal liabilities under company law, legal and contractual obligations to employees and the public, contractual obligations. Organizational Management – Principles of organization, span of control. Elements of organization. Types. Principles of management. Schools of thought. Management by objectives. Financial Management - Accounting methods. Financial statement. Elements of costing. Cost planning and control. Budget and budgetary control. Cost reduction programmes. Depreciation accounting, valuation of assets. Personnel Management – Selection, recruitment and training. Job evaluation. Merit rating. Incentive schemes. Trade unions and collective bargaining. Industrial Psychology – Individual and Group behaviour. The learning process. Motivation and Morale. Influence of the industrial Environment. Engineering Economy: Assessment of Economic Viability of engineering projects (the are capital intensive), using such methods as: Benefit Cost Ratio; Internal Rate of Return; Short term rate method, etc. Appraisal of financial implications of engineering projects before implementation.

CVE511: Structural Mechanics III

(2 Units, Core, L =30)

Course Learning Outcomes

At the end of the course, students should be able to:

1. Apply finite element principles to analyse and resolve forces in structures, and understand the areas of application of finite element methods.
2. Analyse structures using the plastic method, including the concept of plastic hinges, and calculate the shape factor and collapse load for rectangular sections.
3. Determine collapse mechanisms in frames, including identifying the conditions for full collapse, and apply plastic analysis to design and evaluate structural systems.
4. Evaluate the behaviour of structures beyond the elastic limit, including understanding the plastic behaviour of materials and structures, and apply this knowledge to design and analyse structural systems.

Course contents

Analysis and resolution of forces in the Finite Element. Areas of application of finite elements. Principles of finite elements. Plastic method of structural analysis. Plastic Hinge. Analysis of

rectangular section. Shape Factor. Conditions for Full Collapse. Collapse mechanisms in frames.

CVE521 Design of Reinforced Concrete Structures II
Course Learning Outcomes

(2 Units, Core, L =30)

At the end of the course, students should be able to:

1. Design reinforced concrete elements, including slabs, beams, columns, and foundations, using standard codes and formulae, and interpret detailed drawings.
2. Analyse and design one-way and two-way spanning slabs, including checking for deflection, and apply design principles to ensure structural integrity.
3. Design beams and columns, including simply supported and continuous beams, and columns subjected to various loads, using code coefficients and structural analysis methods.
4. Detail reinforced concrete elements, including beams, columns, and foundations, and ensure that designs meet standard code requirements and quality control measures.
5. Apply quality control principles in reinforced concrete construction, including ensuring compliance with design specifications, standards, and codes, and completing a design project that demonstrates mastery of reinforced concrete design principles.

COURSE CONTENT:

Objectives of reinforced concrete design; Interpretation of detail drawings. Grades of concrete and steel. Understanding design information and formulae. Use of standard codes in design; Design of two way spanning slab. Design of a one way spanning slab. Check for deflection in slabs. Design of simply supported beam. Design of continuous beam using code coefficient and other structural analysis method; Design of shear for beam. Design of various types of stair cases. Types of structural columns. Design and detailing of columns. Types of structural foundation. Design and detailing of structural foundations. Quality control in reinforced concrete construction. Design project.

CVE531 Water Resources and Environmental Engineering, (2 Units: Core; LH = 30)
Course Learning Outcomes

On completion of the course, students should be able to:

1. Plan for any water development project by obtaining required data while considering environmental factors and multiple uses of the project.
2. Evaluate the economic analysis of water projects and cost implications using the benefit-cost ratio based on the design period.
3. Plan water distribution system using EPANET software to estimate water consumption and population of water consumers using different or at least three (3) population forecasting methods.
4. Propose solutions to solid waste ravaging the environment based on six (6) integrated waste management elements and principles.
5. Suggest and describe at least four (4) solid waste sustainable practices and solid waste disposal methods for different types of solid waste in the environment.

Course contents

Planning for water resources development projects: levels of planning, phases, objectives, data requirements, project formulation and evaluation. Environmental considerations systems analysis. Multiple purpose projects. Engineering economy in water resources planning: social importance, annual-cost comparisons, interest and taxes, frequency and economy, economic

studies for public works, cost allocation. Planning of water distribution system. Estimation of water consumption and use. Estimation of the population of water consumers using different population forecasting methods. Design period. Design of water distribution system using computer-aided software. Management of water crisis and pollution. Water conservation technique. Solid waste management: general principles of solid waste management. Solid waste sustainable practices (the 4 R's) reduction, reuse, recycle and recovery. Different methods of refuse disposal include: refuse bin; incinerator; landfill; various composting methods; including vermin-composting, etc.

CVE 541 Geotechnical Engineering Course Learning Outcomes

(2 Units: Core; LH = 15, PH=45)

At the end of the course, students should be able to:

1. Conduct site investigations and sub-soil explorations, including selecting appropriate methods and techniques, and interpreting results to inform foundation design.
2. Analyse soil properties and behaviour, including bearing capacity, stress distribution, and settlement, using theoretical frameworks such as Terzaghi's and Meyerhof's analyses.
3. Determine bearing capacity using various methods, including theoretical analyses, field tests, and building codes, and evaluate the merits and demerits of each approach.
4. Calculate stress distribution in soils, including concentrated forces, uniformly loaded areas, and layered systems, using analytical solutions such as Boussinesq's equation and Newmark's influence chart.
5. Address non-technical issues associated with site exploration in challenging environments, such as the Niger-Delta region, and develop strategies for overcoming these challenges.
6. Apply plate theory and conduct field tests, including auger boring and standard penetration tests, to inform foundation design and ensure safe and efficient construction.

Course Content:

Site investigation and sub-soil exploration. Examples. Methods of site exploration. Soil samples and samplers. Penetration and sound tests. Geophysical methods. Non-technical issues associated with site exploration peculiar to the Niger-Delta regions. Site investigation report. Case studies associated with challenges encountered during site investigation. Definition of bearing capacity and terms. Types of bearing capacity failures. Terzaghi's analysis. Skempton's values for N_C . Effect of water table on bearing capacity. Meyerhof's analysis. Determination of bearing capacity by various methods. Bearing capacity from building codes-merits and demerits. Stress distribution. Concentrated force-Boussinesq's Equation. Vertical pressure under uniformly a uniformly loaded rectangular area. Westergaard's analysis. Newmark's influence chart. Equivalent point load method. Two is to one method. Introduction to plate theory. Conducting of auger boring and standard penetration test at a given location. Extraction of disturbed and undisturbed soil sample. Determination of CBR of soil sample.

CVE551 Highway and Transportation Engineering 11 Course Learning Outcomes

(2 Units, Core, LH 30)

On completion of the course, students should be able to:

1. Apply transportation planning principles, including travel demand modelling, trip generation, trip distribution, and modal split, to design and evaluate transportation systems.
2. Conduct surveys and investigations, including traffic surveys, to gather data and inform transportation planning and design decisions.
3. Evaluate road pavement surface characteristics, including skid resistance and roughness, and apply measurement techniques to ensure safe and efficient transportation infrastructure.
4. Develop maintenance strategies for various types of roads, including earth roads, water-bound macadam roads, bituminous surfaces, and cement concrete surfaces.
5. Conduct economic evaluations of transportation projects, including comparing pavement types and applying various economic evaluation methods, to inform decision-making.
6. Compare and contrast Nigerian highway design policies, standards, and specifications with international best practices, and apply this knowledge to design and evaluate transportation infrastructure.

Course Contents

Transportation planning. Travel demand modelling, transport modelling, transport demand and supply, trip generation, types of trip, growth factor modelling, regression methods, trip distribution, modal split, mode choice, and factors influencing the choice of mode. Surveys and investigations. Importance of surveys and investigation, types of surveys and investigation, traffic surveys guidelines for alignment and route selection, Road pavement surface characteristics. Importance of skid resistance, factors governing skid resistance, measurement of skid resistance, pavement roughness, importance of smooth riding surface, measurement of road roughness. Highway maintenance. Maintenance of earth roads, water-bound macadam roads, bituminous surface, and cement concrete surface. Highway economics. Economics of pavement types, the various methods of economic evaluation, study of Nigerian highway design policies, standards and specifications in comparison with international standards.

CVE561 Hydraulics Structures & Design (2 Units, Core, LH= 30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Design urban storm water drainage systems, including computing energy and classifying water surface profiles, and applying hydraulic principles to ensure efficient and safe drainage.
2. Analyse flow through pipes and porous media, using empirical formulae such as Rose's Equation, Karman-Kozeiny's Equation, Colebrook's Equation, and Powell's Equation.
3. Design multiple-purpose reservoirs, including flood control facilities, water supply, irrigation, recreation, navigation, erosion control, and apply principles of dam design and spillway design.
4. Design municipal water reticulation systems, including determining flow in networks of pipes and fittings using Hardy Cross Iterative methods, and applying principles of water distribution.
5. Evaluate the economy of water systems, including cost-benefit analysis and internal rate of return, and apply principles of water resources management and administration.
6. Apply hydraulic principles to design and analyze various water resources infrastructure, including stilling basins, dykes, levees, coastal protection, and harbor engineering.

Course Contents:

Hydraulic Design of Urban Storm Water Drainage System, etc. Introduction to wide open channel flow; for $R = Y_n$: Steady Gradually Varied flow, Unsteady open channel flow and Hydraulic Jump. Computation of energy and Classification of water surface profiles, stilling basins, and municipal storm drainage systems. Flow through Pipe or Closed Conduit Pipe as well as flow through porous medium using modern empirical formulae such as: Rose's Equation; Karman Kozeny's Equation; Colebrook's Equation, and Powell's Equation. Introduction to Multiple Purpose Reserved Design for flood control facilities; water supply, irrigation, recreation, navigation and erosion control. Dams; spillways; dykes; levees; coastal protection and harbour engineering. Municipal Water Reticulation: Types of water supply networks (dead end grid pattern, looping; determination of flow in network of pipes/fittings using both Hardy Cross Iterative methods of Quantity balance approach and Head balance approach. Aspects of Water Resources Management and Administration. Economy, Analysis (Cost-Benefit; Internal Rate of Return, etc) of Water Systems.

