ENUGU STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

HANDBOOK FOR

UNDERGRADUATE PROGRAMMES

2022/2023 ACADEMIC SESSION

THE PRINCIPAL OFFICERS

OF THE UNIVERSITY

THE VICE CHANCELLOR
Professor Aloysius-Michaels Nnabugwu Okolie.

DEPUTY VICE-CHANCELLOR
Professor Chike E. Nwoha.

THE REGISTRAR
Mr. Ambrose George Ugwu

BURSAR
Dr. Augustine Ikechukwu Ojeh

THE UNIVERSITY LIBRARIAN
Dr. Ezema Ifeanyi Jonas.

UNIVERSITY ADDRESSES

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SOURCES OF INFORMATION

SERVICES	LOCATION OF OFFICE
Admission, Pre-Registration, Course Registration, Matriculation, Examination matters, Records/Academic Transcript, Change of Names	Academic Liaison of ESUT, Agbani
Scholarship and Prizes, Bursary Awards, Guidance and Counseling, Students' Welfare/NYSC Matters, Registration of Clubs, Associations and Religious Fellowship and Foreign Student's Matters.	The Student Affairs ESUT, Agbani
Payment of Fees	e-Payment to ESUT Account, ESUT, Agbani
Library	University Library, ESUT, Agbani
Postgraduate Studies	Postgraduate School, ESUT, Agbani
Health Services	Health Centre, ESUT, Agbani
Information and Communication Technology	ICT ESUT, Agbani
Sports and Athletics	Sports Unit, Registry Department, ESUT, Agbani

Research and Innovation	Directorate of Research and Innovation, ESUT, Agbani
Security	Security Office, ESUT, Agbani
Postal Services	ESUT, Post Office, Agbani
University Publications, Public and Alumni Relations	Public and Alumni Relations Unit, Vice Chancellor's Office, ESUT, Agbani

University Enugu Campus
Liaison Office,
Enugu, Enugu State

College of Medicine
ESUCOM, Parklane,
Enugu, Enugu State,
Nigeria.

University Nsukka Campus
Liaison Office,
Enugu, Enugu State

Pre-Degree Programme
Nsukka, Enugu State,
Nigeria.

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PROVOST/DEANS OF FACULTIES

1. **Director, Academic Planning**
   Prof. Chike Anibeze

2. **Provost, College of Medicine**
   Prof. Frank Ezugwu

3. **Dean, School of Postgraduate Studies**
   Prof. Sam Ugwu

4. **Dean, Faculty of Agriculture and Natural Resources Management**
   Prof. Oliver C. Ngwu

5. **Dean, Faculty of Applied Natural Sciences**
   Prof. Godwin Ikechukwu Ameh

6. **Dean, Basic Clinical Sciences**
   Prof. Samuel Ohayi

7. **Dean, Faculty of Basic Medical Sciences**
   Prof. Anthony Okechukwu Akpa

8. **Dean, Clinical Medicine**
   Prof. Innocent IgwebuezeOkafor

9. **Dean, Faculty of Education**
   Prof. Constance Idoko

10. **Dean, Faculty of Engineering**

Prof. G. O. Mbah

11. **Dean, Faculty of Environmental Sciences**
Prof. Augusta I. Emenike

12. **Dean, Faculty of Law**
Prof. Frank Asogwa

13. **Dean, Faculty of Management Sciences**
Prof. Chioma Oleka

14. **Dean, Faculty of Social Sciences**
Prof. Nicholas Attamah

15. **Dean, Faculty of Pharmaceutical Sciences**
Prof. AnthonyAttamah

16. **Dean, Student Affairs**
Prof. Jude Udenta

THE HISTORY OF ENUGU STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY, AGBANI

The Enugu State University of Science and Technology (ESUT) as it is known today, was founded as Anambra State University of Technology (ASUTECH) via Edict Number 7 of 30th July 1980 by His Excellency Chief Jim Ifeanyichukwu Nwobodo. The University started with Faculties of Engineering, Faculty of Sciences and Faculty of Technology. In June 1985, the University authorities saw the compelling need to expand the programmes to include the Faculties of Education, Environmental Sciences, Law, Social Sciences and Management Sciences. From this humble beginning, ESUT has

grown at the end of this decade, 2020, to have eleven (11) faculties and 63 programmes. This growth has been gradual, each administrator building upon the legacy of his predecessor. Following the creation of Enugu State out of Anambra State in 1991, ASUTECH metamorphosed into **Enugu State University of Science and Technology (ESUT)**. ESUT adopted and retained the identities of ASUTECH, including its motto, colour, logo, philosophy and aims/objectives. ESUT having inherited the assets and liabilities of ASUTECH is the first University of Technology in Nigeria and is strategically located in Enugu, the traditional capital of the South Eastern part of the nation. In 2006, the University moved to its permanent site at Agbani, Enugu State under the leadership of His Excellency Dr. Chimaraoke Ogbonnaya Nnamani. The following objectives, as stated in the 2014-2019 Strategic Plan are still relevant today: to avail to all persons without distinction an opportunity of acquiring higher education; to encourage and promote scholarship and to conduct research in scientific, technological, professional and other aspects of life; to relate its activities to the technological, cultural, social and economic needs of the people of Nigeria; to promote research and development directed towards the production of goods and the improvement of technological services; to disseminate scientific and technological knowledge among scientists, researchers, industries, trade services and other bodies which may benefit from such knowledge.

Three periods stand out in the history of ESUT. The first is the period of Prof. Onwuka Dike with the likes of Prof. Mobison in his team, a period referred to as the time of ESUT Computers. At this time, ESUT delivered on its mandate, a mandate to use technology for the profit of society and produced Africa's first computer. At this time also, the Department of Material and Metallurgical Engineering produced pistons for the Peugeot Automobile, Nigeria (PAN) with local

materials. The symbol of authority of the National Assembly was also manufactured by the University at this same period. The second period was the period of Prof. Julius Onah, the time of the ESUT Business School, when Chief Executives of reputable organizations were trained at the school. ESUT Business School overtook the Lagos Business School and others before it, to be the Number 1 business school in Nigeria. Prof. Onah deployed his 20 marketing skills to expand the horizon of ESUT, took the Gown to Town and built a reputable name for the University. The third, is the present time of Prof. Anike, the time of consolidation, when ESUT won awards and recognition for innovations. At this time, the flagship programme in ESUT (Engineering) rose to the challenge and won so many awards and patents, again drawing the national attention to the University. ESUT witnessed the greatest expansion of its services during this time. Between 2000 and 2009, ESUT had 55 undergraduate programmes, by 2015, ESUT had 58 undergraduate programmes and by 2020, ESUT had 63 undergraduate programmes. Many new courses have been introduced at the post graduate level.

Prof. Luke O. Anike became the Vice-chancellor on May 22, 2015 with Mr. Leonard O. Khama, Mr. Ezugwu and Mr George Igwebuike as the Registrar, Bursar and University Librarian respectively.

Prof. Charles U. Eze became the Acting Vice-Chancellor on May 23, 2020 while Barr. M. K. Ikpenwa and Messr Isaac Okoh are also in acting capacities in the positions of Registrar and Bursar respectively. Dr. Ifeanyi Ezema remained the substantive University Librarian.

Professor Aloysius-Michaels Nnabugwu Okolie became the Vice-Chancellor on April 05, 2022 with Mr Ambrose George Ugwu, Dr. Augustine Ikechukwu Ojeh and Dr. Ezema Ifeanyi Jonas as the Registrar, Bursar and University Librarian respectively.

All other information about Enugu State University of Science and Technology, Agbani could be obtained from the University website – ***www.esut.edu.ng***

UNIVERSITY GOVERNANCE

Enugu State University of Science and Technology is an autonomous public institution with the general function of providing liberal higher education. The governing organs of the University consists of the Chancellor, Pro-Chancellor, Vice-Chancellor, Council, Senate, Congregation, all Graduates and Undergraduates of the University in accordance with the provisions of the Enugu State University of Science and Technology, Agbani Edict No.7 of 30th July, 1980.

THE COUNCIL

The Council is the supreme governing authority of the University responsible for policy decisions that have financial implications, the general management of the University affairs, especially the control and maintenance of the property and expenditure of the University. The Council has the power to do anything which in its opinion, is calculated to facilitate the activities of the University, including the regulation of the constitution and conduct of the University. Some members of Council are drawn from the general public. The Pro-Chancellor is the Chairman of Council. Other members of Council are the Vice-Chancellor, the Deputy Vice-Chancellor with the Registrar as the Secretary.

THE SENATE

The formulation of Academic polices including the organisation and control of all academic activities of the University is the responsibility of the University Senate. The Senate is the coordinating body for academic recommendations from the various Faculties and Departments. It gives directives on academic matters through Boards of Colleges and Faculties. The membership of the Senate consists of the Vice-Chancellor as the Chairman, all Professors, Deans, Heads of Department, the University Librarian with the Registrar as the Secretary.

The Senate performs the following functions among others:

(a) Establishment, organisation, control and allocation of responsibilities to Faculties and Departments in the University.

(b) Organisation and control of course(s) of study in the University and Examinations conducted towards the award of relevant degrees in those courses.

(c) Award of degrees and other such qualifications as may be prescribed in line with the aforementioned examinations.

(d) Recommendations to the Council with respect to the award to any person an Honorary Fellowship, Honorary Degree or the title of Emeritus Professor and selection for admission as students in the University.

(e) Determination of what descriptions of dress shall be academic dress for the purpose of the University functions and regulation of the use of Academic Dress.

(f) Appointment and Promotions of Teaching Staff.

(g) Supervision of students' welfare at the University and regulation of their conduct.

(h) Grants of scholarship, prizes and similar awards so far as the award is within the control of the University.

The work of the Senate is carried out through an intricate network of Committees, including the Committee of Provost and Deans, the Development Committee, Students Disciplinary Committee, Farm Management Committee, Board of Postgraduate school etc.

CONGREGATION

Congregation is the general assembly of all graduates who are members of staff of the University**,** both teaching and non-teaching. The Vice-Chancellor is the Chairman. The Congregation has the general functions of serving as a forum for the discussion of any of the University's problems or issues and can make recommendations to Senate and Council in each of which it has two representatives. Congregation is also represented in the Search Committee for the appointment of the Vice-Chancellor.

DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

Introduction

Mechanical Engineering includes the science and art of formulation, design, development, manufacturing and control of systems and components for the conversion of energy and materials into useful mechanical work. These may include both power-generated machines and machines that transform and consume this power, such as nuclear and fossil power plants, propulsion devices, engines, turbines, motors, control mechanisms, transportation system, automobiles trains, space vehicles etc; refrigeration and air-conditioning systems, cryogenic systems; manufacturing machines and system, material handling and earthmoving device. The file requires a basic knowledge of mechanics of solids, fluids, machine

materials, machine design heat power, thermodynamics, heat transfer, manufacturing processes, industrial engineering, management science, optimization, and systems analysis.

Presently, the department has thirty six (36) staff of four Professorial carder, of which two (2) are Associate Professors, two (2) are Adjunct Professors and two (2) are shared Professors. Seven (7) senior Lectures, of which five (5) are core seniors lecturers and four (4) are faculty shared seniors lecturers. Others nine are of lecturers 1, lecturers 11 and assistant lecturer. Besides, the department has twelve (12) Technologists and four (4) Technical/ administrative staff with Engr. Dr. T. O. Onah as Head of Department.

Course description

The B.Eng. Mechanical and Production Engineering (MPE) program offers a comprehensive foundation in the fundamental principles of engineering, providing students with the necessary knowledge and experience to pursue various careers in engineering, technology, business, and management. The program focuses on developing analytical, technical, and problem-solving skills to design, develop, and enhance mechanical systems and manufacturing processes.

Throughout the program, a variety of teaching styles are employed to accommodate the diverse range of topics covered in modern mechanical engineering. This approach ensures that you will acquire a broad set of skills and expertise essential for professional engineers.

In addition to core units that cover essential subjects such as mechanics, thermodynamics, materials science, manufacturing processes, automation, and quality control, the final year offers the flexibility to choose specialized units based on your interests and career aspirations. This allows you to delve deeper into specific areas

of mechanical and production engineering that align with your personal and professional goals.

The final year of the program also includes a significant group project. In this project, you and your peers will collaborate to undertake a major investigative endeavor, which may involve scientific experiments, modeling, design, and investigations. This group project offers an opportunity to apply the knowledge and skills acquired throughout the program in a practical and real-world context, further enhancing your problem-solving abilities and teamwork skills.

Overall, the BEng Mechanical and Production Engineering program provides a well-rounded education that combines theoretical knowledge, practical experience, and teamwork. By completing this program, you will be equipped with the necessary expertise to tackle engineering challenges, contribute to technological advancements, and succeed in various professional roles within the field of mechanical and production engineering.

Aims

This course aims to provide you with an education that covers the breadth of this diverse subject, imparting the necessary knowledge, understanding and skills so that they can operate effectively in your initial appointment and develop your career:

- Develop strong intellectual and practical skills to critically analyse, investigate and solve mechanical engineering problems
- Develop a high degree of competence in the use and adaptation of existing methods, tools and techniques and the application of engineering principles
- Instil creativity in addressing problems relating to engineering components and systems

- Develop a high degree of competence in engineering design, experimentation, technologies of manufacturing and effective management of companies
- Develop skills in the use of computers, software packages, team working, communication, time management and independent learning

PROGRAMME EDUCATIONAL OBJECTIVES

(a) The vision and mission of the ESUT and/or Faculty of Engineering (School).

Philosophy

The founding fathers of University conceived a unique university that must be closely related to society, its industry and above all serves as a catalyst in the technological advancement of the people. The emphasis in the programme is to develop and offer academic and professional programs leading to the award of degrees, certificates and other distinctions, to persons who attain the standard prescribed by the university and have in all other respects satisfied the conditions and requirements lay down or otherwise approved by the University.

ESUT Vision

To be premier university in Africa in capacity development that promotes services to the society through quality teaching, research and community service.

ESUT Mission

To promote scholarship, especially in the areas of Science, Management and Technology, thereby ensuring the development of quality manpower that will utilize technology for the service of socie

(b) The PEOs and where they are published

ESUT- MECHANICAL AND PRODUCTION ENGINEERING (MPE) PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The programme educational objectives aims at imparting quality education to Mechanical and Production Engineering students that will position them for effective contribution to the society by the use of modern technologies and practices. **Program Educational Objectives (PEOs)** for a Mechanical Engineering Program is listed below and published in the student handbook

1. PEO 1: Graduates will apply their knowledge of mathematics, science, and engineering principles to analyze and solve complex mechanical engineering problems.
2. PEO 2: Graduates will demonstrate proficiency in using modern engineering tools, techniques, and software to design, model, simulate, and analyze mechanical systems.
3. PEO 3: Graduates will exhibit effective communication and teamwork skills, enabling them to collaborate with multidisciplinary teams and effectively convey technical information to diverse audiences.
4. PEO 4: Graduates will engage in lifelong learning and professional development, pursuing advanced degrees, certifications, and continuing education opportunities to enhance their knowledge and skills in mechanical engineering.
5. PEO 5: Graduates will demonstrate a strong commitment to ethical and professional responsibility in their engineering practice, considering societal, environmental, and economic

factors while designing and implementing mechanical systems.

(c) PEOs and Alignment of PEOs with Mission and Vision of ESUT

Describe how the PEOs are consistent with the vision and mission of the institution and/or faculty and stakeholders 'requirements.

The Program Educational Objectives (PEOs) of Mechanical and Production Engineering are consistent with the vision and mission statements of ESUT (Enugu State University of Science and Technology) by aligning with the university's overarching goals and objectives. Here's how the PEOs are consistent:

1. ESUT Vision: "To be premier university in Africa in capacity development that promotes services to the society through quality teaching, research, and community service."

PEO Alignment: The first PEO of the Mechanical and Production Engineering program focuses on preparing graduates to engage in engineering practice or other fields for sustainable development. By equipping students with modern technologies and practices, the program aims to position them for effective contributions to society. This directly aligns with ESUT's vision of promoting services to society through quality teaching and capacity development.

2. ESUT Mission: "To promote scholarship, especially in the areas of Science, Management, and Technology, thereby ensuring the development of quality manpower that will utilize technology for the service of society."

PEO Alignment: The remaining PEOs of the program are consistent with ESUT's mission. The PEOs aim to develop graduates who retain intellectual curiosity, pursue lifelong learning, and apply their mechanical engineering education to address technical and societal problems. This aligns with ESUT's mission of promoting scholarship and developing quality manpower that can utilize technology for the service of society.

Additionally, the PEOs emphasize the graduates' readiness to occupy positions of increasing responsibility, aspire to leadership roles, and exhibit ethical and professional standards. These objectives align with ESUT's mission of developing quality manpower capable of contributing to the community, enhancing qualitative service delivery, and acting as agents of positive change.

By imparting quality education, fostering intellectual curiosity, and emphasizing the importance of professional competence, creativity, and responsibility, the Mechanical and Production Engineering program aligns with ESUT's vision and mission to serve society through education, research, and community service.

PROGRAMM OUTCOMES (POS)

PROGRAMM OUTCOMES (POs) OF MECHANICAL AND PRODUCTION ENGINEERING OF ESUT

a) **The POs and state where they are published.**

Program Outcomes (POs) for a Mechanical Engineering Program are published in the student handbook where they can easily familiarize themselves with it. At the end of the program, the graduates will be equipped with the ability to:

1. Apply knowledge of mathematics, science, and engineering fundamentals to solve mechanical engineering problems.
2. Design and conduct experiments, as well as analyze and interpret data to evaluate mechanical systems and components.
3. Design and develop mechanical systems, components, or processes that meet desired specifications and performance requirements, considering factors such as safety, reliability, and cost-effectiveness.
4. Use modern engineering tools, software, and equipment to model, simulate, and analyze mechanical systems, and to design and produce engineering documentation.
5. Function effectively as a member or leader of a multidisciplinary team, understanding the importance of teamwork, collaboration, and effective communication.
6. Demonstrate an understanding of professional and ethical responsibilities in mechanical engineering practice, and the impact of engineering solutions in societal, environmental, and economic contexts.
7. Recognize the need for, and engage in, lifelong learning, keeping up with advancements in the field of mechanical engineering and pursuing professional development opportunities.
8. Communicate effectively, both orally and in writing, using appropriate technical language and visual aids to convey technical information to different audiences.
9. Understand the impact of mechanical engineering solutions on global, economic, environmental, and societal issues, and the need for sustainable and ethical practices.

10. Demonstrate knowledge and understanding of contemporary issues in mechanical engineering, including emerging technologies, industry trends, and professional standards

GENERAL PROGRAMME STRUCTURE

This programme, which leads to a B.Eng. (Mechanical and Production Engineering) degree, is designed to cover a normal period of 5 years post 0'Level or 4 years post A – Level. The 5 year candidates are expected to progress from 100 Level to 500 – Level while the 4 year candidates progress from 200-level to 500 –level.

Each academic year consists of two semesters, each approximately 15 weeks long. The 100-level candidates spend one year in the Faculty, take courses partly from Faculty of Science like Physics, Chemistry and Mathematics. As far as the programme execution is concerned, the courses at the 100 and 200 levels are common to all the students in the Faculty. A few common courses are still run at the 300 and 400 levels. From 200 to 500 level, seven semesters are devoted to formal lectures, tutorials, practical and projects while one semester is used for industrial attachment training.

Teaching and learning

You will be taught by academic staff who are leading experts in mechanical engineering, in a diverse and inclusive learning environment.

We use a combination of lectures, tutorial classes, take home problem sets practical laboratory sessions and computer-based sessions.

An integral component of the program is the annual group design project. Working in small teams, you will tackle real-world engineering challenges and collaborate to devise innovative solutions.

This project emphasizes teamwork, enabling you to develop your problem-solving and project management skills while fostering effective communication and cooperation within a group setting.

In the final (fifth) year of the program, you will embark on a compulsory group project. This project provides a unique opportunity for you to delve deeply into a specific subject or application area that aligns with your interests and career aspirations. Working closely with your project supervisor, you will conduct independent research, apply advanced methodologies, and demonstrate your expertise in the chosen area.

Coursework and assessment

Most course units are assessed through an examination (at the end of the semester) and coursework which is undertaken throughout the year. Parts of the coursework are, in many instances, associated with practical laboratory sessions, whilst others may be based on problem sheets, reports etc.

Course unit details

The courses are grouped into three major groupings: The General Studies Courses, the foundational engineering courses and core engineering courses. The General Studies Courses are taught mostly in year 1.

The foundational engineering courses are taught in the second year while the key engineering knowledge and skills are taught in the core syllabus throughout all years of the course beginning rom the third year.

We view design as an especially important activity, as it integrates the engineering topics across the degree course. Years 2 and 3 also include compulsory workshop practice sessions.

The student's embark on a six month compulsory industrial Training (IT) attachment in the second semester of year four. And group research project is carried out in Year 5.

ADMISSION REQUIREMENT

The Department offers a five-year programme for the Bachelor of Engineering (B.Eng) Hons. degree in Mechanical and Production Engineering. Candidates who have passed the West African Senior Secondary School Certificate or General Certificates of Education (Ordinary Level) may be admitted into the five year programme through an Entrance Examination. In addition to the University entry requirements. Candidates wishing to be admitted into the Department must fulfill the requirements listed below. Applicants for admission by entrance must have obtained either:

1. The West African Senior Secondary School Certificate with at least credits in English Language, Mathematics, Physics, Chemistry and one other subject obtained in one or two sittings.
2. At least five papers in the General Certificate of Education (Ordinary Level) passed at not more than two sittings. The subjects must include the four listed in one above.
3. Senior Secondary Certificate with at least 5 credits in English Language, Mathematics, Physics and Chemistry and one other subjects.

Candidates for admission by direct entry must have obtained;

1. The Higher Certificate (Principal Level) in Pure Mathematics or Pure and Applied Mathematics, Physics and Chemistry.

OR

The General Certificate of Education (Advanced Level) in the subjects listed in one above.

Subject candidates are placed in the second of the standard given-year programme.

2. Candidates with recognized first degree in Engineering or Physical Science or Higher National Diploma (Upper Credit) in Mechanical Engineering will be considered for Direct Entry on the individual merits.

Job Opportunities

The technological advance of any country depends to a large extent on the ingenuity of its high caliber technical manpower. For the well-trained and conscientious mechanical engineer, interesting and challenging job opportunities abound in and outside Nigeria. This ranges from the design development, production, operation, and maintenance of pant, machinery, and equipment to the management of technical systems of men and machines. Mechanical Engineers are urgently needed in such industrial sectors such as Chemical, Petrochemical and Pharmaceutical industries, food processing and beverages, paper, pulp and wood processing, textile industries; power generation; mining and metallurgy; public utilities, construction industries, hospital and biomedical engineering, sanitary and sewage, defense and security; industrial standardization and factory

inspection; transportation and materials handling, agricultural mechanization and teaching/research in Universities, Polytechnics and Research Institutes.

Scholarships

A number of scholarships, bursaries and other forms of financial aid are available each year to students of the Department. These come mainly from Governments, Corporations and Private Foundations. Information about these are widely circulated when available. In the recent past, scholarships have been offered to students of the Department by Shell Petroleum Development Company, Chevron Oil Corporation, Mobile Nigeria Unlimited, Petroleum Trust Development Fund (PTDF) and a number of others.

Staff

The staff are a very committed group and have been coping with the several excess workloads. Efforts are underway to bring the staff strength to more comfortable levels.

