

**OBAFEMI AWOLOWO UNIVERSITY,  
ILE-IFE, NIGERIA**



**FACULTY OF TECHNOLOGY**

**DEPARTMENT OF AGRICULTURAL AND  
ENVIRONMENTAL ENGINEERING**

**2019 EDITION**

## 1.1 MEMBERS OF STAFF OF THE DEPARTMENT

### LIST OF ACADEMIC STAFF

S/N	Name	Qualification	Status	Area of Specialization
1	Prof. J. A. Osunbitan	B.Sc. (1992), M.Sc. (1999), Ph.D. (2007) MNIAE, MNSE, Reg. Engr. COREN R	Professor and Head of Department	<b>Soil and Water Engineering.</b> Agricultural effluents and ground water system. Solute transport in the soil
2	Prof. G.A. Makanjuola	B.Sc. (1962), Ph.D. (1967) FNSE, Reg. Engr COREN	Professor Emeritus	<b>Farm Power and Machine Design</b> Mechanization of Cassava Production. Processing and storage of roots and tuber crops
3	Prof. M.O. Faborode	B.Sc. (1978), M.Sc. (1983), Ph.D. (1986) FNIAE, FNSE, Reg Engr. COREN	Professor	<b>Bioprocess Engineering and Machine Design</b> Biomaterial properties and bioprocess Engineering, Agricultural Technology
4	Prof. J.A. Osunade	B.Sc. (1981) M.Sc. (1985), Ph.D. (1992) MNIAE, MNSE, Reg Engr. COREN	Professor	<b>Farm Structures and Environmental Engineering</b> Application of lateritic soils in building and allied industries, Thermal comfort in livestock housing
5	Prof. K. O. Adekalu	B.Sc. (1983), M.Sc. (1988), Ph.D. (2001) MNIAE, MNSE, Reg Engr. COREN	Professor	<b>Soil and Water Engineering.</b> Hydrology of Agricultural Watershed, Compaction and soil-water properties. Modelling of crop-yield
6	Prof. O. B. Aluko	B.Sc. (1983), Ph.D (1989), Ph.D (1989), MNIAE, MNSE, Reg. Engr. COREN	Professor	<b>Soil-Machine Dynamics</b> Mechanics of agricultural Soils. Development of yam planters.
7	Prof. O. K. Owolarafe	B.Sc.(1989), MSc. (1999), Ph.D. (2007), MNIAE, MASAE, MNSE, Reg Eng	Professor	<b>Farm Machinery and Processing</b> Development of palm fruit harvesting technology and technologies for processing cassava
8	Dr. L. A. Sanni	B.Sc. (1989), M.Sc. (1999), MBA (2001), Ph.D.(2014), MNIAE,	Reader	<b>Farm Machinery and Processing</b> Design and development of agro-

		MASAE, MNSE, Reg Engr. COREN		processing equipment, Automation of mechanical systems for optimizing agro-processing plants
9	Dr. O. A. Aregbesola	B.Sc. (1994), M.Sc. (2001), Ph.D. (2011) MNIAE, MASAE, MNSE, Reg Engr. COREN	Reader	<b>Food Processing and Storage Studies</b> on processing and handling of indigenous food, Preservation and storage of biomaterials, Drying and sorption studies
10	Dr. D. A. Okunade	B.Sc. (1995), M.Sc. (2004), PhD 2015 MNIAE, MNSE, Reg Engr. COREN	Reader	<b>Soil and Water Engineering</b> Studies on the impact of cassava effluents on Soil and groundwater, Water Quality in Agro-processing Environment
11	Dr. B. S. Ogunsina	B.Sc. (1992), M.Sc. (1997), Ph.D. (2010) MNIAE, MNSE, Reg. Engr. COREN	Professor	<b>Farm Power and Processing</b> Processing and utilization of food crops, Technologies for small and medium scale processing of agricultural products, Oilseeds as materials for food biofuel, Renewable energy
12	Dr. G. A. Ogunwande	B.Sc., Ibadan (1997), M.Sc. (2004), M.Sc. (2007), Ph.D.(2010) MNIAE, MNSE, Reg. Engr. COREN	Senior Lecturer	<b>Farm Structures and Environmental Engineering</b> Solid waste management, Farmstead planning and development
13	Dr. O. B. Adeboye	B. Eng. (2001), M. Eng. (2005), Ph.D. (2015), MNIAE, MNSE, Reg. Engr. COREN	Senior Lecturer	<b>Soil and Water Engineering</b> Agricultural water management, Irrigation and drainage, Soil-Water-Plant-Atmosphere System; Climate change and water management, Catchment hydrology
14	Dr. A.O. Adegbenjo	B.Sc. (2002), M.Sc. (2011) MNIAE, MNSE, Reg. Engr. COREN	Lecturer II	<b>Post-Harvest Engineering</b> Hyperspectral Imaging and machine learning in food studies, Engineering properties of agricultural products

<i>Lecturers from Cognate Departments</i>				
15	Prof. K.A. Taiwo	Department of Food Science and Technology B.Sc. (1985), M.Sc. (1986), PhD (1997), MNIAE, FNSE, MNIFST, Reg. Engr.	Professor	Postharvest Food Process Engineering
16	Prof. D.J. Oyedele	Department of Soil and Land Resources Management, B. Agric. (1983), M.Phil. (1988); PhD (1997).	Professor	Soil Physics and Soil and Water Conservation
17	Prof. B.J. Amujoyegbe	Department of Crop Production and Protection B. Agric. (1989), M.Sc., (1994), M.Phil. (2001), Ph.D. (2009), Ph.D. (2011)	Professor	Agronomy Farming System
18	Dr. A.S. Momodu	Centre for Energy Research and Development, Obafemi Awolowo University, Ile-Ife	Senior Research Fellow	Energy in Agriculture/Technology Management

### **LIST OF TECHNICAL STAFF**

<b>S/n</b>	<b>Name</b>	<b>Rank/Designation</b>	<b>Qualification, Date Obtained Membership of Professional Association</b>
1	Mr. J. O. Ogunseejin	Chief Technologist	OND 1981, HND 1988; PGD (2005), MNIAE (2016); MNATE (2017); COREN (R.3894ET, 2017)
2	Mr. R. O. Ibrahim	Principal Technical Officer	OND (2001); HND (2004); MNIMEchE (2008); MNATE (2017); COREN (R.3868ET, 2017)
3	Mr. A. A. Salami	Higher Technical Officer	SSSCE (1999); OND (2006); HND (2009); PGDE (2014); MNATE (2015); AMNIAE (2016); COREN (R.3285ET, 2016)
4	Mr. O. S. Andero	Higher Technical Officer	OND (2003), HND (2007); MNATE (2017); AMNIAE (2016), COREN (R.3847ET)
5	Mr. V. A. Falaju	Craftsman	Trade Test I, 2009; Trade Test II, 2008; Trade Test III, 1990; Technical Craft and Diploma Certificate, 1989, OND (2019)
6	Mr. A. O. Adesina	Assistant Craftsman	CTC (1998), Trade Test III (2000)

		(Electrical)	
7	Mr. D. T. Arigbede	Assistant Craftsman (Welding)	SSSCE (2004), Trade Test III (2011)

## ADMINISTRATIVE STAFF

S/N	NAME	QUALIFICATION	GRADE/POSITION
1	Mrs. D.O. Ajibola	Cert in Typing (25 wpm) Elementary; 1988, SSSCE, 2002, Gen. Grading, Test Cert. (50 wpm), 2004	Secretarial Assistant II
2	Mrs., K.R.M. Adeniji	SSSCE (2001)	Office Assistant

## 1.2 Historical Notes

### 1.2.1 History of the University

Obafemi Awolowo University, Ile-Ife is one of three Universities established in Nigeria between 1961 and 1962 as a result of the report submitted to the Federal Government in September, 1960, by a Commission it appointed in April 1959 under the Chairmanship of Sir Eric Ashby, Master of Clare College, Cambridge, to survey the needs of post-secondary and higher education in Nigeria over the next twenty years. On 8th June, 1961 the Law providing for the establishment of the Provisional Council of the University was formally inaugurated under the Chairmanship of Chief Rotimi Williams.

On 11th June, 1970, an Edict known as the University of Ife edict, 1970 was promulgated by the Government of the Western State to replace the Provisional Council Law of 8th June, 1961. This Edict has since been amended by the Obafemi Awolowo University, Ile-Ife (Amended) Edict No. 112 of 1975 (Transitional Provisions) Decree No.23 of 1975. This new Decree effected a takeover of the Obafemi Awolowo University by the Federal Military Government and established a Provisional Council as an interim governing body of the University which shall subject to the

general direction of the Head of the Federal Government, control the policies and finances of the University and manage its affairs. This Provisional Council has since been replaced by a Governing Council.

The University started with five Faculties – Agriculture, Arts, Economics and Social studies (now Social Sciences), Law and Science. Six new Faculties have since been added, namely the Faculty of Education (established on 1st October, 1967), the Faculty of Pharmacy (established on 1st October, 1969), the Faculties of Technology and Health Sciences (now College of Health Sciences) (both established on 1st October, 1960), Faculty of Administration with effect from 1st October 1979) and Faculty of Environmental Design and Management (established on April 6, 1982).

In 1992, the University established a collegiate system with five Colleges. The system did not function effectively and was abandoned after two years. However, the Postgraduate College and the College of Health Sciences were retained. The College of Health Sciences now comprises of the Faculties of Basic Medical Sciences, Clinical Sciences and Dentistry.

The following other Institutes and major units exist in the University:

- The Adeyemi College of Education located in Ondo
- The Institute of Agricultural Research and Training, Ibadan
- The Natural History Museum
- The Institute of Ecology and Environmental Studies
- The Centre for Gender and social Policy Studies
- The Centre for Industrial Research and Development
- The Institute of Public Health
- The Institute of Cultural Studies
- The Technology Planning and Development Unit
- The Computer Centre

- The Drug Research and Production Unit
- The Equipment Maintenance and Development Centre
- The Central Technological Laboratory Workshop
- The Central Science Laboratory
- Centre for Gender and Social Policy Studies
- Centre for Distance Learning
- Entrepreneurship and Development Studies (IFEDS)
- Obafemi Awolowo University Investment Company Limited

Finally, some other agencies over which the University has no direct, or, in some cases limited control, have premises within the University.

- The Regional Centre for Training in Aerospace Surveys
- The National Central for Technology Management
- The Centre for Energy Research and Development
- The African Regional Centre for Space Science and Education in English.

Finally, some other agencies over which the University has no direct, or, in some cases limited control, have premises within the University. The student population has rising steadily from 244 in 1962/63 to over 30,000 at present.

## **1.2.2 MISSION, VISION, MAJOR THRUSTS OF THE UNIVERSITY**

### **Mission**

To nurture a teaching and learning community; advance frontiers of knowledge; engender a sense of selfless public service; and add value to African culture.

### **Vision**

A top rated university in Africa.

The **major thrusts** of the University Strategic Plan for 2016 – 2020 are:

- Teaching,
- Research and Innovation,

- Governance,
- Fund Generation and Management,
- Human Resources Development and
- Infrastructure and Estate Development.

These major thrusts involve the following broad objectives:

- The modernization of the University's teaching programmes, through a continuous review of the curricula and teaching support services
- The pursuit of a research agenda that will deepen the University's contribution to national development through research outputs and products uptake,
- The preparation of students for self-employment and entrepreneurship.
- The continued development and expansion of Information and Communication Technology (ICT) for all aspects of the institution's functions.
- An expanded revenue base backed by improved financial management capability.
- The development of strategic linkages and partnerships

### **1.2.3 HISTORY OF THE FACULTY OF TECHNOLOGY**

The Faculty of Technology was established in 1970 with the following Departments:

- i. Department of Agricultural Engineering
- ii. Department of Chemical Engineering
- iii. Department of Computer Science
- iv. Department of Electronic and Electrical Engineering
- v. Department of Food Science and Technology

The growth of the Faculty during the first ten years of its life may appear tremendous on cursory examination. It is therefore necessary to explain the philosophy and the need for the growth. At the time the Faculty of Technology at Ife came into existence, the University set itself the goal of



developing areas of Engineering and Technology that were not adequately covered by existing University programmes in the country. This was why it started by first developing programmes in Agricultural Engineering, Chemical Engineering, Computer Science, Electronic Engineering, Food Science and Technology and Estate Management.

It was however realized from the beginning that by the time the programme in Agricultural Engineering is fully developed, considerable amount of equipment would have been accumulated for teaching the science and practice of Civil and Mechanical Engineering. Furthermore for the development of postgraduate courses in Agricultural Engineering, it is necessary to have well developed Department of Mechanical and Civil Engineering. It thus became clear that these traditional areas of Engineering needed to be developed. In 1977 the University decided to nurture Civil Engineering in the Department of Agricultural Engineering and Mechanical Engineering in the Department of Chemical Engineering.

The Department of Electronic and Electrical Engineering offered initially a programme in Electronic Engineering. It was decided that in order to strengthen this programme it is necessary to develop the heavy current Electrical Engineering programme.

The demand for Metallurgical Engineers and Scientists in the country has increased tremendously in the last few years due to the very rapid growth of the metallurgical and allied industries and the progress in the industrialization of the country. Also, the search for minerals in various parts of the country has gained momentum in recent years and the need for local expertise in the evaluation and exploitation of minerals has become very urgent. These needs informed the establishment of the Department of Metallurgical and Materials Engineering in 1978. The

Department cooperates with other Departments in the teaching and research on building materials and electrical/electronic materials.

The Technology Planning and Development Unit was established in 1974 primarily to conduct policy research on how to harness Science and Technology for Economic Development. Its establishment underscored the critical need for research capability and advisory capacity to assist government and other policy making-bodies in reaching decisions about the allocation and monitoring of resources for the development of scientific and technological capabilities in Nigeria and in other less developed countries. By 1981/82 the then Department of Estate Management was developed into a separate Faculty of Environmental Design and Management, leaving the Faculty since then to be consisted of the following Departments and Unit:

- (i) Department of Agricultural Engineering
- (ii) Department of Chemical Engineering
- (iii) Department of Civil Engineering
- (iv) Department of Computer Science and Engineering
- (v) Department of Electronic and Electrical Engineering
- (vi) Department of Food Science and Technology
- (vii) Department of Mechanical Engineering
- (viii) Department of Metallurgical and Materials Engineering
- (ix) Technology Planning and Development Unit.

The entire Departments have now revised their programmes in line with current needs of the nation and global challenges.

#### **1.2.4. HISTORY OF AGRICULTURAL ENGINEERING**

The Department of Agricultural Engineering at the Obafemi Awolowo University is part of the Faculty of Technology, which

comprises nine departments with staff strength of over 100 academics. The Department collaborates closely in teaching and research with other Departments in the Faculty and with the Faculty of Agriculture. On the whole, the Department teaches two faculty courses in the Faculty of technology and services seven courses in the Faculty of Agriculture. The Department has workshop and laboratory facilities, which have helped to establish it as a foremost Department of Agricultural Engineering in Nigeria. Facilities for field experimentation and testing of agricultural implements exist at the University's Teaching and Research Farm, which is also on campus.

The Department is one of the five pioneer Departments of the Faculty established in 1970. Undergraduate teaching commenced immediately, under a five-year B.Sc. programme, while the postgraduate programme leading to either M.Sc. or Ph.D degrees was added in 1979. The foundation staffs of the department were employed in the Department of Plant Science (Faculty of Agriculture) until the creation of the Faculty of Technology.