ELA501 Civil Engineering Laboratory Practical

(2 Units, Core, PH =90)

Course Learning Outcomes:

Upon successful completion of the course, students will be able to:

1. Understand the unit operations and processes they have learnt in the classroom and their applications to real-time situations, through the opportunity to work with equipment in the laboratory.
2. Apply safety precautions in handling samples, materials, chemicals, and laboratory equipment.
3. Develop good analytical and critical thinking skills needed to analyse data, draw conclusions from their experiments, and interpret data.
4. Develop teamwork skills, learn how to communicate effectively, and collaborate to achieve a common goal.
5. Develop good technical writing skills and learn how to communicate scientific information effectively

Course Content:

Laboratory Experiment on Sand moisture content test, Laboratory Experiment on Fine and coarse aggregate grading test, Laboratory Experiment on Slump cone test, Laboratory Experiment on Destructive test on hardened concrete, Laboratory Experiment on Non-destructive test on hardened concrete, Laboratory Experiment on Direct shear box test, Laboratory Experiment on Triaxial compression test, Laboratory Experiment on Unconfined compression strength test, Laboratory Experiment on California Bearing Ratio test.

CVE513 Advanced Structural Engineering

(2 Units, Elective, LH =30)

Course Learning Outcomes

At the end of the course, students should be able to:

1. Conduct feasibility studies for building projects, including site selection, and develop work programs and structural schemes for construction projects.
2. Design and detail major structural engineering works, including load transfer paths, and apply standard specifications for building construction.
3. Select and design foundations for buildings, considering site conditions and structural requirements, and appraise existing structures for stability and safety.
4. Develop construction drawings and bar bending schedules, and apply modern structural forms and methods of construction to building projects.

5. Design water retaining structures, including applying relevant design codes and standards, and ensuring structural integrity and durability.

Course contents

Feasibility study of building. Planning of building and Civil Engineering works. Terminologies in Building. Site selection. Work program structure in buildings. Structural scheme selection in structures. Load transfer path. Client brief and conditions. Bar bending schedule. Construction drawings. Building tools, materials and equipment. Choice of foundation. Structural appraisal of buildings. Design and detailing of major structural engineering works. Standard specifications for building. Modern structural forms and methods of construction. Design of water retaining structures.

CVE 533: Advanced Water Resources and Env. Eng. I (2 Units, Elective, LH =30)

Courses Learning Outcomes

At the end of the course, students should be able to:

1. Design water intake works, including selecting the type of intake and designing its elements, to ensure a safe and efficient water supply.
2. Analyse and design storage reservoirs, including determining yield and capacity, estimating reservoir losses, and predicting the probable life of a reservoir.
3. Design dams, including calculating forces on dams, selecting the type of dam, and ensuring safety against failures, and designing spillways and outlet works.
4. Select and design pumps, including determining design parameters, and apply principles of pump operation and selection
5. Apply principles of dam safety, including protection against scour, and ensure the stability and integrity of water storage and conveyance structures.

Course Contents

Water intake and storage Works: Types of intakes works, elements of intake work. Storage Reservoir: characteristic of reservoir; Yield and capacity of a reservoir; Reservoir losses; Probable life of a reservoir. Dams: Forces on dams; types of Dams; Failures, Safety of Dams. Spillways: crest gates, outlet works, protection against scour. Pumps: Types of pumps; determination of design parameters.

CVE553 Advanced Highway and Transportation Engineering 11 (2 Units, Elective, LH 30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Design flexible pavements, including applying geometric and material modelling, analyzing multilayer systems, and using design methods such as AASHTO and empirical methods.
2. Design rigid pavements, including analyzing stresses, designing based on fatigue behavior, and applying AASHTO design methods, and design reinforcement, joints, and dowel bars.
3. Construct concrete roads, including designing concrete mixes, producing and transporting concrete, and applying quality control measures, and use admixtures and additives to enhance concrete performance.
4. Design overlays, including evaluating the need for overlays, selecting design methods, and constructing overlays for flexible and rigid pavements.
5. Apply ethical principles in pavement design and construction, including ensuring safety, durability, and sustainability, and minimizing environmental impact.

6. Design traffic signals, including evaluating the advantages and disadvantages of traffic signals, designing signal indications, and analyzing capacity and level of service, and apply principles of traffic signal design and operation.

Course Contents

Pavement flexible design. Geometric/material modelling, Analysis of linear multilayer system, Analysis of one-layer system, Elastic multilayered system, Analysis of two-layer system, Three-layered system; AASHTO design for flexible pavement: Pavement serviceability, Equivalent axle load factors, Performance criterion for flexible pavements, Layer coefficients, Drainage coefficients, Selection of layer thickness; Empirical Methods using CBR Methods, Design Procedures in Road Note 29, Methods based on Pavement Performance. Design of Rigid Pavement. Factors Affecting Design such as Wheel load and its repetitions, Area of Contact of Wheel, Sub-grade strength and its properties, Poisson's Ratio, Reinforcement. Analysis of Stresses, Design Based on Fatigue Behavior of Concrete, AASHTO Method of Rigid Pavement Design, Reinforcement in Slab, Design of Joints, Design of Dowel Bars, Design of Tie Bars, Continuously Reinforced Cement Concrete Pavement, Fiber Reinforced Concrete, Pre-Stressed Concrete Pavement. Construction of Concrete Roads: Introduction to Concrete Mix Design for Rigid Pavement, Production/Transportation of Concrete, Manual Construction Methods, Temperature of Placing, Joints/Dowels/Tie-Bars/Curing, Quality Control, Use of Admixtures and Additive in Concrete, High Performance Concrete. Overlay design and construction. Need of overlays, overlay design methods for flexible pavement, overlay design methods for rigid pavement, Traffic signals. Advantages and disadvantages of traffic signals, signal indications, design principles of traffic signal, evaluation of a traffic signal, fixed-time signals and vehicle-actuated signals, capacity and level of service analysis of a signalized intersection.

SECOND SEMESTER

GRE 502: Engineering Law

(2 Units: Core: LH =30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Apply principles of common law and equity, including understanding their history, definition, and division, and interpreting legislation and contractual obligations.
2. Analyze and apply contract law, including offer, acceptance, communication, and termination, in engineering contexts.
3. Apply laws related to intellectual property, including patents, registered designs, and their requirements, application, and infringement.
4. Apply principles of company law, labour law, and industrial law, including understanding legal liabilities, obligations, and rights in various contexts.

Course Content

Common Law: its history, definition, nature and division. Legislation codification interpretation. Equity: Definition and its main spheres. Law of contracts for Engineers, offer, acceptance, communication termination. General principles of criminal law. Law of torts. Definition, Classification and liabilities. Patents, requirements application and infringement. Registered designs, application, requirements types and infringement. Company law. Labour law and industrial law.

CVE512 Structural Mechanics IV

(2 Units, Core, LH =30)

Course Learning Outcomes

At the end of the course, students should be able to:

1. Apply matrix methods of structural analysis, including stiffness and flexibility methods, to analyse indeterminate structures.
2. Use the stiffness method to analyse structures, including determining the stiffness matrix, and solve problems using this method.
3. Apply the flexibility method to analyse indeterminate structures, including determining the flexibility matrix, and solve problems using this method.
4. Analyse slabs using Yield Line Theory, including determining yield line patterns, and calculate collapse loads for different edge conditions.
5. Apply finite element methods to analyse structures, including understanding the principles, advantages, and types of finite elements, and solve problems using finite element analysis.
6. Analyse structures using the plastic method of structural analysis, including understanding plastic hinges, shape factor, and collapse mechanisms, and calculate collapse loads for beams and frames.

Course contents

Matrix method of structural analysis. Stiffness method of structural analysis. Steps in the Stiffness matrix method of structural analysis. Solved Examples using the Stiffness method of structural analysis. Flexibility method of indeterminate structures. Steps involved in the Flexibility method of structural analysis. Solved problems using the Flexibility method of structural analysis. Yield Line Theory. Basic Assumptions in the Yield Line Theory. Yield line development. One way simply supported slab. One way continuous slab. Two-way slabs. Sign conventions in Yield line Theory. Methods of Analysis in Yield Line Theory. Analysis of Yield line patterns for the determination of collapse load for different edge conditions using the virtual work method. Solved problems using Yield line Theory. Analysis and resolution of forces in the Finite Element. Areas of application of finite elements. Principles of finite elements. Advantages of finite elements. Types of finite elements. Elements and Nodes. Shape Function. Degree of freedom. Stiffness matrix. Linear spring as a Finite Element. Problems in Finite Element. 2-D Scalar Variable Problems. Plastic method of structural analysis. Plastic Hinge. Analysis of rectangular section. Shape Factor. Conditions for Full Collapse. Collapse mechanisms in beams and frames.

CVE522 Design of Prestressed Concrete Structures (2 Units, Core, LH =30)

Course Learning Outcomes

At the end of the course, students should be able to:

1. Design prestressed concrete members, including analysing concrete sections under working loads, and determining prestress force and tendon profiles.
2. Analyse prestressed concrete members subjected to axial and eccentric prestress forces, and calculate stresses under quasi-permanent loads.
3. Determine prestress losses and calculate deflections in prestressed concrete members, and design end block reinforcement.
4. Design prestressed concrete members for serviceability and ultimate limit states, including applying relevant design codes and standards.
5. Apply principles of prestressed concrete to design and analyse complex structures, including ensuring structural integrity, durability, and safety.

Course contents

Introduction to Prestressed Concrete. Principles of prestressing. Stages in the design of prestressed concrete. Methods of prestressing. Analysis of the concrete section under working load. Analysis of members subjected to axial prestress force. Analysis of members subjected to eccentric prestress force. Design for serviceability: Limit state. Determination of minimum

section properties. Design of prestress force. Stress under quasi permanent load. Magnel diagram construction. Design of tendon profiles. Width of cable zone. Prestress Losses. Calculation of deflections in prestressed concrete. Design of End block reinforcement. Analysis and design at the Ultimate limit state.

CVE532 Waste Water and Environmental Engineering. (2 Units: Core; L = 30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Identify and characterise wastewater, including types, sources, and treatment methods, and apply unit operations and processes to design wastewater treatment systems.
2. Design wastewater disposal systems, including selecting appropriate methods and technologies, and ensuring environmental sustainability.
3. Analyse air pollution, including identifying sources, classifying pollutants, and understanding effects on the environment, plants, and human health.
4. Apply air quality management principles, including using pollutant standard indices, and understanding meteorology and dispersion of air pollutants.
5. Design air pollution control systems, including selecting control devices for particulate and gaseous contaminants, and ensuring effective pollution reduction.
6. Address global environmental problems, including understanding causes, effects, and solutions to global warming, ozone depletion, acid rain, and greenhouse effects, and promoting sustainable practices.