DEPARTMENTAL ACADEMIC STAFF

S/L	NAME	RANK
1	Engr Dr Thomas Okechukwku Onah	Associate Professor & HOD
2	Engr Professor Bethrand Nduka Nwankwojike	Adjunct Professor
3	Engr Professor Steven Nwchukwu Ojobor	Adjunct Professor
6	Engr.Dr Innocent O. Ani	Associate Professor

7	Engr Dr Marcel. Onyekachi Egwuagu	Senior Lecturer
8	Engr Dr Obuka Sylverster P. Nnameka	Senior Lecturer
9	Engr Dr Chidiebere Diyoke	Senior Lecturer
10	Engr Dr Azubuike Michael Nwankwo	Senior Lecturer
11	Engr Dr Chika Edwin Oriaku	Adjunct Senior Lecturer
12	Engr Dr Ifediegwu Cyprian	Adjunct Senior Lecturer
13	Engr Dr ILO Paulinus Chukwudi	Lecturer 1
14	Dr. Ozioko, Raphael Emeka	Lecturer 1
15	Engr. Chukwujindu, Sunday	Lecturer 1
16	Ani, John Ndubuis	Lecturer 1
17	Engr. Ngwaka, Charles U	Lecturer 11
18	Engr Dim Eberechukwu	Lecturer 11
19	Engr Christian Chikezie Aka	Lecturer 11
20	Collins Obumuneme Eneh	Assistant Lecturer

DEPARTMENTAL NON ACADEMIC STAFF

S/N	NAME	RANK
1	Engr. Agu Michael N.	Chief LabTechnologist
2	Engr. Emenike Mathew	Asst. Chief Lab Technologist

3	Chukwuonwe B. Nkechi.	Chief lab supervisor
4	Chibuoke O. Francis	Senior Technologist
5	Idi, Melitus K.	Senior Technologist
6	Eze Leonard C.	Senior Technologist
7	Anioke, Sylvester A.	Senior Technologist
8	Engr Silvanus C Chime	Technologist I
9	Onah Onyekachi J.	Technologist II
10	Nnamani, Gabriel	Technical Officer,
11	Chukwu, Elias O.	Chief Works supervisor
12	Chukwuemeka C Odo	Technologist
13	Mrs Violet O. UDEH	Administrative/Secretarial duties
14	Bar (Mrs) Nwanneka MBAH	Typing and Shorthand
15	Mr Kenechukwu UDENSI	Clinical work
16	Eneh Richard Chijioke	Office Attendant
17	Mrs Violet O. UDEH	Administrative/Secretarial duties

ATTENDANCE AT LECTURES

i. Attendance at lectures, tutorials, laboratory and workshop practical, studio sessions, is compulsory. Class Admit Cards should be used to effect this regulation.

ii. Repeat courses should be attended in their entirety. Most of the problems encountered by students under course credit system are caused by student's failure to attend lectures and

do in-course assessment in courses which they are repeating. Repeating courses without attending the whole course of lectures and doing all the class assignment has often resulted in repeated failures. Even when the same lecture is giving a course a second or a third time, he/she will more often than not modify his/her teaching to incorporate recent advances or give a different emphasis to one part of the syllabus or another. This will make things difficult for the student who is relying only on reading of previous notes.

COURSE EVALUATION/SEMESTER EXAMINATION

Students may be evaluated by a combination of the following methods:

i. Unannounced quizzes
ii. Take home assignment
iii. Assessment of workshop/laboratory/studio/field/clinics etc.
iv. Mid semester examinations
v. Semester (end of course) examination

i. to iii above make up the continuous assessment which forms part of the end of course grading, provided that it does not count for more than 30%. There shall be no less than two continuous assessments per semester.

CREDIT LOAD

A student shall normally, in any one academic year be allowed to register for, and take a minimum of, 30- and a maximum of 48-credits. This means that a student can register for a minimum of 15 credits and maximum of 48 credits per semester. Thus no student can be credited with more than 48 credits at the end of each academic year. Without prejudice to the above, a graduating student may register for only the number of credits he/she requires to graduate.

REGISTRATION OF COURSES

i. All course to be taken in the first and second semesters are registered at the beginning of every session. Failed courses are registered first and higher level courses are then added to make up the approved minimum of 24 credits per semester. If the student is advised to carry full load.
ii. Failure to register means that no record of the student will be in the department and Faculty for that session and

consequently no provision will be made for the student's examinations.

iii. Registration forms must be carefully and correctly filled out. Cancellations, erasures, mutilations, etc are not allowed on the forms. Any form bearing any of these defects is nullified and therefore unacceptable. Academic advisers should be consulted before filing the registration forms.

iv. Late registration may be allowed only on payment of a penalty fee which varies from time to time according university regulations.

v. There is no promotion from year to year within the course credit system. If the time table permits, a third year student may, for example, take a lower level course, provided that she/he has the pre-requisites (if any).

vi. Students are never asked to repeat an entire year unless their Cumulative Grade Point Average is below 1.0. They repeat only those courses which they fail. Students carrying over courses shall not be allowed to register for more than the approved number of credits for the session.

vii. Postponement of carryover is **not** allowed. This implies that a student in second year cannot carry over year one course to the third year. The carryover 100 level course must be taken in year two.

EXAMINATION SCORING AND GRADING SYSTEM/DEGREE CLASSIFICATION

The following examination grading and degree classification system shown in table 1 is adopted by the university and it is in consonance with the NUC approved guideline.

Table 1: The Grading System

Credit Hrs.	%age Score	Letter Grade	Grade Point (GP)	Final Cumulative Grade Point Average	Final Cumulative Grade Point Aver. (FCGPA)	Cass of Degree
	70-100	A	5.00	Grade Points divided by Credit	4.50 – 5.00	First Class
	60–69	B	4.00		3.50-4.49	2nd Class Upper
	50 – 59	C	3.00		2.40 – 3.49	2nd Class Lower
	45 – 49	D	2.00		1.50 – 2.39	3rd Class
	40 – 44	E	1.00		1.00 – 1.49	Pass
	0 – 39	F	0.00		0.00 – 0.00	Fail

The degree classification will be based on the Final Cumulative Grade Point Average (FCGPA). FCGPA is calculated by dividing the sum of all Grade Points for all the courses taken (including failed courses) by the total credits of courses taken.

GRADING OF REPEATED COURSES:

Students earn their full marks in repeated courses. However, in calculating the FCGPA, the Grade Point earned in all attempts (including failed attempts) are used.

WITHDRAWAL FROM THE UNIVERSITY:

Any of the under listed factors may necessitate the withdrawal of a student from the university.

i. Withdrawal on Academic Grounds

A student whose CGPA drops below 0.80 at the end of a particular period of academic probation should withdraw from the university. However consideration may be given for withdrawal from programme of study and possible transfer to other programmes within the university for which the year in the new programmes, she/he will be required to withdraw finally from the university. For students who repeat the year of study following their poor performance in the proceeding academic year, they are expected to achieve a CGPA of not less than 1.50 before they would be allowed to continue in their programme. If they fail to achieve the minimum CGPA, they will be required to withdraw from the university.

A student who spends more than 50% above the stipulated number of year of the programme in which s/he is enrolled should apply through his/her HOD and Dean to Senate for extension of his/her registration. Registration can be extended for another 50% of the stipulated number of years of the programme. To grant extension, the student would have paid the Registration Extension fee approved by Senate which usually is not less than half the total fee paid by the fresh students. Students granted extension will in addition pay all approved school fees during the period of extension. If after this extension, the

candidate is unable to complete the programme, the student should withdraw from the university.

ii. Voluntary Withdrawal

Students may withdraw voluntarily from the university at any time on the completion of the official withdrawal forms obtainable from the Records officer of the university.

Such students may retain the grades made for the courses already completed and passed. Students who have thus withdrawn voluntarily from the university may apply to the Registrar for re-admission

iii. Withdrawal on Health Reasons

An approved medical officer may recommend that a student withdraws or be asked to withdraw from the university on health grounds. The affected student may be re-admitted into the university on production of a valid medical certificate of fitness from an approved medical officer.

iv. Withdrawal for Disciplinary Reasons

Students who are asked to withdraw for disciplinary reasons may appeal against the director in accordance with the provisions of the University Edict on discipline of students.

v. Unauthorized Withdrawal

Students who withdraw from the university without authority shall be deemed to have processed themselves out of the university.

ACADEMIC PROBATION

A student admitted through the University Matriculation and Examination goes on probation if, after the second semester examination, his or her CGPA is 1.20.

A probationary period is a period of trail (not a repeat), during which s/he is expected to improve on her/his academic performance.

REPETITION OF YEAR STUDY

(a) A student whose CGPA drops below 1.00 but above 0.60 is expected to repeat the year in the following academic year during which s/he is expected to achieve a CGPA of not less than 1.50. If s/he fails to achieve that minimum s/he shall be required to withdraw from the university.

(b) A student repeating the year of study following a CGPA of less than one carries only 75% of the total credit load for the year which s/he is repeating.

(c) A student cannot graduate and must withdraw from the university if, on account of repeating the year, s/he spends more than 50% above the stipulated number of years of the programme in which she/he is enrolled.

GENERAL INFORMATION ON FINAL YEAR EXAMINATION

(a) In the final year the students take the normal first semester examinations and the second semester examinations are based on the second semester courses and any other relevant areas as required by the department.

(b) Each semester examination should not normally last for more than three hours.

(c) Department Board of Examiners shall normally meet with the external examiners to agree on grades/results before formal presentation of these results to the Faculty Board and hence to the College Academic Board and Senate.

(d) Any final year student who fails to register for the courses fails one or two final year first and second semester courses shall

be required to register for the courses failed in the following academic year. S/he shall not be required to carry the minimum 15 credits but s/he shall, however pay the full fees of the semester in which the courses s/he is re-registering are offered and appropriate examination fee for the semester courses.

(e) The result shall be presented to Senate for approval through the Faculty Board and Registrar.

(f) University regulations on re-registration of courses and withdrawal from the university shall, subject to the provision of 10.3.5 and 10.3.6 above, apply in all cases.

FINAL YEAR EXAMINATION

(i) The Registrar shall circulate an Examination Time Table to departments not later than two weeks before the start of examinations.

(ii) Lectures and other class work shall normally end at least one week before the start of examination to enable adequate revision to be made.

RESULTS

(i) A student is considered to have passed the examination if he obtains a grade of "E" in each of the courses published for his department.

(ii) In the case of final year students, successful candidates shall be issued with degrees bearing the following performance levels on the FCGPA.

FCGPA	**PERFORMANCE LEVEL**
4.50 – 5.00	First Class Honours
3.50 – 4.49	Second Class Honours Upper Division

2.40 - 3.39	Second Class Lower Division
1.50 – 2.39	Third Class
1.00 – 1.49	Pass
Below 1.00	Fail

INCOMPLETE GRADES

The letters "Inc" will be used to designate incomplete results for students who for legitimate reasons were absent from the examination.

EXTERNAL EXAMINER

(a) External Examiners shall be appointed for University final examination and invited to moderate and review final examinations.

(b) External examiners should be normally Professors or Readers. Where Senior Lecturers are nominated as External Examiners, their nominations must be accompanied by their CVs to enable the Senate ascertain their suitability or otherwise for external examination.

(c) The Head of Department should make an informal contact with the nominated examiner to ascertain availability before presenting the particulars of the person nominated to Senate through the Faculty Board.

(d) Only one external examiner shall normally be appointed per Department per academic year except where there are clearly defined options that cannot be handled effectively by one external examiner.

(e) The External Examiner shall moderate final second semester examination question papers.

(f) Mark or re-mark portions of answer scripts as s/he may determine.

(g) Normally participate in the determination of the result and class of degree of the candidates.

(h) Submit to the Vice-Chancellor, an independent report on the results and work of the departments.

(i) Honoraria are payable for External Examining and the rates are determined on the basis of student numbers.

(j) Where it is not possible to pay cash immediately, the allowance will be remitted by cheque to the address or to the bank account.

(k) Travelling allowance is payable only in respect of External Examiner's own care and based on actual distance covered between stations by the most direct rate.

(l) All claims must be supported by official receipts. Examiners who travel by public transport (including hired vehicles) should claim under Section.

EXAMINATION CONDUCT AND INVIGILATION

i. Students shall use their registration numbers, and not their names, during university examinations.

ii. The University shall supply printed answer booklets for all semester examinations. The booklets, used or unused be removed from the examination halls by candidates.

iii. The information required on the cover page of the examination booklet **must** be clearly and legibly completed by the students.

iv. No student is allowed to bring in any material into the examination hall.

v. Except in case of ill health or accident, no candidate shall be allowed, to leave the examination hall within the first 30 minutes of the commencement of the examinations or to enter the hall after the first 30 minutes.

vi. There shall normally be not less than two invigilators in one examination room. In large halls, 0 ratio of one invigilator to 50 students shall be maintained.

vii. Invigilators shall be drawn from the academic and other related staff of the university.

viii. The invigilators shall keep an officially prepared Examination Attendance List which all students taking the examination must sign. The invigilators must reconcile the number on the attendance register with the number of scripts submitted.

ix. Each examination shall have a Chief Invigilator, who shall collect examination materials from the Faculty Officer 30 – 40 minutes before the examination begins.

SETTING AND MARKETING OF EXAMINATION PAPERS

i. Each lecturer shall be required to submit personally to the Head of Department (HOD), an extant hand written questions for each course he had taught two weeks before commencement of examination. Where 3, 4, 5, or 5 questions are to be answered in the examination, then 6, 8, 9, or 10 questions, respectively will be supplied by the lecturer. One week before commencement of examinations, the HOD shall summon the Departmental Examination Board to moderate the questions. When courses being taught cut across faculties and colleges, the Dean of the Faculty hosting the courses and the relevant HODs should moderate the questions and the Dean takes custody of the moderated questions.

ii. The HOD shall be responsible for the security and production of the question paper.

iii. Normally, examination scripts shall be marked by the lecturer responsible for teaching grades on the prescribed forms and submit the four copes to the HOD. The HOD

calls the Departmental Examination Board who approves the results and two copies forwarded to the dean while one copy is retained by the faculty.

iv. The Dean summons the Faculty Board to approve the results and he forwards a copy approved results to the Examination's office of the Registry while a copy of the approved results is retained in the faculty.

v. For final semester examination results, each Faculty Board of Examiners shall in a meeting in which the Examinations and Records offices of the Registry are in attendance receive and consider final semester examinations grades for result which shall be presented to Senate

vi. In the case of inter faculty courses the relevant lectured shall produce five copies of the results. One copy of the result is retained in the department after approval and four copies forwarded to the Dean. After Faculty approval, one copy is retained in the Faculty, one copy each, dispatched to the serviced department and Faculty, one copy each, dispatched to the serviced department and Faculty, while the original copy is sent to the Examination's office of Registry.

FUNCTIONS OF THE VARIOUS ARMS OF THE UNIVERSITY IN THE CONDUCT OF EXAMINATION

1. The Senate

It shall be the function of Senate to:

i. Approve all university regulations on Examinations

ii. Schedule all official University Examinations.

iii. Approve the appointment of External Examiners and by down conditions for such appointment.

iv. Approve and publish all degree results.

v. Ensure the maintenance and security of Examination papers and scripts.

vi. Receive reports on recommendations on Degree Examination irregularities and misconduct, from the Senate Examination Committee for decision/disposal action.

vii. Advice Council on Examination Fees.

viii. Award degrees and such other qualifications for the award of Aegrotat degrees.

ix. Make recommendations to Council with respect to the award of any honorary degree or the title of Professor Emeritus.

2. **The Registrar** – It shall be the function of the Registrar to:

i. Compile and publish, after matriculation, a list of registered students.

ii. Determine the eligibility of candidates for all final examinations.

Issue admission cards to all eligible candidates in respect of Final Examinations; such cards shall contain:

a) Student matriculation number

b) Recent passport sized photographs certified by the Head of Department and duly signed by the Faculty officer.

iii. Publish Final year results after approval by Senate.

iv. Compile and publish draft Time Table for University Examination at least four weeks before the commencement of examinations and the final Time Table not later than two weeks before the commencement of examinations.

v. Arrange for the printing and issuance of serially numbered Answered Booklets for official University Examinations.

vi. Compile and publish instructions to invigilators.

vii. Publish the names and particulars of all possible graduates at the end of the first semester of Final year.

viii. Compile and publish pass and failure list for Final Examinations in a Central Official University Notice Board as soon as possible, after the approval by the Senate.

ix. Issue statement of result, and official transcripts to authorize bodies showing grades (not marks) in respect of all the campuses for which students are duly registered during the entire programme in the university.

x. Keep in his/her custody, and issue certificates for all Degree, Diploma and Certificates courses passed and approved by Senate.

3. The Faculty Board of Examiners

It shall be the duty of the Faculty Board of Examiners under the Chairmanship of the Dean of Faculty to:

i. Moderate all University/Faculty wide examination papers.

ii. Consider nominations of external examiners from Departments and recommend same to Senate through the Faculty Board.

iii. Consider on behalf of the Faculty Board of the Faculty concerned, the pass, failure or referral list from the Department Examinations Committee and advice Senate through the Faculty Board within two (2) weeks of the completion of the examination taken in the Faculty.

iv. Make recommendations on special cases of examination results to the Academic Board and Senate through the Faculty Board, by which special cases of examination results to the Academic Board and Senate through the Faculty Board, by which special cases would among other things, include:

a) Shortfall in credit units at 400/500 level
b) Withdrawal from the Faculty or the University.
c) Deferment of examinations on grounds of ill health and other deserving circumstances.
d) Any other cases as may be defined by Senate from time to time.

v. Make recommendations about Aegrotat degree through the Faculty Boards to Senate.

vi. Carry out any other activities related to the conduct and administration of examination in the Faculty and make proposals to the Faculty Board as may be necessary.

4. The Dean of Faculty

It shall be the duty of the Dean of Faculty to:

i. Arrange for the security of University/Faculty wide examinations and materials including Answer booklets and Examinations Attendance Register.

ii. Serve as the Chairman of the Faculty Examination Board

iii. Appoint a Faculty Examinations Officer who will not be below the rank of Senor Lecturer.

iv. Appoint all the invigilators in the Faculty on the recommendations of the various Heads of Department.

v. Keep custody of the draft and moderated examination papers for University/Faculty wide courses.

vi. See to the procurement, control and disbursement of examination materials required by his/her Faculty.

vii. Carry out general supervisory roles over all activities related to the conduct and administration of examinations in the Faculty.

viii. Receive reports from the Chief Invigilator or any examination malpractice/misconduct or irregularities in all the examinations conducted in his/her Faculty and

ensure prompt treatment of such cases by Examinations Committee of Senate.

5. The Departmental Examinations Committee

It shall be the function of the Departmental Examinations Committee to:

i. Consider, moderate and approve question papers submitted to the Head of Department by internal examiners (course lecturers) from 100 level to 300/400 level examinations, and in the case of 400 or 500 level examinations, to consider, moderate and approve draft question papers to be moderated by the external examiner.

ii. Recommend to the Head of Department the appointment of External Examiners.

iii. Consider review (if necessary), and prepare examination results by all internal examiners to the Department and prepare pass/failure and referral lists and forward them to the Faculty Board of Examiners.

iv. Make recommendations to the Faculty Board of Examiners about any special cases.

v. Make recommendations on the award of Aegrotat degree to the Faculty Board of Examiners.

vi. Carry out any other activities related to the conduct and administration of examinations as may be prescribed by the Faculty Board of Examiners.

6. The Head of Department

It shall be the function of the Head of Department to:

i. Serve as the Chairman of the Department Examinations Committee.

ii. Appoint the Department Examinations Officer from among members of his/her academic staff, normally not less than the rank of a Senior Lecturer.

iii. Keep custody of all examination question papers and moderated questions and ensure that they are not made known to any unauthorized persons.

iv. Make requisition for, and take charge of all examination materials obtained from the Dean of the Faculty and/or the Registrar.

v. Recommend to the Dean the appointment of invigilators for all examinations in the Department.

vi. Ensure the compliance of all internal examiners with the rules regarding the setting and moderating of question papers and the marking of examination scripts and the computation of the results therefore.

vii. Ensure compliance with all rules regarding eligibility of students during such examinations.

viii. Nominate to the Dean, persons to be appointed external examiners on the recommendation of the Departmental Examinations Committee.

ix. Carry out general supervisory roles on all activities relevant to the design, moderation, conduct and security of all examinations in his/her Department.

x. Receive complaints from students on examination conduct and result and process them through the Departmental Examinations Committee to the Faculty Board of Examiners.

xi. Liaise with the Registrar in keeping appropriate contact with the Departmental External Examiners and ensure timely moderation of 400/500 level examination questions by the external examiner.

xii. Liaise closely with the Faculty Officer in arranging for the reception, transportation, accommodation of Departmental External Examiners and ensuring the

appropriate remuneration due to the External Examiner is paid.

xiii. Ensure that all departmental examinations are adequately catered for in the official university Time Table and allocate halls, rooms, laboratories, and workshop space or each examination in the department.

7. The Departmental Examination Officer

It shall be the function of the Departmental Examinations Officer:

i. Serve as a liaison officer between the Internal Examiners (course lecturers and course co-ordinators) and the Departmental Board.

ii. Prepare the Departmental/Faculty Time Table for each examination.

iii. Collect at the end of each examination, the examination answer scripts from the chief invigilator and assign them to internal examiners for making of scripts and collate all scores for each examination from Internal and External examiners and process, compute and compile them for presentation to the Department/Faculty Board of Examiners through the Head of Department.

iv. Perform any other activities in relation to the setting, conduct and processing of examination results in the Departmental/Faculty as may be prescribed by the Head of Department/Dean and Departmental/Faculty Examination Board.

UNIVERSITY ADMISSION

i. The Registrar shall forward list of candidates as received from JAMB, to the Deans of Faculty highlighting, in the

forwarding memorandum, any important features of the exercise including Faculty/Departmental quota.

ii. The Dean of Faculty shall present the lists to the Faculty Admissions Committee to select their candidates, guided by the approved criteria, and return their recommendations to the Registrar.

iii. A meeting of the Admissions Committee of Senate shall be called to collate and consider Faculty recommendations for approval on behalf of the Senate.

iv. Lists as approved by the Admissions Committee of Senate shall be complied by the Admissions Officer; a set is for his/her transmission to JAMB, while the set is forwarded for retention and records to the Vice Chancellor, Registrar and Faculty.

STUDENT'S CLEARANCE AND REGISTRATION

i. Students offered admission by JAMB shall report to the College Registry for clearance and registration formalities.

ii. Names of all cleared students together with a copy of
   a. The letter of admission
   b. Each claimed qualification
   c. Personal data form duly completed
   d. Receipts as evidence of payment, shall be forwarded to the Registrar (Admissions) in order to facilitate work on the Matriculate and Student Personal Records.

MATRICULATION AND ASSIGNMENT OF NUMBERS

i. The Admissions Officer shall assign Matriculation Numbers to fresh students, in their College, Faculty and Departmental Order.

ii. The Registrar's Representative shall issue the students with the identity cards. The Central Records shall forward authenticated lists of matriculated College students to the College Registry to facilitate issuance of identity cards. The identity cards will be signed by the Registrar of the University.

STUDENT RECORDS AND ISSUANCE OF SEMESTER/FINAL EXAMINATION RESULTS

i. Students' records shall be held in the Registrar's Department in the manner approved by Senate.

ii. The Examinations and Records units shall issue semester examination results to relevant students, with copies to the Dean of Faculty, Head of Department and the sponsors.

iii. Lists of possible grandaunts shall be published by the Registrar after reconciling records with the faculties.

iv. Statements of all final year results and official transcripts shall be issued by the Registrar.