The Department has close links with farmers, governmental and private agricultural establishments, agricultural and industrial research institutions, industry and fellow institutions. Our students normally undergo a total period of 6 months industrial training in these establishments during long vacations. This has enabled staff and students to keep abreast of current developments in agricultural engineering both in Nigeria and abroad. The Department is in the process of strengthening its computing and computer-aided learning facilities as well as capabilities in microelectronics studies. This is to enable the programmes give the students the required familiarity with a range of computer and microprocessor based techniques which are now essential for the modern agricultural engineer.

The current undergraduate student population of the Department stands at 290, with a postgraduate student population of 25, including 6 on the Ph.D degree programme. The undergraduate

programme has since undergone several reviews with the most recent being in 1990 and 1996 when the present programme was put in place in line with the NUC Approved Minimum Academic Standard.

### **Philosophy of the Department**

The desire of the Department of Agricultural Engineering is to create a teaching and research environment for imparting appropriate skill and knowledge in agricultural, food and rural development in an environmental friendly and sustainable manner; conduct cutting edge researches that will advance frontiers of knowledge; contribute a substantial proportion of innovations and inventions in Nigerian agricultural system and pursuit of academic excellence to foster the development of food and agro-allied industries in Nigeria.

The mission of the Department in pursuit of its vision is to be among the top rated Agricultural Engineering Department in Nigeria and World at large; to imbibe in our students the right ethic, attitude and behaviour required of Engineers; to empower them academically and professionally for the creative and effective practice of Engineering in self-employment, food and agro-allied industries, Government and other agencies involved in the management and regulation of agricultural, food and natural resources.

The Department has undergone several reviews which led to a change in the name of the Department from Department of Agricultural Engineering to the Department of Agricultural and Environmental Engineering with effect from 2010/2011 Academic Session. An upgraded and improved curriculum was also approved in addition to this change of name.

## **1.2.5 MISSION, VISION, OBJECTIVES OF THE DEPARTMENT**

### **The Mission**

To create a teaching and research environment for imparting appropriate skill and knowledge in agricultural, food and rural development in an environmental-friendly and sustainable manner;

- conduct cutting edge researches, that will advance frontiers of knowledge and contribute substantial proportion of innovations and inventions to the Nigerian agricultural systems; and
- be engaged in the pursuit of academic excellence to foster a total agro-industrial development in Nigeria.

### **The Vision**

The vision of the Department is to be a top rated Department of Agricultural and Environmental Engineering in Nigeria and the world at large;

- place where students imbibe the right training, ethics, attitude and behaviour required of an Engineer in professional practice; and
- place where students are empowered for creative and effective engineering practice in self-employment, Government and other agencies involved in the management and regulation of agriculture, food and natural resources.

## **1.2.6 MEMBERS OF THE UNIVERSITY**

1. The Members of the University are –
  - (a) the Officers of the University;
  - (b) the members of the Council;
  - (c) the members of the Senate;
  - (d) the members of the academic staff;
  - (e) the graduates;
  - (f) the students; and
  - (g) such other persons as may by Statute be granted the status of members.

2. A person shall remain a Member of the University only so long as he is qualified for such membership under any of the sub-paragraphs of paragraph 1 of this Statute.

### **1.2.7 OFFICERS OF THE UNIVERSITY**

The Officers of the University are –

- (a) the Chancellor;
- (b) the Pro-Chancellor;
- (c) the Vice-Chancellor;
- (d) the Deputy Vice-Chancellor;
- (e) the Registrar;
- (f) the Librarian;
- (g) the Bursar; and
- (h) such other persons as may by Statute be granted the status of Officers.

### **The University Council (as amended by Decree No. 11 of 1993 and Decree 25 of 1996)**

The Council consists of the following members.

- (a) the Pro-Chancellor
- (b) the Vice-Chancellor
- (c) the Deputy Vice-Chancellor
- (d) one person from the Federal Ministry responsible for Education;
- (e) nine persons representing a variety of interests and broadly representative of the whole Federation to be appointed by the National Council of Ministers;
- (f) four members of the Senate appointed by the Senate;
- (g) two members of the Congregation appointed by the Congregation
- (h) one member of the Graduates Association elected by the Graduates Association.

### **1.2.8 ESTABLISHMENT AND FUNCTIONS OF THE COUNCIL**

- (1) There is hereby established for the University a Council to be known as the Council of the Obafemi Awolowo

University Ile-Ife, the constitution and procedure of which shall, subject to the provisions of this Law, be in accordance with such provisions as may be made by Statute in that behalf.

- (2) The Council shall be the governing authority of the University and shall have the custody, control and disposition of all the property and finances of the University and, except as may otherwise be provided in this Law and the Statutes, shall manage and superintend generally the affairs of the University and, in any matter concerning the University not provided for by or under this Law, the Council may act in such manner as appears to the best calculated to promote the interests, objects and purposes of the University.
- (3) Without limiting the generality of the provisions of subsection (2) of this section, the Council, subject to the provisions of this law and the Statutes, shall have the following functions:-
  - (a) to participate in the making, amendment or revocation of Statutes pursuant to the provisions of this law;
  - (b) to make, amend or revoke Ordinances pursuant to the provisions of this Edict.
  - (c) to govern, manage and regulate the finances, accounts, investments, property, business and all other similar affairs whatsoever of the University, and for that purpose to appoint bankers, solicitors and any other persons or agents as the Council may deem expedient, and to cause proper books of accounts to be kept of all sums of money received and expended by the University and of the assets and liabilities of the University in such manner as shall give a true and fair view of the state of affairs of the University and explain its transactions from time to time;
  - (d) to borrow money on behalf of the University;
  - (e) to invest any moneys belonging or appertaining to the University and not for the time being required to be expended for any of its purposes;

- (f) to sell, buy, exchange, lease or accept leases or otherwise dispose of any real or personal property on behalf of the University;
- (g) to provide and maintain the buildings, libraries, laboratories, premises, furniture, apparatus and other means needed for carrying out the work of the University;
- (h) to enter into, vary, perform and cancel contracts on behalf of the University;
- (i) to enter into agreements for the incorporation in the University of any other institution and for taking over its rights, property and liabilities and for any other purpose not inconsistent with any of the provisions of this law;
- (j) to determine, in consultation with the Senate, all University fees;
- (k) to establish, after considering the recommendation of the Senate in that behalf, Faculties, Institutes, Schools, Boards, Departments, and other units of learning and research; to prescribe their organisation, constitution and functions and to modify or revise the same;
- (l) to authorise, after considering the recommendation of the Senate in that behalf, the establishments for the academic staff in the University, and, with the approval of the Senate, to suspend or abolish any academic post except a post created by this law or the Statutes;
- (m) to authorise the establishments for the administrative staff and other staff in the University and to suspend or abolish any such posts other than posts created by this law or the Statutes;
- (n) to make the appointments authorised by this law and the Statutes;
- (o) to regulate the salaries and to determine the conditions of service of all staff employed by the University; provided that the salaries and conditions of service of



- the academic staff shall be regulated and determined in accordance with the recommendation of the Senate;
- (p) to exercise powers of removal from office and other disciplinary control over the academic staff, the administrative staff and all other staff in the University;
  - (q) to institute, in consultation with the Senate, and subject to any such conditions as may be specified by the Council or the founders, as the case may be, Fellowships, Studentships, Scholarships, Bursaries, Prizes, Medals and other endowments and aids to study and research;
  - (r) to promote and to make provision for research within the University.
  - (s) to call for reports from the Senate on any matter relating to instruction or teaching or any other academic matter within the University;
  - (t) to award Honorary Degrees and other distinctions in accordance with such provisions as may be made by Statute in that behalf;
  - (u) to supervise and control the residence and discipline of students of the University and to make arrangements for their health and general welfare;
  - (v) to provide for the welfare of all persons employed by the University and the wives, widows and dependants of such persons, including the payment to them of money, pensions or other retirement benefits and to subscribe to benevolent, superannuation or other similar funds for the benefit of such persons; their wives, widows and dependants;
  - (w) to perform all such other functions as are or may be conferred or imposed on the Council by this law, or by the Statutes, Ordinances and Regulations and to carry this law, the Statutes, Ordinances and Regulations into effect so far as they may concern the Council.
- (4) The Council may constitute boards, committees or other bodies for the purpose of making recommendations to the

Council in respect of any of its functions conferred or imposed under or by virtue of this law.

- (5) The Council may delegate any of its functions conferred or imposed under or by virtue of this law to the Chairman or any other member or members thereof or to anybody comprising such member or members and such other persons as the council may appoint:

Provided that:-

- (a) any such delegation shall be revocable at will and shall not preclude the council from exercising any of its functions under or by virtue of this law;
- (b) the Council shall not so delegate its powers to participate in the making, amending or revocation of Statutes or to make, amend or revoke Ordinances.

### **The Senate**

The University Senate consists of the following members –

- (a) the Vice-chancellor, who shall be the Chairman
- (b) the Deputy Vice-Chancellor;
- (c) the Professors of the University;
- (d) the Librarian of the University;
- (e) the persons for the time being holding such appointments on the academic staff of the University as may be specified by the Vice-Chancellor;
- (f) Twelve-full-time members of the academic staff of the University, other than those mentioned in sub-paragraphs (a) to (e) of this paragraph; elected by the Congregation.

### **Establishment and Functions of the Senate**

- (1) There is hereby established for the University a Senate, the constitution and procedure of which shall, subject to the provisions of this Law, be in accordance with such provisions as may be made by Statute in that behalf.
- (2) The Senate shall, subject to the provisions of this Law and subject also to the powers reserved to the Council in all matters affecting the finances of the University, be the supreme academic authority of the University and be responsible for all academic matters in the University, and

shall organise, control and direct the academic work of the University, both in teaching and research, and shall take such measures and act in such a manner as it thinks proper for the advancement of the University as a place of education, learning and research.

(3) Without limiting the generality of the provisions of subsection (2) of this section, the Senate, subject to the provisions of this Law and the Statutes, shall have the following functions:-

- (a) to formulate and establish the academic policy of the University and to advise the Council on the provision of facilities to carry out that policy;
- (b) to appoint the Deans of the Faculties in accordance with such provisions as may be made by Statute in that behalf;
- (c) to direct and regulate, after considering the views of the Boards of the Faculties concerned respectively, the instruction, teaching and courses of study within the University;
- (d) to regulate all University examinations, and after considering the recommendations of the Boards of the Faculties concerned respectively, to appoint University and External Examiners;
- (e) to regulate the admission of persons to the University and to courses of study in the University and their continuance or discontinuance in such courses and the conditions qualifying for matriculation and for admission to the various titles, degrees, distinctions and other awards offered by the University;
- (f) to award Degrees (other than Honorary Degrees) Diplomas, Certificates and other academic titles and distinctions to persons who shall have pursued in the University such courses of study as may be approved by the Senate and shall have passed such examinations of the University and satisfied such other conditions as may be prescribed by Regulations of the University;

- (g) to recommend to the Council, subject to the procedure prescribed by Senate, the names of persons for the award of Honorary Degrees or other University distinctions;
- (h) to determine what formalities shall attach to the conferment of degrees and other distinctions;
- (i) to determine, after considering the views of the Boards of the Faculties concerned respectively, what examinations and courses of study in other Universities or places of learning shall be deemed equivalent to examinations and courses of study in the University;
- (j) to formulate, modify or revise schemes for the organisation of the existing Faculties, Institutes, Schools, Boards, Departments or other units of learning and research in the University and to assign to them their respective subjects of study and also to make establishment at any time of other Faculties, Institutes, Schools, Boards, Departments or other units of learning and research or of abolishing, combining or sub-dividing any of them.
- (k) to review, refer back, control, amend or disallow any act of any Faculty, Institute, School, Board, Department or other academic body of the University and to give directions to any such body;
- (l) to recommend to the Council, subject to any such conditions as the Senate may wish to specify, or as may be laid down by the founders, as the case may be, the institution of Fellowships, Scholarships,, Studentship, Bursaries, Prizes, Medals and other awards and to prescribe the mode of competition for, and to award, the same;
- (m) to promote research within the University and to require reports from time to time on such research;
- (n) to prepare estimates of expenditure required to carry out the academic work of the University and to submit them to the Council for approval;

- (o) to make recommendations to the Council on the establishments for the academic staff in the University and on the suspension or abolition of any posts in such establishments other than posts created by this Law and the Statutes;
  - (p) to review from time to time the duties of all members of the academic staff and to make recommendations to the Council on their terms and conditions of service;
  - (q) to be generally responsible for the administration of the University Library;
  - (r) to promote and administer the extra-mural work of the University
  - (s) to make recommendations to the Council concerning all University fees;
  - (t) to require a student on academic grounds to withdraw from the University;
  - (u) to prescribe the academic dress to be worn by the various Officers or Members of the University, and the occasions on which it shall be worn;
  - (v) except as otherwise provided, to appoint representatives of the University on other bodies;
  - (w) to discuss and to declare an opinion on any matter whatsoever relating to the University and to report to the council on any matter referred to it by the council;
  - (x) to make, amend or revoke Regulations, and to participate in the making, amendment or revocation of Statutes and Ordinances;
  - (y) to exercise all such other functions as are or may be conferred or imposed on the Senate by this Law or by the Statutes, ordinances or Regulations and to carry this Law, the Statutes, Ordinances and Regulations into effect so far as they may concern the Senate.
- (4) The Senate may constitute boards, committees or other bodies for the purpose of making recommendations to the Senate in respect of any of its functions conferred or imposed under or by virtue of this Law.

- (5) The Senate may delegate any of its functions conferred or imposed under or by virtue of this Law to any member or members thereof or to anybody comprising such member or members and such other persons as the Senate may appoint; Provided that-
- (a) any such delegation shall be revocable at will and shall not preclude the Senate from exercising any of its functions under or by virtue of this Laws;
  - (b) the Senate shall not delegate its powers to participate in the making, amendment or revocation of Statutes or Ordinances or to make, amend or revoke Regulations, or to award Degrees, Diplomas, Certificates, fellowships, Scholarships, Exhibitions, Bursaries, Medals, Prizes, and other similar titles or distinctions.

## **THE FACULTIES**

- (1) The University comprises of the following Faculties-
- (a) Faculty of Administration;
  - (b) Faculty of Agriculture;
  - (c) Faculty of Arts;
  - (d) Faculty of Education;
  - (e) Faculty of Environmental Design and Management
  - (f) Faculty of Law;
  - (g) Faculty of Pharmacy;
  - (h) Faculty of Science;
  - (i) Faculty of Social Sciences;
  - (j) Faculty of Technology
  - (k) Faculty of Basic Medical Sciences
  - (l) Faculty of Clinical Sciences
  - (m) Faculty of Dentistry
- (2) The Senate shall prescribe which Departments and subjects of study shall form part or be the responsibility of each of the Faculties. A Department or subject of study may, if the Senate so directs, form part or be the responsibility of more than one Faculty.