Course contents

Waste Water. Types of wastewaters. Treatment methods- unit operations and Unit processes. Methods of wastewater disposal. Introduction to air pollution. Sources of air pollution. Units of air pollution. Classification of pollutants. Effects of air pollutants on the environment, plants and human health. Air quality management. Pollutant Standard Index. Meteorology and Dispersion of Air. Elemental properties of the atmosphere and influence of meteorological phenomena on air quality. Lapse rates and Dispersion. Pollution dispersion behaviour in the environment. Air pollution control systems: Control devices for particulate contaminants and control devices for gaseous contaminants. Global environmental problems are due to air pollution. Definition, causes, potential effects, and solutions to Global warming, Ozone depletion, acid rain, and greenhouse effects.

CVE 542 Foundation Engineering

(2 Units, Core, LH 30)

Course Learning Outcomes

By the end of this course, students will be able to:

1. Determine bearing capacity of shallow and deep foundations, including calculating ultimate, safe, and allowable bearing capacities, and applying factors of safety and shape effects.
2. Design foundations, including selecting types of foundations (footings, rafts, piles), and determining their suitability for different soil conditions.
3. Analyse earth pressure, including calculating active, passive, and at-rest pressures, and applying Rankine and Coulomb wedge theories.
4. Design retaining walls, including analysing stability and determining earth pressures, and selecting types of retaining walls. Earth pressures (active, passive, and at-rest) using Rankine, Coulomb wedge, and Cumming's methods.
5. Analyse slope stability, including identifying types and mechanics of slope failures, and applying theoretical and graphical solutions.
6. Apply soil mechanics principles to design and analyse geotechnical structures, including foundations, retaining walls, and slopes, and ensure stability and safety.

Course Content:

Bearing Capacity: Ultimate, safe and allowable bearing capacities. Bearing capacity factors: case of shallow and deep foundations, factor of safety, shape effect, footings under eccentric inclined loads. Foundation: Type and choice of foundations: footings, rafts and pipes. Use and general characteristics of pipes, piles in sand, and piles in clay. Negative skin friction; pile groups, bearing capacity and settlement of pile groups; efficiency of pile groups. Earth Pressure: Pressure equilibrium. Active, passive and at-reset pressure, earth coefficients, computation of earth pressures using the Rankine and the Coulomb wedge theories, and Cumming's method. Earth pressures on retaining walls. Types and analysis of retaining walls. The use of bracing as lateral support in open cuts, anchored bulkheads free earth support method of analysis. Slope Stability: Types and mechanics of slope failures. Theoretical and graphical solutions of slope stability problems. Effect of tension cracks on slope stability. Ordinary method of slices.

CVE552 Highway and Transportation Engineering 111

(2 Units, Core, LH 30)

Course Learning Outcomes

By the end of the course, students will be able to:

1. Analyse traffic stream characteristics, including fundamental parameters and relations of traffic flow, and apply traffic stream models.
2. Design and implement traffic measurement procedures, including selecting appropriate methods and technologies, and collecting and analysing traffic data.
3. Develop microscopic traffic flow models, including vehicle arrival models, car-following models, and lane-changing models, and apply microscopic traffic simulation.
4. Apply railway engineering principles, including understanding gauges, permanent way, wheel and axles, and track resistance.
5. Design and analyse railway tracks, including calculating stresses in tracks and components, and selecting suitable materials and fastenings.
6. Evaluate and mitigate track maintenance issues, including wear and failures in rails, and select jointed or welded rails, sleepers, and ballast.

Course Contents

Traffic Stream Characteristics: Fundamental Parameters/Relations of Traffic Flow, Traffic Stream Models, Moving Observer Models. Traffic Measurement Procedures: Measurement at a Point, Measurement Over a Short Section, Measurement Along a Length of Road, Automated Traffic Measurement, Intrusive Technologies, Non-Intrusive Technologies, Travel Time Data Collection. Microscopic Traffic Flow Modelling: Vehicle Arrival Models: Headway, Vehicle Arrival Models: Count, Car Following Models, Lane Changing Models, Microscopic Traffic Simulation. Railway Engineering: Introduction to Railway Engineering, Gauges and Permanent Way, Wheel and Axles, Coning of wheels, Track Resistance, Hauling Capacity, Track Modulus, Stress in Tracks, Stresses in Components of Track, Rails, Wear & Failures in Rails, Jointed or Welded Rails, Sleepers, Ballast, Fastenings.

CVE582 – Construction Engineering

2 Units: Core; LH = 15,PH=45)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Apply construction practices and professional relations, including managing earthwork equipment, and calculating capital outlay and operating costs.
2. Design and assemble formwork components, and implement strategies to improve productivity and construction practices.
3. Manage construction projects, including ensuring safety, securing project financing, and understanding insurance, bonding, and contract terms.

4. Solve job site and engineering problems, including applying knowledge of building and heavy construction practices in Nigeria, and developing effective solutions.

Course Content

Construction practices and professional relations. Earthwork equipment, capital outlay and operating cost. Formwork design component assembly. Improvement of productivity and construction practices, safety, project financing, insurance, bonding and contract terms. Solution to job site and engineering problems in buildings and heavy construction in Nigeria.

CVE592 – Building Services Engineering (2 Units: Core; LH = 30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Design and select mechanical and electrical systems for buildings, including HVAC, plumbing, and electrical systems.
2. Apply principles of building services, including illumination, comfort, and climate control, to create functional and sustainable buildings.
3. Design and implement building infrastructure, including water supply, drainage, and fire protection systems.
4. Integrate building services and systems, including elevators, escalators, and acoustics, to ensure efficient and safe building operation.

Course Content

Engineering study of materials and equipment used in mechanical and electrical services of buildings. Design of building service components, modern building operation, selection of necessary equipment, and specific topics such as illumination, comfort, heat loss and heat gain, air conditioning and climate control, water supply, and fire protection. Drainage systems, plumbing and sewage disposal, elevators, escalators, and building acoustics.

CVE514 Advanced Structural Engineering II (2 Units, Elective, LH =30)

Course Learning Outcomes

At the end of the course, students should be able to:

1. Analyse plates and shells, including bending, vibration, buckling, and stability, using finite element and finite difference methods.
2. Design plates, including applying design principles, and detailing reinforcement for bending, shear, and buckling.
3. Design shells, including applying membrane and bending theory, and detailing reinforcement for various loading conditions.
4. Design dome structures, including analysing and designing for various loads, and applying design principles and considerations.
5. Design very tall buildings, including selecting structural systems, applying wind and seismic design considerations, and analysis and design methods.

Course contents

Theory of Plates: Introduction to plate theory, Bending and vibration of plates, Plate buckling and stability, Plate analysis methods (finite element, finite difference). Theory of Shells: Introduction to shell theory, Membrane and bending theory of shells, Shell buckling and stability, Shell analysis methods (finite element, finite difference), Design of Plates: Design principles and considerations, Plate design for bending, shear, and buckling, Plate reinforcement and detailing. Design of Shells: Design principles and considerations, Shell design for membrane and bending stresses, Shell reinforcement and detailing. Design of Domes: Introduction to dome structures, Dome design principles and considerations, Dome analysis and design methods, Design of Very Tall Buildings; Introduction to tall building

design, Structural systems for tall buildings (framed tubes, bundled tubes, etc.), Wind and seismic design considerations, Analysis and design methods for tall buildings

CVE 534: Advanced Water Resources & Env. Engineering II (2 Units Elective, LH =30)

Course Learning Outcomes

On completion of the course, students should be able to:

1. Describe the principles and best practices for designing sanitary landfills, including site selection, layout and operation.
2. Identify the fundamental concepts and design considerations in wastewater management, including flow rates, pollutant loads and treatment objectives
3. Apply design principles and calculations for preliminary treatment units such as screens, grit chambers and equalisation basins
4. Design primary and secondary wastewater treatment units, including sedimentation, clarification, activated sludge, and trickling filter systems.
5. Apply wastewater management principles, including wastewater characteristics, flow estimation, and treatment objectives, to develop effective treatment solutions.

Course Content

Solid Waste Management- Design of Sanitary Landfills: Introduction to sanitary landfills, Site selection and design considerations, Landfill design and layout, Leachate and gas management. Landfill Operations and Management: Waste acceptance and handling, Landfill operation and maintenance, Environmental monitoring and control.

Liquid Waste Management-Basic Design Considerations and Concepts in Wastewater Management: Introduction to wastewater management, Wastewater characteristics and flow estimation, Wastewater treatment objectives and principles. Design of Preliminary Wastewater Treatment Units: Screening and grit removal, Equalisation and neutralisation, Pre-aeration and chemical treatment. Design of Primary Wastewater Treatment Units: Sedimentation and clarification, Design of primary clarifiers and sludge handling. Design of Secondary Biological Wastewater Treatment Units: Introduction to biological treatment, activated sludge process design, Trickling filter design, biological nutrient removal

CVE554 Advanced Highway and Transportation Engineering 11 (2Units, Core, LH 30)

Course Learning Outcomes

By the end of the course, students will be able to:

1. Describe and apply concepts of capacity and level of service for uninterrupted traffic flow.
2. Analyse urban and freeway corridor operations using transportation engineering principles and identify appropriate traffic control devices and apply them effectively at intersections.
3. Design basic layouts for uncontrolled, rotary, and grade-separated intersections.
4. Conduct and interpret results from parking, accident, congestion, and emission studies.
5. Evaluate traffic performance in complex transportation corridors using corridor analysis techniques.
6. Design basic runway, taxiway, and terminal configurations based on aircraft characteristics and ICAO standards and assess the impact of obstructions on runway orientation and length requirements.
7. Apply knowledge of visual guidance systems, including markings, lighting, and signage, in airport operations.

Course Contents

Uninterrupted Flow: Capacity and Level of Service, Urban Street, Multilane Streets, Freeway Operations, Corridor Analysis. Traffic Intersection Control: Principles of Traffic Control, Traffic Signs, Road Markings, Uncontrolled Intersection, Traffic Rotary, Grade-Separated Intersection. Specialised Traffic Studies: Parking studies, Accident Studies, Fuel Consumption and emission studies, Congestion Studies. Air Transport Engineering: Aircraft Characteristics/Controls, Airport Site & Size Selection, Airport Obstructions, Runway Orientation, Runway Length, Runway Geometric, Taxiway, Exit Taxiway, Aprons and Aircraft Parking, Terminal Area and Building, Terminal Planning and Hangars, Visual Aids-Markings, Visual Aids-Lighting and Signage.