PROCEDURE FOR HANDLING STUDENTS' PETITIONS

When a student has a grievance involving his course, examinations or results, he may seek redress by submitting a written petition in accordance with the following procedure.

GRADES FOR LECTURES, TUTORIALS, PRACTICAL ASSIGNMENTS, TESTS

Student's petition under this category should be directed to the Head of Department where the course is taught. The Head of Department after due consideration, will dispose of the matter and communicate to the student. If the student is not satisfied with the decision of the Head of Department he may appeal through the Head of Department to the Dean of the Faculty and if need be, through him to the College Academic Board and if further need arises, to Senate through the Academic Board.

REVIEW OF EXAMINATION PAPERS

Where a student's petition on examination results requires the review of already marked script, an approved fee must be paid per script by the student before the petition would be entertained. Such petition should be directed to the Secretary to Senate with receipts of payment of requisite fees attached, for necessary action.

In the remarking process, only one independent person should be accepted to remark a paper and the marks awarded by this independent person should be accepted as final. Where the remarking process involves final year second semester courses which had previously been moderated by an External Examiner, the remarking should be done by the External Examiner whose grades shall be accepted as final. If however, the paper in question was one of the papers picked up and remarked by the External Examiner during his/her random sampling of answer scripts, the marks earlier awarded by the External Examiner shall stand.

REGULATIONS ON EXAMINATION IRREGULARITIES

Examination malpractices are irregularities or infringements of the regulations during the conduct of an examination. These include but not limited to, students copying from each other, students bringing into the examination hall, papers, books or other materials during the examination, walking about, causing any form of disturbance, not observing the time regulations of the examination, disobeying, insulting or fighting the invigilator(s). The chief invigilator is required to make a written report immediately, using the
prescribed form, on each case of examination malpractice or irregularity to the Dean of the relevant Faculty through his/her HOD. If need be, extra sheets of paper should be used to include details not included in the form but which are important to the case. The invigilators shall as much as possible control the situation in the examination hall. An on-the-spot statement should be obtained from the student by making him/her read and sign the completed form. Where the student refuses to sign the filled out form, s/he should be asked to write his side of the malpractice story on the spot and submit to the chief invigilator.

THE FOLLOWING PROCEDURE WILL BE ADOPTED IN DEALING WITH EXAMINATION MALPRACTICE

i. The chief invigilator concerned shall, through his HOD, submit three copies of the completed Exam malpractice form together with other reports (if any) and necessary attachments to the Dean of the Faculty offering the course within two working days of the incident. The HOD keeps

one set of the documents and forwards two sets to the Dean.

ii. The Dean shall refer the matter to the Relevant Examination Committee through the Examinations Office of the Registry by forwarding one set of the documents to Examinations office. The Dean retains one set of documents in his/her office.

iii. The relevant Examination Committee should invite the student to appear before it and clear themselves of the allegations.

iv. The Dean of the Faculty and Head of Department shall inform the concerned students at the time the report was made to the committee and before their departure for vocation that they have cases to answer so that they will be available at the time the Committee will sit to deliberate on the allegations.

v. The relevant Examination Committee shall commence investigation within one week of the exams. The committee may obtain written or oral evidence from witnesses, the invigilator(s), the student concerned and any others, if necessary. Thereafter the committee shall submit its findings and recommendations to Senate for a final action.

vi. Any student found guilty of examination malpractice may be subjected to any of the following, depending on the gravity of the offence(s) committed and any appropriate recommendation of the committee.

1. The student may be issued with a warning
2. The student may fail the examination
3. The student may be sent down for one semester, one year, etc as the case may be.
4. The student may be expelled.

5. Any other appropriate punishment as prescribed by the committee in line with approved sanctions.

vii. Any other person who observes any examination malpractice or irregularity shall file a report to the Exams office of the Registry.

CATEGORIZATION OF EXAMINATION IRREGULARITIES AND ACCOMPANYING PUNISHMENT AS APPROVED BY SENATE

a. Examination Offences Committed by Students

The various examination offences committed by students are categorized by following:

1. Offences punishable by expulsion from the university.
2. Offences punishable by suspension for one year or more
3. Offences punishable by failure in the course
4. Offences punishable by issuing a student with written warning.

The following sanctions are recommended as appropriate for the various examination offences which are very common among students.

b. Punishment for Examination Offences Committed by Students

Group A: Offences Punishable by Expulsion from the University

i. Assault on an invigilator

ii. Impersonation: When the impersonator is not a student ESUT, s/he should be handed over to the Police and if s/he

is from another tertiary institution and his particulars are known, he should be reported to his institution.

iii. Involvement in alteration of grades.

iv. Being in possession of any dangerous weapon in and around examination venue. (In addition, the student should e handed over to the Police).

Group B: Offences Punishable by Three (3) Years Suspension

i. Involvement in examination leakage

ii. Destruction of evidence relevant to the case

iii. Smuggling already prepared answer scripts into the examination hall.

Group C: Offence Punishable by Three (3) Years Suspension for the Second Offender and Two (2) Years for the First Offender

i. Being in possession of material relevant to the examination.

ii. Refusal to surrender exhibit in connection with the examination offence

iii. Snatching of answer script from another student

iv. Writing solutions on any part of the body or clothes

v. Use of calculators to store solutions relevant to the solutions.

Group D: Offences Publishable by Three (3) Years Suspension for the Second Offender and One (1) Year for the First Offender

i. Smuggling out answer script from exam hall.

ii. Smuggling out examination questions from exam hall.

iii. Exchange of answer scripts during an examination for the partners.

iv. Failure/refusal to submit answer script after examination.

Group E: Offences Publishable by One (1) Year Suspension for the Second Offender and Being Made to Fail Examination for the First Offender

i. Wring solutions on any part of the question paper
ii. Exchange of question papers with solutions written on any part of them.
iii. Cheating by peeping into another person's work during an examination.
iv. Displaying one's work for another to copy from.
v. Talking to, or with another student during examination
vi. Disobeying the invigilator during examination; e.g. refusal to relocate; refusal to stop writing; refusal to sign in and out; undue delay in submitting answer script at the end of the examination.
vii. Creating disturbance during the examination, e.g. shouting slogan, shuffling feed unduly, whistling, fighting (both partners), assaulting another student, causing panic, etc.
viii. Unjustified verbal attack on the invigilator.

EXAMINATION OFFENCES COMMITTED BY STAFF

Dereliction of Examination Duties

	Offences	Sanctions
i.	Failure to invigilate a scheduled examination without a written permission	Forfeiture of examination allowance as follows: 1st offender, 3 months exam allowance 2nd offender, 6 months exam allowance

		3rd offender, 1 year exam allowance 4th offender, sacked from the university
ii.	Lateness at invigilation of scheduled examination (lateness means arriving after the scheduled time)	Letter of warning for first and second offenders and forfeiture of 3 months exam allowance for 4th offenders. Subsequent offenders will be denied consideration for, or promotion when they are due.
iii.	Failure to submit grades 8 week after examination was conducted.	Withholding of salary until grades are submitted; for 2nd offenders, promotion denied and 3rd offenders are sacked from the university.

Aiding and Abetting Examination Irregularity by Staff:

	Offences	Sanctions
i.	Leakage of examination questions	Dismissal from service
ii.	Connivance at observed case of students cheating at examination. This also includes failure to report such cases.	Suspension for one month without pay for the staff. The candidate(s) helped will also be made to fail the examination.

iii.	Solving problems for students in the examination hall.	Dismissal from service.
iv.	Unofficial alteration of grades	Dismissal from service.
v.	Misuse of answer scripts	Letter of warning for a first offender, a fine of N1,000.00 for a second offender; a fine of N2,000.00 for third offender, denial of promotion for a third offender; dismissal from service for a fourth offender.
vi.	Failure to return unused answer scripts	Surcharge for the number of scripts at the cost of N100.000 (or more as may be reviewed from time to time) per script.

INDUSTRIAL ATTACHMENT

i. No student shall embark on Industrial Training with more than nine (9) credits of carry over courses. Second semester of the penultimate year is reserved for industrial training of all students.

ii. A common system of assessment of students' Industrial Training scheme shall apply for all students irrespective of their departments.

iii. Every student shall submit at the end of Industrial Training:

a. An Industrial Training Report
b. A confidential report from the industry/company/institution etc. where training was undertaken.
c. A log book.

iv. The Industrial Training report, the confidential report, the log book and the supervisor's report(s) shall be forwarded to the relevant Heads of the students' Departments by the Co-ordinator, Students' Industrial Training Scheme, for grading with the assistance of the academic staff in these departments.

Number of weeks usefully spent in industrial training x 15 percent, maximum number of weeks.

i. If a student scored less than 40% of the total marks allocated to "Evidence of Actual Involvement during Training Period," that is less than 12%, he would be deemed to have failed in Industrial Training. He should, therefore, repeat Industrial Training by going back to the appropriate industrial establishment approved by the university for half the period of the time he should have spent on Industrial Training originally. He should then be assessed afresh following the above guidelines.

ii. The Log book shall be bound and sold to students at a reasonable price.

iii. Each student who has completed a period of Industrial Training shall produce four copies of the Industrial Training report. The student shall retain one copy and submit three to the Coordinator, Industrial Training Scheme, who, on adjudging the report to be satisfactory, would forward one copy each to the student's Department

and the Library and retain one copy in the Industrial Training office.

iv. The Industrial Training Report shall be marked according to the following scheme:
   (a) Layout 5%
   (b) Scientific/Technological/Technical content originality 5%
   (c) Intelligent use of illustrations 15%
   (d) Evidence of actual involvement during the training period 30%

v. That evidence of actual involvement during Industrial Training shall be assessed by grading the Confidential Report (10% maximum), the Log Book (15% maximum), and the Supervisor's Report (15% maximum).

SUPERVISOR'S REPORT(S)

If a supervisor's impression about the student is very high the student should be awarded the full mark of 5, or the student should get any mark less than 5, depending on the supervisor's impression. The pass mark shall be 40% of the maximum that is 2.

LOG BOOK

Before grading a student's log book, the lecturers shall ascertain how many weeks the student was supposed to have stayed on Industrial Training.

HONOUR ROLL

Honour Roll, being the document for listing students of outstanding academic performance, shall be kept by the university and shall be published annually after release of the second semester examination results.

i. A student shall obtain a Cumulative Grade Point Average 4.5 or above to be listed.
ii. The Vice Chancellor on behalf of the University, shall write and congratulate a student each time his/her name appears on the Honour Roll.
iii. The University shall award a certificate of Merit to the best graduating student of each year.

ADMINISTRATIVE PROCEDURE FOR ACADEMIC ADVISING

All teaching staffs are involved in academic advising. However, departments may decide to assign this duty to a few members of staff. When this procedure is followed, due allowance should be made for the time by the members of staff concerned with academic advising in relation to their duties. Also a single adviser must look after a single student throughout his course, but changes may be permitted by the Head of Department for very good reason(s).

It is the Registrar's duty to make available all relevant registration materials to Advisers and Head of Department. The Head of Department should arrange for the students to meet with their advisers with Departmental Enrolment Sheets and help them to decide on that courses entered in the Enrolment Sheet are appropriate for the particular Semester, and signs the sheet.

An academic staff, not below the rank of a Senior Lecturer, but preferably, a Professor should be appointed to supervise and monitor academic advising and ensure that the system is working satisfactorily in the university.

THE REGISTRAR

a. The Registrar shall make available in writing to the Department all academic and University Regulations.
b. Provide adequate and effective information on students after admission and registration.
c. Address the students during orientation week, giving them as much information as possible on the university and the academic life in the university community.
d. Disseminate information on job opportunities among students.
e. Provide information to students on career opportunities.

MATERIALS FOR ACADEMIC ADVISING TO BE PRODUCED BY THE REGISTRAR

a. Produce and distribute freshman's Guide to both the freshmen/women and Academic Advisers.
b. Produce and distribute to the appropriate departments A Directory of students for use in the Departments.

FORMS FOR GENERAL OR PARTICULAR USE

a. Adviser's check sheet. This is to be used for keeping track of the student's academic progress.
b. Departmental Enrolment Sheet. This form is to be completed and signed y the Adviser before registration day. From it the students' official Enrolment Card may be filled by any designated representative. Each Department should prepare its own Departmental Enrolment Sheet.

c. Personal Data Card. The Registrar's office will send a copy each to the Department and the Academic advisers.
d. Form for request for Academic Progress. This may be filled by lecturers at the request of an Adviser.

INFORMATION TO BE PREPARED BY THE DEPARTMENTS AND USE AT THE DEPARTMENTAL LEVEL

a. Miscellaneous information relating to enrolment.
b. A list of advisers and their students.
c. Three-year and 4-year degree programme, with clear indications of the compulsory credits required by the Department.

UNIVERSIT AND DEPARTMENTAL REGULATIONS

Regulations governing the following academic activities shall be produced for use in the university.

i. University Regulations
ii. Class attendance list.
iii. Registration Forms/materials

FUNCTIONS OF THE VARIOUS OFFICERS OF UNIVERSITY IN RESPECT OF ACADEMIC ADVISING

1. Academic Advisers:

Mapping out programmes for individual students. Ensuring effective enrolment of students during registration periods. Checking of academic load of students with regard to the number of credit hours to be carried pro session. Changing of course or degree programmes. Making sure that the regulation of Academic Departments of the University are duly observed by the students.

Effective keeping of folders for the students. Interviewing the students at least once every session. Making a sessional academic appraisal on the work of
each student. Consulting the Student Affairs office where students have psychological problems to be solved.

2. Head of Department:

Appoint of Advisers; ensuring that the Academic Advisers do their work effectively; meeting students and staff in order to explain departmental procedures especially before registration (see orientation of student's paragraph below); receiving Adviser's recommendations and suggestions and considering other special cases referred to them by the Advisers. The types of recommendations to be checked include programmes for individual students, credit hours and changes of courses or degree programmes.

Enforcement of departmental and university regulations; mapping out all departmental degree programmes; including the compulsory credit hour load required by the department.

Making inter-departmental arrangements which concern staff and students in their departments; maintaining the major files on the students and giving their staff access to such files. Also making sure that the Advisers get duplicates of academic records of students; keeping the Deans and the Registrar informed about what allocations of Academic Advisers they have made in respect of every student in the departments.

Dean of Faculty:

Ensuring that all the departments have clearly marked out programmes (see 'Academic Advisers').

Reviewing Head of Departments' recommendations and suggestions and considering special cases. Such special cases will deal with mapping out programmes for individual students, checking of credit hour loads, and changing of course or degree programmes. Ensuring compliance with Faculty and University regulations.

Student's Affair Officer:

a. Advising students on careers.
b. Arranging vacation jobs for them.
c. Making arrangement for work aid.
d. Arranging other loans/Scholarships.
e. Making hall arrangements and initiating disciplinary actions.
f. Informing Heads of Department about (c) and (d)
g. Giving any necessary psychological advise.

ORIENTATION FOR STAFF

The following method will be adopted for the orientation of staff:

a. All relevant documents and forms mentioned below in connection with the orientation of students will be made available to staff at appropriate times.
b. Advisers will be informed about their functions (see Head of Departments above).
c. The Registrar's office will send to the Academic Advisers through the Dean and Head of Department all information and forms concerning students' advising.
d. From time to time, regular departmental staff meeting will be held during which time students' progress and academic advising will be discussed. The Registrar will be invited to such meeting if need be.

ORIENTATION OF STUDENTS

The following method will be adopted for orientation of students:

i. Pre-Admission:

a. Information Handbook shall be sent to individual students on payment of appropriate fee to be determined by the Student Affairs Officer. Complimentary copies will be sent to schools and colleges throughout Nigeria.

b. Principals of schools and colleges and students shall be invited to visit the university.

c. University Information Bulletin will be sent to schools and institutions throughout Nigeria.

d. The Registrar's office will make available people talk to schools and colleges on request.

e. The opportunity offered by visits of schools principals may be used to give them information about the university.

ii. Pre-Registration

Before students who have been offered admission to the university enroll for their courses, they will be issued with their schedule of fees. The Dean of Student Affairs will notify the students who have chosen to be provided with accommodation by the Student Accommodation Advisory Bureau (SAAB) about the rules and regulations governing such accommodation.

GUIDING INFORMATION ON CLEARANCE, FEES, REGISTRATION, AND OTHER RELATED MATTERS

On arrival at the university, fresh students report at the treasury unit of the university or college Bursary to pay the acceptance fee.

They report at the Registry thereafter, with all their credentials, letters of admission and receipt in respect of the acceptance fee, and collect acceptance and clearance forms from the Registrar's representative in the college. Complete the forms as required in triplicate and return them to the same officer with three file folders.

LATE REGISTRATION

Registration of courses shall end one month after the commencement of each semester. Late registration may however be permitted on payment of the prescribed fee. Late registration lasts for two weeks and students who fail to register within this period should consider themselves as having been processed out of the university.

INTERNAL AND EXTERNAL TRANSFERS

Students who have been duly registered into specific academic departments may be allowed to transfer into other departments after one academic year of their stay in the department of initial admission, subject to cumulative grade point average of 2.40.

External transfer to other institutions of higher learning may be considered after appropriate recommendations from both the Head of Department and the Dean.

Students who seek transfers should therefore begin by consulting with their Head of Department.

SEMESTERS

Normally the University adheres to the following semester dates:
First Semester – Mid October to Mid February

Second Semester – Mid March to end June
Long Vacation – July to Mid October

VOLUNTARY WITHDRAWAL

Requests for voluntary withdrawal for genuine reasons may be allowed, provided the Head of Department, Deans of Faculty are in agreement. Such requests for voluntary withdrawal are granted if:

The students had paid the full fees for the semester and duly registered.

However for fresh students, requests for voluntary withdrawal shall not be permitted. Rather the students should be encouraged to seek for deferment within the time frame allowed by the University for Deferment of admissions.

GUIDANCE AND COUNSELING SERVICES

Guidance and counseling services to the students of the university are a part of the responsibility of the Students Affairs Department. Students who need counseling services should report at the Student Affairs Department and see the Dean of Students Affairs.

GUIDANCE FOR THE OPERATION OF THE MATURE STUDENTS' PROGRAMME

i. The Mature Students' Programme was approved by the University Senate in 1988 and commenced in 1988/89 academic year with a token admission of the full-time option students into some departments especially in the Faculty of Social Sciences. The guidelines for operations of this

Programme was considered and approved by Senate on 22nd November 1989. The highlights are as follows:

ii. Basic qualification shall be limited to considerable level of basic education plus a minimum age of 35 years. Years of relevant job experience as well as quality of basic educational shall constitute an advantage.

To give effect to the foregoing provision, scoring criteria shall be worked out and applied in the processing of the applications.

iii. The Special Condition of Release Permissions from each candidate's employer shall be taken into account in admitting into the part-time option of the programme.

iv. An approved application fee is payable for obtaining application forms for the Programme. Other fees payable shall be announced from time to time.

v. All Mature Students Programme in ESUT are centrally coordinated in the university headquarters under a Director.

FRESH PROPOSAL ON MODE OF STUDY

a. Course content and structure to be followed by mature part-time students shall be identical with those of their full time counterparts.

b. All the students shall start their programmes from first year excepting where Senate on the recommendation of the Mature Students Programme Board approves otherwise.

c. Attendance to lectures shall be mandatory for all mature part-time students for a minimum of one hour a week per registered course taught within the official Time Table of the Mature Student's Programme.

d. Official lecture hours for the Mature Student part time programme shall be in the evenings and on weekends.

e. The minimum number of courses registrable in one semester shall be 8 while the minimum shall be 4 for a minimum of 9 credit loads and a minimum of 15 credits.

f. Course duration shall be flexible depending on the length of time required or taken by each student to complete the relevant course credit requirements.

g. In addition to a minimum of 50% attendance of lectures required, each student will be required to take an active part in the university's special home study support programme based on relevant reading materials.

h. Course requirements in areas other than those provided for under section a – g above shall be the same as for the regular full time students.

i. The minimum and maximum number of years of study for non-Engineering programmes shall be 6 and 9 years, respectively; for Engineering programmes, it shall be 7 and 10 years respectively.

j. Admitted candidates shall be required to withdraw at any point in time, should the University Administration discover that they did not attain the minimum age of 35 years required for the programme or that information on the basis of which a given candidate was admitted, was false.

EXAMINATION MALPRACTICE

A	**NATURE OF OFFENCE**	**PENALTY**
i.	Impersonation	Expulsion for both students
ii.	Forged receipt(s)	Expulsion

iii.	Unauthorized handling of examination questions	Suspension for three (3) years. Expulsion at repeat of the same offence
iv.	Collaborative copying	Suspension for two (2) years
v.	Exchange of answer Booklets/written materials	Suspension for two (2) years
vi.	Refusal to handover suspected/incriminating materials	Suspension for three (3) years. Expulsion at a repeat of the same offence.
vii.	Destruction of suspected /incriminating material	Expulsion
viii.	Mutilation or use of fake/false Registration Number	Expulsion
ix.	Assault or fighting an invigilator	Expulsion
x.	Presentation of false identity card	Suspension for three (3) years
xi.	Possession of unauthorized material relevant to the examination	Suspension for three (3) years
xii.	Smuggling of question paper out of the examination hall	Suspension for three (3) years
xiii.	Smuggling of answer script into the examination hall	Suspension for three (3) years
xiv.	Refusal to appear before malpractice panel after three invitations	Expulsion
xv.	Refusal to sign examination misconduct form	Suspension for one (1) year

COURSE DESCRIPTION

The BEng Mechanical and Production Engineering program offers a comprehensive foundation in the fundamental principles of engineering, providing students with the necessary knowledge and experience to pursue various careers in engineering, technology, business, and management. The program focuses on developing analytical, technical, and problem-solving skills to design, develop, and enhance mechanical systems and manufacturing processes.

Throughout the program, a variety of teaching styles are employed to accommodate the diverse range of topics covered in modern mechanical engineering. This approach ensures that you will acquire a broad set of skills and expertise essential for professional engineers.

In addition to core units that cover essential subjects such as mechanics, thermodynamics, materials science, manufacturing processes, automation, and quality control, the final year offers the flexibility to choose specialized units based on your interests and career aspirations. This allows you to delve deeper into specific areas of mechanical and production engineering that align with your personal and professional goals.

The final year of the program also includes a significant group project. In this project, you and your peers will collaborate to undertake a major investigative endeavor, which may involve scientific experiments, modeling, design, and investigations. This group project offers an opportunity to apply the knowledge and skills acquired throughout the program in a practical and real-world context, further enhancing your problem-solving abilities and teamwork skills.

Overall, the BEng Mechanical and Production Engineering program provides a well-rounded education that combines theoretical

knowledge, practical experience, and teamwork. By completing this program, you will be equipped with the necessary expertise to tackle engineering challenges, contribute to technological advancements, and succeed in various professional roles within the field of mechanical and production engineering.

AIMS

This course aims to provide you with an education that covers the breadth of this diverse subject, imparting the necessary knowledge, understanding and skills so that they can operate effectively in your initial appointment and develop your career:

- Develop strong intellectual and practical skills to critically analyse, investigate and solve mechanical engineering problems
- Develop a high degree of competence in the use and adaptation of existing methods, tools and techniques and the application of engineering principles
- Instil creativity in addressing problems relating to engineering components and systems
- Develop a high degree of competence in engineering design, experimentation, technologies of manufacturing and effective management of companies
- Develop skills in the use of computers, software packages, team working, communication, time management and independent learning

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

1. PEO 1: Graduates will apply their knowledge of mathematics, science, and engineering principles to analyze and solve complex mechanical engineering problems.