- (3) The membership of each Faculty Board consists of the following –
- (a) the Vice-Chancellor;
  - (b) the Deputy Vice-Chancellor;
  - (c) the Dean of the Faculty;
  - (d) the Professors and Heads of the Departments comprising the Faculty;
  - (e) such other full-time members of the academic staff of the Departments comprising the Faculty as the Senate may determine after considering the recommendation of the Faculty Board;
  - (f) such other Professors and other Heads of Departments as the Senate may determine after considering the recommendation of the Faculty Board;
  - (g) such other persons within or outside the University as the Senate may appoint after considering the recommendation of the Faculty Board.

### **1.3 ORGANIZATION AND ADMINISTRATION OF THE UNIVERSITY**

The Vice-Chancellor is the Chief Executive Officer of the University and five other Principal Officers of the University, namely; the Deputy Vice-chancellors (2), the Registrar, the University Librarian and the Bursar report to him. The University Librarian is in charge of the University Library while the Bursar takes charge of the University finances. The Registrar is the Secretary to Council and the Chief Administrative officer of the University and he assists the Vice-chancellor in the day-to-day administration of the University. He is also the Secretary to Senate and heads the Registry, comprising the Directorate of Academic Affairs, the Directorate of Council Affairs, Division of Corporate Services and the Director of Personnel Affairs. The Planning, Budgeting, Monitoring/Management Information System Unit takes care of the academic planning, budgeting and

monitoring needs of the University and is under the Vice-Chancellor's Office.

The University Central Administration also includes some Units providing common services. They are Medical and Health Services, the Division of Maintenance Services, the Physical Planning and Development Unit and the Computer Centre, Heads of these units report to the Vice-Chancellor.

### **1.3.1 THE CONGREGATION**

1. The Congregation comprises of :-
  - (a) the Vice-Chancellor, who shall be the Chairman;
  - (b) the Deputy Vice-Chancellor;
  - (c) all full time members of the academic staff;
  - (d) the Registrar;
  - (e) the Bursar;
  - (f) every member of the administrative staff who holds a Degree of any university, recognized for the purposes of this Statute by the Vice-Chancellor, not being an Honorary Degree.
2. It shall be the functions of Congregation:-
  - (a) to discuss and declare an opinion on any matter whatsoever relating to the University, including any matters referred to it by the Council or the Senate;
  - (b) to communicate directly with the Council or the Senate on any matter affecting the University; to receive information from time to time on the state of the University from the Vice-Chancellor.

### **1.3.2 INFORMATION ON FACILITIES**

#### **(A) HEZEKIAH OLUWASANMI LIBRARY**

##### **Plan of the Library**

The Library consists of the North and South wings, which are connected by walkways on two levels.



## **Membership**

Membership of the Library is available, on completion of a registration card, to all students, members of the senior staff of the University and such other persons as may be determined by the Library Committee or the University Librarian on behalf of it. Students are required to renew their registration at the beginning of each academic year. Library Cards and Borrower's Tickets are not transferable; books issued on them remain the responsibility of the person whose name appears on them. A lost Library Card or Borrower's Ticket may be replaced on submission of a written application.

## **The Library Collection**

Hezekiah Oluwasanmi Library now contains over 380,000 volumes. It consists of two main areas:

- (i) The Undergraduate Areas and
- (ii) The Research Areas.

### **1. Serials Collection**

The Serials Collection consists of:

Current journals, the most current issues of which are shelved in the display section of the Serials Room.

- a) Latest backfile i.e. the latest 10 years of journals which are on open access to registered senior staff and postgraduate students.
- b) Older backfiles i.e. journals older than ten years are on closed access to all categories of readers who must obtain and complete request forms at the serials hatch.

### **2. Africana Special Collection**

The Africana Special Collection is a collection of rare and other books of primary interest to people whose fields of interest are in African Studies. Staff publications and theses submitted for higher degrees of the University as well as of

other Universities are also housed there. The Collection is closed access.

### **3. Documents Collection**

The Documents Collection includes official publications of the Federal Government of Nigeria, the old regional governments, the present state governments and the Federal Capital Territory. It also includes publications of other African governments and international organizations.

### **4. Reference Collection**

Dictionaries, encyclopedia, handbooks, directories, atlases, University Calendars, etc. are shelved in the Reference Room. Bibliographies, indexes and abstracts are available in the Bibliography Room. Reference books do not ordinarily circulate. A newspaper clippings file (post-October, 1985) and a vertical file of reprints and other pamphlet type materials are kept in the Reference Room.

### **5. Reserve Collection**

#### **i) Day reserve collection**

Multiple copies of textbooks, particularly some of those recommended for specific courses, are shelved in the Reserve Books Room on Floor 3 North Wing East.

#### **ii) Two-Hour Reserve**

Some other materials, periodical articles in particular, are placed on 2-hour reserve. These may be obtained on request (signature and seat number required) and retained for a period of two hours at a time, subject to renewal, provided other readers have not demanded the materials.

### **6. Recent Accessions**

A selection of books added to the Library stock is normally displayed for several days before being put in the main

collection. The books may not be borrowed while on display but may be reserved at the Loans Desk.

### **Catalogues**

A library catalogue is a finding list of books and other materials available in the Library. The following catalogues can be found in the Catalogue Hall:

- (i) The Author/Title Catalogue
- (ii) The Subject Catalogue
- (iii) The Shelf List
- (iv) The Serials Catalogue
- (v) The Documents Catalogue

### **How to Borrow a Book**

When you have found the book you want to borrow, you will be required to sign your name and address on the book card provided in duplicate. You must surrender a Borrower's Ticket for each book borrowed. When you return a book, you must ensure that you received your Borrower's Ticket back immediately.

### **Reservation**

A book can be reserved by filling a reservation slip; in which case, it will not be renewed for the present borrower when returned, and, if it is already overdue, it will be recalled at once.

### **Inter-Library Loan**

If the book you require is not in stock, it is often possible to borrow it from another library. This service is dependent on goodwill and co-operation between libraries, and readers who benefit from it are required to observe the regulations applying to each loan.

### **Photocopying Services**

Within the limitations imposed by copyright, the library is able to supply readers with photocopies of periodical articles and parts of books at moderate charges.

## **Penalties for Overdue or Lost Books**

Penalties for overdue books will be imposed as follows:-

- a) ₦5,00 per day for the first 30 days, thereafter, all loan privileges will stop.
- b) Books specially recalled by the University Librarian will attract a fine of ₦10,00 per day after the third day from the date of recall.
- c) Books lost or damaged will attract a fine five times the current cost of the books.
- d) No student will be allowed to attend the Graduation Ceremony or receive his/her certificate without a clearance certificate from the University Library to the effect that no book or fine is outstanding against him or her.

## **(B) DIVISION OF STUDENTS' AFFAIRS**

### **1. Guidance and Counselling Unit:**

The Division of Student Affairs has Professional Counsellors who are committed to helping students grow in self-understanding in the process of integrating their personal and academic experiences. The services are free to students and are confidential (i.e. not used as part of his/her other University records). The services include personal counselling, group counseling, study skills improvement, tests anxiety reduction, personal crisis intervention, psychological testing, career and occupational counseling and settlement of grievances between students. Where necessary, consultations are made with campus organizations, specialist and academic Departments, to ensure that students' problems are resolved satisfactorily.

The Counsellors can be contacted at the Division of Student Affairs between 10.00 a.m. and 2.00 p.m. Monday to Friday.

### **2. Scholarship and Financial Assistance:**

The Division of Students' Affairs serves as a link between students and sponsoring authorities, both within and

outside Nigeria. Students are advised to check the Notice Boards in their respective faculties as well as those at the Division of Student Affairs Building for advertisements and other relevant information. Liaison is also maintained between students and governments at various levels for scholarship and bursaries.

#### **1.4 UNIVERSITY EXAMINATION REGULATIONS**

- a) The Senate shall have control and general direction of all the Examinations and shall exercise such powers as may be necessary to discharge these functions.
- b) The Committee of Dean shall be responsible for the details of organization and administrative arrangements for all Examinations. The university Time-table Sub Committee shall assist it in the performance of these functions.
- c) Subject to the overriding control of the Senate, exercised through the Committee of Deans under Regulation (b) above, Examinations shall be conducted by Departmental Boards of Examiners appointed by the Business Committee of Senate on the recommendations of the Faculty Board.
- d) The Senate shall determine any matter relating to the conduct of organization and arrangement of examination

##### **1.4.1 REGISTRATION FOR UNIVERSITY EXAMINATIONS**

- a) A candidate for any Departmental examination must have registered for the courses online not later than the closing date prescribed in the University calendar. Any candidate who fails to register for courses at the appropriate time as prescribed by Senate will not be allowed to take any examination in such courses. Any examination taken without course registration shall be null and void.

- b) Students who register for courses are committed to the number of units registered for and are expected to take examinations in such courses. If a student failed to take an examination he would be scored “0F” for the number of units he had registered for and in which he had failed to take the prescribed examination
- c) Any student who does not have any course or courses to offer in a particular semester should apply for Leave of Absence (LOA)
- d) A student who has less than 15 units in a particular semester to graduate should apply to the Faculty Board for permission to register for less than 15 units. Failure to do so constitutes a breach of regulation which may result in the non-processing of the candidate’s results.
- e) A candidate who cannot register for courses during the prescribed period for registration because of an illness, must ensure that medical report on his illness is forwarded by him or his parents/sponsors to reach the Dean of the Faculty not later than four weeks after the end of the normal registration period scheduled in the University Calendar. Such medical report should be forwarded for authentication by the Director of Medical and Health Services for it to be considered valid. Such a student shall be exempted from the penalties of late registration. All applications should be routed through the Head of Department.
- f) Students must attend a minimum of 75% of course instructions including lectures, tutorials and practical classes where required to qualify to sit for examination in any course.
- g) A candidate for a university examination in a particular degree programme should not be a regular candidate for another degree in this or any other university concurrently.

Any candidate so discovered shall forfeit his/her studentship

#### **1.4.2 ABSENCE FROM EXAMINATION**

Students must present themselves at examinations for which they have registered. Students who fail to do so for reason other than illness or accident shall be bound by the following regulations:

- a) Any student who fails to register for courses during one semester without permission should be deemed to have scored “0F” in the minimum number of units required for full time students (i.e 15 units)
- b) Students who registered for courses, attended classes regularly, did all practical and tests but did not take required Semester examination should be given a continuous assessment grade in each of the affected courses and a grade of “0F” in the examination which they should have taken, but which they did not take.
- c) Students who have less than 15 units to graduate but who fail to take the required examinations should be deemed to have scored “0F” in the outstanding courses only provided such candidates obtained permission to register for less than 15 units
- d) Any Student who on the account of illness, is absent from a University examination may be permitted by the Senate on the recommendation from the Faculty Board, to present himself/herself for such examination at the next available opportunity provided that:
  - (i) A full-time student in the University shall report any case of illness to the University Health Centre at all times.
  - (ii) When a student falls ill during examination, he or she first report to the Director, Medical and Health

Services before attending any hospital outside the University. A report of sickness should be made to the Registrar within a week and a medical certificate for validation of his illness within three weeks.

- (iii) When a student falls ill before an examination he/she shall be under an obligation to send a medical report countersigned by the Director, Medical and Health Services within one week of such illness. Any time outside this period, shall be considered on its on merit.
- (iv) The Director of Medical and Health Services should within 48 hours, submit a medical report on a candidate who is ill during an examination and is taken to the Health Centre or referred by it to the hospital for treatment.
- (v) A student applying for Leave of Absence (LOA) on medical grounds must forward his application together with a medical report to the Dean of the Faculty through the Head of Department. The Medical report must be countersigned by the Director of Medical and Health Services. All applications for Leave of Absence (LOA) must be taken by the Faculty Board

### **1.4.3 EXAMINATION OFFENCES**

- a) A student shall not be allowed during an examination to communicate by word or otherwise with any other students nor shall he/she leave his/her place except with the consent of an invigilator. Should a student act in such a way as to disturb or inconvenience other candidates, he shall be warned and if he persists he may, at the discretion of the invigilator, be excluded from the examination room. Such an action by the invigilator must also be reported in writing



through the Head of Department to the Vice-Chancellor within 24 hours.

- b) It shall be an examination offence for any student, staff or any person whatsoever to impersonate a student in any University examination. Any student or staff of the University found guilty under this regulation shall be subjected to disciplinary action by the appropriate authority of the University. The candidate impersonated shall also be liable of an infraction of this regulation where it is established directly from circumstantial evidence that the impersonation is with his knowledge or connivance.
- c) No candidate shall take into an examination room, or have in his/her possession during an examination any book or paper or printed or written documents, whether relevant to the examination or not, unless specifically authorized to do so. An invigilator has authority to confiscate such documents
- d) Mobile phones are not allowed in examination halls
- e) A student shall not remove from an examination room any paper, used or unused, except the question paper and such book and papers, if any, as he is authorized to take into the examination room.
- f) Candidates shall comply with all “directives to candidates” set out on an examination answer book or other examination materials supplied them. They shall also comply with direction given to them by an Invigilator
- g) Candidates shall not write on any paper other than the examination answer books. All rough works must be done in the answer books and crossed out neatly. Supplementary answer books, even if they contain only rough work must be tied inside the main answer books

- h) When leaving the examination room, even if temporarily, a candidate shall not leave his written work on the desk but he/she shall hand it over to an invigilator. Students are responsible for the proper return of their written work.
- i) Smoking shall not be permitted in examination room during examination sessions.
- j) Any candidate or staff who attempts in any way to unlawfully have or give pre-knowledge

**ii) Penalties for Examination Malpractice and Other Offences**

- (a) Any examination offence would attract appropriate penalty including outright dismissal from the University.
- (b) Where the Vice-Chancellor has reason to believe that the nature of any question or the content of any paper may have become known before the date and time of the examination to any persons other than the examiners of the paper, the Board of Examiners, and any official of the University authorized to handle the paper, he may order the suspension of the examination or the cancellation of the paper or setting of a new paper and shall report the matter to the senate. The Vice-Chancellor shall also take any disciplinary measure against any student or students involved, as he may deem appropriate.
- (c) If in the opinion of an invigilator, circumstances arise which render the examination unfair to any candidate he must report the matter to the Vice-Chancellor within 24 hours after the examination. Where such matter is reported to the Vice-Chancellor he may take such action as he deems fit. If he directs that another examination be held, that examination shall be the examination for the purpose of this regulation.

- (d) Any candidate or member of staff may complain to the Vice-Chancellor that an examination has been improperly conducted. The Vice-Chancellor shall investigate the complaint and report the result of his investigation to the Senate which shall take such action as it may deem appropriate, including with-holding a result or deprivation of the award of a degree, diploma etc as laid down in Statue 17. However where it is shown to the satisfaction of the Committee of Deans that any alteration or amendment of a University regulation involving a change in a course or study or in examination requirements has caused hardship to a candidate in any examination, the Committee of Deans shall make such provisions as it thinks fit for the relief of each hardship and report same to Senate.

## **1.5 THE COURSE UNIT SYSTEM AND THE COMPUTATION OF GRADE POINT AVERAGE (G.P.A) AS OPERATED IN OBAFEMI AWOLowo UNIVERSITY**

### **1.5.1 INTRODUCTION**

Performance in a course shall be measured in terms of:

1. The results of prescribed theory and practical examination
2. Continuous assessment which shall constitute between 30% - 40% of the final grade
3. Assessment of such essay, practical exercises and reports prescribed for each course.
4. Each course shall be examined at the end of the course. The examination shall be conducted as prescribed by Senate
5. Each examination shall be 1 – 3 hours in duration.