5.3. Students Course Workload and Prerequisites courses

The course structure and workload for all courses in the Civil Engineering programme at Igbinedion University, Okada, is presented in Tables 5.6 – 5.10 for 100L to 500L, respectively, with the workload by students, including the lecture, tutorial, practical and prerequisite courses as well as credit units for each course. All levels (100-500) are in line with the Benchmark Minimum Academic Standards of the NUC (BMAS, CCMAS), and even COREN.

Table 5.6: 100 Level Course Workload and Pre-requisites

FIRST SEMESTER							Pre-requisites (O' Level)
S/N	Course Code	Course Title	L	T	P	Credit Units	
1.	GST 111	Communication in English	2	1	-	2	
2.	CHM 101	General Chemistry I	2	1	-	2	
3.	CHM 107	General Practical Chemistry I	2	1	-	1	
4.	MTH 101	Elementary Mathematics I (Algebra & Trigonometry)	2	-	-	2	
5.	MTH103	Elementary Mathematics III (Vectors, Geometry & Dynamics)	1	1	-	2	
6.	PHY 101	General Physics I	1	1	-	2	
7.	PHY 103	General Physics III	1	1	-	2	
8.	PHY 107	General Practical Physics I	2	-	-	1	
9.	GET 101	Engineer in Society	2	-	-	1	
10.	CEE 101	Introduction to Civil Engineering	2	-	-	2	
11.	IUO-GST 113	Use of Library Study Skills and ICT				2	
12.	IUO-GST 114	IT Essentials				1	
TOTAL CREDIT UNITS						20	
SECOND SEMESTER							Pre-requisites O' Level
S/N	Course Code	Course Title	L	T	P	Credit Units	
1.	GST 112	Nigerian People and culture	2	1	-	2	
2.	CHM 102	General Chemistry II	2	1	-	2	
3.	CHM 108	General Practical Chemistry II	2	1	-	1	
4.	MTH 102	Elementary Mathematics II (Calculus)	-	-	2	2	
5.	PHY 102	General Physics II (Electricity & Magnetism)	1	1	-	2	
6.	PHY 104	General Physics IV (Waves, vibration and optics)	-	-	1	2	
7.	PHY 108	General Practical Physics II	1	1	-	1	
8.	GET 102	Engineering Graphics and Solid Modelling I	1	1	-	2	
9.	STA 112	Probability I	1	1	-	3	

10.	IUO-EET 102	Engineering Equipment Training	1	-	-	1	
		TOTAL CREDIT UNITS				18	
		GRAND TOTAL CREDIT UNITS				38	

Note: L = Lecture Hours/Week; T = Tutorial Hours/Week; P = Practical Hours/Week.

Table 5.7: 200 Level Course Workload and Pre-requisites

S/N	Course Code	FIRST SEMESTER	L	T	P	Credit Units	Prerequisites
		Course Title					
1	CEE 201	Civil Engineering Drawing	2	1	-	2	
2.	ENT 211	Entrepreneurship and Innovation	1	-	1	2	
3.	GET 201	Applied Electricity I	1	-	-	3	
4.	GET 203	Engineering Graphics & Solid Modelling II	2	-	-	3	
5.	GET 205	Fundamentals of Fluid Mechanics	2	-	-	3	
6.	GET 207	Applied Mechanics	1	1	-	3	
7.	GET 209	Engineering Mathematics I	1	1	-	3	MTH111, TH112
8.	GET 211	Computing and Software Engineering	1	1	-	3	
9.	IUO-ELA201	Engineering Laboratory I	-	-	2	1	
10.	IUO-GST 211	Environment and Sustainable Development	2	-	-	2	
		TOTAL CREDIT UNITS				25	

SECOND SEMESTER

S/N	Course Code	Course Title	L	T	P	Credit Units	Prerequisites
1.	GST 212	Philosophy, Logic and Human Existence	2	1	-	2	
2.	GET 202	Engineering Materials	1	-	1	3	
3.	GET 204	Students Workshop Practice	2	-	-	2	
4.	GET 206	Fundamentals of Thermodynamics	2	-	-	3	
5.	GET 208	Strength of Materials	2	-	-	3	
6.	GET 299	SIWES I	2	-	-	3	
7.	GET 210	Engineering Mathematics II	2	-	-	3	MTH111, TH112
8.	IUO-GST 222	Community Service Programme	2	-	-	1	
9.	IUO-ELA202	Engineering Laboratory II	-	-	2	1	
10.	IUO-CEE292	Elements of Architectural Design	1	1	-	2	
		TOTAL CREDIT UNITS				23	
		GRAND TOTAL CREDIT UNITS				48	

Note: L = Lecture Hours/Week; T = Tutorial Hours/Week; P = Practical Hours/Week.

Table 5.8: 300 Level Course Workload and Pre-requisites

S/No	Course Code	FIRST SEMESTER	L	T	P	Credit Units	Prerequisites
		Course Title					
1	EMA301	Engineering Mathematics III	2	1	-	3	GET209,
2.	GRE 331	Research Methods and Technical Report Writing	2	-	-	2	
3.	CVE311	Theory of Structures	2	1	-	3	GET208
4.	CVE331	Civil Engineering Hydrology I	1	-	1	2	
5.	CVE341	Soil Mechanics	2	-	1	3	
6.	CVE361	Fluid Mechanics II	1	-	1	2	GET205
7.	CVE391	Building Technology	2	-	-	2	IUO-CEE292
8.	ELA301	Civil Eng. Laboratory Practical I	-	-	2	2	

9.	EPS311	Introduction to Entrepreneurship Studies	1	-	1	2	
10	IUO-GET 313	IUO Upskill Course I AutoCAD				0	
.		TOTAL CREDIT UNITS				21	

SECOND SEMESTER

S/N	Course Code	Course Title	L	T	P	Credit Units	Prerequisites
1.	EMA 302	Engineering Mathematics IV	2	1	-	3	GET210
2.	CVE 312	Structural Mechanics I	2	1	-	3	GET208
3.	CVE 322	Design of Reinforced concrete Structures I	2	1	-	3	GET208
4.	CVE332	Civil Engineering Hydrology II	2	-	-	2	
5.	CVE 342	Engineering Geology	2	1	-	3	
6.	CVE 372	Engineering Survey and Geo-Informatics	2	-	1	3	
7.	CVE 382	Civil Eng. Materials	2	1	-	3	
8.	CVE392	Terotechnology	2	-	-	2	
9.	ELA 302	Civil Eng. Laboratory Practical II	-	-	2	2	
10.	IUITS 302	Igbinedion University Industrial Training Scheme III	-	-	1	1	
11.	IUO-GET 314	IUO Upskill Course II: Graphics Design				0	
		TOTAL CREDIT UNITS				25	
		GRAND TOTAL CREDIT UNITS				46	

Note: L = Lecture Hours/Week; T = Tutorial Hours/Week; P = Practical Hours/Week.

Table 5.9: 400 Level Course Workload And Pre-Requisites

FIRST SEMESTER							
S/N	Course Code	Course Title	L	T	P	Credit Units	Prerequisites
1.	EMA 401	Engineering Mathematics V	2	1	-	3	GET209,GET210, EMA301 & 302
2.	CVE 411	Structural Mechanics III	2	-	-	2	CVE311,CVE312
3.	CVE 421	Design of Timber and Steel Structures II	2	-	-	2	CVE322
4.	CVE 431	Public Health Engineering	2	-	-	2	
5.	CVE 441	Soil Mechanics and Foundation Engineering	1	-	1	2	CVE341,CVE342
6.	CVE 451	Highway & Transportation Engineering I	2	-	-	2	
7.	CVE 461	Hydraulics	2	-	-	2	GET205, CVE361
8.	CVE 471	Engineering Surveys and Geo-Informatics	2	-	1	3	CVE372
9	CVE 481	Civil Engineering Practice and Law	2	1	-	3	CVE382
10	CVE 491	Computer Applications in Civil Engineering and Drawing	1	-	1	2	IUO-CEE292
11	ELA 401	Civil Eng. Laboratory Practical III	-	-	2	2	ELA201,ELA202, ELA301, ELA302.
12	IUO CERT411	Career Enhancement and Resilience Training	2	-	-	2	
		TOTAL CREDIT UNITS				27	
SECOND SEMESTER							
12.	IUITS 402	Igbinedion University Industrial Training Scheme IV	-	-	6	6	
		GRAND TOTAL CREDIT UNITS				33	

Note: L = Lecture Hours/Week; T = Tutorial Hours/Week; P = Practical Hours/Week

Table 5.10: 500 Level Course Workload And Pre-Requisites

FIRST SEMESTER							
S/N	Course Code	Course Title	L	T	P	Credit Units	Pre-requisites
1.	GRE 501	Engineering Management and Economics	2	1	-	3	

2.	CVE 511	Structural Mechanics III	2	-	-	2	CVE411, CVE312
3.	CVE 521	Design of Concrete Structures II	2	-	-	2	CVE322, CVE421
4.	CVE 531	Water Resources and Environmental Eng.	2	-	-	2	CVE431
5.	CVE 541	Geotechnical Engineering	2	-	-	2	CVE341, CVE441
6.	CVE 551	Highway and Transportation Engineering II	2	-	-	2	CVE451
7.	CVE 561	Hydraulic Structures and Design	2	1	-	2	GET209, CVE361, CVE461
8.	ELA 501	Civil Eng. Laboratory Practical IV	2	-	-	2	
9.	CVE 501	Final Year Engineering Project	2	-	1	3	
		OPTIONAL COURSES* (E)					
10.	CVE 513	Advanced Structural Engineering I	2	-	-	2	
11.	CVE 533	Advanced Water Resources and Environmental Engineering I	2	-	-		
12.	CVE 543	Advanced Geotechnical Engineering I	2	-	-		
13.	CVE 553	Adv. Highway and Transportation Eng. II	2	-	-		
		TOTAL CREDIT UNITS				22	