2. PEO 2: Graduates will demonstrate proficiency in using modern engineering tools, techniques, and software to design, model, simulate, and analyze mechanical systems.
3. PEO 3: Graduates will exhibit effective communication and teamwork skills, enabling them to collaborate with multidisciplinary teams and effectively convey technical information to diverse audiences.
4. PEO 4: Graduates will engage in lifelong learning and professional development, pursuing advanced degrees, certifications, and continuing education opportunities to enhance their knowledge and skills in mechanical engineering.
5. PEO 5: Graduates will demonstrate a strong commitment to ethical and professional responsibility in their engineering practice, considering societal, environmental, and economic factors while designing and implementing mechanical systems.

PROGRAM OUTCOMES

Program Outcomes (POs) for a Mechanical Engineering Program are published in the student handbook where they can easily familiarise themselves with it. At the end of the program, the graduates will be equipped with the ability to:

1. Apply knowledge of mathematics, science, and engineering fundamentals to solve mechanical engineering problems.
2. Design and conduct experiments, as well as analyze and interpret data to evaluate mechanical systems and components.

3. Design and develop mechanical systems, components, or processes that meet desired specifications and performance requirements, considering factors such as safety, reliability, and cost-effectiveness.
4. Use modern engineering tools, software, and equipment to model, simulate, and analyze mechanical systems, and to design and produce engineering documentation.
5. Function effectively as a member or leader of a multidisciplinary team, understanding the importance of teamwork, collaboration, and effective communication.
6. Demonstrate an understanding of professional and ethical responsibilities in mechanical engineering practice, and the impact of engineering solutions in societal, environmental, and economic contexts.
7. Recognize the need for, and engage in, lifelong learning, keeping up with advancements in the field of mechanical engineering and pursuing professional development opportunities.
8. Communicate effectively, both orally and in writing, using appropriate technical language and visual aids to convey technical information to different audiences.
9. Understand the impact of mechanical engineering solutions on global, economic, environmental, and societal issues, and the need for sustainable and ethical practices.
10. Demonstrate knowledge and understanding of contemporary issues in mechanical engineering, including emerging technologies, industry trends, and professional standards

General Programme Structure

This programme, which leads to a B.Eng. (Mechanical and Production Engineering) degree, is designed to cover a normal period of 5 years post 0'Level or 4 years post A – Level. The 5 year candidates are expected to progress from 100 Level to 500 – Level while the 4 year candidates progress from 200-level to 500 –level.

Each academic year consists of two semesters, each approximately 15 weeks long. The 100-level candidates spend one year in the Faculty, take courses partly from Faculty of Science like Physics, Chemistry and Mathematics. As far as the programme execution is concerned, the courses at the 100 and 200 levels are common to all the students in the Faculty. A few common courses are still run at the 300 and 400 levels. From 200 to 500 level, seven semesters are devoted to formal lectures, tutorials, practical and projects while one semester is used for industrial attachment training.

Teaching and learning

You will be taught by academic staff who are leading experts in mechanical engineering, in a diverse and inclusive learning environment.

We use a combination of lectures, tutorial classes, take home problem sets practical laboratory sessions and computer-based sessions.

An integral component of the program is the annual group design project. Working in small teams, you will tackle real-world engineering challenges and collaborate to devise innovative solutions. This project emphasizes teamwork, enabling you to develop your problem-solving and project management skills while fostering effective communication and cooperation within a group setting.

In the final (fifth) year of the program, you will embark on a compulsory group project. This project provides a unique opportunity for you to delve deeply into a specific subject or application area that aligns with your interests and career aspirations. Working closely with your project supervisor, you will conduct independent research, apply advanced methodologies, and demonstrate your expertise in the chosen area.

Coursework and assessment

Most course units are assessed through an examination (at the end of the semester) and coursework which is undertaken throughout the year. Parts of the coursework are, in many instances, associated with practical quizzes, laboratory sessions, whilst others may be based on problem sheets, reports etc.

Course unit details

The courses are grouped into three major groupings: The General Studies Courses, the foundational engineering courses and core engineering courses. The General Studies Courses are taught mostly in year 1.

The foundational engineering courses are taught in the second year while the key engineering knowledge and skills are taught in the core syllabus throughout all years of the course beginning rom the third year.

We view design as an especially important activity, as it integrates the engineering topics across the degree course. Years 2 and 3 also include compulsory workshop practice sessions.

The student’s embark on a six month compulsory industrial Training (IT) attachment in the second semester of year four.

A group research project is carried out in Year 5.

COURSE DESCRIPTIONS
100 LEVEL

FIRST SEMESTER

Course Code	Course title	Total credit
GST 111	Communication in English I	2
GST 113	Nigeria Peoples and Culture	2
GST 121	Use of library, Study Skills & ICT	2
ICH 111	General Chemistry I	3
ICH 197	General Practical Chemistry 1	1
MAT 111	Elementary Mathematics I	3
PHY 111	General Practical Physics 1	3
CEE 121	Computer Programming	3
PHY 197	General Practical Physics I	1
	Total	20

100 LEVEL
SECOND SEMESTER

Course Code	Course Title	Total Credit
GST 112	Communication in English II	2
MEC 122	Basic Engineering Drawing	2
ICH 112	General Chemistry II	3
ICH 198	General Practical Chemistry II	1
MAT 112	Elementary Mathematics II	3
PHY 112	General Physics II	3
MME 122	Engineering Materials	3

PHY 198	General Practical Physics II	1
GST 118	Peace Studies & Conflict Resolution	2
GST 114	Social Sciences	2
	Total	22

200 LEVEL
FIRST SEMESTER

Course Code	**Course Title**	**Total credit**
EEE 221	Applied Electricity I	3
MEC 223	Engineering Drawing I	2
CHE 225	Fundamentals of Fluid Mechanics	3
CVE 227	Applied Mechanics	3
FEG 227	Engineering Mathematics I	3
FEG 221	Engineer in Society	2
CEE 221	Introduction to Modeling and Simulation	2
FEG 293	General Engineering Laboratory Course	1
	Total	**19**

200 LEVEL
SECOND SEMESTER

Course Code	**Course Title**	**Total Credit**
ENS 222	Introduction to Entrepreneurship	2
EEE 222	Applied Electricity II	3
MEC 224	Engineering Drawing II	2
FEG 294	Student Workshop Experience	1
CHE 226	Fundamentals of Thermodynamics	3
CVE 228	Strength of Materials	3
FEG 228	Engineering Mathematics II	3

FEG 290	SIWES I	2
	Total	**19**

300 LEVEL

FIRST SEMESTER

Course Code	**Course Title**	**Total Credit**
ENS 311	Entrepreneurship Practicum	2
FEG 321	Engineering Mathematics III	3
MEC 341	System Analysis & Modeling	2
EEE 343	Electrical Machines	2
MEC 381	Engineering Communication	1
MEC 361	Thermodynamics I	2
MEC 371	Fluid Mechanics I	2
MEC 397	Laboratory Practicals I	2
MEC 351	Workshop Practice	2
MEC 353	Manufacturing Technology	2
	Total	**20**

300 LEVEL
SECOND SEMESTER

Course Code	**Course Title**	**Total Credit**
FEG 322	Engineering Mathematics IV	3
MEC 344	Theory of Machines I	2
MEC 352	Engineering Metallurgy	2
MEC 322	Engineering Statistics	2
MEC 398	Laboratory Practicals II	1

MEC 332	Mechanics of Materials	2
MEC 326	Engineering Drawing III	2
MEC 342	Engineering Mechanics	2
FEG 390	SIWES II	3
	Total	**19**

400 LEVEL
FIRST SEMESTER

Course Code	**Course title**	**Total credit**
MEC 461	Thermodynamics II	2
MEC 463	Heat and Mass Transfer I	2
MEC 447	Theory of Machines II	2
MEC 475	Fluid Mechanics II	3
MEC 431	Machine Design I	3
MEC 433	Advanced Mechanics of Materials	2
MEC 441	Computers and Computational Methods	2
MEC 499	Laboratory Practicals III	2
	Total	**18**

400 LEVEL
SECOND SEMESTER

Course Code	**Course Title**	**Total Credit**
FEG 490	SIWES III	6

500 LEVEL
FIRST SEMESTER

Course Code	**Course Title**	**Total Credit**

MEC 583	Engineering Law	2
MEC 565	Applied Thermodynamics	2
MEC 575	Fluid Dynamics	2
MEC 533	Machine Design II	2
MEC 597	Laboratory Practice IV	2
MEC 545	Theory of Elasticity and Fracture	2
MEC 543	Control System	2
MEC 581	Advanced CAD/CAM	3
MEC 591	Seminar	3
	Total	**20**

500 LEVEL
SECOND SEMESTER

Course code	**Course title**	**Total credit**
MEC 582	Engineering Management	2
MEC 566	Heat & Mass Transfer II	2
MEC 534	Machine Design III	2
MEC 568	Refrigeration and Air-Conditioning	2
MEC 564	Tribology	2
MEC 576	Turbomachinery	2
MEC 599	Project	6
	Total	**18**

BENG MECHANICAL AND PRODUCTION ENGINEERING COURSE DETAILS

Course description

The BEng Mechanical and Production Engineering will give you an excellent grounding in the knowledge and experience of the most

fundamental of all engineering disciplines, preparing you for a variety of careers in engineering, technology, business and management.

We use a variety of teaching styles that reflect the diversity of topics covered in modern mechanical engineering, and you will develop the range of skills and expertise that a professional engineer must possess.

In addition to core (compulsory) units, the final year provides you with the opportunity of choosing specialist units. Moreover, the final year also features a group project - you will undertake a major investigative project by within your group, which may require all or one of scientific experiments, design, modelling and investigations.

Aims

This course aims to provide you with an education that covers the breadth of this diverse subject, imparting the necessary knowledge, understanding and skills so that they can operate effectively in your initial appointment and develop your career:

- Develop strong intellectual and practical skills to critically analyse, investigate and solve mechanical engineering problems
- Develop a high degree of competence in the use and adaptation of existing methods, tools and techniques and the application of engineering principles
- Instil creativity in addressing problems relating to engineering components and systems
- Develop a high degree of competence in engineering design, experimentation, technologies of manufacturing and effective management of companies

- Develop skills in the use of computers, software packages, team working, communication, time management and independent learning

PROGRAM EDUCATIONAL OBJECTIVES (PEOS) FOR A MECHANICAL ENGINEERING PROGRAM:

1. Graduates will apply their knowledge of mathematics, science, and engineering principles to analyze and solve complex mechanical engineering problems.
2. Graduates will demonstrate proficiency in using modern engineering tools, techniques, and software to design, model, simulate, and analyze mechanical systems.
3. Graduates will exhibit effective communication and teamwork skills, enabling them to collaborate with multidisciplinary teams and effectively convey technical information to diverse audiences.
4. Graduates will engage in lifelong learning and professional development, pursuing advanced degrees, certifications, and continuing education opportunities to enhance their knowledge and skills in mechanical engineering.
5. Graduates will demonstrate a strong commitment to ethical and professional responsibility in their engineering practice, considering societal, environmental, and economic factors while designing and implementing mechanical systems.

PROGRAM OUTCOMES (POS) FOR A MECHANICAL AND PRODUCTION ENGINEERING PROGRAM:

Program Outcomes (POs) for a Mechanical Engineering Program are published in the student handbook where they can easily familiarise themselves with it. At the end of the program, the graduates will be equipped with the ability to:

1. Apply knowledge of mathematics, science, and engineering fundamentals to solve mechanical engineering problems.
2. Design and conduct experiments, as well as analyze and interpret data to evaluate mechanical systems and components.
3. Design and develop mechanical systems, components, or processes that meet desired specifications and performance requirements, considering factors such as safety, reliability, and cost-effectiveness.
4. Use modern engineering tools, software, and equipment to model, simulate, and analyze mechanical systems, and to design and produce engineering documentation.
5. Function effectively as a member or leader of a multidisciplinary team, understanding the importance of teamwork, collaboration, and effective communication.
6. Demonstrate an understanding of professional and ethical responsibilities in mechanical engineering practice, and the impact of engineering solutions in societal, environmental, and economic contexts.
7. Recognize the need for, and engage in, lifelong learning, keeping up with advancements in the field of mechanical engineering and pursuing professional development opportunities.
8. Communicate effectively, both orally and in writing, using appropriate technical language and visual aids to convey technical information to different audiences.

9. Understand the impact of mechanical engineering solutions on global, economic, environmental, and societal issues, and the need for sustainable and ethical practices.
10. Demonstrate knowledge and understanding of contemporary issues in mechanical engineering, including emerging technologies, industry trends, and professional standards

COURSE CONTENT SPECIFICATIONS/SYLLABUS

100 LEVEL COURSES

GST 111: Communication in English (2 Units)

Course Learning Objectives (CLO):

1. Define the language skills in English;

2. Define with examples the parts of Speech in English;

3. Define the concept of morpheme and state its types and features;

4. Discuss the word formation processes;

5. Discuss the other grammatical units in English; and

6. Define the English concord and state the types and rules.

Course Learning Outcomes (CLO):

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

1. Identify possible sound patterns in English Language;

2. List notable language skills;

3. Classify word formation processes;

4. Construct simple and fairly complex sentences in English;

5. Apply logical and critical reasoning skills for meaningful presentations;

6. Demonstrate an appreciable level of the art of public speaking and listening; and

7. Write simple and technical reports.

Course Contents

Sounds and sound patterns in English Language (vowels and consonants, phonetics and phonology); English word classes (lexical and grammatical words, definitions, forms, functions, usages, collocations); major word formation processes; the sentence in English (types: structural and functional); grammar and usage (tense, concord and modality). Reading and types of reading, comprehension skills, 3RsQ. Logical and critical thinking; reasoning methods (logic and syllogism, inductive and deductive argument, analogy, generalization and explanations). Ethical considerations, copyright rules and infringements. Writing activities (pre-writing (brainstorming and outlining), writing (paragraphing, punctuation and expression), post- writing (editing and proofreading). Types of writing (summary, essays, letter, curriculum vitae, report writing, note-making). etc. Mechanics of writing. Information and Communication Technology in modern language learning. Language skills for effective communication. The art of public speaking.

Assessment methods:

Method	Weight

Exam	**70%**
Others (Quiz and assignments)	**30%**

Feedback methods: Feedback on the Assessed assignment work both class-wide and individual

GST 112: Nigerian Peoples and Cultures (2 Units)

Course Learning Objectives (CLO):

1. Introducing students to the traditional Southern and Northern Nigerian peoples and culture;
2. Helping students understand the evolution of Nigeria as a political unit;
3. Highlighting some major culture areas of Nigeria;
4. Analyzing the impact of Western education on national development in Nigeria; and
5. Helping students understand the concepts of functional education, national economy, and social justice

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Analyze the historical foundation of Nigerian cultures and arts in pre-colonial times;
2. Identify and list the major linguistic groups in Nigeria;
3. Explain the gradual evolution of Nigeria as a political entity;
4. analyze the concepts of trade and economic self-reliance of Nigerian peoples in relation to national development;
5. Enumerate the challenges of the Nigerian state regarding nation building;

6. Analyze the role of the judiciary in upholding fundamental human rights
7. Identify the acceptable norms and values of the major ethnic groups in Nigeria; and
8. List possible solutions to identifiable Nigerian environmental, moral and value problems.

Course Contents

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

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, assignments)	**30%**

Feedback methods: Feedback on the Assessed assignment work both class-wide and individual

GST 121: Use Of Library, Study Skills and ICT (2 Units)

Course Learning Objectives (CLO):

1. To identify and selected information materials.
2. Determine the information needs of users through user community analysis.
3. To acquire selected books and non-book materials through purchase, donations or gift and exchange
4. To ensure users are assisted to use library materials by paying attention to users queries
5. To ensure there is internet connectivity which bridges gap for physical books
6. To preserve for future generation, all information materials both in print and non-print format

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Acquaint themselves with the parts of a book and the different types of libraries resources including the use of media resources

2. Understand the purpose of the University Library, the kind of materials it acquires and their physical arrangement and organization.
3. Have a general idea of classification systems used in libraries as God was the first classifier.
4. Know or have knowledge of how to select books on their subject areas as well as spiritual growth
5. Know how to use the card catalogue and ability to search for information beyond the catalogue e.g. internet search.
6. 6. Familiarize them with the major reference books both general and specialized, what they are and how to use them

Course Contents

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

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, Assignments)	**30%**

Feedback methods: Feedback on the Assessed assignment work both class-wide and individual

ICH 111: General Chemistry I (2 Units)

Course Learning Objectives (CLO):

1. 1. Develop good study habit
2. Learn to perform the appropriate mathematical operations in the different topics of chemistry.
3. Understand and use the basic concepts of chemistry and be able to apply these concepts to more in-depth studies and in different sequences.
4. Prepare for a position in one of many fields such as chemical industry, agriculture, textiles, nutrition, or medicine

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. define atom, molecules and chemical reactions;
2. discuss the modern electronic theory of atoms;
3. write electronic configurations of elements on the periodic table;
2. rationalize the trends of atomic radii, ionisation energies, electronegativity of the elements, based on their position in the periodic table;
3. identify and balance oxidation–reduction equation and solve redox titration problems;
4. draw shapes of simple molecules and hybridised orbitals;
5. identify the characteristics of acids, bases and salts, and solve problems based on their quantitative relationship
6. apply the principles of equilibrium to aqueous systems using LeChatelier's principle to predict the effect of concentration, pressure and temperature changes on equilibrium mixtures;

7. analyse and perform calculations with the thermodynamic functions, enthalpy, entropy and free energy; and
8. Determine rates of reactions and its dependence on concentration, time and temperature.

Course Contents

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

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

ICH 197: General Practical Chemistry I (1 Unit)

Course Learning Objectives (CLO):

1. Enhance students' practical laboratory skills and equipment/instrument use.
2. Enhance students' general transferable skills.
3. To contextualize theory in the real world.

4. Enhance students' engagement with the subject

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. State the general laboratory rules and safety procedures;
2. Collect scientific data and correct carry out chemical experiments;
3. Identify the basic glassware and equipment in the laboratory;
5. State the differences between primary and secondary standards;
6. perform redox titration;
7. Record observations and measurements in the laboratory notebooks; and
8. Analyze the data to arrive at scientific conclusions.

Course Contents

Laboratory experiments designed to reflect topics presented in courses ICH 111 and ICH 112. These include acid-base titrations, qualitative analysis, redox reactions, gravimetric analysis, data analysis and presentation.

Assessment methods:

Method	Weight
Exam	**0%**
Others (Reports problem sets, labs)	**100%**

Feedback methods: Feedback on the Assessed report and lab work both class-wide and individual

MTH 111: Elementary Mathematics I (3 Units)

Course Learning Objectives (CLO):

1. Discuss the concept of logic and abstract thinking
2. Understand the concept of permutations and combination
3. Illustrate Binomial expansion of algebraic expression
4. Understand the algebraic operations of matrixes and determinants

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

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

Course Contents

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

Assessment methods:

Method	Weight
Exam	**70%**

Others (Quiz, problem sets)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

PHY 111: General Physics I (2 Units)

Course Learning Objectives (CLO):

1. Definition of the basic concept of Physics in connection to introductory mechanics, thermal and properties of matter.
2. Explanation of basic unit of quantities in Physics
3. Recognize some basic problem solving approaches in Physics in connection t
4. Preliminary analysis of mechanics, thermal and properties of matter.
5. Application of physics problem solving concepts to Physics problems in connection to Formulation of Physics problems in connection to introductory mechanics, thermal and properties of matter

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Identify and deduce the physical quantities and their units;
2. Differentiate between vectors and scalars;
3. describe and evaluate motion of systems on the basis of the fundamental laws of mechanics;
4. Apply Newton's laws to describe and solve simple problems of motion;
2. Evaluate work, energy, velocity, momentum, acceleration, and torque of moving or rotating objects;

3. Explain and apply the principles of conservation of energy, linear and angular momentum;
4. Describe the laws governing motion under gravity; and
5. Explain motion under gravity and quantitatively determine behaviour of objects moving under gravity.

Course Contents

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

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

CEE 121: Computer Programming (3 Units)

Course Learning Objectives (CLO):

1. Describe the concept of programming logic, programs, algorithms and flowcharts.
2. Designing and implementation, debug and test small programs using different programming paradigms
3. Translate common programming tools such as compilers, editors and debuggers to design, implement, debug and test small programs.
4. Demonstration of the relative advantages and disadvantages of each programming tools kills

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Provide vivid descriptions on the concept of programming logic, programs, algorithms and flowcharts
2. Design, implement, debug and test small programs using different programming paradigms
3. Use common programming tools such as compilers, editors and debuggers to design, implement, debug and test small programs
4. .Demonstrate a clear understanding of the relative advantages and disadvantages of each programming tools kills

Course contents

Introduction to computers and computing problems solving on computer algorithms, design using flowchart and pseudo-code. Introduction to high level programming languages. Basic and FORTRAN syntax, flow of control, input/output constructs, data types. Programming in FORTRAN. Extensive exercises in solving engineering problems using flowchart and pseudo-code

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

PHY 197: General Practical Physics I (1 Unit)

Course Learning Objectives (CLO):

1. Identify the importance of graphs in the study of physics
2. identify the two variables as physical quantities to be measured,
3. show how the two variables are related either linearly or non-linearly,
2. identify linear relationship from non-linear relationship
3. translate non-linear relationships to linear relationships
4. Use graphs to determine physical constants through the use of slopes (gradients) or intercepts.

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

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

Course Contents

Introductory course emphasizes quantitative measurements, the treatment of measure errors, and graphical analysis. A Variety of experimental techniques will be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, etc., covered in PHY 111 and PHY 112. However, emphasis should be place on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

GST 112: Communication in English II (2 Units)

Course Learning Objectives (CLO):

1. Develop paragraphs in a logical and coherent manner ;
2. Develop outlines and create supporting
3. Recognize and write topic sentences and attain coherence in written English; sentences
5. Write various forms of essays (narrative, descriptive, expository and argumentative/persuasive);
6. Recognize and produce as accurately as possible, the English vowels and consonants;
7. Deliver an effective public speech

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Advance paragraphs in a logical and coherent manner ;
2. Change outlines and create supporting
3. Identify and write topic sentences and attain coherence in written English; sentences
4. Mark various forms of essays (narrative, descriptive, expository and argumentative/persuasive);
5. Distinguish and produce as accurately as possible, the English vowels and consonants;
6. Distribute an effective public speech

Course Contents

Logical presentation of papers; phonetics; Instruction on lexis; Art of publics peaking and oral communication; figures of speech; précis; Report writing. Understanding writing skills (effective writing skills, the process of writing, qualities of a good writing). The paragraph (developing paragraph, structuring the paragraph, the topic sentence, writing effective paragraphs). Outlining {writing an outline, components of an outline, sample outlines) . Essay writing 1 (narrative & descriptive). Essay writing (argumentative and expository. Speaking skills

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

GST 118: PEACE AND CONFLICT RESOLUTION (2 Units)

Course Learning Objectives (CLO):

1. Meaning and nature of conflict
2. Causes and types of conflicts
3. Types of issues on conflict analysis, management, resolution and transformation
5. Processes of conflict resolution – mediation negotiation, arbitration, litigation, conciliation and so on
6. Explanation of peace education
7. Scrutinization the role of communication and language in conflicts
8. Explanations the importance of the rules of conflict intervention
9. Determination the latent stage of conflict and possible response
10. Global issues and peace-building

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Define and explain the meaning and nature of conflict
2. Discuss the causes and types of conflicts
3. Discuss issues on conflict analysis, management, resolution and transformation
4. Explain the processes of conflict resolution – mediation negotiation, arbitration, litigation, conciliation and so on
5. Give detailed explanation of peace education
6. Examine the role of communication and language in conflicts

7. Explain the importance of the rules of conflict intervention
8. Determine the latent stage of conflict and possible responses
9. Discuss and be familiar with global issues and peace-building.