#### **Levels of Performance**

A candidate shall be recorded as having attained in a course a level of achievement graded as follows:

I - Incomplete

A	-	Excellent	70-100%
B	-	Very good	60-69%
C	-	Good	50-59%
D	-	Satisfactory	45-49%
E	-	Adequate	40-45%
F	-	Failure	39% and below
W	-	Withdrawal	

### 1.5.2 CALCULATION OF GRADE POINT AVERAGE (G.P.A)

The overall performance of each candidate during an entire semester shall be determined by means of a weighted grade point average, obtained by awarding credit points in respect of each course multiplied by the numerical value of the grade obtained as follows:

A	=	5 credit point per unit
B	=	4 credit points per unit
C	=	3 credit points per unit
D	=	2 credit points per unit
E	=	1 credit point per unit
F	=	0 credit point per unit

The grade point average is the total number of credit points divided by the total number of units for all courses taken during a particular semester

### 1.5.3 DEFINITION OF TERMS

- (i) **Student Workload:** This is defined in terms of course units. One unit represents one hour of lecture or one hour of Tutorial or 2-4 hours of practical work per week throughout a semester. Thus for example, a course in which there are 2 hours of lectures and 1 hour of Tutorial per week is a 3 unit course.
- (ii) **Total Number of Units (TNU):** This is the total number of course units carried by a student in a particular semester. It is the summation of the load

Units on all Courses carried during the semester. For example, a student who is carrying 6 courses of 3 units each has a TLU of 18 for that semester. No student shall be allowed to carry (i.e. register for) or be examined in more than 24 units in any particular semester.

- (iii) **Cumulative Number of Units (CNU):** This is the summation of total number of units over all the semesters from the beginning to date. A student who is prone to repeating courses will finish (if he does not drop out) with a higher CNU than his non-repeating colleague and will most likely require a longer time to complete requirements for the award of Degrees.
- (iv) **Level of Performance Rating:** This is the rating of grades obtained in terms of credit points per load unit. The rating used is as follows:

<i>Level of Performance</i>		<i>Rating (credit points per units)</i>	
A	=	70% - 100%	5
B	=	60% - 69%	4
C	=	50% - 59%	3
D	=	45% - 49%	2
E	=	40% - 44%	1
F	=	0% - 39%	0

Based on the above, a student who obtained a grade of 'A' in a 4-unit course has scored 20 Credit points, and one who obtained a grade of C in that course has scored 12 Credit points.

- (v) **Total Credit Points (TCP):** This is the sum of the products of the course units and rating in each course, for the entire semester period. For example, consider a student who took 4 courses of 5 units each. Let's say the grade obtained in the four courses were C.B.F.D. respectively. The TCP of this student is obtained as  $5 \times 3 + 5 \times 4 + 5 \times 0 + 5 \times 2 + 45$ .

- (vi) **Cumulative Credit Point (CCP):** This is the summation of Total Credit Points over all semesters from beginning to date.
- (vii) **Grade Point Average (GPA):** This is the total credit points (TCP) divided by the total units (TNU). For example, consider the student's scores referred to above. His TCP is 45, and of course, his TNU is 20 (i.e. 4 courses at 5 units each, for the semester). The highest GPA that can be earned is 5.0 and that is when a student has earned a grade of 'A' in every course during the semester. The lowest GPA obtainable is 0.0 and this would happen if the student has F all round during the semester.
- (viii) **Cumulative Grade Point Average (CGPA):** This is the summation of TCPs for all semester, divided by the summation of TNUs for the said semesters. Like the GPA, CGPA obtainable ranges from 0 to 5.

#### 1.5.4 GPA AND CGPA SAMPLE COMPUTATIONS

Sample computations: Consider a student who has enrolled in the Department for a course programme designated as AEE and has just completed 2 full semesters in the University. His course programme and his GPA and CGPA could be as follows:

##### SEMESTER I

1	2	3	4	5	6	7	8
	L	T	P	Units		RESULTS	
Course Code					GRADES	Credit Points	GPA/CGPA
AEE 101	1	0	0	1	75% (A)	1 x 5 = 5	GPA=35/18 = 1.94
AEE 103	3	0	2	4	64% (B)	4 x 4 = 16	CCP = 35 + 0 = 35
AEE 105	3	0	3	4	45% (D)	4 x 2 = 8	CNU = 18 + 0 = 18
AEE 107	3	1	5	6	40% (E)	6 x 1 = 6	CGPA=35/18= 1.94
AEE 109	2	1	0	3	30% (F)	3 x 0 = 0	
				TNU =18		TCP = 35	In this case the TCP, TNU and GPA will be the same for CCP, CNU and CGPA

## SEMESTER II

1	2	3	4	5	6	7	8
	L	T	P	Units		RESULTS	
Course Code					GRADES	Credit Points	GPA/CGPA
AEE 102	2	0	0	2	65% (B)	2 x 4 = 8	GPA=52/18=2.89
AEE 104	3	0	2	4	70% (A)	4 x 5 = 20	CCP=52+35= 87
AEE 106	3	0	3	4	48% (D)	4 x 2 = 8	CNU=18+18= 36
AEE 108	3	1	0	4	58% (C)	4 x 3 = 12	CGPA=35/18=2.42
AEE 110	2	1	3	4	43% (E)	4 x 1 = 4	
				TNU =18		TCP = 52	

### 1.6 MISCELLANEOUS NOTES ON THE COURSE UNIT SYSTEM

- (i) A student's workload is defined in terms of course units. One unit represents one hour of lecture or one hour of tutorial, or 2-4 hours of practical work per week throughout a semester. All courses shall run for one semester or a full session of two semesters.
  
- (ii) The final award and the class of the degree shall be based on the Cumulative Grade Point Average (CGPA) obtained by each candidate in all prescribed courses approved by the University. The final cumulative grade point average shall be calculated on the basis of the total number of credit points and the total number of course units registered for during the course of the student's programme. In the case of a failed course, the candidate must repeat the course at the next available opportunity. If the course is an elective, the candidate may substitute another course and shall not be required to pass the failed elective course. If the course is a restricted elective, substitution can only be made from the list of restricted electives. The failed grade would however be reflected in the transcript.

- (iii) A candidate who has satisfactorily completed all requirements for the degree with an overall grade point average of not less than 1.50 shall be awarded the Honours degree as indicated below:

First Class	4.50 – 5.00
Second Class (Upper Division)	3.50 – 4.49%
Second Class (Lower Division)	2.40 – 3.49%
Third Class Honours	1.50 – 2.39%
Pass	1.00 – 1.49%

- (iv) Passes in 12 units of Special Electives is a requirement for graduation.
- (v) A candidate who scores a cumulative grade point average (CGPA) of less than 1.00 in two consecutive semesters shall be required to withdraw from the University.

### **1.7 TRANSFER WITHIN THE UNIVERSITY AND LENGTH OF STAY IN THE UNIVERSITY**

- (a) To qualify for a degree, a candidate will normally be required to spend a minimum of two academic years at the Obafemi Awolowo University.
- (b) If a student transfers from one Faculty to another, the transfer would be treated as if he/she is just being admitted into the University since as part of the requirement for graduation the student has to take all the foundation/compulsory courses in the new Faculty/Department. In that case his/her stay in the new Faculty/Department should be 1½ times the number of semesters required to complete a programme.
- (c) Where a student transfers from a science based faculty to another, the computation of his result in the new Faculty shall take cognizance of his previous CGPA in



the new Department. The duration of the stay in the University will be what remains of the 1½ times the number of semesters required to complete the programme as approved by Senate.

- (d) Where a student is transferring from a science-based to a Humanities/Arts-based Faculty or vice-versa, the transfer should be treated as if the student is just being admitted into the University. The GPA of the student will not be transferred to the new Department. He / She will however be required to take all the foundation/compulsory courses in the new Department.

### **RELEASE OF EXAMINATION RESULTS**

- (i) At the end of each semester, a provisional list of successful candidates in course examination shall be published by the Chief Examiner soon after the ratification of the recommendation of the Board of Examiners by the Faculty Board.
- (ii) The proceedings of Boards of Examiners are confidential and are in no circumstances to be disclosed at any time to any candidate or to any other unauthorized person.
- (iii) However, without prejudice to Regulation (ii) above, a student contesting a given grade after the release of results can appeal to the Vice-Chancellor, who shall cause the Head of Department to call for the affected paper of the candidate for re-marking. This shall be done after payment of the prescribed fee.
- (iv) The final results of candidates for the award of a degree shall be published by the Registrar after they have been approved by Senate.

## **2.0 BACHELOR OF AGRICULTURAL & ENVIRONMENTAL ENGINEERING**

### **2.1 OBJECTIVE**

The objectives of the B.Sc. degree programme in Agricultural and Environmental Engineering are to

- (a) train engineers capable of applying engineering principles to agricultural mechanization, crop and food production, preservation and storage, farm and agricultural business management, agricultural water management, farm structures, rural electrification, waste water and effluent management and environmental planning and management.
- (b) train engineers for the economic selection, optimum utilization, operation, maintenance and repair of labour saving equipment that are used in agriculture and environmental management with the objective of maximizing the benefits derived from them.
- (c) train engineers who can relate their activities to the needs of the society in general and to develop in them a sense of responsibility that is required for their professional work.
- (d) identify the limitation of our students and to make a real effort to provide compensating measures.
- (e) make continuing reappraisal of our curriculum to ensure its consistency with the goal of training the most productive agricultural engineer that the given parameters of time and financial outlay will permit.

The undergraduate programme in the Department of Agricultural and Environmental Engineering covers the broad spectrum of the Agricultural Engineering and Environmental Engineering fields of practice. The undergraduate programme is broad-based and prepares the students for a wide range of opportunities in agriculture and all agricultural engineering-related industries. The students have two possible options in the final year namely, the Farm Machinery/Crop Processing

and Storage; and the Farm Structures and Environment/Soil and Water Engineering options. Each student undertakes a Design and Research project, in his/her final year, which emphasizes the creative nature of Agricultural Engineering, challenges their individual industry and originality and draws the whole course together by utilizing the taught material. It is the combination of fundamental engineering analyses, knowledge of challenges of tropical agriculture, practical awareness, creativity and familiarity with new emerging technologies that gives our programme its distinctiveness and makes our graduates attractive to prospective employers. The graduate programme complements the undergraduate programme with emphasis on specialization in specific areas.

## **2.2 DEGREE OFFERED**

The Department offers Bachelor of Science degree in Agricultural and Environmental Engineering Masters of Science and PhD degrees in Agricultural Engineering

## **2.3 ENTRY REQUIREMENTS**

### **(a) Unified Tertiary Matriculation Examination (U.T.M.E). Entry**

The minimum requirements for admission to courses leading to a B.Sc. Degree programme in the Department of Agricultural and Environmental Engineering are those for entry into the Faculty of Technology. Prospective students are required to have credits in five subjects at the Senior Secondary School (SSS) Examinations or West African School Certificate (WASC) Levels (or passes at General Certificate of Education (GCE “O”Level) including Mathematics, Physics, Chemistry and English Language.

### **(b) Direct Entry**

Admission to Part II is possible for candidates who in addition to meeting the Faculty General Admission Requirements, have good passes in two Advanced Level of the GCE (or equivalent) in Physics, Pure Mathematics or Applied Mathematics or Chemistry, or approved equivalent qualifications; such as the

Ordinary National Diploma (Upper Credit) in relevant fields.  
HND holders may be admitted to Part III.

## **2.4 Requirements for the award of degree**

### **2.5 Graduation Requirements**

#### **(a) Foundation Programme**

#### **(b) Special Electives**

12 units of Special Electives. Student could exceed the stated minimum number of units by selecting courses of choice provided that the approval of the Head of Department (or his appointed representative) is obtained.

#### **(c) Departmental Requirements**

- (i) 33 units of Part I Physics, Chemistry and Mathematics courses comprising MTH 101, MTH 102, MTH 104, PHY 101, PHY 102, PHY 107, PHY 108, CHM 101, CHM 102, CHM 103, and CHM 104.
- (iii) 68 units of Agricultural and Environmental Engineering courses, excluding Industrial Training course and restricted electives.
- (iv) 9 units of Chemical Engineering courses comprising CHE 201, CHE 305 and CHE 306.
- (v) 5 units of Civil Engineering courses comprising CVE 202, CVE 401.
- (vi) 5 units of Computer Science & Engineering courses comprising CSC 201 and CSC 202.
- (vi) 3 units of Electronic and Electrical Engineering courses comprising EEE 201 and EEE 291.
- (vii) 8 units of Part II Mathematics courses comprising MTH 201 and MTH 202.

- (viii) 19 units of Mechanical Engineering courses, comprising MEE 203, MEE 204, MEE 205, MEE 206, MEE 303, MEE 305, MEE 306, MEE 395 and MEE 396.
- (ix) 6 units of Materials Science Engineering courses, comprising MSE 201 and MSE 305.
- (x) 5 units of Technology Planning and Development courses, comprising TPD 101, TPD 501, and TPD 502.
- (xi) 15 units of Industrial Training courses, comprising AEE 200, AEE 300 and AEE 400.
- (xii) 6 units of Faculty of Agriculture courses, comprising CPP 305, ANS 306 and AXR 309.

**(d) Restricted Electives**

The following restricted electives are available in the department:

**OPTION A: AGRICULTURAL MACHINERY AND POST-HARVEST ENGINEERING**

COURSE CODE	COURSE TITLE	PRE-REQUISITE/ CO-REQUISITE	L T P	UNITS
<i>Student can choose any of the following restricted electives</i>				
AEE 512	Heat Transfer		2 1 0	3
AEE 518	Mechanical Systems Analysis		2 1 0	3
AEE 520	Automatic Control and Robotics		2 1 0	3
AEE 540 /FST 514	Agricultural Biotechnology		2 1 0	3
AEE 530	Energy in Agriculture	AEE 305	2 1 0	3

NOTE: It is compulsory for students to do project in the option that they select.