SECOND SEMESTER

S/No	Course Code	Course Title	L	T	P	Credit Units	Pre-requisites
1.	GRE 502	Engineering Law	2	-	-	2	
2.	CVE 512	Structural Mechanics IV	2	-	-	2	CVE411, CVE312
3.	CVE 522	Prestressed Concrete Design	2	-	-	2	CVE322, CVE421
4.	CVE 532	Waste Water & Environmental Engineering	2	1	-	3	CVE431
5.	CVE 542	Foundation Engineering	2	-	-	2	CVE341, CVE441
6.	CVE 552	Highway and Transportation Eng II	2	-	-	2	
7.	CVE 582	Construction Engineering	2	-	-	2	
8.	CVE592	Building Services	2	-	-	2	
9.	CVE 502	Final Year Engineering Project	2	1	-	3	
		OPTIONAL COURSES* (E)					
10.	CVE 514	Advanced Structural Engineering II	2	-	-	2	
11.	CVE 534	Advanced Water Resources and Environmental Engineering II	2	-	-		
12.	CVE 544	Advanced Geotechnical Engineering II	2	-	-		
13.	CVE 554	Adv. Highway and Transportation Eng. II	2	-	-		
		TOTAL CREDIT UNITS				22	
		GRAND TOTAL CREDIT UNITS				44	

***Note: Only one of the optional courses can be taken.**

CHAPTER SIX

UNDERGRADUATE RESEARCH OPPORTUNITIES AND DEPARTMENTAL RESEARCH AREAS

6.1. Undergraduate Research Opportunities

The Department of Civil Engineering provides students with numerous opportunities to engage in research, innovation, and applied problem-solving as part of their academic training. Undergraduate research forms an essential component of the Civil Engineering curriculum, helping students to develop analytical skills, creativity, and an investigative mindset required for professional and postgraduate advancement. Students are encouraged to undertake final-year projects and supervised investigations that address real-world engineering challenges affecting communities, industries, and the environment.

Through these projects, students learn how to:

- Formulate research problems and objectives.
- Apply scientific and engineering principles to practical situations.
- Collect, analyze, and interpret technical data.
- Communicate findings effectively through written reports and presentations.

The Department provides guidance, supervision, and access to laboratories and field facilities to ensure that students gain hands-on experience in research design, testing, and data analysis. Collaborative research with industry and professional bodies is also encouraged, especially in areas of national importance such as water supply, road infrastructure, and environmental sustainability.

6.2. Departmental Research Areas

The Department of Civil Engineering engages in multidisciplinary research aimed at addressing Nigeria's infrastructural, environmental, and developmental needs. Faculty members and students contribute to research that promotes innovation, sustainable development, and technological advancement.

Major research areas in the Department include:

1. **Structural Engineering:** Structural analysis and design of buildings and bridges. Concrete technology and materials testing. Structural health monitoring and failure analysis.
2. **Geotechnical Engineering:** Soil mechanics and foundation engineering. Slope stability and ground improvement techniques. Geotechnical site characterization and soil-structure interaction.
3. **Highway and Transportation Engineering:** Highway design, construction, and maintenance. Traffic flow analysis and transportation planning. Pavement materials and performance evaluation.
4. **Water Resources and Environmental Engineering:** Water quality assessment and treatment, Hydrology and flood management. Wastewater management and environmental impact studies.

The Department encourages interdisciplinary collaboration between students and staff across different fields of engineering and applied sciences. Partnerships with government agencies, construction companies, and research institutions provide students with practical exposure to real-life engineering projects. Outstanding undergraduate research works are often showcased during departmental exhibitions, project defenses, and national competitions, and students are motivated to publish or present their findings in professional forums. The Department is

continually expanding its research capacity through the establishment of modern laboratories, digital design tools, and partnerships with professional and international bodies. Students are therefore urged to approach research with enthusiasm, innovation, and a sense of responsibility toward solving societal problems through engineering.

CHAPTER SEVEN

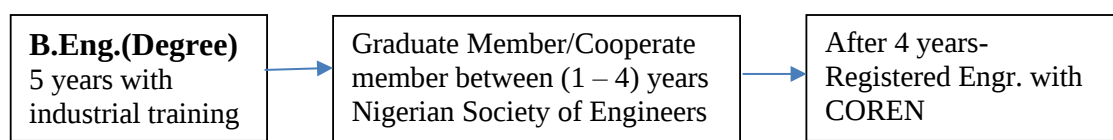
PROFESSIONAL REGISTRATION AND STAFF QUALIFICATION

7.1 Professional Registration

Graduates of Civil Engineering are encouraged to pursue professional registration to become recognized engineers in Nigeria. To become a fully qualified professional engineer, graduates must be registered by the Council for the Regulation of Engineering in Nigeria (COREN)- the statutory body responsible for regulating and controlling the practice of engineering. They can then use the letters “Engr.” before their names, indicating that they are registered Engineers.

The requirements are:

1. B. Eng. qualification obtained from accredited universities offering engineering disciplines, complete the mandatory Student Industrial Work Experience Scheme (SIWES)
2. 4 years working experience after graduation (Post graduation practical experience) under the supervision of registered engineers
3. Technical professional experience report writing and project Design with other exams which may be examined by the Nigerian Society of Engineers regulation body.
4. The national youth service year is often counted as one if spent with an appropriate engineering enterprise.



Professional registration not only confers legal recognition to practice as an engineer but also enhances career advancement, ethical practices and contribution to national development. The department encourages both students and staff to engage in continuous professional development and to seek membership and registration with relevant professional bodies.

7.2 QUALIFICATION REQUIREMENT FOR DEPARTMENTAL STAFF

The entry qualifications of staff seeking academic placement in the Department as recommended by the NUC and COREN, are as follows:

7.2.1 ACADEMIC STAFF

a. Graduate Assistant:

Candidates must have an Honours Degree in the appropriate discipline with at least a Second Class (Lower pass), and should have completed the National Youth Corps Service, where applicable.

b. Lecturer II:

Candidates must have a degree of Master's in the appropriate discipline plus at least two years of cognate experience.

c. Lecturer I:

Candidates should normally have a Ph.D. Degree with at least one year of teaching or industrial experience, plus one scholarly publication. However, where a candidate does not possess a PhD,

but has a degree of Master's with sufficient industrial experience, acceptable for professional registration, such a candidate, who should also show evidence of research potential, may be considered.

d. Senior Lecturer:

Candidates should normally possess a Ph.D. Degree and/or research experience and/or industrial experience. Such candidates should also have six (6) scholarly publications, four (4) of which must be journal articles. The other two (2) may be referred to Proceedings or Technical Reports. The candidates should also be registered with their professional bodies (COREN, etc.).

e. Associate Professor:

Candidates should normally possess a Ph.D. Degree with teaching and research experience. Such candidates should possess the ability to provide academic leadership in addition to having a considerable number of referred journal publications (not less than 12), that must be assessed externally.

f. Professor:

Candidates should normally possess a Ph.D. Degree, with teaching and research experience. They should have a demonstrable ability to provide virile academic leadership in addition to a considerable number of referred journal articles that must be externally assessed.

7.2.2. TECHNICAL STAFF:

The services of very competent senior technical staff are required to run laboratories, workshops/studios, and maintain teaching and research equipment. The requisite qualifications and experience are presented below for each category of technical staff:

a. Assistant Technical Officer:

Candidates should possess an Ordinary National Diploma in the appropriate discipline.

b. Technical Officer II/Technologist II:

Candidates should possess a Higher National Diploma with at least two (2) years cognate experience, or a City and Guilds Certificate with at least four (4) years cognate experience.

c. Senior Technical Officer/Technologists:

As above, but with at least six (6) years and eight (8) years cognate experience as per qualification, respectively.

d. Principal Technical Officer/Technologist:

As above, but with at least eight (8) years and ten (10) years cognate experience, respectively.

e. Assistant Chief Technical Officer/Technologist:

As above, but with at least twelve (12) years, and fourteen (14) years cognate experience, respectively.

f. Chief Technical Officer/Technologist:

As above, but with at least fourteen (14) years and sixteen (16) years cognate experience, respectively.

7.3 Qualification and List of Civil Engineering Staff

The department has a highly experienced team of academic, technical and administrative staff with cognate experience. Names, rank, status, qualifications and professional membership of Civil Engineering teaching staff, non-teaching staff indicating Full Time (FT) and Part Time (PT) (adjunct). Those on study leave are also specified in Table 7.1

Table 7.1: Staff in Civil Engineering Department

S / N	Name	COREN #	Rank/ Status	Date of first Appointment	Details of Qualifications			Specialization
					Degree	Year	Institution	
1	Ezugwu Maryann Ogoamaka	R22944	Associate Professor/ HOD	5 th Feb, 2007	Ph.D.	2018	UNIBEN	Water Resources & Environmental
					M.Eng.	2010	UNIBEN	
					B.Eng.	2005	FUTO	
2	Joel Manasseh	R12416	Professor/ Sabbatical	19 th March, 2025	Ph.D.	2006	UNN	Highway & Transportation
					M.Eng.	1999	ABU	
					B.Eng.	1994	FUAM	
3	Prof C.A Ezeaguu	R,18108	Professor/ PT	16 th Nov, 2012	Ph.D.	2008	UNIBEN	Structures
					M.Eng.	2004	UNIBEN	
					B.Eng.	2001	UNIBEN	
4	Oyigbo Thaddeus Ezechi	R15976	Senior Lecturer/ FT	4 th January, 2022	Ph.D.	2017	UNN	Construction
					M.Eng.	2012	UNN	
					B.Eng.	2002	FUAM	
5	Eze Avemaria Matthew	R7590	Senior Lecturer/ FT	3 rd March, 2004	M.Eng.	1994	UNIBEN	Geotechnical
					B.Eng.	1987	UNN	
6	Ogheneochuko Daniel Eguonor	R51688	Lecturer I/ FT	23 rd Sept, 2019	M.Eng.	2018	UNIBEN	Structural Engineering
					B.Eng.	2012	UNIBEN	
7	Akhimien Faith Osarumwense	R60428	Lecturer I/ FT	2 nd Sept, 2019	M.Eng.	2008	UNILAG	Water Resources & Environmental
					B.Eng.	1998	AAU	
8	Imarhiagbe Eghosa Akugbe	R75441	Lecturer II /FT	28 th Sept, 2022	M.Eng.	2016	UNIBEN	Highway & Transportation
					B.Eng.	2009	UNIBEN	
9	Uzoka Celestine Chukwudi	R50423	Lecturer II /FT	22 nd April, 2024	M. Eng.	2016	UNIBEN	Structures
					B. Eng.	2009	UNIBEN	

Technical Staff of Civil Engineering Programme.