Course Contents

Basic concepts in peace studies and conflict resolution; peace as vehicle of unity and development; conflict issues; Types of conflict, e.g. Ethnic/religious/political/economic conflicts, Root causes of conflict and violence in Africa; Indigene/settler phenomenon; peace-building, management of conflict and security. Elements of peace studies and conflict resolution, developing a culture of peace; peace mediation and peace-keeping; Alternative dispute resolution (ADR). Dialogue/arbitration in conflict resolution; Role of international organizations in conflict resolution e.g. ECOWAS, Africa Union, United Nations, etc.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz)	**30%**

Feedback methods: Feedback on the Assessed work both class-wide and individual

GST 114: Social Sciences (2 Units)

Course Learning Objectives (CLO):

1. To introduce students to concepts of geography as a scientific discipline

2. To examine the sense of location specification, including an appreciation of forms and structure of Nigeria n settlement pattern, economic activities and challenges
3. To provide understanding on the relationships in economic and political geography of both in history and in the contemporary with the aim of creating environmental consciousness

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Understand the concepts of geography as a scientific discipline
2. Examine the sense of location specification, including an appreciation of forms and structure of Nigeria n settlement pattern, economic activities and challenges
3. Provide understanding on the relationships in economic and political geography of both in history and in the contemporary with the aim of creating environmental consciousness

Course Contents

Geography as a science and branch of studies in geography. Political development of Nigeria. Nigerian population: size, distribution and changes. Urbanization in Nigeria. Nigerian settlement dynamics. Nigerian Economy: Tourism and Transportation systems in Nigeria. Nigerian Economy: Nigeria basic production, economic system and industrialization. Environmental challenges in Nigeria. Nigerian Economy: Mining: Minerals and power. Nigerian vegetation zones and Agricultural

Assessment methods:

Method	Weight
Exam	**70%**

Others (Quiz, problem sets)	**30%**

Feedback methods: Feedback on the Assessed work both class-wide and individual

MEC-122 Basic Engineering Drawing (2 Units)

Course Learning Objectives (CLO):

1. Outline different types of lines & use of different types of pencils in an Engineering Drawing
2. Construct broader lines and dimensioning principles
3. Illustrate letters & numbers in drawing sheet
4. Develop projection of points, straight lines, solids etc.
6. Develop different types of surfaces.
7. Construct with illustrations isometric projection.
8. Draw freehand sketches and linkages with Engineering constructions

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Elucidate drawing as a means of communication.
2. Construct borderlines and dimensioning.
3. Illustrate drawing, measuring, lettering and dimensioning of objects in various views/positions;
4. Identify the various types of lines, their applications and geometry;

5. Demonstrate the geometrical construction of parallel and perpendicular lines, bisection and division of lines,

6. Draw construction and bisection of angles.

7. Construct triangles, inscribed, ascribed and circumscribed circles of triangle, quadrilaterals, polygons, circle and geometrical construction on circle

8. Demonstrate freehand sketching, symbols, conventions an scales

Course contents

Introduction to Engineering. Drawing as a means of communication. Drawing paper format. Engineering Dimensioning and border lines Drawing instruments and the use of graphic tools. Introduction to engineering drawing, measuring, lettering and dimensioning of objects in various views/positions. Types of lines and their applications. Engineering Geometry; geometrical construction of parallel and perpendicular lines. Bisection and division of lines. Construction and bisection of angles. Construction of triangles. Inscribed, ascribed and circumscribed circles of triangle, quadrilaterals, polygons, circle and geometrical. Construction on circle including principle of tangency. Conics and engineering curves; ellipse, parabola, hyperbola, cycloid, trochoid, involutes, simple mechanism etc. Fundamentals of Orthographic Projections, first and third angle orthogonal projections. Isometric projections. Freehand sketching. Symbols and Conventions. Scales.

Minimum Academic standards

Good drawing studio, equipped with more than NUC minimum academic standard requirement facilities.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

ICH 112: General Chemistry II (3 Units)
Course Learning Objectives (CLO):

1. Application theories and principles behind important chemical reactions in biochemistry and physiology, such as acid/base reactions, chemical equilibria, redox reactions, etc.
2. Relationship of terminology, functional groups, and reactivity of organic compounds.
3. Demonstration quantitative reasoning skills and competency with arithmetic, algebra, and statistics at a level appropriate for intermediate level science majors.
4. Description, explanation and application of the concepts, knowledge and vocabulary of general chemistry at the level necessary for success in intermediate and upper division course for science majors.

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. State the importance and development of organic chemistry;
2. Define fullerenes and its applications;
3. Discuss electronic theory;

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

Course Contents

Historical survey of the development and importance of organic chemistry; fullerenes as fourth allotrope of carbon, uses as nanotubules, nanostructures, nanochemistry. Electronic theory in organic chemistry. Isolation and purification of organic compounds; determination of structures of organic compounds including qualitative and quantitative analysis in organic chemistry; nomenclature and functional group classes of organic compounds. Introductory reaction mechanism and kinetics. Stereochemistry. The chemistry of alkanes, alkenes, alkynes, alcohols, ethers, amines, alkyl halides, nitriles, aldehydes, ketones, carboxylic acids and derivatives. The chemistry of selected metals and non-metals. Comparative chemistry of group IA, IIA and IVA elements. Introduction to transition metal chemistry.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

ICH 198: General Practical Chemistry II (1 Unit)

Course Learning Objectives (CLO):

1. Classification of rules and safety procedure in scenond phase of Practical Chemistry

2. Analysis scientific data and correctly carry out chemical experiments;
3. Identification the basic glassware and equipment in the laboratory;
4. Identification and transfer of preliminary tests which include ignition, boiling point, melting point, test on known and unknown organic compounds;

5. Analysis of solubility tests on known and unknown organic compounds;
6. Calculation of elemental tests on known and unknown compounds; and

7. Prescription of functional group/confirmatory test on known and unknown compounds which could be acidic/basic/ neutral organic compounds.

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. State the general laboratory rules and safety procedures;
2. Collect scientific data and correctly carry out chemical experiments;
3. Identify the basic glassware and equipment in the laboratory;

4. Identify and carry out preliminary tests which include ignition, boiling point, melting point, test on known and unknown organic compounds;

5. Carry out solubility tests on known and unknown organic compounds;
6. Carry out elemental tests on known and unknown compounds; and

7. Carry out functional group/confirmatory test on known and unknown compounds which could be acidic/basic/ neutral organic compounds.

Course Contents

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

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MAT 112: Elementary Mathematics II (Calculus) (3 Units)

Course Learning Objectives (CLO):

1. Identification the types of rules in differentiation and integration;
2. Recognition of meaning of function of a real variable, graphs, limits and continuity;
3. Computation of some applications of definite integrals in areas and volumes;
4. Calculations of function of a real variable, plot relevant graphs, identify limits and idea of continuity;
5. Classification of the derivative as limit of rate of change;
6. Techniques of differentiation and perform extreme curve sketching;
7. Integration as an inverse of differentiation;
8. Analysis of methods of integration and definite integrals; and
9. Integration application to areas, volumes.

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Identify the types of rules in differentiation and integration;
2. Recognize and understand the meaning of function of a real variable, graphs, limits and continuity;
3. Solve some applications of definite integrals in areas and volumes;
4. Solve function of a real variable, plot relevant graphs, identify limits and idea of continuity;
5. Identify the derivative as limit of rate of change;

6. Identify techniques of differentiation and perform extreme curve sketching;

7. Identify integration as an inverse of differentiation;

8. Identify methods of integration and definite integrals; and
9. Perform integration application to areas, volumes.

Course Contents

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

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

PHY 112 General Physics II (3 Units)

Course Learning Objectives (CLO):

1. List and explain the general properties of waves.
2. Describe the general properties of sound.
3. Describe what static electricity is and how it originates.

4. Define and demonstrate an understanding of electrical potential.
5. Analyze electrical circuits. .
6. Describe the properties of magnetic fields.
7. Explain how light interacts with lenses and mirrors. .
8. Describe optical phenomena associated with the wave properties of light.
9. Describe quantum theory and how it relates to the model of the atom
10. Describe the structure and properties of the nucleus of an atom.

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Explain the general properties of waves.
2. Describe the general properties of sound.
3. Describe what static electricity is and how it originates.
4. Demonstrate an understanding of electrical potential.
5. Analyze electrical circuits. .
6. Define the properties of magnetic fields.
7. Clarify how light interacts with lenses and mirrors. .
8. Label optical phenomena associated with the wave properties of light.
9. Designate quantum theory and how it relates to the model of the atom

Course Contents

General properties of waves. General properties of sound. Electricity is and how it originates. Electrical potential. Electrical circuits. Properties of magnetic fields. Light interacts with lenses and mirrors.

Optical phenomena associated with the wave properties of light. Quantum theory and how it relates to the model of the atom. Structure and properties of the nucleus of an atom.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

PHY 198 General Practical Physics II (1 Unit)

Course Learning Objectives (CLO):

1. Preparation of a written laboratory report that effectively interprets and communicates their results.
2. Effectively use computers as a tool for communication, data collection, and data analysis.
3. Laboratory activities where students collect, organize and analyze data demonstrating

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Be able to prepare a written laboratory report that effectively interprets and communicates their results.
2. Be able to effectively use computers as a tool for communication, data collection, data analysis.
3. Perform at least 10 laboratory activities where students collect, organize and analyze data demonstrating concepts from the 8 major objectives listed above

Course Contents

This practical course is a continuation of PHY 197 and is intended to be taught during the second semester of the 100 level to cover the practical aspect of the theoretical courses that have been covered with emphasis on quantitative measurements, the treatment of measurement errors, and graphical analysis. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MME 122 Engineering Materials (3 Units)

Course Learning Objectives (CLO):

1. Provide general introduction to the field of Physical Metallurgy.
2. Definition of crystal structures, solidification,
3. Explanation of equilibrium phase diagrams, transformation diagrams
4. Analysis of diffusion, liquid to solid transformations, ferrous and non-ferrous materials,
5. Description of Cold work, recovery and Recrystallization

Course Learning Outcomes (CLO):

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

1. list the main classes of engineering materials.
2. enumerate the important properties of each of the main classes of engineering materials. calculate the total energy of an electron in n^{th} orbit
3. describe the four quantum numbers
4. explain electronic configuration and the aufbau principles.
5. describe the different types of bonding, both primary and secondary bonding, with sketches. name the three most

common metal crystal structures and give examples of metals which have each of these crystal structures
6. sketch the unit cells of bcc, fcc and hcp crystal structures and calculate the packing efficiency of each of them.
7. distinguish between a metal, an alloy and a composite material
8. explain different fabrication methods in engineering and give examples of products made from each of them.

Course Contents

Introduction to electronics configuration, atomic structures, inter-atomic bonding mechanisms, crystal and microstructure. Relationship between structure and properties of metals, alloys, ceramics and plastics. Principles of eh behavior of materials in common environments. Fabrication processes and applications.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

200 LEVEL COURSES

EEE 221 Applied Electricity I (3 Units)

Course Learning Objectives (CLO):

1. Explanation of electrical machines and apply them for practical problems

2. Explain various types' semiconductors.

3. Analysis digital electronics.

4. Application of the course to electronic systems

5. Understanding of the electrical properties and characteristics of various materials

6. Applications associated with generation, transmission and distribution of electric power

Learning Outcomes

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

1. Discuss the fundamental concepts of electricity and electrical d.c. circuits;

2. State, explain and apply the basic d.c. circuit theorems;

3. Explain the basic A.C. circuit theory and

4. Apply to solution of simple circuits.

Course contents

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

Assessment methods:

Method	Weight
Exam	**70%**

Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 223: Engineering Drawing I (2 Units)

Course Learning Objective (CLO)

1. Teach multi-view representation and its application in engineering drawing, including the ability to accurately represent objects in multiple views.
2. Introduce advanced concepts in isometric drawing, oblique drawing, and the representation of complex assemblies and components.
3. Develop expertise in dimensioning techniques, including the proper use of dimension lines, tolerances, and geometric dimensioning and tolerancing (GD&T) symbols.
4. Develop proficiency in the interpretation and creation of sections and auxiliary views, understanding their role in providing additional information and clarity in engineering drawings.
5. Acquire knowledge and skills related to the representation and specification of various mechanical components, including threads, bolted joints, keys, cottered joints, and other conventional representations.

Course Learning Outcomes:

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

Apply multi-view representation techniques accurately to represent

objects in different views, demonstrating proficiency in both first and third angle projection methods.

1. Create isometric drawings and simple pictorial assembly drawings, accurately representing the spatial relationship between components and assemblies.
2. Generate oblique drawings using different techniques such as cavalier, cabinet, and angles other than 45 degrees, effectively communicating the shape and features of objects.
3. Apply proper dimensioning techniques, including the selection and placement of dimension lines, the use of tolerances, and the application of GD&T symbols, ensuring clear and accurate communication of size and shape requirements.
4. Interpret and create sections and auxiliary views, correctly representing the internal features and hidden details of objects, and apply the appropriate conventions for representing threads, bolted joints, keys, cottered joints, and other mechanical components based on relevant standards such as BS 308

Course contents

Revision of multi-view representation. Harder examples on two and three view representation ($1^{st}$and 3^{rd} Angles). Harder examples on isometric drawing to include simple pictorial assembly drawing in isometric. Harder examples on oblique drawing (Cavalier, Cabinet and Angles other than 45 degrees). Dimensioning. Sections and conventions. Auxiliary views. Representation and specification of threads. Bolted joints. Keys and cottered joints. Conventional representations (see BS 308).

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

CHE 225: Fundamental of Fluid Machines (3 Units)

Course Learning Objective (CLO) :

1. Impart a comprehensive understanding of the properties and behavior of fluids, including fluid statics and the conservation laws governing fluid flow.
2. Gain knowledge of friction effects and losses in laminar and turbulent flows in ducts and pipes, and learn how to calculate and analyze these effects.
3. Describe the application of dimensional analysis and dynamic similitude principles to solve engineering problems and establish relationships between physical quantities in fluid systems.
4. Explore the construction and operation principles of selected hydraulic machinery, such as pumps and turbines, and understand their role in various applications.
5. Gain insights into hydro power systems, including their design, components, and overall functioning, and comprehend their significance in renewable energy generation.

Course Learning Outcomes (CLO):

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

1. Demonstrate a solid understanding of fluid properties, including viscosity, density, and pressure, and apply this knowledge to analyze fluid statics and pressure distributions in various scenarios.
2. Apply the conservation laws of mass, energy, and momentum to analyze and solve problems related to fluid flow in pipes, ducts, and other hydraulic systems.
3. Analyze and quantify friction losses in laminar and turbulent flows, and utilize appropriate equations and models to calculate pressure drop and flow rates in fluid systems.
4. Utilize dimensional analysis techniques to establish dimensionless groups and scaling laws, and apply them to solve problems related to model testing and fluid system design.
5. Understand the construction and operation principles of hydraulic machinery, including pumps and turbines, and evaluate their performance characteristics and efficiency in different applications

Course Contents

Properties of fluids, fluids statics conservation laws, friction effects and losses in laminar and turbulent flows ducts and pipes. Dimensional analysis and dynamic similitude, principles of construction and operation of selected hydraulic machinery. Hydro power systems.

Assessment methods:

Method	Weight
Exam	**70%**

Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

CVE 227: Applied Mechanics (3 Units)

Course Learning Objective (CLO):

1. Define concepts of friction, wear and lubrication applications in kinematics;
2. Present the principles of selection of power screws, belt, ropes and chains drives,
3. Discuss the principles of selection clutches, brakes
4. Clarify the principles of selection in dynamometer and its application in torque
5. Examine between Hydrodynamics and hydrostatic lubrication.
6. Illustrate tribology and its associated problem

Course Learning Outcomes (CLO):

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

7. Analyse the concepts of friction, wear and lubrication applications in kinematics;
8. Explain the principles of selection of power screws, belt, ropes and chains drives,
9. Explain the principles of selection clutches, brakes
10. Explain the principles of selection dynamometer and its application in torque
11. Differentiate between Hydrodynamics and hydrostatic lubrication;
12. Explain tribology and its associated problems

Course Contents

Concept of Friction. Wear and lubrication applications in kinematics. Selection of power screws. Selection of power screws belt. Forces, moments, couples. Equilibrium of simple structures and machines parts. Friction. First and second moments of area; centroids. Selection of power screwsropes. Selection of power screws chains drives. Selection of clutches and brakes. Principles and application of dynamometer. Principles of hydrodynamics. Hydrostatic lubrication. Study of journal bearing. Reynolds equation. Graphical solutions of viscose oil and gas bearings. Hydrodynamics drives. Hydrodynamics torque converters. Hydrodynamics vibrations. Computational procedures. Software packages for the analysis of tribological problems. Kinematic of particles and rigid bodies in plane motion. Newton's laws of motion. Kinetic energy and momentum analysis.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

FEG 227: Engineering Mathematics I (3 Units)

Course Learning Objective (CLO):

1. Qualitative problems based on vector and matrix analyses such as linear independence and dependence of vectors, rank etc.

2. Analyzing concepts of limit theory and nth order differential equations and their applications to physical phenomena.
3. Breakdown of problems of differentiation of functions of two variables and know about the maximization and minimization of functions of several variables.
4. Applications of double and triple integration in finding the area and volume of engineering solids, and explain the qualitative applications of Gauss, Stoke's and Green's theorem.
5. Clarification of ordinary differential equations and applications, and develop a mathematical model of linear differential equations, as well as appreciate the necessary and sufficient conditions for total differential equations.
6. Application of engineering models through partial differential equations such as wave equation, heat conduction equation, etc., as well as fourier series, initial conditions and its applications to different engineering processes

Course Learning Outcomes (CLO):

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

1. Solve qualitative problems based on vector and matrix analyses such as linear independence and dependence of vectors, rank etc;
2. Describe the concepts of limit theory and nth order differential equations and their applications to physical phenomena;
3. Solve the problems of differentiation of functions of two variables and know about the maximization and minimization of functions of several variables;
4. Describe the applications of double and triple integration in finding the area and volume of engineering solids, and explain the qualitative applications of Gauss, Stoke's and Green's theorem;
5. Explain ordinary differential equations and applications, and develop a mathematical model of linear differential equations, as

well as appreciate the necessary and sufficient conditions for total differential equations.

6. Analyses of basic engineering models through partial differential equations such as wave equation, heat conduction equation, etc., as well as Fourier series, initial conditions and its applications to different engineering processes

Course Contents

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

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

FEG 221: Engineering in Society (2 Units)

Course Learning Objective (CLO):

1. Different between science, engineering and technology, and relate them to innovation;

2. Different cadres of engineering – engineers, technologists, technicians and craftsmen and their respective roles and competencies;

3. Identification and distinguish between the relevant professional bodies in engineering;

4. Categorizing the goals of global development or sustainable development goals (SDGs); and

5. Identifying and evaluate safety and risk in engineering practice.

Course Learning Outcomes (CLO):

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

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

Course Contents

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

soft and digital skills. Guest seminars and invited lectures from different engineering professional associations

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

CEE 221: Introduction to Modeling and Simulation (2 Units)

Course Learning Objective (CLO):

1. Grasp design thinking and be obsessed with the determination to apply such to solving simple every day and also complex problems using matlab.
2. Recognize the fundamental concepts of functions and basic plotting, vector and matrix generation, array operations, linear and nonlinear equations. Programming (M-file scripts and functions).
3. Show skills to represent Programming languages in the world of engineering objects in actionable solid models, and put such models in a form where they can be inputs for simulation and analyses.
4. Development facility in simulation model building, examples/area of applications prepare the objects for modern production and manufacturing techniques of additive and subtractive manufacturing.
5. Introduction to some open circuit simulator software like Proteus, Multisim, PECS

Course Learning Outcomes (CLO):

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

1. Have good grasp of design thinking and be obsessed with the determination to apply such to solving simple every day and also complex problems using matlab
2. Recognize the fundamental concepts of functions and basic plotting, vector and matrix generation, array operations, linear and nonlinear equations. Programming (M-file scripts and functions)
3. show good skills in programming languages in the world of engineering objects in actionable solid models, and put such models in a form where they can be inputs for simulation and analyses;
4. Have knowledge of facility development in simulation model building, examples/area of applications prepare the objects for modern production and manufacturing techniques of additive and subtractive manufacturing;
5. Describe some open circuit simulator software like Proteus, Multisim, PECS

Course Contents

Modeling: meaning, classification, modeling tool (MATLAB), introduction to MATLAB, creating variables, functions and basic plotting, vector and matrix generation, array operations, linear and nonlinear equations. Programming (M-file scripts and functions), control flow and operations, debugging M-file. Simulation: Meaning, Why simulation? Develop an appreciation for the need for simulation; How do we simulate? Develop facility in simulation model building, examples/area of applications, Advantages and drawbacks of simulation. Computer Simulation, Introduction to some open circuit

simulator software like Proteus, Multisim, PECS (Power Electronics Circuit Simulator, Python etc)

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

FEG 293: Student Workshop Experience (1 Unit

Course Learning Objectives (CLO):

1. Introduce students to practicals and skills in general engineering, providing instruction in the operation of hand and powered tools for wood and metal cutting and fabrication.
2. Develop students' understanding of safety protocols and procedures for the usage of tools and machines, ensuring a safe working environment.
3. Provide supervised hands-on experience to students, allowing them to apply their knowledge and skills in using tools and machines for selected engineering tasks.
4. Familiarize students with various techniques and practices involved in general engineering, including proper tool selection, material cutting, and fabrication methods.
5. Enhance students' practical skills in general engineering, promoting hands-on learning and problem-solving abilities in real-world engineering scenarios.

Course Learning Outcomes (CLO):

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

1. Demonstrate practical knowledge and skills in general engineering, including the operation of hand and powered tools for wood and metal cutting and fabrication.
2. Demonstrate a strong understanding of safety protocols and guidelines for using tools and machines, ensuring a safe working environment for themselves and others.
3. Apply their knowledge and skills in using tools and machines to complete selected engineering tasks.
4. Develop familiarity with various techniques and practices involved in general engineering, demonstrating the ability to select appropriate tools, cut materials, and fabricate components.
5. Developed problem-solving abilities in real-world engineering scenarios.