## OPTION B: SOIL AND WATER/ FARM STRUCTURES AND ENVIRONMENTAL ENGINEERING

COURSE CODE	COURSE TITLE	PRE-REQUISITE/CO-REQUISITE	L T P	UNITS
<i>Student can choose any of the following restricted electives</i>				
AEE 512	Heat Transfer	-	2 1 0	3
AEE 514	Water Resources Development		2 1 0	3
AEE 524	Design of Hydraulic Control Structures		2 1 0	3
AEE 530	Energy in Agriculture	AEE 403	2 1 0	3
AEE 532	Livestock Housing		2 1 0	3
AEE 538	Crop and Food Storage Technology	AEE 505	2 1 0	3

**NOTE:** It is compulsory for student to do project in the option that they select.

## 2.6 OUTLINE OF PROGRAMME FOR PARTS I - V

### PART ONE

#### PART I HARMATTAN SEMESTER

COURSE CODE	COURSE TITLE	PRE-REQUISITE/CO-REQUISITE	L T P	UNITS
MTH 101	Elementary Mathematics I	-	4 1 0	5
PHY 101	General Physics I	-	3 1 0	4
PHY 107	Experimental Physics 1A	-	0 0 3	1
CHM 101	Introductory Chemistry I	-	3 1 0	4
CHM 103	Introductory Chemistry Practical I	-	0 0 3	1
TPD 101	Engineers in Society	-	1 0 0	1
SE	Special Elective	-	2 0 0	2
SE	Special Elective	-	2 0 0	2
	<b>TOTAL</b>		<b>15 3 6</b>	<b>20</b>

**NOTE:** Students could take additional special electives courses.

## PART I RAIN SEMESTER

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>PRE-REQUISITE/ CO-REQUISITE</b>	<b>L T P</b>	<b>UNITS</b>
MTH 102	Elementary Mathematics II	-	4 1 0	5
MTH 104	Vectors	-	2 0 0	2
PHY 102	General Physics II	-	3 1 0	4
PHY 108	Experimental Physics IB	-	0 0 3	1
CHM 102	Introductory Chemistry II	-	3 1 0	4
CHM 104	Introductory Chemistry Practical II	-	0 0 3	1
AEE 102	Introduction to Agricultural and Environmental Engineering	-	2 0 0	2
SE	Special Electives	-	2 0 0	2
	<b>TOTAL</b>		<b>16 3 6</b>	<b>21</b>

## PART TWO

### PART II HARMATTAN SEMESTER

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>PRE-REQUISITE/ CO-REQUISITE</b>	<b>L T P</b>	<b>UNITS</b>
MTH 201	Mathematical Methods I	MTH 101	3 1 0	4
MEE 203	Engineering Drawing I	-	1 0 3	2
MEE 205	Engineering Mechanics I	-	2 1 0	3
CSC 201	Computer Programming I	-	2 0 3	3
CHE 201	Introduction to Thermodynamics	-	2 1 0	3
EEE 201	Applied Electricity	PHY 102	2 0 0	2
EEE 291	Applied Electricity Laboratory I	-	0 0 3	1
MSE 201	Elements of Engineering Materials	-	2 0 3	3
TPD 101*	Engineers in Society		1 0 0	1
SE	Special Elective		2 0 0	2
	<b>TOTAL</b>		<b>17 3 12</b>	<b>24</b>

NOTE: \*The course is compulsory for direct entry student. One SE course for direct entry student.

## RAIN SEMESTER

COURSE CODE	COURSE TITLE	PRE-REQUISITE/CO-REQUISITE	L T P	UNITS
MTH 202	Mathematical Methods II	MTH 102	3 1 0	4
MEE 204	Engineering Drawing II	MEE 203	1 0 3	2
MEE 206	Engineering Mechanics II	MEE 205	2 1 0	3
CVE 202	Strength of Materials	MEE 205	2 0 3	3
CSC 202	Computer Technology	CSC 201	1 0 3	2
AEE 202	Workshop Practice	-	1 0 3	2
AEE 102*	Introduction to Agricultural and Environmental Engineering	-	2 0 2	2
SE	Special Electives	-	2 0 0	2
SE	Special Elective	-	2 0 0	2
	<b>TOTAL</b>		<b>16 2 14</b>	<b>22</b>

*NOTE: \*Direct Entry student should take AEE 102 in Part 11 and could register for an additional special elective course with maximum of 2 Units.*

## PART III HARMATTAN SEMESTER

COURSE CODE	COURSE TITLE	PRE-REQUISITE/CO-REQUISITE	L T P	UNITS
MEE 303	Fluid Mechanics I	MEE 205/206	2 0 3	3
MSE 303	Mechanics of Materials	CVE 202	2 0 3	3
MEE 305	Mechanics of Machines I	MEE 206	2 0 0	2
MEE 395	Mechanics of Machines Laboratory I	MEE 206	0 0 3	1
AEE 307	Farm Electrification	EEE 201	2 0 3	3
CPP 305	Crop Science		2 0 0	2
CHE 305	Engineering Analysis I	MTH 202	2 1 0	3
AXD 509	Introducing Technology Change to Agriculture		2 0 0	2
SE	Special Electives		2 0 0	2
	<b>TOTAL</b>		<b>16 1 12</b>	<b>21</b>



**PART III**  
**RAIN SEMESTER**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>PRE-REQUISITE/ CO-REQUISITE</b>	<b>L T P</b>	<b>UNITS</b>
MEE 306	Mechanics of Machines II	MEE 305	2 0 0	2
MEE 396	Mechanics of Machines Laboratory II	MEE 395	0 0 3	1
AEE 302	Statistics for Engineers	-	2 0 0	2
AEE 304	Basic Soil Mechanics	MEE 303	2 0 3	3
AEE 306	Applied Engineering Thermodynamics	CHE 201	2 0 3	3
AEE 308	Surveying of Agricultural Land	-	1 0 3	2
ANS 306	Animal Science	-	2 0 0	2
CHE 306	Engineering Analysis II	CHE 305	2 1 0	3
SE	Special Elective		2 0 0	2
	<b>TOTAL</b>		<b>15 1 12</b>	<b>20</b>

**PART IV**  
**HARMATTAN SEMESTER**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>PRE-REQUISITE/ CO-REQUISITE</b>	<b>L T P</b>	<b>UNITS</b>
AEE 401	Properties and Processing of Agricultural Materials	AEE 306	2 0 3	3
AEE 403	Hydraulic Engineering	MEE 303	2 0 3	3
AEE 405	Hydrology	MEE 303	2 0 3	3
AEE 407	Design of Agricultural and Food Processing Machines I		2 0 3	3
AEE 411	Design of Agricultural Structures	CVE 202	2 0 3	3
AEE 413	Agricultural Waste Management		2 0 3	3
CVE 401	Technical Report Writing	MEE 303	2 0 0	2
SE	Special Electives		2 0 0	2
	<b>TOTAL</b>		<b>16 0 18</b>	<b>22</b>

NOTE: Student could take special elective with maximum of 2 Units.

## RAIN SEMESTER AND LONG VACATIONS

COURSE CODE	COURSE TITLE	PRE-REQUISITE/ CO-REQUISITE	L T P	UNITS
AEE 200	Students Workshop Experience Programme (SWEP)	-	0 0 9	3
AEE 300	Students Industrial Work Experience Scheme I (SIWES I)	AEE 200	0 0 9	3
AEE 400	Students Industrial Work Experience Scheme II (SIWES II)	AEE 300	2 0 21	9
	<b>TOTAL</b>		<b>2 0 39</b>	<b>15</b>

## PART FIVE HARMATTAN SEMESTER

COURSE CODE	COURSE TITLE	PRE-REQUISITE/ CO-REQUISITE	L T P	UNITS
AEE 501	Farm Machinery I		2 0 3	3
AEE 503	Design of Agricultural and Food Processing Machines II	AEE 407	2 0 3	3
AEE 505	Farm Structures and Environmental Control Engineering	AEE 411	2 1 0	3
AEE 507	Soil and Water Conservation Engineering	AEE 405	2 0 3	3
AEE 509	Farm Power I		2 0 3	3
AEE 525	Design and Research Project I		0 0 6	2
TPD 503	Industrial Law Processing and Operation Management	-	2 0 0	2
TPD 501	Industrial and Engineering Economics		2 0 0	2
	<b>TOTAL</b>		<b>14 1 18</b>	<b>21</b>

*NOTE: It is compulsory for student to do project in the option that they select. Student can choose any of the restricted electives (Section 2.5d).*

**PART FIVE**  
**RAIN SEMESTER**  
**OPTION A: AGRICULTURAL MACHINERY AND POST-HARVEST ENGINEERING**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>PRE-REQUISITE/ CO-REQUISITE</b>	<b>L T P</b>	<b>UNITS</b>
AEE 502	Farm Machinery II	AEE 501	2 0 3	3
AEE 510	Farm Power II	AEE 509	2 0 3	3
AEE 526	Design & Research Project II	AEE 525	0 0 12	4
AEE 504	Handling of Agricultural Materials	AEE 401	2 0 3	3
AEE 536	Crop and Food Preservation		2 0 0	2
TPD 502	Technology Policy	-	2 0 0	2
	Total		10 0 21	17

**PART FIVE**  
**RAIN SEMESTER**  
**OPTION B: SOIL AND WATER/ FARM STRUCTURES AND ENVIRONMENTAL ENGINEERING**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>PRE-REQUISITE/ CO-REQUISITE</b>	<b>L T P</b>	<b>UNITS</b>
AEE 506	Design of Environmental Control Structures	AEE 411	2 0 3	3
AEE 508	Irrigation and Drainage Engineering	AEE 507	2 0 3	3
AEE 516	Bioprocess Material and Effluent Management	AEE 413	2 0 3	3
AEE 526	Design and Research Projects II	AEE 525	0 0 12	4
AEE 534	Rural Infrastructures Engineering		2 0 0	2
TPD 502	Technology Policy		2 0 0	2
			<b>10 0 21</b>	<b>17</b>

*NOTE: It is compulsory for student to do project in the option that they select. Student can choose any of the restricted electives (Section 2.5d).*

## **2.7 COURSE CONTENT**

### **AEE 102: INTRODUCTION TO AGRICULTURAL AND ENVIRONMENTAL ENGINEERING (2 0 0 = 2 units)**

Introduction to Agricultural and Environmental Engineering, definition and scope. Areas of specialization in Agricultural and Environmental Engineering. Interdisciplinary nature of Agricultural and Environmental Engineering; Relationship between Agricultural and Environmental Engineering and agriculture and other engineering professions. Professional societies and their ethics. Agricultural and Environmental Engineering and the Nigerian Economy. Relevance of Agricultural and Environmental in achieving the United Nations Sustainable Development Goals. Employment opportunities in Agricultural and Environmental Engineering. Challenges of food security and the needs for mechanization, rural industrialization, entrepreneurship skills etc.

*Learning Outcomes: Knowledge of career opportunities in Agricultural and Environmental Engineering profession. Knowledge of the relevance of Agricultural and Environmental Engineering in nation's building.*

### **AEE 200: STUDENTS WORK EXPERIENCE PROGRAMME (0 0 9 = 3 unit)**

Introduction to workshops and laboratories environment in agricultural and environmental engineering. Identification of key equipments, tools and their functions. Safety in engineering workshops. Selection, operation, care and uses of shop tools and equipment. Wood working, concrete and masonry, iron working, black-smithing, welding, cutting and brazing. Glazing and sheet metal work. Repair and maintenance of tractors and farm machinery. Building of equipment adaptable to farm shop construction. Fabrication, maintenance and repair of farm field processing machines. Introduction to soil and water engineering and equipment in soil and water laboratory.

*Learning Outcomes: Practical knowledge and specialized skill of workshop practice in Agricultural and Environmental Engineering*

### **AEE 202: WORKSHOP PRACTICE (1 0 3 = 2 units)**

Introduction to workshop practice. Workshop safety measures. Hand and powered tools emphasizing safety measures to be taken during operation. Engineering materials. Theory and practice of metal joining, soldering, brazing, welding, metal cutting, forming, casting and moulding. Workshop materials, gauges and measuring devices. Bench work; marking out, scribing, punching, cutting, drilling, riveting, tapping, dieing, etc. Description of the function and capabilities of grinding machines. Practice in grinding tools and drills. Function and capabilities of drilling machines, lathe machines, milling machines and shaping machines. Machining processes. Measurements, tolerance of products. Jigs, fixtures, practice in the use of the machines. Introduction to computer aided manufacture.

*Learning Outcomes: Practical skills and knowledge of workshop environment and safety practices in engineering profession*

### **AEE 302: STATISTICS FOR ENGINEERS (2 0 0 = 2 units)**

Statistical concepts, probability and distribution functions, normal distribution. Tests of hypotheses and significance testing of means, independent and paired/correlated samples studies, confidence interval. Completely randomized design (one-way ANOVA), Completely randomized block design (two-way ANOVA). Factorial experimental design. Introduction to basic programming languages in statistics. Applications of spreadsheet and computer software for instance R Statistics, SARS and Matlab in analyzing and interpreting scientific data.

*Learning Outcomes: Basic knowledge of research methodology and application of statistics in engineering*

### **AEE 304: BASIC SOIL MECHANICS (2 0 3 = 3 units)**

Introduction. Soil constituents, origin, occurrence and composition. Clays and their behaviours. Particle size analysis. Engineering classification of soils. Plasticity of fine-grained soils and determination of soil index properties. Phase relationships. Compaction of soils. Flow of water through the soils: Hydraulic

conductivity; laboratory and field measurements; Soil water content (Direct and indirect methods of measurement); Energy state of water; Soil water potential and measuring devices. Water infiltration in the vadose zone: infiltration models. Rudiments of permeability and seepage. Introduction to effective stress. Mechanical properties (shear strength and loading capability of soils) and stress-strain characteristics of soil. Mohr's Circle in Soil Mechanics. Excursion to building or road construction sites, field compaction of soil and tillage operations.

*Learning Outcomes: Basic knowledge in soil mechanics and applications in engineering and agriculture*

### **AEE 306: APPLIED ENGINEERING THERMODYNAMICS II (2 0 3 = 3 units)**

Gaseous mixtures (Dalton's law of partial pressures, Gibb-Dalton's law, relation between partial pressure, mole and volume fraction, relation between volumetric and gravimetric basis analysis, equivalent molecular weight) Combustion (combustion equations, combustion analysis calculation of air fuel ratio on volumetric and gravimetric basis, effect of combustion on environment), Other methods of energy conversion, e.g. Fuel cells, Introduction to Psychrometry, Basic principles and practice of refrigeration and air conditioning, Refrigeration cycle, Dehumidification of moist air by sorbent materials.

*Learning Outcomes: Knowledge of heat processes and applications in Agricultural and Environmental Engineering*

### **AEE 307: FARM ELECTRIFICATION (2 0 3 = 3 units)**

The use of electricity as a power source for lighting, comfort in living, farm production and processing. Design and on-farm use of electric equipment and systems. Switches and controls. Planning the farmstead distribution system:- Demand load for farm buildings, Central metering and distribution, Capacity of main service. Selecting feeder conductors. Electric central and circuit protection. Electric motors: Motor rating and selection, measurement of motor characteristics. Stand-by power units: Purpose and importance, stand - by generator type, selection,

maintenance and operation. Installation and operation of solar systems. The peculiar nature of farm electrification. The Nigerian rural environment. Design project.

*Learning Outcomes: Basic knowledge of modes of operation of electrical machines and their applications in agro-allied and related industries*

### **AEE 308: AGRICULTURAL LAND SURVEYING (1 0 3 = 2 units)**

Types of surveys, classes of surveys, Instruments and care, measurement of distances - pacing, stadia, taping, electronic and photographic methods. Levelling - elevations. Earth's curvature and atmospheric refraction. The engineer's telescope, bubble tube, dumpy level, land level, level rods, automatic level, Field notes. Errors and corrections. Angles and directions - bearings and azimuths, magnetic compass and earth's magnetic field. Changes in declination, aerial surveying, topographic maps, introduction to photogrammetry. Remote Sensing and Geographic Information System (GIS) and their applications in mapping land and water resources.

*Learning Outcomes: Basic knowledge of land surveying, remote sensing and geographic information system and application in modern precision agriculture*

### **AEE 401: PROPERTIES AND PROCESSING OF AGRICULTURAL MATERIALS**

**(2 0 3 = 3 units)**

Properties of agricultural materials (physical, mechanical, thermal, electrical, optical, rheology etc.) Moisture material relations: moisture content (definition, importance, methods of determination) safe moisture content, equilibrium moisture content (definition, importance, methods of determination). Air movement (airflow resistance, pressure losses in systems, fans), Drying food produce (principle, theory, thin layer and deep bed drying). Dryers used in food processing (tray, cabinet, drum, spray, freeze), Dryer performance and efficiency.