S/N	Name of Staff	Rank/Designation	Status	Qualifications / Professional Reg.
1	Mr. William Osiboko	Principal Technologist	F/Time	HND(Civil)
2.	Mr Oluwaseun, Joseph	Technologist 1	F/Time	HND(Civil)
3.	Mr.Osaro Efosa Ogbewe	Principal Technologist	F/Time (Masters/PhD study leave)	HND(Civil)
Administrative Staff				
S/N	Name of Staff	Rank/Designation	Status	Qualifications/ Professional Reg.
1.	Miss Dinah Ibrahim	Confidential Secretary II	F/Time	Diploma in Office Tech & Mgt.

7.4 External Examiners in the Civil Engineering Department

List of external examiners that have served in the department is given in Table 7.2

Table 7.2: External Examiners that served in the department till date.

S/N	Name of the External Examiner/Academic Session	Designation/Domicile Institution	Appointment Status	Qualification
	2022/2023 – 2024/2025			
1.	Prof. Olumide Moses. Ogundipe	Professor of Civil Engineering (EKITI STATE UNIVERSITY)	External Examiner	B. Eng. (Civil Eng.) 2001 M.Eng (Civil Eng) 2006; PhD(Civil Eng) 2011; FNSE (16562), COREN (R.15245) NICE(C.02842)
	2018/2019 – 2021/2022			
2.	Prof U.O. Orie	Professor of Civil Engineering (UNIBEN)	External Examiner	B. Eng. (Civil Eng.) 1998 M.Eng (Structures) 2005; PhD (Structures)2010; MNSE, COREN(R. 17211) MNIStructE
	2014/2015 – 2017/2018			
3.	Engr. Prof. O. C. Izinyon	Professor of Civil Engineering (UNIBEN)	External Examiner	B. Eng. (Civil Eng.)1984 M.Eng (Water Res & Env. Eng) 1992; PhD(Water Res & Env. Eng) 20; MNSE, COREN Registered
	2012/2013 – 2013/2014			
4.	Engr. Dr. Ogwueleka Toochukwu Chibueze	Associate Professor (UNI of ABUJA)	External Examiner	B.Eng. (Civil Eng.)1996 M.Eng (Water Res & Env. Eng)2000; PhD(Water Res & Env. Eng) 2005; MNSE (13595) COREN (R.11980)

CHAPTER EIGHT

BLUE SKY ALUMNI

8.1. Civil Engineering, IUO Alumni contribution to the Nation and the world.

The graduates of Civil Engineering, IUO are able to hold their own and defend their certificates anywhere in the world. They leave the campus and enter the world to conquer and to excel. Today, there is an array of standard bearers for IUO-civil Engineers- people who have distinguished themselves in the field. In this section we present some of them to inspire the students. The list here is by no means exhaustive, it is just a sampler, however, it shows how the vision of excellence of the University is being realized with proofs all around the globe.

ALUMNUS PROFESSIONAL PROFILE

DR. DOUBRA CHARLES AMBAIOWEI

Doubra is a Professional Engineer, practicing in the Province of Ontario, Canada. Doubra earned a Ph.D. in Civil Engineering from the University of Waterloo, Ontario, Canada (**UW, 2015**); an MSc. degree in Construction Management from the University of Birmingham, England, UK (**UoB, 2010**); and a B.Eng. degree in Civil Engineering from Igbinedion University Okada (**IUO, 2008**).

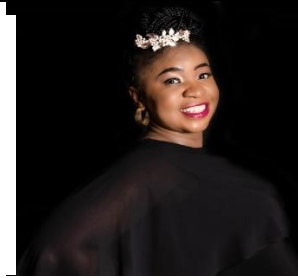


Technical Director for the Ontario Road Builders' Association (**ORBA**) and Ontario Asphalt Pavement Council (**OAPC - A council of ORBA**), where he provides technical advice, instructions, and coordinates studies impacting on the design, production and placement of better quality pavement (roads, highways & airfield) infrastructure.

Doubra is also the co-founder and principal partner at **DEANAR Consults (DC) Limited**, and founding shareholder and Executive Director, Construction & Technical Operations at **Technological Services Network Ltd.** He specializes in Civil Engineering consultancy, research, education and training involving high technology engineering services in support of superior pavement infrastructure projects. He is a registered engineer with COREN and NSE in Nigeria. He is active with several local and international organizations and agencies with a mandate to advance transportation infrastructure.

JESSICA CHINWE ACHEBE

Jessica is a project and business management professional and has developed practical engineering and research experiences from leading and coordinating various sustainable transportation projects and programs, including a prior consulting experience with the **World Bank Group**.



Jessica is currently a co-founder and managing partner at **DEANAR Consults (DC) Limited** a Post-Doctoral Fellow at **McMaster University**, Hamilton, Ontario Canada, and a Pavement Engineer at **PTech Engineering Inc.**, where she leads and coordinates various sustainable transportation projects and programs with focus on creating awareness of individual and collective actions that can effectively reduce greenhouse gas emissions and climate change impacts.

She earned a Ph.D. in Civil Engineering from the University of Waterloo, Ontario, Canada (**UW, 2022**); a Master of Environmental Study (M.E.S) degree in Sustainable Management from the University of Waterloo, Ontario, Canada (**UW, 2016**); a Graduate Certificate in Global Business Management, from Centennial College, Toronto, Ontario, Canada (**CCT, 2014**); and a B.Eng. degree in Civil Engineering from Igbinedion University Okada (**IUO, 2008**).

'KUNLE OLAGUNJU

MBA | MSc. | B.Eng. | PMP | PCIP

Transportation Engineer!

Project Manager!

Business Consultant!



Principal: JCL, Management Consulting Company

B.Eng., Civil Engineering, Igbinedion University, Okada (2008).

M.Eng., Transportation Engineering, Carleton University, Ottawa, Ontario (2012).

PCIP: Professional, Critical Infrastructure Protection of Canada. (2012)

Certificate Lean Six Sigma, University of Toronto, Ontario (2016).

MBA, Wilfrid Laurier University, Waterloo, Ontario (2020).

PMP: Project Management Professional (2020).

HIGHLIGHTED EXPERIENCE

Manager, Ontario Line Subway Projects, Metrolinx, Government of Ontario. (2016-Present)

Project Manager (Consultant), Capital Projects, BC Transit, Government of British Columbia (2019-Present)

Junior Project Manager, OHL Construction Canada Inc. Mississauga, Ontario. (2015-2016)

Assistant Project Manager & Field Engineer, PNR Railworks Inc. (Railway Construction Company), Guelph, Ontario. (2013-2014)

Transportation Engineer/Contract Administrator, McIntosh Perry Consulting Engineers, Ottawa, Ontario. (2012-2015)

Project Management Coordinator, Puzzles Construction and Engineering, Lagos. (2008-2010)

Naankang Dawam

+ (234) 817 418 9114| Email: naankangdawam@yahoo.com

MSc in Applied Geographical Information System and Remote Sensing, University of Southampton, School of Geography & Environment, UK (Sep 2011 – Dec 2012)
Bachelor of Engineering, Civil Engineering, Igbinedion University Okada, Edo, Nigeria. (Sep 2003 – Jul 2008)



MD/CEO: LATAEN ENGINEERING LIMITED, JOS

MD/CEO Taen Nigeria Limited, Plateau, Nigeria (Jan 2014 – Present)

PART-TIME LECTURER: Plateau State Polytechnic, Barkin Ladi, IT, Civil Engineering, GIS and Remote Sensing Lecturer (August,2014 – Present)

GIS Technician : Virgin Media, Bellshill, Glasgow, UK (Aug 2012 – Jan 2013)

ONYEGBADUE CHIGOZIE MICHAEL.

Founder of “THE STRUCTURAL MASTERCLASS”

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07039882716
chygomic@gmail.com

B.Eng. in Civil Engineering, Igbinedion University Okada (2013).

M.Eng. (Structures) in Rivers State University (2019).

M.D of High-tex Nig Ltd, Port Harcourt, a firm whose exploits have gone global in the areas Construction, Innovative Designs, Structural Integrity tests, CAD Trainings.

“THE STRUCTURAL MASTERCLASS” is a training course that demystifies Reinforced concrete structural design using practical and easy methods. His training approach have gotten wide applause as it is digitalized and distributed throughout Nigeria and Ghana.

ENGR. NNONYELU PRINCE EMMANUEL (MNSE).

Holds a bachelor of Engineering in Civil engineering from Igbinedion University Okada, Edo State. Which was completed in 2017, He is currently registered with both Coren and Nse. Between the year 2018 -2021 , he worked with ISTROM AND STEELBRIDGE as a builder before becoming a construction manager/site engineer. Having accomplished 4 massive project within the 3years span, he decided to follow his dreams and start a company title PRINNON STALWART STRUCTURES LTD. This company is currently into Real estate, property management and general home maintenance concurrently. The head office is currently in Abuja with a branch office in Anambra state . you can visit <https://prinnongroup.com.ng/> to be part of the vision.

In 2022 he was among the 3 MOFCOM SCHOLARSHIP Awardees from Nigeria and now undergoes an MSC Program in Tongji University Shanghai, china full sponsored by the chinese and Nigerian



**Name: Engr lawal Ahmed
Adeyinka**

B. Eng Civil Engineering (IUO)

Year of Graduation - 2014

Present Appointment – Director Technical at BAL Engineering. LTD. N0. 38 Stadium Road, Ilorin Nigeria.

CEO/MD at MABLAW Engineering LTD, No 50 Harper Crescent, Wuse Zone 7, Abuja.



Engr. Danagogo Wenike-Briggs ,MNSE
HIGHLY SKILLED DYNAMIC AND
VERSATILE CIVIL ENGINEER

Profile

Skilled and a professional with a high-impact engineering & management knowledge tailored to reach many diversified areas of major construction and management challenges. A motivated individual with over 15+ years of experience with a clear understanding of the roles and responsibilities associated with civil engineering and project management as well as excellent ability to communicate, maintain and develop effective working relationships with clients, operational teams, delivery partners and colleagues. Possess a broad range of technical and leadership skills and uses rigorous logic and methods to come up with effective solutions for difficult problems. Haven had a long track record of making best use of any available resources and techniques, I am currently open to any management or construction challenging opportunities.