Course Contents

Laboratory investigation and report submission for selected experiments and projects in Thermodynamics, Applied Mechanics and Applied Electricity and Fundamental of fluid mechanics.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

ENS 222: Introduction to Entrepreneurship (2 Units)

Course Learning Objectives (CLO):

1. Explanation of the concepts and theories of entrepreneurship, intrapreneurship, opportunity seeking, new value creation and risk-taking;

2. Characterization of an entrepreneur in the society

3. Accounting for the importance of micro and small businesses in wealth creation, employment generation and financial independence;

4. Involvement of entrepreneurial thinking in global society

5. Identifications of key elements in innovation;

6. Enterprise formation, partnership and networking, including business planning;

7. Application of contemporary entrepreneurial issues in Nigeria, Africa and the rest of the world.

8. Applications of basic principles of e-commerce

Course Learning Outcomes (CLO):

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

1. Explain the concepts and theories of entrepreneurship, intrapreneurship, opportunity seeking, new value creation and risk-taking;
2. State the characteristics of an entrepreneur;

3. Analyze the importance of micro and small businesses in wealth creation, employment generation and financial independence;
4. Engage in entrepreneurial thinking;
2. Identify key elements in innovation;
3. Describe the stages in enterprise formation, partnership and networking, including business planning;
4. Describe contemporary entrepreneurial issues in Nigeria, Africa and the rest of the world; and
5. State the basic principles of e-commerce

Course Contents

Introductory entrepreneurial skills. Relevant concepts: Enterprise, entrepreneur, entrepreneurship, Business, Innovation, Creativity, Enterprising and entrepreneurial attitude and behavior. History of entrepreneurship in Nigeria. Rationale for entrepreneurship, creativity and innovation for entrepreneurs. Leadership and entrepreneurial skills for coping with challenge. Unit operations and time management. Creativity and innovation for self-employment in Nigeria. Overcoming job creation. Challenges. Opportunities for entrepreneurship, forms of businesses, staffing, marketing and the new enterprise. Feasibility studies and starting a new business. Determining capital requirement and raising capital. Financial planning and management. Legal issue, insurance and environmental consideration. Also to be incorporated, on the other side of the spectrum, are employability, skills-interview techniques, oral presentation skills, etc

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

EEE 222: Applied Electricity II (3 Units)

Course learning Objectives:

1. Demonstration of the concept of electrical basic machines
2. DC, synchronous alternators, transformers, equivalent circuits analysis
3. Converting electronic schematic circuit into printed circuit board (PCB) layout and vice versa using computer aided design (CAD) software.
4. Operation of three phase balanced circuits
2. Interpretation and testing of various functional, PN junction Diode, transistors, FRTs, Zener, Rectifiers.
3. Basic control systems, open/close loop systems.
4. Application of the principles of electrical power generation, transmission, distribution as well as the utilization.
5. Communications fundamentals, introduction of TV, Radio Telephone systems.

Course Learning Outcomes (CLO):

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

1. Demonstrate the concept of electrical basic machines
2. Demonstrate DC, synchronous alternators, transformers, equivalent circuits.
3. Exhibit the understanding of converting electronic schematic circuit into printed circuit board (PCB) layout and vice versa using computer aided design (CAD) software.
4. Demonstrate the operation of three phase balanced circuits

6. Read and interpret and test various functional, PN junction Diode, transistors, FRTs, Zener, Rectifiers.
7. Demonstrate the skills to basic control systems, open/close loop systems...
8. Exhibit the understanding of the principles of electrical power generation, transmission, distribution as well as the utilization.
9. Exhibit the understanding of the communications fundamentals, introduction of TV, Radio Telephone systems.

Course Contents

Basic machine – DC, synchronous alternators, transformers, equivalent circuits. Three phase balanced circuits, PN junction Diode, transistors, thyristors FRTs, Zener, Rectifiers. Basic control systems, open/close loop systems. Communications fundamentals, introduction of TV, Radio Telephone systems.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 224: Engineering Drawing II (2 Units)

Course Learning Outcome (CLO):

The course is intended to teach the following

1. Skills in analyzing and determining intersections of solids, enabling the representation of complex geometric relationships and facilitating the design of mechanical components.
2. Cams and their applications, including the interpretation and representation of cam profiles in engineering drawings.
3. Acquire skills in the development of surfaces, allowing for the accurate representation of curved and irregular shapes and the creation of detailed engineering drawings.
4. Develop competence in creating detail drawings of mechanical components such as belts, chains, gears, bearings, lubrication arrangements, couplings, brakes, flexible shafts, universal joints, etc., ensuring clear and accurate communication of design specifications.

Course Learning Outcomes (CLO):

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

Apply projection techniques to accurately project points, lines, planes, and solids onto different views, demonstrating proficiency in graphical representation.

1. Analyze and determine intersections of solids, effectively representing complex geometric relationships and providing comprehensive engineering drawings.
2. Interpret and represent cam profiles, showcasing an understanding of cam mechanisms and their applications in mechanical systems.
3. Develop surfaces accurately, utilizing appropriate methods such as ruling and triangulation to represent curved and irregular shapes in engineering drawings.

4. Create detailed drawings of mechanical components, including belts, chains, gears, bearings, lubrication arrangements, couplings, brakes, flexible shafts, universal joints, etc., incorporating appropriate dimensions, tolerances, and annotations to convey design specifications.

Course Contents

Further works on projections; projection of points, lines, planes and solids. Intersections of solids. Cams. Interpretation of solids. Development of surfaces. Detail drawing belts, chains, gears. Bearing and lubrication arrangements. Couplings brake, flexible shafts, universal joints, etc. Assembly drawings. Revisions

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

FEG 294: Student Workshop Experience (1 Unit)

Course Learning Objectives (CLO):

1. Gain a comprehensive understanding of the operation and safe usage of hand and powered tools for various engineering tasks, including wood and metal cutting and fabrication.
2. Develop practical skills in using tools and machines effectively and safely to perform selected engineering tasks, promoting proficiency and confidence in hands-on work.

3. Cultivate a strong foundation in general engineering principles and practices, enabling successful execution of practical tasks in diverse engineering contexts.
4. Foster an understanding of safety protocols and best practices in tool and machine operation, emphasizing the importance of workplace safety and risk management.
5. Promote teamwork, problem-solving, and communication skills through supervised hands-on experiences, encouraging collaboration and effective communication in engineering tasks.

Course Learning Outcomes (CLO):

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

1. Demonstrate competency in operating hand and powered tools for wood and metal cutting and fabrication, ensuring accurate and efficient execution of engineering tasks.
2. Apply theoretical knowledge to practical scenarios, effectively utilizing tools and machines to accomplish selected engineering tasks with precision and attention to detail.
3. Exhibit proficiency in executing practical tasks related to general engineering, showcasing an understanding of fundamental principles and practices.
4. Adhere to safety protocols and practices when operating tools and machines, prioritizing personal and workplace safety in all engineering activities.
5. Collaborate effectively in a team environment, demonstrating problem-solving and communication skills through

supervised hands-on experiences, fostering an environment of mutual support and shared learning.

Course Contents

Introduction to practicals and skills in general engineering through instruction in operation of hand and powered tools wood and metal cutting and fabrication. Supervised on experience in safe usage of tools and machines for selected tasks

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

CHE 226: Fundamental of Thermodynamics (3 Units)

Course Learning Goals

1. Introduce the fundamental principles and concepts of thermodynamics, including the Zeroth, First, Second, and Third Laws of Thermodynamics.
2. Tech students application of mathematical relationships and equations to solve problems related to thermodynamics.
3. Impart the ability to analyze and predict the properties and changes in state of pure substances using thermodynamic principles.
4. Describe the behavior of perfect gases and how to apply thermodynamic principles to analyze and predict the properties and transformations of ideal gas systems.

5. Expose Students to analyses and evaluation of the performance of cycles, including efficiency calculations and optimization.

Course Learning Outcomes

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

1. Demonstrate a comprehensive understanding of the basic concepts and principles of thermodynamics, including the Zeroth, First, Second, and Third Laws of Thermodynamics.
2. Apply mathematical relationships and equations to solve thermodynamics problems, including calculations involving heat, work, energy, and entropy.
3. Analyze and predict the properties and changes in state of pure substances using thermodynamic principles, including phase diagrams, heat capacities, and enthalpy calculations.
4. Apply thermodynamic principles to analyze and predict the behavior of perfect gases, including the ideal gas law, specific heat capacities, and gas power cycles.
5. Analyze and evaluate the performance of ideal gas cycles, including efficiency calculations, optimization techniques, and the impact of different cycle parameters

Course Contents

Basic concepts, quantitative relations of Zeroth, first, second and third laws of thermodynamics. Behavior of pure substances and perfect gases. Ideal gas cycles

Assessment methods:

Method	Weight
Exam	**70%**

Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

CVE 228: Strength of Materials (2 Units)

Course Learning Objectives (CLO):

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

Course Learning Outcomes (CLO):

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

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

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

Course contents

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

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

FEG 228: Engineering Mathematics II (3 Units)

Course Learning Objectives (CLO):

1. Analysis physical systems using ordinary differential equations (ODEs);
1. solving ODEs, solution methods, and analytically sa wide range of ODEs, including linear constant coefficient types;
2. Mathematically solving differential equations using MATLAB and other emerging applications;
3. Calculus operations on vector-valued functions, including derivatives, integrals, curvature, displacement, velocity, acceleration, and torsion, as well as on functions of several variables, including directional derivatives and multiple integrals;
4. Problems using the fundamental theorem of line integrals, Green's theorem, the divergence theorem, and Stokes' theorem, and perform operations with complex numbers;
5. Application of concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions of complex variables, as well as the theory of conformal mapping to solve problems from various fields of engineering; and
6. Computations of complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula.

Course Learning Outcomes (CLO):

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

1. Describe physical systems using ordinary differential equations (ODEs);
1. 2.explain the practical importance of solving ODEs, solution methods, and analytically solve a wide range of ODEs, including linear constant coefficient types;
2. numerically solve differential equations using MATLAB and other emerging applications;
3. 4.perform calculus operations on vector-valued functions, including derivatives, integrals, curvature, displacement, velocity, acceleration, and torsion, as well as on functions of several variables, including directional derivatives and multiple integrals;
4. solve problems using the fundamental theorem of line integrals, Green's theorem, the divergence theorem, and Stokes' theorem, and perform operations with complex numbers;
5. apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions of complex variables, as well as the theory of conformal mapping to solve problems from various fields of engineering; and
6. Evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula.

Course Contents

Second order differential equations, line integral multiple integral and their applications, differentiation of integral. Analytical functions of complex variables. Transformation and mapping. Special functions.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

FEG 290: Students Industrial Work Experience (SIWES I) (2 Units)

Course Learning Objectives (CLO):

1. Industrial workplace perceptions, ethics, health and safety consciousness, inter-personal skills and technical capabilities needed to give them a sound engineering foundation;

2. Learning and practicing basic engineering techniques and processes applicable to their specialisations;

3. Building machines, devices, structures or facilities relevant to their specific engineering programmes and applications; and

4. Acquiring competence in technical documentation (log-book) and presentation (report) of their practical experiences.

Course Learning Outcomes (CLO):

SIWES should provide opportunity for the students to:

1. Acquire industrial workplace perceptions, ethics, health and safety consciousness, inter-personal skills and technical capabilities needed to give them a sound engineering foundation;
2. Learn and practice basic engineering techniques and processes applicable to their specializations;

3. Build machines, devices, structures or facilities relevant to their specific engineering programmes and applications; and
4. Acquire competence in technical documentation (log-book) and presentation (report) of their practical experiences.

Course Contents

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

300 LEVEL COURSES

MEC 344 Theory of Machines I (2 Units)

Course Learning Objectives (CLO):

1. Expose students to simple mechanisms and their analysis, including the ability to analyze and interpret vector diagrams associated with these mechanisms.
2. Teach simple harmonic motion and its applications in mechanical systems, including the ability to analyze and calculate relevant parameters.
3. Impart Newton's laws of motion and their application in force analysis of mechanisms, considering the effects of friction.

4. Expose the students to the analysis and application of theory of structures, including the ability to analyze and design structural components of machines.
5. Gain knowledge of dynamics of linear systems, balancing techniques, and gear systems and gear trains, understanding their principles and applications in mechanical systems.

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Analyse and interpret vector diagrams associated with simple mechanisms, demonstrating an understanding of their behavior and functionality.
2. Analyse and calculate parameters related to simple harmonic motion, applying this knowledge to mechanical systems.
3. Analyze and design structural components of machines, applying the theory of structures to ensure stability and structural integrity.
4. Analyze the dynamics of linear systems, apply balancing techniques, and understand the principles and applications of gear systems and gear trains in mechanical systems.
5. Determining the velocity and acceleration of machine elements using both analytical and graphical approaches, with a particular focus on the analysis of slider-crank and quick return mechanisms.
6. Apply instantaneous center methods and calculate forces required to accelerate machine elements, demonstrating an understanding of their effects and implications.

Contents

Simple mechanisms and their analysis, vector diagrams; simple harmonic motion;Newton's laws of motion; force analysis of mechanism, friction effect; analysis and applications; theory of structures; dynamics of linear systems, balancing; gear systems and gear trains rigid body; introduction to tribology. Velocity and acceleration of machine element using both analytical and graphical approaches, with particular references to the slider- cranks and quick return mechanism. Instantaneous centre methods, forces to accelerate machine elements, brakes and dynamometers.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 326: Engineering Drawing III

Course Learning Objectives (CLO):

1. Teach proficiency in using AutoCAD for producing 2-D and 3-D drawings.
2. Expose students to the use of SolidWorks to create engineering drawings, demonstrating an understanding of its features and functionalities.
3. Impart the application of the principles of descriptive geometry to accurately represent complex shapes and structures in engineering drawings.

4. Explain the application of the concepts of limits and fits in engineering drawings to ensure proper assembly and functionality of components.
5. Interpret and apply geometric tolerancing principles to accurately communicate design requirements and specifications in engineering drawings.

Course Learning Outcomes:

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

1. Create detailed and accurate 2-D and 3-D drawings using AutoCAD, demonstrating proficiency in utilizing its various tools and features.
2. Produce engineering drawings using SolidWorks that effectively communicate design intent and specifications.
3. Apply descriptive geometry principles to accurately represent complex shapes, intersections, and projections in engineering drawings.
4. Incorporate appropriate limits and fits in engineering drawings to ensure proper assembly and functionality of components.
5. Communicate design requirements and specifications effectively through the application of geometric tolerancing principles in engineering drawings.

Course contents

Introduction to AutoCAD. Using AutoCAD to produce 2-D and 3-D drawing. Use of SolidWorks for engineering drawing. Descriptive geometry. Limits and fits. Geometric tolerancing. Welding drawing

and design. Redesigning of casts components using welded joints. Harder examples on exploded assembly drawing (e.g complete gear box in exploded assembly drawing). Pipe joints. Arrangement of engineering components to form a working plant (Assembly drawing of a Plant). Revision.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 331: Mechanics of Materials I Prerequisite: EEE 151, CVE III, CVE 213 (2 Units)

Course Learning Objectives (CLO):

1. Explain the concepts of triaxial and combined stresses, including normal and shear stresses, and their effects on materials and structures.
2. Explain how to apply failure theories and criteria to determine the strength and stability of structures under different loading conditions.
3. Impart analyses of stresses in thin-walled and thick-walled pressure vessels, as well as the design considerations for riveted and welded joints in such structures.
4. Analyze and calculate shear forces and bending moments in beams, including reinforced concrete beams, and understand their effects on structural integrity and design.

5. Evaluate the behavior and design considerations for non-round cross-section beams, curved beams, and hollow beams with thin-walled sections, considering their unique load-carrying capabilities and structural performance.

Course Learning Outcomes (CLO):

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

1. Apply the principles of triaxial and combined stresses to analyze and predict the behavior of materials and structures under different loading conditions.
2. Determine the failure theories and criteria that govern the behavior and failure of materials under specific loading conditions, and apply them to practical engineering problems.
3. Analyze and design thin-walled and thick-walled pressure vessels, considering the effects of internal and external pressures, as well as the design considerations for riveted and welded joints.
4. Calculate and analyze shear forces and bending moments in beams, including reinforced concrete beams, to determine their structural integrity and suitability for specific applications.
5. Evaluate the behavior and design considerations for beams with non-round cross-sections, curved beams, and hollow beams with thin-walled sections, considering their load-carrying capabilities and structural performance in different engineering scenarios.

Prerequisite: EEE 151, CVE III, CVE 213

Course contents

Triaxial and combined stresses-normal and shear. Plastic behavior of materials, failure theories and criteria. Stresses in thin-walled and thick-walled and pressure vessels, riveted and welded joints. Shearing and bending of beams – shear force and bending moments, reinforced concrete beams. Non-round cross-section beams, curved beams, hollow beams with thin-walled sections.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 332: Mechanics of Materials II Prerequisite: MME 335, Year 3 (2 Units)

Course Learning Objectives (CLO):

1. Analyze and calculate deflection in beams using appropriate methods, including the revision of solution techniques.
2. Explain shear stress distribution and its effect on beam deflection, including the concept of the shear center.
3. Teach analysis and calculation of the behavior of unsymmetrical bending in beams, considering the resulting stresses and deformations.

4. Apply strain energy methods to determine the response of structures and thin members subjected to various loading conditions.

5. Analyze and design helical and leaf springs, considering their mechanical behavior and applications, as well as their interaction with other components in mechanical systems.

Course Learning Outcomes:

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

1. Calculate and analyze deflection in beams using appropriate methods, demonstrating an understanding of solution techniques and their limitations.

2. Evaluate the shear stress distribution in beams and determine the deflection due to shear, including the identification and utilization of the shear center.

3. Analyze and predict the behavior of beams under unsymmetrical bending, considering the resulting stresses, deformations, and structural integrity.

4. Apply strain energy methods to analyze and design structures and thin members, considering the distribution of internal forces, displacements, and potential energy.

5. Design and analyze helical and leaf springs, considering their mechanical behavior, load-carrying capacity, and performance characteristics in different applications.

Prerequisite: MME 335

Course contents

Deflection of beams; revisions of method of solution; shear stress distribution and deflection due to shear centre. Unsymmetrical bending. Strain energy methods. Application to thin members and indeterminant structures. Helical and leaf springs. Plastic bending of beams, bucking. Plastics behavior of materials, failure theories and criteria.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 397: Laboratory Practical I (2 Units)

Course Learning Objectives (CLO):

1. Expose students to practical experience and skills in conducting basic laboratory experiments related to fluid flow in mechanical engineering, such as measuring discharge over weirs, impact of a jet, discharge through an orifice, flow through a Venturi, and friction loss in pipes.
2. Impart practical knowledge and skills in the measurement of vibration and torsion, including the use of appropriate instruments and techniques.

Course Learning Outcomes:

1. Perform laboratory experiments related to fluid flow, such as measuring discharge over weirs, impact of a jet, discharge through an orifice, flow through a Venturi, and friction loss in pipes, demonstrating proficiency in using relevant apparatus and techniques.
2. Collect and analyze experimental data related to fluid flow, applying appropriate calculations and analysis methods to obtain accurate results.
3. Conduct laboratory experiments to measure and analyze vibrations, demonstrating proficiency in using vibration measurement instruments and techniques.
4. Conduct laboratory experiments to measure and analyze torsion in mechanical systems, demonstrating proficiency in using torsion measurement instruments and techniques.
5. Communicate experimental findings effectively, both orally and in written form, including presenting experimental procedures, data analysis, and conclusions in a clear and organized manner.

Course contents

Introduction to Laboratory Safety and Procedures; Overview of laboratory safety guidelines and practices; Introduction to laboratory equipment and instrumentation; Familiarization with laboratory protocols and procedures; Measurement of thermodynamic properties (pressure, temperature, volume); Data acquisition and analysis techniques; Error analysis and uncertainty calculations; Experimental design and planning; Statistical analysis of experimental data; Data Analysis and Reporting; Data processing and interpretation using statistical methods; Drawing meaningful conclusions from

experimental data; Report writing and presentation skills for technical reports; Oral presentation of experimental results; Use of visualization tools (e.g., graphs, charts) to present data effectively
Fluid flow – discharge over weirs, impact of a jet, discharge over weirs, impact of a jet, discharge through orifice, flow through a venture, friction loss in pipe etc; measurement of vibration and torsion

Assessment methods:

Method	Weight
Exam	**0%**
Others (Reports, problem sets, labs)	**100%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 398: Laboratory Practicals II (2 Units)

The objectives of this course are to ensure that students participate in basic laboratory experiment in thermodynamics, fluid mechanics, heat transfer etc.

Course Learning Objectives (CLO):

1. Expose students to practical experience and skills in conducting basic laboratory experiments related to thermodynamics, including the measurement of thermodynamic properties and processes.
2. Demonstrate practical knowledge and skills in conducting laboratory experiments related to fluid mechanics, including the measurement of flow rates, pressures, and forces in fluid systems.

3. Develop proficiency in conducting laboratory experiments related to heat transfer, including the measurement of heat transfer rates, temperature distributions, and thermal conductivity.

4. Demonstrate appropriate experimental techniques and instrumentation in the areas of thermodynamics, fluid mechanics, and heat transfer.

5. Expose students to data analysis, interpretation, and presentation of experimental results in the fields of thermodynamics, fluid mechanics, and heat transfer.

Course Learning Outcomes:

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

1. Perform laboratory experiments related to thermodynamics, demonstrating proficiency in measuring thermodynamic properties and analyzing thermodynamic processes.

2. Conduct laboratory experiments in fluid mechanics, accurately measuring flow rates, pressures, and forces, and applying relevant principles and equations to interpret and analyze the data.

3. Conduct laboratory experiments in heat transfer, accurately measuring heat transfer rates, temperature distributions, and thermal conductivity, and applying relevant principles and equations to interpret and analyze the data.

4. Utilize appropriate experimental techniques and instrumentation in conducting laboratory experiments in thermodynamics, fluid mechanics, and heat transfer, ensuring accurate data collection and analysis.

5. Analyze and interpret experimental data, draw meaningful conclusions, and effectively communicate the results through written reports and oral presentations in the fields of thermodynamics, fluid mechanics, and heat transfer.

Course contents

Measurement of flow rates using different devices (e.g., orifice meter, venturi meter); Determination of pressure distribution in flow systems; Analysis of fluid properties (e.g., viscosity, density); Study of fluid behavior (e.g., flow regimes, pressure losses); Investigation of fluid forces (e.g., buoyancy, drag); Measurement of heat transfer rates (e.g., conduction, convection, radiation); Analysis of temperature distributions in heat transfer systems; Determination of thermal conductivity of materials; Study of heat exchangers and heat transfer mechanisms; Investigation of heat transfer enhancement techniques;

Assessment methods:

Method	Weight
Exam	**0%**
Others (Quiz, problem sets, labs)	**100%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 351: Workshop Practice (2 Units)

Course Learning Objectives (CLOs):

1. Expose students to safety measures in the workshop when working with electrical workshop equipment, hand and powered tools, measuring devices, drilling machines, and various machines used in the workshop environment.

2. Teach the use of workshop tools and machines such as gauges, micrometers, drilling machines, lathes, grinding machines, milling machines, shaping machines, and welding equipment.
3. Impart the tools and machines used in woodwork, including the classification and uses of different types of wood, and skills in utilizing various joint types in carpentry and joinery.
4. Explain the fundamental skills in brickwork and masonry, including setting out equipment using working drawings, bonding, plumbing, leveling, gauging, and erecting corners in brick/block work.
5. Explain skills for testing electrical installations and circuits for safety and apply appropriate safety measures when working with electrical equipment.

Course Learning Outcomes:

1. Demonstrate knowledge and application of safety measures in the workshop, including electrical workshop environments, hand and powered tools, and various measuring devices.
2. Operate and utilize a range of workshop tools and machines effectively and safely, including gauges, micrometers, drilling machines, lathes, grinding machines, milling machines, shaping machines, welding equipment, and woodworking tools.
3. Apply woodworking techniques, including wood selection, joint types, wood preparation, and preservation, to perform tasks and create basic woodwork projects.