*Learning Outcomes: Knowledge of properties of agricultural materials and applications in post harvest technology*

### **AEE 403: HYDRAULIC ENGINEERING (1 0 3 = 2 units)**

Fundamentals of fluid flow. Characteristics of hydraulic fluids. Dimensional analysis. Water pressure and Pressure forces. Hydraulics of flow in closed conduits. Pipe network analysis. Fundamentals of open channels (including transitions and controls of hydraulic jumps). Water measurements. Introduction to the design of hydraulic structures such as dams, culverts, weirs, spillway. Hydraulic machines e.g. pumps, *valves*; introduction to hydraulic model studies. Testing of component and system performance

*Learning Outcomes: Knowledge and application of fluid mechanics and hydraulics in design, development and operation of farm machine and equipment*

### **AEE 405: HYDROLOGY (2 0 3 = 3 units)**

Scope of hydrology and hydrologic cycle. Relevance of hydrology to Agricultural and Environmental Engineering. Elements of weather including precipitation (rainfall), humidity, air temperature, solar radiation, net solar radiation, sunshine hours, vapour pressure, evaporation and wind speed and direction. Measurement of precipitation and the challenges associated with them. Analyses of areal rainfall data. Meteorological factors influencing rainfall and evaporation. Measurement and estimation of evaporation (bare soil and vegetated surfaces). Interception of precipitation. Evapotranspiration: measurement and introduction to empirical models for estimation. Infiltration of water through the soil: field and laboratory measurements. Empirical infiltration model and factors controlling infiltration. Streamflow: runoff processes, statistical analysis and inferences. Measurement of surface runoff at field level and models for estimation in catchments. Flood routing. Hydrograph and rainfall intensity duration. Rainfall-Runoff relationships. Climate change and environmental disasters e.g. flooding: causes, effects and solutions. Analysis and management of groundwater. Excursion to a meteorological station and flood plains.



*Learning Outcomes: Knowledge of scientific and engineering hydrology. Application of knowledge of hydrology in environmental and agricultural water management.*

**AEE 407: DESIGN OF AGRICULTURAL AND FOOD PROCESSING MACHINES I (2 0 3 = 3 units)**

Philosophy of design. Components of design. Agricultural Machines: Types and functional requirements. Engineering materials. Stress and deflection analysis. Theories of failure. Design against failure. Detachable fasteners. Power screws. Shafting design. Elements of agricultural and food processing machines. Introduction of Computer Aided Design (CAD) in agricultural and food processing machine design. Machine production planning and work scheduling. Commercialization of engineering design. Production, surface protection and decorative treatment of machines. Group project.

*Learning Outcomes: Knowledge of design of agricultural and food processing equipment using modern technique*

**AEE 411: DESIGN OF AGRICULTURAL STRUCTURES (2 0 3 = 3 units)**

Introduction to Agricultural Structures. Selection of materials in relation to use – steel, wood, concrete and masonry. Types of structural frames. Estimating loads; stress analysis. Introduction to structural design - philosophy of design, elastic and plastic design concepts. Reinforced concrete design. Design for axial loadings. Design of beams. Types of Foundation, Design and analysis of trusses and columns. Design of simple foundation, slab, connections, and joints. Computer concept for improved analysis and design. Design project. Introduction to AutoCad. Design project.

*Learning Outcomes: Knowledge of design of agricultural structures. Application of engineering into the design and management of agricultural structures and buildings*

### **AEE 413: AGRICULTURAL WASTE MANAGEMENT (1 0 2 = 2 units)**

Introduction to Environmental Engineering. Air, land and water pollution. Global and local legislations on environmental pollution and management. Waste management methods: Disposal methods – Land disposal (Landfill), Thermal disposal (Incineration). Recycling methods–Physico-chemical reprocessing, Biological reprocessing – composting and anaerobic digestion. Energy recovery – waste-to-energy. Avoidance and reduction methods – waste minimization. Waste handling and transport. Waste management concepts. Introduction to modelling of bio-waste. Application of waste in organic farming. Group projects.

*Learning Outcomes: Knowledge of waste management. Application of engineering principles in design of machine for waste recycling*

### **AEE 501: FARM MACHINERY I (2 0 3 = 3 units)**

Overview of agricultural mechanization. Types of farm machinery and their field management requirements. Primary and secondary tillage, planting, cultivation, fertilizer and crop protection and harvesting operations. Impact of tillage on environment. Machine performance, costs of use of agricultural machinery. Safe operation of agricultural machinery. Group project.

*Learning Outcomes: Knowledge of design and operation of farm machinery. Design and operation of machine for agricultural activity and value addition*

### **AEE 502: FARM MACHINERY II (2 0 3 = 3 units)**

The agricultural tractor: types, the P.T.O. drive, the Hooks joint, hitch implement and analysis. The mechanics of farm tractors chassis. Implement penetration theory. Constructional features, force analysis and design considerations of various agricultural machinery used for tillage. Spraying and dusting, harvesting, and post harvest machines etc. Impacts of farm operations on the environment. Group project. *Learning Outcomes: Knowledge of design and operation of farm machinery. Design and operation of machine for agricultural activity and value addition*

### **AEE 503: DESIGN OF AGRICULTURAL AND FOOD PROCESSING MACHINES II (2 0 3 = 3 units)**

Mechanical power transmission: gear drives, belt drives, chain drives, ropes and hoists, springs, bearings. Welding, Brakes, Clutches and Couplings. Vibrations. Design of machines for unit operation in food processing including concentration and dehydration. Application of Computer Aided Design (CAD) to agricultural and food processing machines. Design Project.

*Learning Outcomes: Knowledge of design of agricultural and food processing equipment for value addition*

### **AEE 504: HANDLING OF AGRICULTURAL MATERIALS (2 0 3 = 3 units)**

Flow process and challenges of handling local food produce (e.g. garri, HQCF, palm oil, yam flour, parboiled rice, cereal flours), Separation, cleaning and sorting of agricultural produce (importance, methods, device/equipment used), Size reduction (importance, methods, size reducing devices/equipment, energy analysis during size reduction), Basic principles important to separation and size reduction (aerodynamics, particle size characteristics, screening analysis, cyclone ), Methods and equipment for the handling of small and large lots of agricultural products (belt, chain, bucket, screw, pneumatic). Other selection of agricultural produce handling equipment such as elevators, cranes, fork lifts, trucks, carts, etc. Agricultural industry layout. Environmental issues in food handling. Industrial visit.

*Learning Outcomes: Knowledge of handling of agricultural materials*

### **AEE 505: FARM STRUCTURES AND ENVIRONMENTAL CONTROL ENGINEERING (2 1 0 = 3 units)**

Introduction to farmstead planning and layout: Land acquisition and site selection. Planning factors and farmstead development: zone planning, Farmstead and main road, topography, climate and services. Planning activities centers: Family living, machinery storage, grain storage and processing etc. Planning services: Drives and parking. Environmental needs for agricultural production:

Environmental consideration for livestock production, heat and moisture production in livestock and poultry, etc.

*Learning Outcomes: Knowledge of design of farm structures and modern farmstead planning*

### **AEE 506: DESIGN OF ENVIRONMENTAL CONTROL STRUCTURES (2 0 3 = 3 units)**

Review of basic structural components. Elementary structural analysis and design. Environmental requirements for man and plants. Design of environmental systems for crops and animal production: Design of grain storage and grain handling equipment, Structures for semi-perishable and perishable crops etc. Design of animal housing: cattle, pig, rabbit, sheep and goat etc. Design of ventilation systems for crops and animals. Principles of refrigeration. rural water supply and sanitation.

*Learning Outcomes: Knowledge of design criteria and analysis of farm structure. Design of modern crop storage facility and animal houses. Design of farm structures for environmental sustainability*

### **AEE 507: SOIL AND WATER CONSERVATION ENGINEERING (2 0 3 = 3 units)**

Definition, concept and scope of soil and water conservation. Processes and mechanics of erosion. Classes, types, forms and significance of soil erosion. Classifications, factors, analysis and measurements of water and wind erosion. Models for estimating soil loss by water and wind erosion e.g. Modified Universal Soil Loss Equation (USLE). Erosion control: biological and mechanical. Contouring, strip cropping, terracing, mulching and tillage practices - principles, design, efficiency and limitations and geotextile materials. Principles, classification, design, construction, operation, maintenance, efficiency and limitations of terrace and vegetated waterways. Selected mechanical conservation structures, windbreaks and shelter belts. Water harvesting: principles and techniques. Soil pollution due to erosion processes and water quality management. Climate change and desertification – causes, effects on soil and water and control measures. Excursion to land reclamation and erosion control sites.

*Learning Outcomes: Specialised skills in soil and water conservation. Design of soil and water conservation structures. Application of water conservation in agro-environmental management*

**AAE 508: IRRIGATION AND DRAINAGE ENGINEERING**  
**(2 0 3 = 3 units)**

Perspectives (water availability in time and space) and the general concept of irrigation: full, deficit and supplemental irrigation). Climate change and water management for agriculture. Irrigation development and Planning: factors affecting irrigation planning and development Weather factors influencing crop water demand, crop production and water management e.g. rainfall, air temperature, humidity, solar radiation, wind speed and sunshine hours etc. Agricultural soils: physical and chemical properties. Soil water constants e.g. field capacity, permanent wilting point; soil water potentials, and measurement of soil water. Plants: general overview and types, crop growth factors e.g. water and soil fertility; determination of crop growth parameters e.g. leaf area index, biomass etc. Soil-Water-Plant-Atmosphere Relationship. Estimation of evapotranspiration and consumptive use. Introduction to wastewater irrigation and water quality for irrigation (standard). Applications of water lifting devices (pumps). Types of irrigation: surface, sprinkler and drip systems; their design, construction, operation and maintenance at field levels. Application of renewable energy in irrigated agriculture. Drainage of agricultural land and control of water table, application of engineering principles to surface and sub-surface drainage. Design, construction, operation and maintenance of open channel and closed drainage systems. Environmental influences of irrigation and drainage systems. Excursion to an irrigation scheme.

*Learning Outcomes: Specialised skills in water management for agriculture and food security. Knowledge of design, operation and maintenance of irrigation and drainage equipment. Application of knowledge to address food and energy challenges in the developing countries.*

### **AEE 509: FARM POWER I (2 0 3 = 3 units)**

Power sources for agriculture. Introduction to heat engines and energy conversion devices. Theory of internal combustion engine and thermodynamic cycles. Internal combustion engines and application to tractors and implements. Fuels, oils and lubricants. Constructional features and operation of tractor engines. The spark ignition and compression engine systems, air/fuel systems, engine lubrication and lubricating system, engine cooling and cooling system and ignition and electrical systems. Design of spark ignition and compression ignition engines. Effect of combustion on environment.

*Learning Outcomes: Knowledge of design, operation and application of farm equipment*

### **AEE 510: FARM POWER II (2 0 3 = 3 units)**

Tractor power transmission system, tractor constructional features, stability analysis/mechanics of farm tractor chasis. Traction theory, human factors in tractor design and utilization, the tractor hydraulic system. Performance, operation and testing of agricultural power units. Tractor selection, utilization and preventive maintenance. Tractor Power cost estimation.

*Learning Outcomes: Knowledge of design, operation application of farm equipment*

### **AEE 512: HEAT TRANSFER (2 1 0 = 3 units)**

Basic principles of heat and mass transfer (steady state heat transfer, heat transfer in one or more dimension, laws governing heat transfer, electrical analogy of heat transfer), Heat conduction in cartesian, cylindrical and spherical coordinates, Thermal convection, Thermal convection, heat transfer through composite surfaces, Combined mode of heat transfer, Heat exchangers (types, applications/uses, fouling in heat exchangers, analysis of LMTD, effectiveness and heat transfer in exchangers).

*Learning Outcomes: Knowledge of heat transfer and utilization in mechanical system and farm structure*

## **AEE 514: WATER RESOURCES DEVELOPMENT (2 1 0 = 3 units)**

Definition and scope of water resources development and management. Occurrence, uses, demand and supply for water. Water scarcity, causes, effects and solutions. Methods of increasing water availability. Flood and drought management under climate change. Water power. Integrated Water Resources Management (IWRM) and water rights: concept and importance. Water quality and the environment. Urban and rural water supply systems in the developing countries. Introduction to computer modelling and optimization in water resources development. Conjunctive use of water resources. Application of remote sensing and geographic information systems in water resources management. Hydraulic structures e.g. earth dams: Siteing and selection, features, types, design considerations, construction, operation and maintenance. Farm, fish ponds and reservoirs. Economics of water resources management. Excursion to a dam or water works.

*Learning Outcomes: Specialised skill the development of water resources. Introduction to modern tools and application in water resource development*

## **AEE 516: BIOPROCESS MATERIALS AND EFFLUENT MANAGEMENT (2 0 0 = 3 units)**

Types, characteristics, chemistry and microbiology of biological waste and effluent. Collection, treatment and disposal of biological waste and effluent. Design, operation and construction of operational and maintenance facilities. Effect of bio-effluent discharge on river/soil ecology and pollution. Conversion, recycling and potential use of biological wastes.

*Learning Outcomes: Specialised skill in bioprocess materials and management. Knowledge of design and operation of sustainable waste recycling system*

**AEE 518: MECHANICAL SYSTEMS ANALYSIS (2 1 0 = 3 units)**

Dynamic analysis (Distributed and lumped parameter systems). Equation of motions for simple physical systems. Dynamic response of elementary systems. Vibration isolation. Dynamic stability. Introduction to non-linear and time varying systems.

*Learning Outcomes: Knowledge of dynamic and static analysis in mechanical systems*

**AEE 520: AUTOMATIC CONTROL (2 1 0 = 3 units)**

Significance of automatic control. Basic automatic control systems. Input signals and responses. Servomechanism. Block diagram. Linear systems. Open and closed loop transfer functions. Measuring instruments and transducers. Introduction to robotics technology.

*Learning Outcomes: Specialised skill in mechanical automatic system*

**AEE 524: DESIGN OF HYDRAULIC CONTROL STRUCTURES (2 1 0 = 3 units)**

General requirement and design considerations for conveyance, regulating, water measurement and protective structures in water delivering systems. Energy dissipation, transitions and erosion protection along canals. Pipe and pipe appurtenances, Safety features in canals.

*Learning Outcomes: Specialised skill in design, operation and management of modern hydraulic structures*

**AEE 525: DESIGN AND RESEARCH PROJECT I**

Research methodology: definition; types; features and processes of engineering research. Formulation of scientific research, objectives, methodology and collection of relevant data and their analysis using appropriate software and scientific tools. State-of-the-art tools for scientific research, writing and presentations. Ethical issue in scientific, engineering and agricultural researches. Standard scientific nomenclatures and symbols. Plagiarism and scientific writing. Plagiarism and software for its detection



(Similarity Index). Students are assigned to supervisors for guidance and mentorship. Student should submit three bound copies of proposal and defend the contents before committee of examiners.

*Learning Outcomes: Knowledge of research methodology, scientific writing and presentation of report*

### **AEE 526: DESIGN AND RESEARCH PROJECT II**

The project proposal in AEE 525 is to be completed in AEE 526. The students will defend their thesis and submit three bound copies plus electronic copy stored in a compact disc to the department.