History

Gubernatorial candidate of the young progressive party (YPP) Rivers State 2023.

Managing Director /CEO

Structural consultant/Project Manager of Geepapi Construction & Development Comp. Ltd

COREN Certified (R39630) | NSE Certified (36725) | Ms Project | PMI Member (4204180)

American Project Management Professional Certified (APMP Member 308) | Certificate of service Julius Berger Plc.

- **B.Eng. in Civil Engineering Igbinedion University Okada Edo state (2009)**
- **Post Graduate Diploma (PGD) in Project Management Technology Federal University of Tech Owerri (FUTO) 2017**
- **M.Sc. Ed in Industrial vocational education building technology Ignatius Ajuru University of Education (IAUE) 2020**
- **Ph.D. Ed in Industrial vocational education building technology Ignatius Ajuru University of Education (IAUE) in view.**

SOCIAL MEDIA HANDLES

Twitter @DanagogoWB | Instagram @danagogowenikebriggs | Facebook @wenike-briggs danagogo | YouTube @danagogowenike-briggs400

Name: Adamu Suleiman

B. Eng Civil Engineering (IUO)

Year of Graduation - 2017

Present Appointment - Civil Servant at Suleja Local government, Niger State and Self Employed

Diploma - Building Technology

Institution -Waziri Umaru Federal Polytechnic Birnin Kebbi, Kebbi state.



ABUBAKAR ABDULSALAM TSANNI

Abubakartsanni1@gmail.com | +2348062251269

He obtained a Diploma in Civil Engineering from Hassan Usman Katsina Polytechnic in 2016, after which he proceeds to Igbinedion University, where he bagged a Bachelor of Engineering (Second Class Upper 4.09) in 2020. He is presently enrolled for M.Engr in Civil Engineering at the Nile University Abuja.

Previously, he served as Trainee Engineer at KIPS Consultant Engineering in 2020, Technical Assistant at Katsina State Road Maintenance Agency in 2016 and Financial Secretary of Arewa Student Forum, IUO chapter 2018/2019.

He is currently working as a Civil Engineer II at Nigeria Ports Authority (NPA)



Patrick William Archibong is a highly accomplished and driven professional with a Bachelor of Engineering degree in Civil Engineering from **Igbinedion University, Okada (IUO)**, conferred in 2020. His pursuit of academic excellence led him to be awarded the prestigious Polish Government Scholarship in 2022 for his master's degree in Civil Engineering at the esteemed Wroclaw University of Science and Technology, Poland. Notably, Wroclaw University of Science and Technology is recognized as the top-ranking institution for Civil Engineering studies in Poland, as per Times Higher Education.



With a profound passion for the field, William has honed his expertise through practical experience. In 2021, he showcased his remarkable skills as a project Engineer at Valington Home and Properties Ltd., a renowned and rapidly expanding real estate company in Nigeria. During his tenure, William successfully managed and coordinated a diverse portfolio of building projects within the Estate, demonstrating his adeptness at overseeing complex construction endeavors.

Engr. Muhammad Ahmad Adam holds a Bachelor of Engineering degree in Civil Engineering from Igbinedion University Okada (IUO), which was completed in 2018. Currently, he serves as the Project Engineer and Chief Structural Designer at Settrack Nigeria Limited. In 2019, he worked as a Site Engineer at SKY Technical and Construction Limited. He also served as a Technical Advisor for the Kano State. In 2016, Engr. Muhammad Ahmad Adam was the first registered President of the Nigerian Institution of Civil Engineers IUO Chapter. Engineering Association in 2019



Engr. Ejiro Oghenetega Sota is a civil and environmental engineer with a strong background in cost estimation and construction management. She earned her Master of Science in Civil and Environmental Engineering from the University of California, Berkeley in 2024, following a Bachelor of Engineering in Civil Engineering from Igbinedion University, Okada in 2015.

Engr. Sota is a registered engineer with the Council for the Regulation of Engineering in Nigeria (COREN) and a member of several professional organizations, including the National Society of Black Engineers (NSBE) and the American Society of Civil Engineers (ASCE).

Her professional experience spans both Nigeria and the United States. She currently serves as a Project Engineer at Suffolk Construction Company Inc. in California, United States. Prior to this, she worked with Seplat Energy PLC in Delta State, Nigeria, as a Facilities Civil Engineer and earlier as a Junior Field Civil Engineer. Her work has focused on life cycle cost analysis and predictive modeling to optimize building materials for affordable housing projects, infrastructure development and project execution.



Engr. Abbas Abubakar

Civil Engineer | Project Supervisor | CEO, A-Square Multi-Project Global Concept Ltd

A dedicated and results-oriented Civil Engineer with proven expertise in site supervision, project execution, and infrastructure development. I have served as a Site Engineer and Project Supervisor at Patuxent Nigeria Limited, where I successfully managed diverse civil and building projects from planning to completion.

Currently, I lead as the CEO of A-Square Multi-Project Global Concept Ltd, overseeing construction and multi-sectoral projects with a focus on quality, innovation, and efficiency. I hold a B.Eng. in Civil Engineering from Igbinedion University, Okada (2013–2018).

Key Skills:

Project Management | Site Supervision | Civil Works | Team Leadership | Quality Assurance | Client Relations

EMAIL: aabubakar909@gmail.com



APPENDIX A



IGBINEDION UNIVERSITY, OKADA STUDENT COURSE EVALUATION FORM

Dear Student,

It is a global practice in academic settings that students are given the opportunity to express their views and make recommendations on their educational activities. Such an effort will facilitate improved student-teacher relationships and provide an opportunity for the College/Department to correct any areas of lack and improve the teaching-learning environment. This will in turn improve the quality of teaching-learning activities and the learning outcomes. You are therefore requested to sincerely complete the form below. Please tick. The response that you think is the most appropriate to each statement.

Note: You are not required to write your name.

S/N	Area of Assessment	Excellent	Very Good	Good	Fair	Poor	Weighted Average
A	COURSE PRESENTATION						
1.	Clearly states the course objectives and course contents						
2.	Covers course content with a schedule						
3.	Discusses mode of assessment with students						
4.	Presents material in a well-organized way						
5.	Completes syllabus within time						
B	MODE OF DELIVERY						
6.	Makes good use of teaching aids						
7.	Is clear and understandable at lectures						
8.	Pace of lecture delivery						
9.	Allows opportunities for asking questions						
10.	Shows thorough knowledge of subject						
11.	Links theory with practical						
12.	Lecturer available for consultation on course-related matters outside classes						
C	LECTURER'S COMPORTMENT AND CLEANLINESS IN CLASS						
13.	General appearance of lecturer and Attitude in Class						
14.	Ensures that class is Clean and controls class well						
15.	Punctuality and reliability in attendance						
16.	Reschedules lectures and makes up for lost time						
D	PEDAGOGY						
17.	Gives adequate assignments and returns written work on time.						
18.	Makes constructive comments on written work						
19.	Gives adequate tutorials						
20.	The Course has increased my knowledge of the subject						

Any other comments about the course and / or Lecturer:

.....



APPENDIX B

Igbinedion University, Okada
Gen. Abdulsalami A. Abubakar College of Engineering
Department of Civil Engineering

Civil Engineering Programme

Students' Course Evaluation Questionnaire (Evaluation of CLOs)

Course Code: CVE311

Course Name: Theory of Structures

Session -Semester: 2024/2025 - First

The questionnaire should be filled by each student at the time of course completion.

Please give us your views so that the quality of this course can be improved. You are encouraged to be candid in your answers. Any information you share here will be kept confidential.

Course Learning Outcomes

For each Learning Outcome listed below, please choose the one response that most accurately represents your view:

1 = Strongly disagree

2 = Disagree

3 = Not Sure

4 = Agree

5 = Strongly Agree

I was able to attain the following learning outcomes for this course:

CLO1	Differentiate different types of columns based on BS 8110 and use Euler's theoretical formula to determine the buckling loads of columns under	
CLO2	Analyse symmetrical and eccentric loading and bending of columns about one axis (uni-axial bending) and about two axes (bi-axial bending) for the	
CLO3	Describe types of trusses and frames and calculate force reaction on members both internal and external using method of joints and sections	
CLO4	Describe creep, fatigue, fracture and stress concentration in machine parts and structural components and suggest preventive approach to guide	
CLO5	Discuss two (2) types and various forms of Springs, its usefulness and where they are applicable in machine parts and engineering applications.	