4. Execute basic brickwork and masonry skills, including setting out equipment using working drawings, bonding, plumbing, leveling, gauging, and erecting corners in brick/block work.

5. Demonstrate basic electrical skills and knowledge, including testing electrical installations and circuits, understanding electrical safety practices, and applying appropriate safety measures when working with electrical equipment.

Course contents

Safety measures in the workshop including electrical workshop, introduction to workshop hand and powered tools, emphasizing safety, various gauge micrometer and other measuring devices. Introduction to drilling machine and drilling processes. Screw threads and thread cutting using stock and dies. Marking off on faceplate. Function lathe. Capabilities of grinding machine, drilling machine, lathe machine, milling and shaping machine. Practice in the use of the machines. Introduction to welding and brazing. AC and DC electric are welding. Fitting and assembling. Basic electrical skills. Testing of electrical installation and circuits including earthling. Tools and machines for woodworks. Classifications and uses of wood. Various joints types used in carpentry and joinery. Preparation and preservation of wood. Basic skills in brickwork and masonry. Setting out equipment using working drawings. Bonding, plumbing, leveling, gauging and erection of corners in bricks/block work.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 342: Engineering Mechanics (2 Units)

Course Learning Objectives (CLOs):

1. Teach the application of Newtonian principles and their application in solving dynamical problems.
2. Expose students to the application of the principles of particle kinematics, including rectilinear and plane curvilinear motion.
3. Analyses and interpretation kinematics of rigid bodies:.
4. Translation, rotation, and general plane motion of rigid bodies and apply the principles of work, energy, work-energy relations, virtual work, impulse, and momentum.
5. Expose Students to solving real world problems related to the motion, forces, and energy of particles and rigid bodies.

Course Learning Outcomes:

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

1. Apply Newtonian principles to analyze and solve dynamical problems, demonstrating an understanding of the laws of motion and their practical application.
2. Analyze and interpret particle kinematics, including rectilinear and plane curvilinear motion, and apply the principle of conservation of momentum to solve problems related to particle motion.

3. Analyze and interpret kinematics of rigid bodies, including fixed bodies and fixed axes of rotation.

4. Analyze and interpret kinetics of rigid bodies, including the general equation of motion, and apply the principles of work, energy, work-energy relations, virtual work, impulse, and momentum to solve problems related to the motion and forces of rigid bodies.

5. Apply problem-solving skills to complex dynamical systems, utilizing the principles and concepts learned in the course to analyze, interpret, and solve problems related to the motion, forces, and energy of particles and rigid bodies.

Course contents

Formation of Dynamical problems, Newtonian principles. Kinematic of particles – rectilinear and plane curcilinear and motion work, principle of conservation of momentum. Plane kinematics of rigid bodies – fixed bodies – fixed axis = of rotation. Absolute and relative motion including instantaneous center of zero velocity. Rotating axes of motion. Plane kinetic of rigid bodies – general equation of motion. Translation, rotation and general plane motion. Work and energy, work energy relations, virtual work, impulse and momentum.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 353: Manufacturing Technology (2 Units)

Course Learning Objectives (CLOs):

1. Expose Students to knowledge of industrial safety practices and skills to identify and mitigate potential hazards in a manufacturing environment.
2. Teach the principles of ergonomics and how to apply them in a manufacturing setting.
3. Explain basic metrology techniques and their application in meal component manufacturing
4. Explain and demonstrate different manufacturing processes such as casting, forging, press steel work, spinning, metal joining, and heat treatment.
5. Expose students to the application of machine tools and knowledge of tool life management and understand the capabilities of specific machines such as slotting machines, grinding machines, broaching machines, and modern machine techniques.

Course Learning Outcomes:

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

1. Demonstrate knowledge and implementation of industrial safety practices and accident prevention measures in a manufacturing environment.

2. Apply principles of ergonomics to optimize workspaces, tools, and equipment in manufacturing settings, ensuring worker comfort, safety, and productivity.
3. Utilize basic metrology techniques to measure and control quality in meal component manufacturing processes.
4. Apply various manufacturing processes, including casting, forging, press steel work, spinning, metal joining, and heat treatment, to produce mechanical components effectively and efficiently.
5. Apply specific machine techniques such as slotting, grinding, broaching, and modern machining methods.

Course contents

Industrial safety and accident prevention. Ergonomics. Basic metrology and application in meal component manufacturing. Casting, forging, press steel work, spinning, metal joining and heat treatment. Machine tools classification, installation. Maintenance. Tool life. Function and capabilities slotting machine, grinding machine broaching machine. Modern machine techniques. Jigs' and fixtures.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 361: Thermodynamics I (2 Units)

Course Learning Objectives (CLOs):

1. Teach the fundamental principles and concepts of thermodynamics, including the distinction between macroscopic and microscopic domains.
2. Teach the application of the first law of thermodynamics to closed systems focusing on concepts such as internal energy, work, and non-work processes and to analyze expanders, nozzles, and throttling processes based on the first law.
3. Expose students to the properties of working fluids, including liquids, vapors, and gases. They will explore the liquid-vapor phase equilibrium diagram and become familiar with the saturated and superheated states of water and other refrigerant fluids.
4. Teach the behavior of perfect gases and ideal gases in relation to P-V-T (pressure-volume-temperature) constants including the mole relation, specific heat, gas constant, and different gas processes such as isothermal, isobaric, isochoric, adiabatic, and polytropic processes.
5. Introduce students to the second law of thermodynamics, including concepts of reversibility, irreversibility, cycles, efficiencies, and the Carnot cycle in idealized heat engines and refrigerators. They will learn about heat pumps, the Carnot principle, Clausius inequality, T-S diagrams, maximum available energy, reversible heat transfer, and entropy change in isolated systems. They will grasp the consequences of the second law in energy conversion.

Course Learning Outcomes:

1. Demonstrate a comprehensive understanding of thermodynamics, differentiating between the macroscopic and microscopic domains and recognizing the relationship between statistical and classical thermodynamics in equilibrium.
2. Apply the first law of thermodynamics to closed systems, including the concepts of internal energy, work, non-work processes, and the sign conventions in heat and work transfer.
3. Apply the properties of different working fluids, in solving real world problems
4. Apply the principles of ideal gases and various gas processes, including understanding the behavior of perfect gases, ideal gases, and P-V-T constants
5. Apply the second law of thermodynamics to heat engines and refrigerators, heat pumps,

Course contents

Basic concepts of thermodynamics, macroscopic and microscopic domains.Brief description statistical thermodynamics, classical thermodynamics in equilibrium. Thermodynamics universe. The zeroth law. Intensive and measurements. Calibration processes. The first law in closed systems, internal energy, work and non-work. Sing convention in heat and work transfer. Flow processes and enthalpy. First law expenders; nozzles and throttling processes.

Properties of working fluids, liquids, vapours and gases, liquid vapour phase equilibrium diagram, saturated and superheated state in water and in working fluid of refrigerator. The p-h data of the pure water substance in boiling. Steam quality measurement: Barley calorimeter, separating, throttling and combined calorimeter. Use of property

tables. Processes in the vapour phase. Constant volume, constant pressure, isothermal, hyperbolic ad polytrophic processes. The perfect gas, the ideal; gas and P-V-T constant. The mole relation. Specific heats the gas constant, processes with idea gas: isothermal, isobaric, isochronal, adiabatic and polytrophic processes.

The second law of thermodynamics. Concepts of cycles and efficiencies. Reversibility, Carnot cycle in idealized heat. Irreversibility, Carnot cycle in idealized heat engines and refrigerators (vapour and gases). Heat pumps, Carnot principle and Clausius inequality. T-S diagrams for various processes. Maximum available energy. Reversible heat transfer and entropy change in isolated systems. Consequences of the second law in energy conversion.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 371: Fluid Mechanics I (2 Units)

Course Learning Objectives (CLOs):

1. Teach the the fundamentals of incompressible flow, including the characteristics and behavior of fluids that do not experience significant density changes.
2. Expose students to the application of Bernoulli's equation and momentum theorems to analyze and solve engineering problems related to fluid flow in various scenarios, including pipe flow, duct flow, and the study of drag and lift.

3. Impart the concept of vorticity and characteristics of potential flows and their applications in engineering problems.
4. Explain the concept of dimensional analysis and its application to flow problems. enabling them to make predictions and analyze real-world scenarios based on dimensional analysis techniques.
5. Teach the concepts of boundary layers and separation in fluid flow and be able to analyze and interpret these phenomena in various scenarios.

Course Learning Outcomes:

1. Demonstrate a comprehensive understanding of incompressible flow principles, including hydrostatics, the mass conservation equation, and the differential equations of motion for inviscid flows.
2. Apply Bernoulli's equation and the principles of linear and angular momentum to solve engineering problems related to fluid flow, including pipe flow, duct flow, and the analysis of drag and lift.
3. Analyze vorticity and potential flows, understanding their characteristics and applications in engineering problems. Interpret the equations governing viscous fluid flow and explore special solutions.
4. Apply dimensional analysis and modeling techniques to flow problems, enabling the prediction and analysis of fluid flow phenomena based on scaling and modeling principles.
5. Analyze flow with heat losses and gain in pipes and ducts, including an understanding of boundary layers, separation,

and their implications in fluid flow. Interpret and analyze these phenomena in practical scenarios.

Course contents

An introduction to incompressible flow and Hydrostatics.Mass conservation equation differential equations of motion for inviscid flows, Bernoulli's equations. Linear and angular momentum theorems and applications to engineering problems. Vorticity and potential flows. Equation governing viscous fluid flow and some special solutions. Dimensional analysis and modeling with application to flow problems. Flow with heat losses and gain in pipes and ducts. Boundary layer and separation. Drag and lift.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 312 Engineering Drawing III Prerequisite: MEC 211, MEC 212 Year 3 (2 Credits)

Course Learning Objectives (CLO):

1. Impart advanced proficiency in working with loci, specifically epicycloids and hypocycloids, understanding their properties and applications in engineering.

2. Teach points of interest in mechanisms, including critical points and features that affect the functionality and operation of mechanical systems.
3. Expose students to a comprehensive understanding of screw threads and fastenings, including different thread types, their design principles, and their applications in engineering.
4. Impart skills in projections of lines, plane areas, and solids on auxiliary planes, accurately representing complex geometries in engineering drawings.
5. Enhance understanding and application of engineering components, considering their function, assembly, and integration within mechanical systems.

Course Learning Outcomes (CLO):

Upon completion of this course, students will be able to:

1. Demonstrate advanced proficiency in working with loci, accurately constructing epicycloids and hypocycloids and understanding their practical applications in engineering.
2. Possess a comprehensive understanding of screw threads and fastenings, including their design principles, proper selection, and their role in securing components in mechanical systems.
3. Demonstrate proficiency in projecting lines, plane areas, and solids on auxiliary planes, accurately representing complex geometries and providing detailed engineering drawings.
4. Create assembly drawings and prepare schedules of parts, effectively communicating the assembly process and identifying individual components.

5. Represent limits, fits, tolerances, and surface finish on drawings, adhering to industry standards and conventions.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

400 LEVEL COURSES

MEC 463: Heat and Mass Transfer I (2 Units)

Course Learning Objectives (CLOs):

1. Understand the fundamentals of heat transfer: Students will gain a comprehensive understanding of the basic principles of heat transfer, including conduction, convection, and radiation. They will grasp the nature of thermal conductivity in liquids, solids, and gases, and how it varies with temperature and pressure.
2. Apply one-dimensional steady-state conduction principles: Students will learn to apply the principles of one-dimensional steady-state conduction to analyze heat transfer in various scenarios. They will understand the mechanisms and equations involved in conduction and be able to solve problems related to heat transfer in plane walls and cylindrical tubes.
3. Understand the basics of convective heat transfer and heat exchangers: Students will be introduced to convective heat

transfer and gain an understanding of the principles underlying heat exchangers. They will learn about the different modes of convection and the factors that influence convective heat transfer. They will also become familiar with heat exchanger designs and applications.

4. Analyze conduction with and without heat generation: Students will explore conduction with and without heat generation in different mediums. They will understand the mechanisms and equations governing heat transfer in these scenarios and be able to analyze and solve problems related to conduction in various materials.

5. Understand the principles of radiative heat transfer: Students will learn about radiative heat transfer and its fundamental principles. They will gain knowledge of the nature of radiation and its interaction with different surfaces. They will also understand the factors that affect radiative heat transfer and its applications in various contexts.

Course Learning Outcomes:

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

1. Demonstrate a comprehensive understanding of heat transfer principles, including conduction, convection, and radiation. Understand the nature of thermal conductivity in liquids, solids, and gases and how it varies with temperature and pressure.

2. Apply the principles of one-dimensional steady-state conduction to analyze heat transfer in various scenarios, including solving problems related to heat transfer in plane walls and cylindrical tubes.

3. Understand the basics of convective heat transfer, including the different modes of convection and factors influencing convective heat transfer. Gain familiarity with heat exchanger designs and their applications.

4. Analyze conduction with and without heat generation in different mediums, understanding the mechanisms and equations governing heat transfer in these scenarios. Solve problems related to conduction in various materials.

5. Understand the principles of radiative heat transfer, including the nature of radiation and its interaction with different surfaces. Recognize the factors affecting radiative heat transfer and its applications in various contexts.

.Course contents

Introduction to Heat Transfer – conductivity, conviction and radiation. Thermal conductivity, nature of thermal conductivity of liquids, solid and gases. Variation of thermal conductivity with temperature and pressure. One dimensional steady-state conduction. Introduction to connective heat transfer heat ex-changers. Conduction with heat and without heat generation in plane wale and cylhderial tube.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 433: Advanced Mechanics of Materials (2 Units)

Course Learning Objectives (CLOs):

1. Teach the behavior and analysis of thick cylinders and compound cylinders
2. Expose Students to the principles and methods for analyzing the bending of flat plates and be able to determine the stresses and deflections in various plate configurations.
3. Explore the behavior of beams placed on an elastic foundation learning the theory and techniques for analyzing the stresses, deformations, and stability of such systems.
4. Teach the concepts and techniques for analyzing these stresses and their distribution in various shell configurations.
5. Explain the principles and methods of the two-dimensional theory of elasticity to understand how to apply elasticity to plastic problems and limit theory, analyzing the behavior of materials under both elastic and plastic deformations.

Course Learning Outcomes:

1. Demonstrate a comprehensive understanding of the mechanics of thick cylinders and compound cylinders, including the principles and techniques for analyzing the stresses and deformations in these structures.
2. Analyze the bending behavior of flat plates, determining the stresses and deflections in various plate configurations and understanding the concept of plate bending.
3. Understand the behavior of beams on an elastic foundation, including the theory and techniques for analyzing the stresses, deformations, and stability of such systems.

4. Analyze the membrane stresses in shell structures of revolution, understanding the concepts and techniques for evaluating these stresses and their distribution in various shell configurations.

5. Apply the principles of the two-dimensional theory of elasticity and analyze elasticity to plastic problems and limit theory, understanding the behavior of materials under both elastic and plastic deformations and being able to solve related problems.

Course contents

Thick cylinders; compound cylinders. Rotation disks. Bending of flat plates. Beams on an elastic foundation. Membrane stresses in shell so revolution. Two-dimensional theory of elasticity. Elasticity to plastic problems, and limit theory.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 431: Mechanical Engineering Design I (3 Units)

Course Learning Objectives (CLOs):

1. Expose Students to a a comprehensive understanding of the behavior and analysis of thick cylinders, compound cylinders, rotation disks, bending of flat plates, beams on an elastic foundation, and membrane stresses in shell structures of revolution.

2. Teach Students the design principles and analysis techniques for mechanical connections such as key and splines, shrink fits, power screws, bolts and nuts, studs, and welds.
3. Explore the principles and applications of flexibility elements, including springs and vibration dampers.
4. Analyze constraint elements and their effects
5. Explore the design and manufacturing aspects of pressure vessels, gaskets, and economic considerations

Course Learning Outcomes:

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

1. Demonstrate a comprehensive understanding of the behavior and analysis of various structural elements, including thick cylinders, compound cylinders, rotation disks, bending of flat plates, beams on an elastic foundation, and membrane stresses in shell structures of revolution.
2. Analyze and design mechanical connections, such as key and splines, shrink fits, power screws, bolts and nuts, studs, and welds. Understand their function, analyze stress concentrations, and optimize tightening methods.
3. Understand the principles and applications of flexibility elements, such as springs and vibration dampers. Analyze their behavior and apply them appropriately in mechanical systems.
4. Analyze constraint elements, including limited bearings (plain, ball, roller, and tilting pad). Understand their principles, analyze their effects, and apply them in mechanical systems.

5. Explore the design and manufacturing aspects of pressure vessels and gaskets, including their design principles, manufacturing methods, and limitations and fits. Understand the economic considerations involved in designing and manufacturing mechanical components and systems.

Course contents

Torsional – Key, splines, shrink fits. Linear – power screws, function of screws and stress concentration. Bolts and nuts, studs. Optimum tightening. Bolt group. Pilgrim nuts permanent rivets welds. Adhesives Flexibility:springs and vibration dampers. Constraint: limited-bearings –plant, ball, roller and titling pad. Pressure vessels. Gaskets manufacture: methods, limits and fits. Economics.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 461: Thermodynamics II (2 Units)

Course Learning Objectives:

To deliver a broad and in-depth presentation of modern thermodynamics based on concepts with sufficient coverage of power, refrigeration, heat pumps, combustion and reacting and non-reacting gas mixtures. Specifically, after attending MEC 461, students will learn to do the following:

1. Computation: Compute values associated with theoretical air, enthalpy of formation, and adiabatic flame temperature

2. Real world problem solving: Apply first and 1second law of thermodynamics concepts in real-world problems in power and refrigeration: Applications include refrigeration and air conditioning, reciprocating engines, Power plants (gas turbine engines, steam turbines and its variants), chemical fuel combustion and piston-cylinder cycles
3. Thermodynamic models: Develop software based thermodynamic models to evaluate and analyze the performance of steam power cycles including reheat and regenerative vapor power cycles.
4. Power system performance assessment and selection: Conduct air-standard analyses of internal combustion engines (Otto, Diesel, and dual cycles) and gas turbine power plants based on the Brayton cycle and its hybrids
5. Concept map: List and connect word/concepts associated with the design of a vapour power cycles/refrigeration cycles/gas power cycles/gas turbines using a concept map.
6. Sensitivity analysis: Evaluate and explain the effects on power or refrigeration system performance of varying key parameters
7. Ideal gas mixtures: Apply mass, energy, and entropy balances to model and analyse systems involving ideal gas mixtures, including mixing processes/combustion.

CLOs

Upon completion of this course, students will be able to:

1. Describe the steps involved in the design of a steam power plant in a concept map
2. Develop a simulation model of steam power plant with/out superheat and reheat including regenerative rankine cycles to analyse their performance (thermal efficiency, net power output, and mass flow

rates), and to prepare an engineering report describing the model and its outcome

3. Evaluate and discuss the effects on steam Rankine cycle performance of varying steam generator pressure, condenser pressure, and turbine inlet temperature.
4. Discuss the principal sources of exergy destruction and loss in a vapour power plants and possible ways to minimise them.
5. Prepare a technical report describing the design of a gas turbine power plant and refrigeration system for a given constraint/application including design calculations and in-class presentation of the results.
6. Model and analyse the performance of gas turbine–related hybrid applications involving combined gas turbine–vapor power plants
7. Apply thermodynamic laws (mostly conservation of mass, energy and the 2^{nd} law) to model thermodynamics systems (Compressors, piston-cylinder systems, waste heat boiler, gas turbine, tank etc) involving ideal gas mixtures/combustion

Course contents

Heat engines: steam in ranking cycle applications, reciprocating and rotary steam plants (turbines). Use of tables and h-s charts. Processes on T-S diagram. Actual work, Rankine work, Carnot work and efficiencies including isentropic Rankine work and actual efficiencies. Steam generators, boiler rating, boiler efficiency and its improvements; airpreheat, economizers, superheat etc. Air standard cycles. The gas air standard cycles and the stirring cycle.Various analyses; work production, air-standards efficiencies relative and real efficiencies. The thermodynamics of ideal gas mixtures, Dalton's law and mixture properties. Chemical fuels and basic elements of combustion. Mass balance. Simple combustion equations; air requirements. Stoichiometric and theoretical air. Combustion products

considered as ideal gases. Heating values of fuels: bomb and gas calorimeters. Engine trails' b.h.p., indicated means effective pressures and their measurement. Fuel consumption loop. Exhaust gas analysis and energy balance in engine trails graphical representations to test results. Reciprocating compressor; single stage with and without clearance effects. Different compression processes isothermal, polytrophic, adiabatic and isentropic. Powers demands efficiencies. Rating of air compressors. Theoretical and true volumetric efficiencies. Air receivers and energy balance reciprocating compressor. The positive displacement rotary compressors stage.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 475: Fluid Mechanics and Transport Processes II
Prerequisite: MEC 371 (3 Units)

Course Learning Objectives:

1. Introduce the principles of fluid mechanics to analyze and solve specific problem areas such as lift and drag in various applications.
2. Understand and analyze the behavior of fluid flow in open and closed conduits, including boundary layers, separation, and the effects on flow characteristics.
3. Introduce similarity laws and modeling techniques to predict and analyze fluid flow behavior in different scales and scenarios.

4. Gain an introduction to steady compressible fluid flow, including the analysis of one and two-dimensional subsonic and supersonic flows, shock waves, and the effects of friction.
5. Explore wave phenomena in fluid mechanics and solve problems using the method of characteristics, with a focus on their applications in population dynamics.

Course Learning Outcomes

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

1. Apply fluid mechanics principles to analyze and solve specific problem areas, such as lift and drag in real-world applications.
2. Analyze and predict fluid flow characteristics in open and closed conduits, including the understanding of boundary layers, separation, and their impact on flow behavior.
3. Apply similarity laws and modeling techniques to scale and simulate fluid flow scenarios, allowing for predictions and analysis in different contexts.
4. Analyze and interpret the behavior of steady compressible fluid flows, including subsonic and supersonic flows, shock waves, and the effects of friction on flow properties.
5. Create solutions to problems related to wave phenomena in fluid mechanics using the method of characteristics, and understand their applications in population dynamics and other relevant fields.

Course contents

Application of fluid mechanics to specific problem areas such as lift and drag. Flow in open and closed conducts, boundary layers, separation. Similarity laws, modeling. Introduction to steady compressible fluid flow. One and two dimensional subsonic and supersonic flows, shock waves, friction. Waves phenomena and their solution by the method of characteristics. Application in

population. Introduction to turbulence length seals, momentum and diffusivity, Reynold's stresses. Lubrication theory.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 499: Laboratory Pacticals III (2 Units)

Course Learning Objectives

1. Expose students to practical experience and hands-on skills in conducting laboratory experiments related to thermodynamics and heat engines, specifically focusing on the shell point engine, two-stroke engine, and the effects of compression ratios.

2. Develop proficiency in performing experiments related to mechanics, including the use of the tiling pad apparatus to analyze the behavior of rotating shafts and the study of whirling of shafts. Additionally, gain hands-on experience with the thin cylinder apparatus.

3. Gain practical knowledge and skills in conducting heat transfer experiments, covering various aspects of heat transfer such as conduction, convection, and radiation.

Course Learning Outcomes:

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

1. Demonstrate proficiency in conducting laboratory experiments related to thermodynamics and heat engines, including the ability to set up and operate the shell point engine, analyze the performance of two-stroke engines, and investigate the impact of compression ratios on engine efficiency.