*Learning Outcomes: Knowledge of research methodology, scientific writing and presentation of report*

### **AEE 530: ENERGY IN AGRICULTURE (2 1 0 = 3 units)**

Energy - Basic definitions and classifications. Roles of energy industrial and nation development. Energy balance, management and evaluation of alternatives. Renewable and alternative energy. Solar, biomass, wind, thermal, hydraulics, and their applications in agriculture. Energy conversion devices. Group project.

*Learning Outcomes: Basic knowledge of application of alternative and renewable energy in agriculture*

### **AEE 532: LIVESTOCK HOUSING (2 1 0 = 3 units)**

Animal behaviour. Environmental requirements. Effect of temperature and humidity on the environment of a livestock house. Temperature and humidity stress in a confinement. Heat and moisture production in livestock. Animals housing (cattle, swine, poultry, sheep and goat, rabbit). Environmental control of livestock housing. Slaughter slabs and slaughter houses.

*Learning Outcomes: Specialised skill in design and management of modern livestock housing system*

### **AEE 534: RURAL INFRASTRUCTURES ENGINEERING (2 0 0 = 2 units)**

Concept of integrated rural development (planning and implementation). Overview of the problems of rural

infrastructures. Rural road network. Rural roads development, construction and maintenance. Rural water supplies. Rural Sanitation.

*Learning Outcomes: Knowledge of design and sustainable management of infrastructure for rural and agricultural development*

### **AEE 536: CROP AND FOOD PRESERVATION (2 0 0 = 2 units)**

Food microbiology, spoilage and deterioration, Principles and methods of food preservation – high and low temperature methods, use of preservatives, recent issues in food preservation e.g. irradiation. Preservation of tuber crops, grains & cereals, vegetables and fruits. Qualities of food produce as influenced by crop preservation method. Basic principle of crop storage, Type of storage structures – Traditional and Improved Systems. Pest and insect infestation in stored products and their control. Maintenance of storage products and storage structures. Storage structures for grains, semi-perishable crops (e.g. potatoes, yams, etc.) and perishable crops (e.g. fruits and vegetables). Governmental storage policies/systems e.g. strategic food reserves.

*Learning Outcomes: Specialised skill in postharvest and food technology*

### **AEE 538: CROP AND FOOD STORAGE TECHNOLOGY (2 1 0 = 3 units)**

Basic principles of crop storage and preservation. Type of storage structures – Traditional and Improved Systems. Pest and insect infestation in stored products and their control. Maintenance of storage products and storage structures. Storage structures for grains, semi-perishable crops (e.g. potatoes, yams, etc.) and perishable crops (e.g. fruits and vegetables). Strategic food reserves.

*Learning Outcomes: Specialised skill in food storage technology*

## **AEE 540: AGRICULTURAL BIOTECHNOLOGY (2 1 0 = 3 units)**

The emergence of biotechnology and its application in basic and applied science disciplines. Introduction to molecular biology and molecular engineering. Genetically modification of microorganisms, plant and animal cells: gene mapping, gene transfer, recombinant DNA techniques, protoplasm fusion, etc. Safety and biological implications of genetically modified seed, food and organisms. Global and local regulations and politics of genetically modified food items. Biotechnological tools in solving food related problems, e.g. fermentation, post-harvest operations and food processing, functional foods and novel food products development.

*Learning Outcomes: Knowledge of molecular engineering. Application of biotechnology in agriculture*

## **SERVICE COURSES FOR THE FACULTY OF AGRICULTURE**

### **AEE 352: AGRICULTURAL ENGINEERING I (2 0 3 = 3 units)**

General introduction on Agricultural and Environmental Engineering. Engine power systems. Fuel combustion systems Lubrication systems. Cooling systems. Electrical systems Power transmission. Application and control of engine power. Water for agriculture; Measurement of soil moisture; Soil moisture constants. Basic terms in irrigation water management. Modern land clearing operations for agriculture and equipment. Tillage systems in the tropics and planting operations, fertilizer application.

*Learning Outcomes: Basic knowledge of agricultural engineering and relevance in national, economic and industrial development. Knowledge of modes of operation of farm equipment*

### **AEE 402: FARM MECHANIZATION PRACTICES (0 0 3 = 2 units)**

Introduction. Farm machinery: tractors (working systems, operation and maintenance), tillage operations and implements- primary and secondary tillage. Farm systems- operations and management. Post-harvest implements. Marketing strategies.

*Learning Outcomes: Basic knowledge of operation and maintenance of farm equipment*

### **AEE 408: REPORT WRITING IN AGRICULTURAL ENGINEERING (1 0 0 = 1 unit)**

Introduction – characteristics of technical writing, common deficiencies in writing. Standard report formats – layout, mechanical accuracy, usage of abbreviations, numbers, punctuations and capitalization. Types of reports. The main elements of a report/thesis/dissertation – prefatory section, main body and appendix. Report outlines. Literature referencing – reviewing, citing, listing. Tabular, graphic, and pictorial aids in report writing – classification of graphic aids, preparation, placement and discussion. Formal communication – business letter and memorandum. Tools for scientific research, writing and presentation. Standard scientific nomenclatures and symbols. Ethical issue in scientific, engineering and agronomic researches and writing. Plagiarism and software for its detection (Similarity Index).

*Learning Outcomes: Basic knowledge of scientific writing and presentation using modern instructional materials and techniques*

### **AEE 409: AGRICULTURAL LAND SURVEYING (0 0 3 = 2 units)**

Introduction to surveying- types of surveys, classes of surveys, instruments and care. Measurement of distances - errors and corrections, land area measurements. Levelling- tripod level, hand level and clinometers. Angles, bearings and coordinates. Global positioning system and electronic distance measurement.

*Learning Outcomes: Basic knowledge of land surveying for agriculture land development*

### **AEE 552: PRINCIPLES OF SOIL AND WATER CONSERVATION (2 1 0 = 3 units)**

Definition and scope of soil and water conservation. Water erosion and control practices. Principles and practice of irrigation. Flood irrigation practices. Drainage of agricultural land. Fundamental of water resources development.

*Learning Outcomes: Basic knowledge of soil and water conservation. Knowledge of control and management of watershed for sustainable agriculture environmental protection*

### **AEE 553: AGRICULTURAL ENGINEERING II (2 0 3 = 3 units)**

Grain drying, storage and processing. Water resources development. General concept of water management for agriculture. Irrigation: types; irrigation scheduling and measure of efficiency in irrigation. Drainage of agricultural land. Soil erosion and flood: causes, effects and control. Planning of farmstead. Construction materials. Handling of Agricultural waste, disposal and/or recycling.

*Learning Outcomes: Basic knowledge of irrigation and drainage and management of agricultural waste*

### **AEE 554: BASIC LIVESTOCK HOUSING (2 1 0 = 3 units)**

Basic planning tools. Materials of Construction. Environmental considerations for animals housing. Housing and production systems for animals (Beef and Dairy Cattle, Pigs, Sheep and Goat, Poultry etc.). Rural water supply. Waste management in the rural environment.

*Learning Outcomes: Basic knowledge of design and operation of livestock housing system*

### **AEE 558: PRINCIPLES OF FARM MACHINERY (2 0 3 = 3 units)**

Introduction. Types of agricultural tractors. Sizes of agricultural tractors. Farm implements. Machine performance. Cost of use of agricultural equipment. Cost factors. Sources of power for

machinery. Elements of mechanical power transmission. Farm operations. Planting. Cultivation. Fertilizer and insecticide application. Harvesting. Safety.

*Learning Outcomes: Basic knowledge of operation and management of farm machine*

### **AEE 560: FARM POWER (2 0 3 = 3Units)**

Basic thermodynamics of engine cycles. Engine power transmission systems. Hydraulic control, hitching and steering. Elementary traction theory. Tractor selection; application and maintenance. Economics of tractor utilization.

*Learning Outcomes: Basic knowledge of engineering systems in farm machine*

### **2.8 PRIZES IN THE DEPARTMENT**

1. **Professor V. A. Oyenuga (Vabo) Prize:** This prize is given to the best graduating student in the Department of Agricultural and Environmental Engineering
2. **Maksteck Industries & Engineering Services Ltd. Prize:** This prize is given to the best graduating student in the Department of Engineering
3. **Engineer J. A. Olaleye Prize:** This prize is given to the the best graduating student in the Agricultural and Environmental Engineering
4. **Engineer Toye Akintola Prize:** This prize is given to the student with best final year project
5. **Professor V. A. Oyenuga (Vabo) Prize:** This prize is given to the best graduating student in Crop Processing and Storage in the Agricultural and Environmental Engineering
6. **Engineer E. A. Ladipo's Prize:** For the best graduating student in Farm Power and Machinery in the Agricultural and Environmental Engineering
7. **Miss Oluyemisi Ayodeji Komolafe's Prize:** For the best female graduating student in the Agricultural and Environmental Engineering
8. **Prof. Henry Olaniyi Fapohunda's Prize:** For the best graduating student in Soil and Water Engineering Option in

the Department of Agricultural and Environmental Engineering

### **3.0 POSTGRADUATE PROGRAMME**

#### **3.1 INTRODUCTION**

The postgraduate programme is designed to be a logical complement to the undergraduate programme with emphasis on specialisation in specific areas. Specifically, the postgraduate programme is designed for Agricultural Engineering graduates or graduates of other engineering fields who wish to re-orientate their specialisation and are prepared to make up for deficiencies as their former training may not include relevant agricultural engineering subjects.

The programme which is normally by course work and research project is designed to equip the agricultural engineer with the necessary tools to deal with the problems of modernising Nigerian agriculture by giving him professional and academic expertise in one of the following areas:

- (a) Farm Power and Machinery
- (b) Post-Harvest Engineering
- (c) Soil and Water Resources Engineering
- (d) Farm Structures and Environmental Engineering.

#### **3.2 Degree Awarded**

The Department of Agricultural and Environmental Engineering offers an M.Sc. and a Ph.D degrees in Agricultural Engineering. Each programme is based on course work and research:

- (i) M.Sc. Degree Programme: M.Sc. programmes will not take less than two semesters.
- (ii) M.Phil. Programme:
- (iii) PhD. Programme:

The minimum period of duration of study for the PhD. degree shall be four semesters after M.Sc. degree. Course work required is at least 24 units including whatever might have been taken earlier at M.Sc. or M.Phil. level.

### 3.3 GENERAL REQUIREMENTS

#### Admission requirements

- (i) Candidates for the M.Sc. programme must have at least a B.Sc. Second Class (Honours) Lower Division degree in Agricultural Engineering. Candidates with Second Class B.Sc. Honours degree in other fields of engineering may be considered for admission and such candidates will be required to make up for any deficiencies in their preparation. Candidates with Third Class will be admitted to the M.Sc. programme subject to passing a written examination in two B.Sc. courses in the relevant field into which M.Sc. admission is being sought.
- (ii) Candidates who have successfully completed the Postgraduate Diploma Programme in Obafemi Awolowo University with an average cumulative grade of B and above may be admitted into the M.Sc. programme. However, a candidate registered for the M.Phil. who has shown exceptional ability may at the beginning of the third semester be transferred to candidature for the Ph.D. according to the postgraduate regulations.
- (iii) Normally, only candidates who have obtained the degree of M.Sc. of this University in Agricultural Engineering may be registered for the Ph.D. programme.

### 3.4 GENERAL DEPARTMENTAL REQUIREMENTS

#### Programmes (Course Outline)

All courses are of one semester duration

#### CORE COURSES

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Code	Course Title	Units
AGE 601	Design of Experiments in Agricultural Engineering	3
AGE 602	Instrumentation in Agricultural Engineering Research	3
AGE 603	Engineering Analysis	3
AGE 604	Systems Engineering	3

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## SPECIALISATION A: FARM MACHINERY

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Code	Course Title	Units
AGE 611	Agricultural Machine Analysis and Design (Compulsory)	3
AGE 612	Advanced Farm Power and Machinery (Compulsory)	3
AGE 613	Production Techniques	3

**Also as additional options, AGE 621 to AGE 626 from specialization B, AGE 631 from specialization C and AGE 644 from specialization D.**

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## SPECIALISATION B: POST-HARVEST ENGINEERING

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Code	Course Title	Units
AGE 621	Momentum, Heat and Mass Transfer (Compulsory)	3
AGE 622	Advanced Physical and Mechanical Properties of Agricultural Products (Compulsory)	3
AGE 623	Handling of Agricultural Materials and Processing Plants	3
AGE 624	Food Process Engineering	3
AGE 625	Storage Methods and Systems	3
AGE 626	Solar Engineering in Agricultural Processes	3
AGE 627	Advanced Heat Transfer	3
AGE 628	Refrigeration and Air Conditioning	3

**Also as additional option, AGE 611, AGE 612, AGE 613 from specialization A and AGE 643, AGE 645 from specialization D.**

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## SPECIALISATION C: SOIL AND WATER ENGINEERING

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Code	Course Title	Units
AGE 631	Design and Operation of Irrigation Systems (Compulsory)	3
AGE 632	Drainage Principles and Design (Compulsory)	3
AGE 633	Hydraulic Design of Soil and Water Control Systems	3
AGE 634/ GLY 605/ CEG 643	Groundwater System Design	3
AGE 635	Water Resources Planning and System Analysis	3
AGE 636/ CEG 641	Agricultural Water-shed Management and Analysis	3
AGE 637/ CEG 642	Design of Dams	3

**SPECIALISATION D: FARM STRUCTURES AND ENVIRONMENTAL ENGINEERING**

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Code	Course Title	Units
AGE 641	Elements of Structural Analysis I (Compulsory)	3
AGE 642	Elements of Structural Analysis II (Compulsory)	3
AGE 643	Engineering Properties of Materials of Construction	3
AGE 644	Building Construction and Surveying	3
AGE 645	Farmstead Planning and Building Environment	3
AGE 646	Buildings and Environments for Crop Production	3
AGE 647	Buildings and Environments for Animal Production	3
AGE 648	Public Health Engineering	3

**Also AGE 635 and AGE 633 from Specialization C and AGE 625 from Specialization B as additional options.**

**AGE 601: Design of Experiments in Agricultural Engineering**

Planning and designing experimental programme in Agricultural Engineering. Statistical methods, their application to laboratory and field experiments. Introduction to automatic data processing. Theory of models. **3 units**

**AGE 602: Instrumentation for Agricultural Engineering Research**

Theory of measurements, error analysis. Methods and instruments for measuring temperature, flow, pressure, force, torque, displacement and stress, moisture content in biological materials. Basic electrical characteristics of associated transducer, electronic amplifiers and recorders. Automatic control elements and systems. **3 units**

**AGE 603: Engineering Analysis**

Advanced calculus in engineering. Numerical analysis and methods. Engineering applications of Fourier and Laplace transform. Solution of partial differential equations. **3 units**

**AGE 604: Systems Engineering**

Review of the production function and marginal analysis. Analysis and optimization of systems for agricultural production and processes. Linear programming and sensitivity analysis. Integer, goal and dynamic programming and search techniques for agricultural processes. Transportation system and Resource allocation models. Simulation by mathematical models of discrete and continuous systems. Single server queuing. **3 units**