APPENDIX C

SAMPLES OF PROJECT TOPICS COMPLETED BY STUDENTS IN THE DEPARTMENT

S/N	MAT. NO.	NAMES ↓	SEX	PROJECT TOPICS
1	16/019057/ENG	ADO ABUBAKAR SADIQ	M	EFFECTS OF SUGAR AS AN ADMIXTURE ON THE SETTING TIME OF CEMENT AND COMPRESSIVE STRENGTH OF CONCRETE
2	14/016353/ENG	AKAALIAN DAVID DANIEL	M	MITIGATING THE EFFECT OF FLOOD BY CARRYING OUT TOPOGRAPHICAL SURVEY CASE STUDY AREA (CROWN ESTATE OKADA)
3	16/019066/ENG	ANDREW AYIBABINMOTE I DESMOD	M	MITIGATING THE EFFECT OF FLOOD BY CARRYING OUT TOPOGRAPHICAL SURVEY CASE STUDY AREA (CROWN ESTATE OKADA)
4	14/016118/ENG	BALA SULEIMAN SULEIMAN	M	COMPARATIVE ANALYSIS OF COMMON SACHET PACKAGED WATER CONSUMED IN OKADA COMMUNITY, EDO STATE
5	12/015190/ENG	IBRAHIM SHEHU AHMED	M	COMPARISON OF THE COMPRESSIVE STRENGTH OF CONCRETE MADE WITH RIVER SHARP SAND, QUARRY DUST AND EROSION SAND AS FINE AGGREGATES
6	13/015754/ENG	IKEBUAKU WISDOM CHINONSO	M	EFFECTS OF AGGREGATE SIZES ON THE COMPRESSIVE STRENGTH OF CONCRETE
7	14/016649/ENG	ISAAC VICTOR SUCHET	M	EFFECTS OF AGGREGATE SIZES ON THE COMPRESSIVE STRENGTH OF CONCRETE
8	14/016676/ENG	KALU AMADI IJEOMA	F	COMPRESSIVE STRENGTH OF HOLLOW SANDCRETE BLOCK WITH POLYETHYLENE TEREPHTHALATE (PET) BOTTLE GROUTED WITH EROSION SAND
9	14/016732/ENG	MUNEMUNE EBITIMI ARTHUR	M	HYDROLOGICAL ANALYSIS AND HYDRAULIC DESIGN OF STORM WATER DRAINAGE SYSTEM FOR ETEGWE TOWN, YENAGOA, BAYELSA STATE
10	14/016772/ENG	OBOKO VICTOR	M	MITIGATING THE EFFECT OF FLOOD BY CARRYING OUT TOPOGRAPHICAL SURVEY CASE STUDY AREA (CROWN ESTATE OKADA)
11	13/148605/ENG	OKAFOR ELIZABETH ONYINYE	F	COMPARATIVE ANALYSIS OF COMMON SACHET PACKAGED WATER CONSUMED IN OKADA COMMUNITY, EDO STATE
12	14/016836/ENG	OKOLOCHA FAITH	F	EFFECT OF DIFFERENT METHODS OF CURING ON COMPRESSIVE STRENGTH OF CONCRETE
13	4/016861/ENG	OLOGUN BENSON KEN	M	DESIGN AND FABRICATION OF DIRECT PUSH SOIL SAMPLER USING PERCUSSION DRILLING BY FALLING HAMMER
14	15/017162/ENG	OMOLU OSMOND	M	EFFECTS OF SUGAR AS AN ADMIXTURE ON THE SETTING TIME OF CEMENT AND COMPRESSIVE STRENGTH OF CONCRETE
15	14/016881/ENG	OMO-OLAYE PRECIOUS IRESE	M	COMPARISON OF THE STRENGTH OF CONCRETE PRODUCED WITH PARTIAL REPLACEMENT OF GRANITE WITH GRAVEL
16	15/017835/ENG	UGUOJI ENINIDIEMI	M	DESIGN AND FABRICATION OF DIRECT PUSH SOIL SAMPLER USING PERCUSSION DRILLING BY FALLING HAMMER
17	17/020138/ENG	ABDULSALAM ABUBAKAR TSANNI	M	COMPARATIVE ANALYSIS OF THE PARTIAL REPLACEMENT OF SANDS WITH QUARRY DUST AS A FINE AGGREGATE IN CONCRETE PRODUCTION
18	15/017947/ENG	EBEDE CHINEDU DAVID	M	MICROBIAL ASSESSMENT OF DRINKING WATER SOURCES (CASE STUDIES, IGUOMO, AKANOPE, UGBUWE, OKODO, UTESE, EGBETA, UHEN, OGBESE)
19	16/019118/ENG	EZECHILUE ZITA-FRANCES IFEOMA	F	COMPARATIVE ANALYSIS AND COST IMPLICATIONS OF THE USE OF WOOD (TIMBER) AND STEEL FOR ROOF TRUSSES IN A MULTIPURPOSE BUILDING
20	15/017161/ENG	GARBA ASSUMPTA	F	COMPARATIVE ANALYSIS AND COST IMPLICATIONS OF THE USE OF WOOD (TIMBER) AND STEEL FOR ROOF TRUSSES IN A MULTIPURPOSE BUILDING

21	15/017163/ENG	IGHODARO OSAHON SAMUEL	M	INVESTIGATION OF THE ENGINEERING PROPERTIES OF TERMITE MOUND SOIL GOTTEN FROM DIFFERENT COMMUNITIES IN EDO STATE. (CASE STUDY OF UDENI, EPUA, EVBOBANOSA, AND ABUDU)
22	15/017166/ENG	MANAGER FUN- KURO	M	MICROBIAL ASSESSMENT OF DRINKING WATER SOURCES (CASE STUDIES, IGUOMO, AKANOPE, UGBUWE, OKODO, UTESE, EGBETA, UHEN, OGBESE)
23	14/017102/ENG	MOKOLO KENNEDY BUDE	M	COMPARATIVE ANALYSIS OF THE PARTIAL REPLACEMENT OF SANDS WITH QUARRY DUST AS A FINE AGGREGATE IN CONCRETE PRODUCTION
24	15/017789/ENG	NJIGHA PIUS ARINZE	M	MICROBIAL ASSESSMENT OF DRINKING WATER SOURCES (CASE STUDIES, IGUOMO, AKANOPE, UGBUWE, OKODO, UTESE, EGBETA, UHEN, OGBESE)
25	16/018779/ENG	NMADU IFOLO FAVOUR	M	COMPARATIVE ANALYSIS ON THE COMPRESSIVE STRENGTH OF CONCRETE MADE FROM DIFFERENT BRANDS OF ORDINARY PORTLAND CEMENT BRANDS
26	15/018021/ENG	NTE-DANIEL SOLOMON NGBOAWAJI	M	A SURVEY OF ABANDONED CONSTRUCTION PROJECTS (CASE STUDY: OKADA TOWN)
27	15/017777/ENG	ODOCK PAUL NSABE	M	COMPARATIVE ANALYSIS ON THE COMPRESSIVE STRENGTH OF CONCRETE USING SEAWATER AND PORTABLE WATER
28	15/017699/ENG	OLAIDE TAIWO GEORGE	M	A SURVEY OF ABANDONED CONSTRUCTION PROJECTS (CASE STUDY: OKADA TOWN)
29	16/018848/ENG	PATRICK WILLIAM ARCHIBONG	M	COMPARATIVE ANALYSIS ON THE COMPRESSIVE STRENGTH OF CONCRETE USING SEAWATER AND PORTABLE WATER
30	15/018134/ENG	SIMON CHUKWUNONS O STANLEY	M	INVESTIGATION OF THE ENGINEERING PROPERTIES OF TERMITE MOUND SOIL GOTTEN FROM DIFFERENT COMMUNITIES IN EDO STATE. (CASE STUDY OF UDENI, EPUA, EVBOBANOSA, AND ABUDU)
31	16/018548/ENG	AWUJOOLA TIMILEHIN MARVELOUS	F	A STUDY ON THE CAUSES AND REMEDIAL MEASURES OF FAILURES IN REINFORCED CONCRETE BUILDING STRUCTURES DUE TO DESIGN AND CONSTRUCTION. A CASE STUDY OF EVALUATION OF BUILDING FAILURES IN SELECTED AREAS IN NIGERIA
32	16/018662/ENG	HAMZA ZAINAB YAHAYA	F	CHARACTERIZATION AND QUANTIFICATION OF SOLID WASTE IN EQUITY GIRLS HOSTEL BLOCK, IGBINEDION UNIVERSITY OKADA.
33	17/020003/ENG	OGWARA PRECIOUS	M	COMPARATIVE ANALYSIS ON THE COMPRESSIVE OF STRENGTH OF CONCRETE USING EROSION SAND AND SHARP SAND FROM WARRI AND BENIN CITY AS FINE AGGREGATE IN CONCRETE PRODUCTION
34	16/019045/ENG	OKUNFOLAMI OLANIPEKEN SAMUEL	M	COMPARATIVE ANALYSIS ON THE COMPRESSIVE OF STRENGTH OF CONCRETE USING EROSION SAND AND SHARP SAND FROM WARRI AND BENIN CITY AS FINE AGGREGATE IN CONCRETE PRODUCTION
35	16/018406/ENG	ONYELIMBE CHIOMA CYNTHIA	F	COMPARATIVE ANALYSIS OF THE USE OF WASTE GLASS AS PARTIAL REPLACEMENT OF FINE AGGREGATE IN CONCRETE
36	16/018922/ENG	TIKU COSMAS BESSONG	M	THE EFFECT OF WATER CONTENT ON THE BEARING CAPACITY OF COMPACTED TROPICAL RED EARTH SOIL
37	17/019972/ENG	ABEDNEGO, AROGBOWEI	M	VARIATION OF BEARING CAPACITY WITH COMPACTION MOISTURE CONTENT. A CASE STUDY OF OKADA LATERITIC SOIL
38	17/019852/ENG	ABUBAKAR, MUHAMMAD TSANNI	M	VARIATION OF BEARING CAPACITY WITH COMPACTION MOISTURE CONTENT. A CASE STUDY OF OKADA LATERITIC SOIL
39	17/019690/ENG	BITRUS, GABRIEL SHEKWONYADU	M	COMPARATIVE ANALYSIS OF THE USE OF PLASTIC AS PARTIAL REPLACEMENT OF CEMENT IN CONCRETE
40	17/019751/ENG	EYIBIO, JOSHUA EBONG	M	COMPARATIVE STUDY OF THE LEVEL OF WATER RELATED DISEASES AND QUALITY OF BOREHOLE DRINKING WATER SOURCES IN OKADA TOWN.

41	17/019356/ENG	EMMA-IWUAGWU, UZOMA ERNEST	M	COMPARATIVE ANALYSIS OF THE PARTIAL REPLACEMENT OF CEMENT WITH CERAMICS WASTE IN CONCRETE PRODUCTION
42	19/024321/ENG	ETUK, ABASIEKEME BASSEY	M	COMPARATIVE STUDY OF THE LEVEL OF WATER RELATED DISEASES AND QUALITY OF BOREHOLE DRINKING WATER SOURCES IN OKADA TOWN
43	17/019217/ENG	MUSA, BOLIYA BUBA	M	APPRAISAL AND PROPOSAL OF A SUITABLE WATER DISTRIBUTION SYSTEM IN BLUE ROOF STAFF QUARTERS, CROWN ESTATE OKADA
44	17/019288/ENG	OJO, WISDOM AIGBE	M	COMPARATIVE ANALYSIS ON THE EFFECT OF REDUCED CEMENT CONTENT IN GLASS CONCRETE
45	19/023289/ENG	OKUWE, ANTHONY OGHENEVWOGA GA	M	COMPARATIVE ANALYSIS OF THE USE OF PLASTIC AS PARTIAL REPLACEMENT OF CEMENT IN CONCRETE
46	17/019275/ENG	OYOROKO, OGHENERUKEV WE	M	COMPARATIVE ANALYSIS OF COMPRESSIVE STRENGTH OF CONCRETE MIXED WITH GRANITE USING PALM KERNEL SHELL AS PARTIAL REPLACEMENT
47	17/019782/ENG	SAYYADI, NASIR UMAR	M	COMPARATIVE ANALYSIS OF THE USE OF WASTE PAPER AS PARTIAL REPLACEMENT OF CEMENT AGGREGATE IN CONCRETE