**AGE 611: Agricultural Machines Analysis and Design**

Mechanical and experimental analysis of selected mechanisms used in agricultural machines. Advanced kinematics and dynamics of motion in 3 dimensions. Vibration absorption and isolation. Critical analysis of working forces and stress on components of agricultural machines. Stress-strain relationship of soils under dynamic loads. Mechanics and design of traction and transport devices. Hydraulic control. **3 units**

**AGE 612: Advanced Farm Power and Machinery**

Recent research trends in the field of farm power and machinery with particular reference to the functional requirements of machines for tillage, seeding, cultivation, weeding and harvesting illustrated with selected examples like vibratory tillage, distribution patterns of seeds, fertilizers, herbicides, electrostatic dusting, vibratory harvesting of fruits and vegetables, dynamic shear cutting, gathering, threshing and separation of grains. Effects of crop maturity, condition and environment on harvesting efficiency. Selection of power units for mechanized farming. Present situation and future trends and problems in farm mechanization. **3 units**

**AGE 613: Production Techniques**

Organization for production, production control, forecasting and inventory control. Sheet metal fabrication by forming and stamping. Influence of material parameters on formability

and die design. Techniques in moulding and casting. Metal machining, machine-tools and instruments. Jigs and fixtures. Materials, equipment and processes for fabrication of plastics. Theory and applications of welding processes; factors affecting weldability; considerations in the design of welded components. Workshop metrology. Equipment and planning in Agricultural Machinery maintenance and service plants. **3 units**

**AGE 621: Momentum, Heat and Mass Transfer**

Fundamentals of momentum, heat and mass transfer. Applications to food processing. **3 units**

**AGE 622: Advanced Physical and Mechanical Properties of Agricultural Products.**

Water - material interaction in agricultural materials. Visco-elastic properties of Agricultural materials. Viscometry and mixing. Mechanical damage to agricultural materials during processing. Aero and hydrodynamic characteristics. Frictional properties. **3 units**

**AGE 623: Handling of Agricultural Materials and Processing Plant**

Principles, design and selection of material handling systems and processing plants. Techniques, equipment and management practices in drying systems. Refrigerated storage. Equipment, planning and evaluation of processing plants. Conveying and elevating equipment. Size reduction equipment. Project organization and development. Block diagram, flowsheet and layout. Critical Path Analysis. **3 units**

**AGE 624: Food Processing Engineering**

Calendering and Extrusion, Preservation Processes. Thermal process calculation. Reaction kinetics. Pasturization. Commercial sterilisation, Fermentation Cooling, Freezing, and Thawing, Drying, Freeze drying, Spray drying, Drum drying. **3 units**

### **AGE 625: Storage Methods and Systems**

Design of storage bins and silos. Other storage facilities, classes of pests, rodents and fungi that attack production, Pest/Product relationships, Methods of control (fumigants, insecticides), storage inspection method, quality control, losses, etc. **3 units**

### **AGE 626: Solar Engineering in Agricultural Processes**

Rationale for utilization of solar energy, Solar Radiation. Flat and concentrating collectors, Solar Heating systems. Solar cooling systems, energy application in agricultural processes (drying, air-conditioning, refrigeration), Solar distillation, Solar process economics. **3 units**

### **AGE 627: Advanced Heat Transfer**

Review of Heat transfer principles, Conduction, Radiation, Convection, Heat Exchanger Theory and Design, Thermal Stresses, Mass Transfer, Boilers. **3 units**

### **AGE 628: Refrigeration and Air Conditioning**

Load Calculation, Duct and Pipe sizing, Systems and Design Calculation, Microbiology, diseases, and deterioration of foods, Food refrigeration, Refrigerated Warehouse Design. **3 units**

### **AGE 629: Size Reduction and Separation Processes**

Milling of grains, effect of crop properties on milling characteristics, shelling of grains size analysis Centrifugation, Filtration, Dewatering, Precipitation, Coagulation, Pneumatic separation, grain cleaning, and separation processes. **3 units**

### **AGE 631: Design and Operation of Irrigation Systems**

Advanced soil-water-plant relationships, crop water requirements; Farm pumps. Surface irrigation hydraulics and design; sprinkler fluid dynamics, design and operation. Design and operation of trickle (drip) systems. **3 units**

**AGE 632: Drainage Principles and Design**

Drainage theory, soil water potentials, Darcy's law, Dupuit - Forcheimer, anisotropy, homogeneity, design equations and their assumptions. Engineering investigation, design, specifications contracts cost estimation of surface and sub-surface drains for water logging and salinity control in agricultural soils. Reclamation of saline and sodic soils. **3 units**

**AGE 633: Hydraulic Design of Soil and Water Control Systems**

Energy and momentum analyses in open channel flow - steady, uniform and non-uniform flow, backwater curves, gradually varied and unsteady flow. Analysis of flow profiles. Hydraulic design of transitions, drops, chutes, spillways, culverts, checks, headgates and other structures for water conveyance systems. Design of canals, flumes and pipelines. **3 units**

**AGE 634: Groundwater System Design/GLY 605: Hydrology**

Flow of fluids through porous media - steady and unsteady flows through saturated and unsaturated porous materials. Groundwater occurrence, distribution, movement exploration and recharge, water wells drilling methods, design criteria hydraulics and specifications. Planning, development and management of groundwater, safe yield. Conjunctive use of surface and groundwater. **3 units**

**AGE 635: Water Resources Planning and Systems Analysis**

Planning concepts, economic and financial analysis, multiobjective planning, Techniques of operation research and system analysis - linear, integer, mixed integer and dynamic programming - applied to water resources and water quality problems. **3 units**

### **AGE 636: Agricultural Watershed Management and Analysis**

Hydrology of Agricultural Lands Typical Problems, Data for Hydrologic Analyses, Determination of Runoff from Precipitation. Determination of Peak Rates of Runoff, Hydrographs, Field Applications. Land classification as a basis for soil and water conservation. Major conservation practices recommended for irrigated, non-irrigated and other land uses. Erosion control for agricultural watersheds. **3 units**

### **AGE 637: Design of Dams**

Detailed consideration of different types of dams. Location of dams. Design of dam embankment and spillway. Selection of materials. Construction principles and methods. Special design problems. **3 units**

### **AGE 638: Special Topics in Water Resources Engineering**

Study of advanced concepts and experimental techniques used in solving water resources engineering problems. Application of simulation methods, mathematical models and advanced research methods in areas of hydrology, hydraulics of water control facilities and water resources development. **3 units**

### **AGE 641: Elements of Structural Analysis I**

Direct and shear stresses and strains, compound stress and strain. Shear and bending moment, stresses in beams. Trusses and plane frameworks, graphic statics, deflections of trusses. Deflection of beams. Cylinders and spheres, circular plates. **3 units**

### **AGE 642: Elements of Structural Analysis II**

Long span structures, Statically indeterminate structures. Approximate analysis and stress analysis of statically indeterminate structures. Influence lines, plastic behaviour of structures, deflections, Matrix and computer methods of

structural analysis. Introduction to advanced structural mechanics. **3 units**

**AGE 643: Engineering Properties of Materials of Construction**

Types of materials, steels, wood, concrete rubber, plastics, etc. used in construction materials will be treated in terms of storage. Stress strain and allowable stresses in various materials, material selection concrete properties and mix-design. **3 units**

**AGE 644: Building Construction and Surveying**

Survey instruments, horizontal distances measurements levelling. Measurement of horizontal and vertical angles field survey, setting batter boards, soil investigation, design of simple foundation and footings walls, roofs, structural design and simple frame work, selection of building materials, calculation of quantities, Introduction to CMP. Design of storage buildings, storage inspection methods and quality control and losses. Packaging, etc. Can be taught in cooperation with Plant Science Department. **3 units**

**AGE 645: Farmstead Planning and Building Environment**

Concept of a modern farm set-up. The village environment and social arrangements. Type of structures needed in an efficient farmstead. The family house its layout and design. Structures for machinery storage and maintenance. The farm office and its functions. Thermodynamics of buildings - heat flow characteristics in buildings, heat exchange, ventilation, solar heat and control. Mechanical ventilation. Environmental parameters and their measurements. **3 units**

**AGE 646: Buildings and Environments for Crop Production**

Green houses, glass houses and related structures - construction, layout and needed controls. Plant growth



characteristics as related to the environment. **3 units**

**AGE 647: Buildings for Animal Production**

Environmental requirements for animals: heat exchange characteristics between animals and their surroundings, environmental factors and effects on reproduction and growth. Heat stress on animals in a tropical environment. Relationship between differential animal physical requirements and buildings to house them. Waste collection as part of housing design. Automatic feeding systems. Other specialized facilities. **3 units**

**AGE 648: Public Health Engineering**

The role of the engineer in the control of the environment; considerations of the total environment the (Eco-system). Communicable and non-communicable disease; epidemiology and vital statistics. Role and control of insects and rodents in disease transmission. Water supply and wastewater problems; fundamentals of designs of water and wastewater treatment facilities. Solid waste (refuse) handling and disposal. Air pollution and control. **3 units.**

**3.6 EXAMINATIONS**

Examinations of all Agricultural Engineering subjects delivered as semester courses will consist of 3-hour papers. The candidates will sit for the examinations at the end of the respective semester.

**(a) M.Sc.**

Course work required for M.Sc. programme is a minimum of 21 course units including 4 score courses: AGE 601, AGE 602, AGE 603 and AGE 604, and at least 3 electives chosen in respective field of specialization.

**(b) M.Phil.**

Course work required for M.Phil programme is a minimum of 21 course units including 4 core courses: AGE 601, AGE 603 and and at least 3 courses in their

chosen field of specialization.

**(c) Ph.D**

Course work required for Ph.D. programme is a minimum of 30 units including whatever might have been taken earlier at M.Sc. level. The courses should include AGE 601, AGE 602, AGE 603 and AGE 604, and at least three courses in their chosen field of specialization. M.Sc. as well as Ph.D theses should be submitted at the end of the course. An assessment of a thesis taken together with the performance of the candidate at an oral Examination will be taken into account in recommending the award of the degree. Each candidate is required to give a Departmental seminar before graduation.

**3.7 Staff members for the graduate programmes**

	<b>Name</b>	<b>Qualification</b>	<b>Status</b>	<b>Area of Specialization</b>
1	Prof. J. A. Osunbitan	B.Sc. (1992), M.Sc. (1999), Ph.D. (2007) MNIAE, MNSE, Reg. Engr. COREN R	Professor and Head of Department	<b>Soil and Water Engineering.</b> Agricultural effluents and ground water system. Solute transport in the soil
2	Prof. M.O. Faborode	B.Sc. (1978), M.Sc. (1983), Ph.D. (1986) FNIAE, FNSE, Reg Engr. COREN	Professor	<b>Bioprocess Engineering and Machine Design</b> Biomaterial properties and bioprocess Engineering, Agricultural Technology
3	Prof. J.A. Osunade	B.Sc. (1981) M.Sc. (1985), Ph.D. (1992) MNIAE, MNSE, Reg Engr. COREN	Professor	<b>Farm Structures and Environmental Engineering</b> Application of lateritic soils in building and allied industries, Thermal comfort in livestock housing
4	Prof. K. O. Adekalu	B.Sc. (1983), M.Sc. (1988), Ph.D. (2001) MNIAE, MNSE, Reg Engr. COREN	Professor	<b>Soil and Water Engineering.</b> Hydrology of Agricultural Watershed, Compaction and soil-water properties. Modelling of crop-yield

5	Prof. O. B. Aluko	B.Sc. (1983), Ph.D (1989), Ph.D (1989), MNIAE, MNSE, Reg. Engr. COREN	Professor	<b>Soil-Machine Dynamics</b> Mechanics of agricultural Soils. Development of yam planters.
6	Prof. O. K. Owolarafe	B.Sc.(1989), MSc. (1999), Ph.D. (2007), MNIAE, MASAE, MNSE, Reg Eng	Professor	<b>Farm Machinery and Processing</b> Development of palm fruit harvesting technology and technologies for processing cassava
7	Dr. L. A. Sanni	B.Sc. (1989), M.Sc. (1999), MBA (2001), Ph.D.(2014), MNIAE, MASAE, MNSE, Reg Engr. COREN	Reader	<b>Farm Machinery and Processing</b> Design and development of agro-processing equipment, Automation of mechanical systems for optimizing agro-processing plants
8	Dr. O. A. Aregbesola	B.Sc. (1994), M.Sc. (2001), Ph.D. (2011) MNIAE, MASAE, MNSE, Reg Engr. COREN	Reader	<b>Food Processing and Storage</b> Studies on processing and handling of indigenous food, Preservation and storage of biomaterials, Drying and sorption studies
9	Dr. D. A. Okunade	B.Sc. (1995), M.Sc. (2004), PhD 2015 MNIAE, MNSE, Reg Engr. COREN	Reader	<b>Soil and Water Engineering</b> Studies on the impact of cassava effluents on Soil and groundwater, Water Quality in Agro-processing Environment
10	Dr. B. S. Ogunsina	B.Sc. (1992), M.Sc. (1997), Ph.D. (2010) MNIAE, MNSE, Reg. Engr. COREN	Professor	<b>Farm Power and Processing</b> Processing and utilization of food crops, Technologies for small and medium scale processing of agricultural products, Oilseeds as materials for food biofuel, Renewable energy
11	Dr. G. A. Ogunwande	B.Sc., Ibadan (1997), M.Sc. (2004), M.Sc. (2007), Ph.D.(2010) MNIAE, MNSE, Reg. Engr. COREN	Senior Lecturer	<b>Farm Structures and Environmental Engineering</b> Solid waste management, Farmstead planning and development

12	Dr. O. B. Adeboye	B. Eng. (2001), M. Eng. (2005), Ph.D. (2015), MNIAE, MNSE, Reg. Engr. COREN	Senior Lecturer	<b>Soil and Water Engineering</b> Agricultural water management, Irrigation and drainage, Soil-Water-Plant-Atmosphere System; Climate change and water management, Catchment hydrology
13	Dr. A.O. Adegbenjo	B.Sc. (2002), M.Sc. (2011) MNIAE, MNSE, Reg. Engr. COREN	Lecturer II	<b>Post-Harvest Engineering</b> Hyperspectral Imaging and machine learning in food studies, Engineering properties of agricultural products

#### 4.0 AREA OF ACTIVE RESEARCH

The Department places considerable emphasis on research in tropical agriculture involving a wide range of work from long term fundamental research to equipment and systems development and testing especially for small-holder farmers and industry. Research laboratory, workshops, equipment and field facilities are available for carrying out research into the different aspects of agricultural engineering and related fields. The Department is equipped with instrumentation for mechanical, hydraulic, flow, thermal and other measurements. Metal and wood fabrication workshop facilities are available for building prototypes of machines and research rigs. Land is available on the University Research Farm for field experiments and the University Computer Centre equipped with modern high-speed computers facilitates data processing.

#### Current research work

The current research include:

- a. Development and application of dynamic models for sustainable management of land and water resources
- b. Design and development of planting and harvesting machinery for agricultural crops
- c. Studies on properties, processing and storage of tropical

- crops
- d. Extraction of oil from oil-bearing seeds
  - e. Development of materials for local farm structures
  - f. Management of agricultural wastes for environmental sustainability.

Students have the opportunity to work with staff members in these areas during their projects in the Part 5. Publications of staff members on these research areas are available on the departmental website (<http://agee.oauife.edu.ng/>), local and international journals.