2. Apply experimental techniques and analyze data from mechanics experiments, specifically with the tiling pad apparatus and whirling of shafts, to understand the behavior of rotating systems and the effects of different parameters.

3. Perform heat transfer experiments to measure and analyze heat transfer mechanisms such as conduction, convection, and radiation, and interpret experimental results to enhance understanding of heat transfer principles.

4. Develop skills in experimental setup, data collection, and measurement techniques relevant to the specific laboratory experiments in thermodynamics, mechanics, and heat transfer.

5. Apply critical thinking and problem-solving skills to troubleshoot experimental setups, identify sources of error, and make accurate and reliable measurements in the laboratory environment.

Course contents

Thermodynamics and heat Engine – shell plinth engine (two stroke-engine, compression ratios etc; Mechanics – Tiling pad apparatus, whirling of shafts, thin cylinder apparatus ; Heat transfer experiments : Measurement of heat transfer rates (e.g., conduction, convection, radiation); Analysis of temperature distributions in heat transfer systems; Determination of thermal conductivity of materials; Study

of heat exchangers and heat transfer mechanisms; investigation of heat transfer enhancement techniques

Assessment methods:

Method	Weight
Exam	**0%**
Others (Quiz, problem sets, labs)	**100%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

FEG 490: Students Industrial Work Experience III (SIWES III) (6 Units)

On the job experience in industrial chosen of practical working experience but not necessarily limited to the student's major (24 weeks from the end of the First Semester at 400 level to the beginning of the First Semester of the following sessions. Thus, the second semesters at 400 level is spent in industry).

MEC 441: Computers and Computational Methods/ Advanced CAD & CAM (3 Units)

Course Learning Goals/Objectives:

The course is intended to make students:

1. Understand and apply approximation techniques, including concepts of accuracy, precision, round-off errors, truncation errors, and error propagation, to effectively analyze and quantify numerical errors in engineering calculations.
2. Gain proficiency in regression methods, both linear and nonlinear, and multiple linear regression, to model and analyze data sets in engineering applications.

3. Develop a solid foundation in statistical methods for representing, modeling, and analyzing engineering data, including hypothesis testing.
4. Acquire a comprehensive understanding of numerical methods for solving linear equations, including Gaussian elimination, Gauss-Sidel methods, and Newton-Raphson iteration, and apply them to solve engineering problems.
5. Utilize MATLAB/SCILAB software to solve engineering problems, including the solution of ordinary differential equations, data analysis, and modeling, and develop skills in algorithm development, input/output, and software analysis for practical engineering applications.

Course Learning Outcomes:

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

1. Identify and quantify numerical errors in engineering calculations, including round-off errors and truncation errors, and their propagation through mathematical operations.
2. Apply regression methods, both linear and nonlinear, and multiple linear regression, to mode
3. l and analyze engineering data sets, and interpret the statistical significance of the obtained results.
4. Apply statistical methods to represent and analyze engineering data, make informed decisions based on data analysis, and conduct hypothesis testing to validate engineering hypotheses.
5. Solve linear equations using numerical methods such as Gaussian elimination, Gauss-Sidel methods, and Newton-Raphson iteration, and apply these methods to solve engineering problems.

6. Utilize MATLAB/SCILAB software to solve engineering problems, including the solution of ordinary differential equations, data analysis, and modeling, and effectively communicate engineering solutions using appropriate software tools.

Course contents

Approximations: Accuracy and precision, definitions of round off and truncation errors, error propagation. Regression Methods: Linear and Non-linear regression, multiple linear regression, general linear least squares. Statistical Methods: Statistical representation of data, modeling and analysis of data, test of hypotheses. Gaussian elimination, Gauss-Sidel-methods and Newton-Rephson Iteration methods of solving linear equations. Forward different tables. Solutions of ordinary differential equations.Algorithms, input and output. Use of MATLAB/SCILAB softwares for engineering applications.Solution to practical engineering problems using software tools. Computer software analysis, highway/transportation, geotechnical, hydraulics/hydrology problem and construction managementICT.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 447: Theory of Machine II (2 Units)
Course Learning Goals:

The course intends to:

1. Develop in the students a thorough understanding of periodic motion, including simple harmonic motion and sinusoidal motion, and their applications in engineering systems.
2. Explain skills and steps in analyzing and solving problems related to free vibration in prismatic bars and cantilevers, utilizing energy methods of solution.
3. Describe the concepts of damped vibrations and forced periodic motion, and apply them to analyze and solve problems involving two-degree-of-freedom systems.
4. Explore the principles of dynamic absorbers and their application in vibration isolation, as well as the measurement and analysis of torsional systems, single rotor systems, two-systems, and geared systems, including the whirling of shafts and the determination of critical speeds.
5. Teach application of the Rayleigh-Ritz equation and other relevant techniques to the design of dynamic systems, such as balancing machinery and optimizing system performance

Course Learning Outcomes:

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

1. Analyze and describe the characteristics and behavior of periodic motion, including simple harmonic motion and sinusoidal motion, and apply them to real-world engineering systems.
2. Apply energy methods to solve problems related to free vibration in prismatic bars and cantilevers, and analyze the natural frequencies and mode shapes of vibrating systems.

3. Analyze and evaluate the behavior of damped vibrations and forced periodic motion in engineering systems, including the impact of external forces and damping on system response.
4. Analyze and design systems with two degrees of freedom, including dynamic absorbers, to mitigate vibrations and improve system performance.
5. Apply principles of vibration analysis to measure and analyze torsional systems, single rotor systems, two-systems, and geared systems, including the determination of critical speeds and the identification of whirling phenomena.
6. Utilize the Rayleigh-Ritz equation and other relevant methods for the design and optimization of dynamic systems, such as balancing machinery and reducing vibrations.

Course contents

Periodic motion: simple harmonic motion and sinusoidal motion. Free vibration, application to prismatic bars and cantilevers, use of energy methods of solution. Damped vibrations and forced periodic motion; two degree of freedom problems; Dynamic absorbers; vibration isolation and measurement of torsional system single rotor systems, two system, geared systems whirling of shafts, crucial speeds of shafts: Rayeigh –Ritz Equation. Application to design of dynamic system, e,g balancing of machinery etc.

500 LEVEL COURSES

MEC 575: Fluid Dynamics (2 Units)

The objectives of the course are to:

1. Describe the principles of one-dimensional inviscid compressible flows with area change and its practical applications.
2. Develop an understanding of the relationships between static and stagnation fluid properties for isentropic flows of ideal gases.
3. Derive the relationships between static and stagnation fluid properties, based on specific-heat ratios and Mach number.
4. Develop expertise in analyzing the effects of area changes for one-dimensional isentropic subsonic and supersonic flows.
5. Develop an understanding of the effects of area changes for one-dimensional isentropic subsonic and supersonic flows flow through converging and converging-diverging nozzles and apply this knowledge to solve related problems.
6. Illustrate shock wave and the variation of flow properties across the shock wave in constant and variable area ducts.
7. Explain the method of design analysis of flow systems involving negligible friction and heat transfer in constant area ducts known as Rayleigh flow.
8. Gain expertise in examining the operation of steam nozzles, which are commonly used in steam turbines.
9. Describe Viscous Effects (a) Compressible boundary layers (b) Shock thickness (c) Shock wave-boundary layer interactions

Learning Outcomes

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

1. Apply Mach number and stagnation properties relations in solving one dimensional compressible flow problems with and without heat transfer

2. Describe characteristic physical features of different compressible flow regimes (subsonic, transonic, supersonic, and hypersonic).
3. Identify and contrast theoretical formulations suitable to mathematically describe each flow regime and explain the range of applicability of the underlying assumptions.
4. Solve one dimensional compressible flow problems involving area change
5. Solve two dimensional compressible flow problems involving oblique shock waves, Prandtl-Meyer expansion waves.
6. Apply computer programs (Matlab, Excel, EES, Javascript calculators, etc.) to compressible-flow problems.
7. Identify the various types of flow that occur with compressible gas flow through nozzles
8. Design convergent-divergent nozzles for given applications
9. Determine what types of engine intake systems that should be used with various subsonic and supersonic aircraft
10. Determine the effects of viscous stresses and heat transfer on compressible fluid flows
11. Calculate heat transfer rates to and from external surfaces in high-speed compressible flows

Course contents

Mathematical theory of the motion of inviscid fluid. Steady compressible flow. Laminar and turbulent boundary layers, and wakes. Theory of turbulence models, isotropic wall and free turbulence.

Assessment methods:

Method	Weight
Exam	**70%**

Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 543: Theory of Elasticity and Fracture (2 Units)

Course Learning Goals

1. Explain the theory of elasticity and its application to solve two- and three-dimensional engineering problems, including stress analysis in structures subjected to point loading, such as round holes, discs, and wedges.
2. Expose students to proficiency in experimental stress analysis techniques, including strain gauging, photo elasticity, and photography, to measure and analyze stress and strain distributions in engineering components.
3. Develop expertise to apply approximate methods, such as the finite element method, to analyze complex engineering systems and structures.
4. Teach conventional design concepts in relation to fractures, including the mechanics of fracture, and develop the ability to evaluate and predict the behavior of materials and structures under fracture conditions.
5. Gain expertise in solving practical engineering problems related to stress analysis and fracture mechanics.

Course Learning Outcomes

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

1. Apply the principles and equations of elasticity theory to analyze and solve two- and three-dimensional engineering

problems, including stress concentration in various geometries under point loading.

2. Utilize experimental stress analysis techniques, such as strain gauging, photoelasticity, and photography, to measure and analyze stress and strain distributions in engineering components, and interpret the obtained data.
3. Apply approximate methods, including the finite element method, to analyze and predict the behavior of complex engineering systems and structures under different loading conditions.
4. Analyze and evaluate the conventional design concepts and criteria related to fractures, including the mechanics of fracture, and assess the failure behavior of materials and structures under fracture conditions.
5. Demonstrate proficiency in applying the principles and techniques learned in the course to solve practical engineering problems related to stress analysis and fracture mechanics, and effectively communicate the findings and solutions to others.

Course contents

Application of the theory of elasticity of two and three-dimensional problems in engineering, stress concentration in round holes, disc, wedges under point loading etc. Experimental stress analysis, strain gauging, photo elasticity and hotography. Approximate methods; finite element method. Conventional design concepts in relation to fractures; the mechanics of fracture. Designing and testing for fracture resistance microscope aspect of fracture. Fracture of specific materials. Fatigue

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 597: Laboratory Practical IV (3 Units)

Course Learning Goals:
The course aims to do the following:

1. Teach hands-on experience and practical skills in conducting laboratory experiments related to refrigeration and air-conditioning systems, including the measurement and analysis of system performance and characteristics.
2. Expose students to an understanding of vibration analysis and acquire practical skills in conducting experiments to analyze and measure vibrations in mechanical systems.
3. Develop proficiency in mechatronic experiments, including the integration of mechanical, electrical, and control systems, and the design and implementation of mechatronic systems.
4. Develop an understanding of mechanical properties of engineering materials and acquire skills in conducting experiments to measure and analyze material properties, such as strength, hardness, and ductility.
5. Impart knowledge and practical experience in the analysis and structure of heat treatment processes for metals, including conducting experiments to study the effects of heat treatment on material properties and microstructure, and understanding the principles of casting processes.

Course Learning Outcomes:

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

1. Successfully conduct laboratory experiments related to refrigeration and air-conditioning systems, and analyze and interpret the obtained data to evaluate system performance and characteristics.
2. Apply experimental techniques and analysis methods to measure and analyze vibrations in mechanical systems, and interpret the results to assess system behavior and performance.
3. Design and conduct mechatronic experiments, integrate mechanical, electrical, and control components, and demonstrate proficiency in mechatronic system design and implementation.
4. Conduct experiments to measure and analyze mechanical properties of engineering materials, and interpret the obtained data to evaluate material performance and behavior.
5. Conduct experiments to study the effects of heat treatment processes on metals, analyze the structure and properties of heat-treated materials, and understand the principles and techniques of casting processes. Effectively communicate experimental procedures, results, and findings through comprehensive laboratory reports.

Course contents

The objective of this course is to ensure that students participate in basic laboratory experiment in different areas e.g refrigeration and air-conditioning, vibration, mechatronic experiment,autotronic

experiment, study of mechanical properties of engineering materials and analysis on the structure of heat treatment of metal,e.g, casting.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 564: Tribology (2 units)

Course Learning Goals for:

1. Explain the theories of friction between metallic and non-metallic surfaces, both in dry and lubricated conditions, and gain knowledge of the testing methods and properties of materials relevant to friction and wear.
2. Develop expertise of different types of lubricants, both solid and liquid, and their characteristics, and understand their roles in reducing friction and wear in mechanical systems.
3. Gain proficiency in the theory of self-acting and pressurized bearings, including the Reynolds equation and its solutions, and understand the effects of dynamic loading, temperature, and pressure on viscosity and lubrication performance.
4. Explore the principles of elastohydrodynamic lubrication, with a focus on its applications in gears and rolling contact bearings, and gain insight into the design considerations for efficient and reliable lubrication in such systems.

5. Develop skills in the design of journals and thrust bearings, considering factors such as load capacity, stability, and lubrication requirements, and understand the principles and techniques involved in designing effective bearing systems.

Course Learning Outcomes for "Friction, Lubrication, and Bearing Design":

1. Apply the theories of friction to analyze and predict the behavior of metallic and non-metallic surfaces under dry and lubricated conditions, and evaluate the factors influencing friction and wear in engineering systems.
2. Evaluate the properties of materials relevant to friction and wear, and apply appropriate testing methods to assess the performance and suitability of materials in frictional applications.
3. Analyze the characteristics and performance of different types of lubricants, both solid and liquid, and select suitable lubricants based on their properties and compatibility with specific applications.
4. Analyze and solve lubrication problems in self-acting and pressurized bearings using the Reynolds equation and its solutions, considering the effects of dynamic loading, temperature, and pressure on lubricant viscosity and performance.
5. Analyze and design efficient and reliable lubrication systems for gears and rolling contact bearings, taking into account elastohydrodynamic lubrication principles, load capacity requirements, and other design considerations. Additionally, demonstrate proficiency in designing journals and thrust

bearings, considering factors such as load capacity, stability, and lubrication requirements.

Course contents

Theories of friction between metallic, non-metallic, dry and lubricated surfaces testing and properties of materials, solid and liquid lubricants. Theory of self-acting and pressurized bearing including Reynolds equation and solutions, dynamics loading, temperature, and pressure effects on viscosity. Ealstohydrodynamic lubrication, gears and rolling contact bearings. Design of journals and thrust bearing.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 576: Turbomachinery (2 Units)

Course Learning Goals

1. Explain the moment of momentum principles and their application to analyze and design various fluid machinery systems, such as turbines, compressors, pumps, and fans.
2. Gain knowledge of the performance characteristics of turbines, including specific speed, and learn how to analyze and interpret turbine performance curves and operating conditions.
3. Develop expertise of the principles of matching pumps with loads, considering factors such as flow rate, head, and

efficiency, and develop the ability to select and design pump systems that meet specific requirements.

4. Explore the cascade theory and its application to analyze the aerodynamic behavior of cascades, including the effects of Mach numbers, and develop skills in interpreting and predicting the performance of cascades.
5. Impart a comprehensive understanding of the performance characteristics of fluid machinery and their impact on system efficiency and performance, and acquire the ability to evaluate and optimize the performance of fluid machinery systems.

Course Learning Outcomes:

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

1. Apply the moment of momentum principles to analyze and design turbines, compressors, pumps, and fans, and evaluate their performance and efficiency in different operating conditions.
2. Analyze and interpret turbine performance characteristics, including specific speed, and understand the factors influencing turbine performance, such as flow rate, head, and efficiency.
3. Evaluate the requirements of pump systems and their loads, and select and design pumps that match the specific operating conditions, considering factors such as flow rate, head, and efficiency.
4. Apply cascade theory to analyze the aerodynamic behavior of cascades, considering the effects of Mach numbers, and predict the performance characteristics of cascades.
5. Evaluate and optimize the performance of fluid machinery systems, considering factors such as efficiency, flow rate,

head, and matching with loads. Additionally, effectively communicate the analysis, design, and evaluation of fluid machinery systems through technical reports and presentations.

Course contents

Moment of momentum principles for turbines, compressors, pumps, fans, performances characteristics of turbines, etc specifics speed. Matching of pump and load. Cascade theory, including Mach number effects.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 533: Mechanical Engineering Design II (2 Units)

Course Learning Goals

1. Develop a comprehensive understanding of safety, wear, and reliability considerations in engineering design, including the evaluation of dimensional determinations, failure theories, and the selection of appropriate design factors for safety and strength.
2. Impart knowledge of fatigue failures and their analysis, including the interpretation of S-N diagrams, understanding

the Goodman Line, and the consideration of fluctuating stresses, shock loads, and transmitted loads in design.

3. Teach proficiency in reducing stress concentration in designs through various methods, such as geometric optimization and the use of appropriate materials, and apply these techniques to the design of shafts and other components.

4. Understand the principles and practices of materials selection in engineering design, considering factors such as mechanical properties, corrosion resistance, and suitability for specific applications.

5. Develop an understanding of the importance of design development, including considerations for ergonomics and aesthetics, and acquire skills in incorporating these factors into the design process.

Course Learning Outcomes

1. Evaluate and apply dimensional determinations and failure theories, such as the maximum shear stress theory, maximum distortion energy theory (von-Mises-Hencky criterion), and maximum normal stress theory, to analyze and ensure the safety and reliability of mechanical designs.

2. Analyze and interpret S-N diagrams and understand the effects of fluctuating stresses, shock loads, and transmitted loads on fatigue failures, and apply appropriate design factors for safety and strength reduction.

3. Apply methods to reduce stress concentration in designs, such as optimizing geometric configurations and selecting suitable materials, and effectively apply these techniques in the design of shafts and other components.

4. Analyze and select appropriate materials for engineering design based on their mechanical properties, corrosion resistance, and suitability for specific applications, and justify material selection decisions.

5. Incorporate considerations for design development, including ergonomics and aesthetics, into the design process, and effectively communicate design solutions that meet both functional and aesthetic requirements.

Course contents

Safety, wear and reliability in design: checking in engineering design with emphasis on dimensional determination, failure theories – maximum shear stress theory, Maximum distortion energy theory (von-Miss – Hencky criterion, Maximum Normal stress Theory) coulomb – Mohr theory, etc fatigue failures, - S,N diagram and Goodman Line, fluctuating stresses, shock loads and transmitted loads factor for safety and strength reduction factors in Design – Notch sensitivity. Method of reducing stress concentration, application to shaft design materials selection, lubrication, design development ergonomics, aesthetics.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 534: Mechanical Engineering Design III Power, Energy and Motion Transfer (2 Units)

Course Learning Goals

1. Develop a comprehensive understanding of flexible drives, including the principles and application of flexible couplings, belts, ropes, and V-ropes, and their roles in transmitting motion and power in mechanical systems.
2. Gain knowledge of solid drives, such as toothed belts, chains, spur gears, helical gears, bevel gears, and worm gears, and understand their design, operation, and application in various mechanical systems.
3. Explore the principles and application of clutches and brakes in mechanical systems, and understand their functions in controlling motion and power transmission.
4. Acquire knowledge of energy transfer mechanisms, including flywheels, and understand their roles in storing and releasing energy in mechanical systems.
5. Develop an understanding of motion transfer mechanisms, such as cams and linkages, and their applications in converting rotary motion to various types of desired motion.

Course Learning Outcomes:

1. Analyze and select appropriate flexible drives, such as flexible couplings, belts, ropes, and V-ropes, based on the requirements of mechanical systems, and effectively design and integrate them for efficient motion and power transmission.
2. Analyze and select suitable solid drives, including toothed belts, chains, spur gears, helical gears, bevel gears, and worm gears, for specific applications, considering factors such as load capacity, speed, and efficiency.

3. Evaluate and select appropriate clutches and brakes for mechanical systems, considering factors such as torque capacity, engagement/disengagement characteristics, and safety requirements.
4. Analyze and design flywheels for energy storage and release in mechanical systems, considering factors such as rotational inertia, energy capacity, and stability.
5. Analyze and design motion transfer mechanisms, such as cams and linkages, to achieve specific types of desired motion in mechanical systems, and effectively communicate the design solutions and their functional characteristics.

Course contents

Power, Energy and Motion Transfer

Flexible drives – flexible coupling, belt, rope and vee rope drivers cutches and brakes, solid drives – Toothed belts, chains, spur, helical, bevel and worm gears, energy transfer – flywheels, motion transfer cams and mechanisms.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 565: Applied Thermodynamics (2 Units)

Course Learning Goals:

1. Review and strengthen understanding of thermodynamics relations and processes as they relate to turbo machinery, providing a foundation for the analysis and design of these systems.

2. Explain the classification and general principles of operation of turbo machines, including axial flow and centrifugal machines, and understand the application of momentum principles in analyzing their idealized performance.

3. Teach the significance and application of velocity triangles in the analysis and design of turbo machinery, and be able to define and discussion of common terms such as efficiency, flow coefficient, pressure coefficient, specific speed, specific diameter, and power coefficient.

4. Develop proficiency in using non-dimensional parameters to present and analyze data in turbo machinery, and understand the importance of dimensional analysis in the design and selection of turbo machines.

5. Describe the importance of airfoils and linear cascades in turbo machinery, and gain an elementary understanding of lift, drag, and their significance in turbo machine and airplane performance

Course Learning Outcomes :

1. Apply thermodynamics relations and processes to analyze and evaluate the performance of turbo machinery systems, and effectively communicate the results through technical reports and presentations.

2. Classify and describe the operating principles of various types of turbo machines, including axial flow and centrifugal machines, and analyze their idealized performance using momentum principles and velocity triangles.

3. Develop models to calculate and interpret important parameters in turbo machinery, such as efficiency, flow

coefficient, pressure coefficient, specific speed, specific diameter, and power coefficient, and utilize these parameters in the design and selection of turbo machines.

4. Utilize non-dimensional parameters to present and analyze data in turbo machinery, and effectively apply dimensional analysis techniques to improve the design and performance of turbo machines.

5. Analyze and evaluate the significance of airfoils, linear cascades, lift, and drag in turbo machinery and airplane performance, and understand the role of theoretical analysis, wind tunnels, and water tanks in the development and improvement of turbo machinery systems.

Course contents

Review of thermodynamics relations and processes.Definition classification of Turbo machines. General principles of operations. Axial flow and centrifugal machines: momentum principles in analyzing idealized turbo machinery performance. Turbo machinery, velocity triangles. Definition and discussion of common terms: efficiency, velocity triangles. Definition and discussion of common terms, efficiency, flow coefficient, pressure coefficient, specific speed, specific diameter, and power coefficient. Use of the terms in the design and selection of turbo machines. Presentation of data using the non-dimensional parameters, as opposed to dimensional parameters. Elementary discussion of airfoils and linear cascades. Lift and drag. Importance of turbo machine and airplane performancevalue and limitations of theoretical analysis. The importance of the wind tunnel and water tank in turbo machinery development.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 599: Project (6 Units)

Intended Goals for Student Undergraduate Degree Project:

1. Teach how to Identify and define a research topic or project that aligns with the student's area of interest and academic discipline, demonstrating the ability to formulate a clear and focused research question or project objective.
2. Conduct a comprehensive literature review to gather relevant information and background knowledge related to the research topic, demonstrating the ability to critically analyze and synthesize existing research and identify research gaps.
3. Design and implement a research methodology or project plan appropriate for the chosen topic, demonstrating the ability to apply research methods and techniques effectively and ethically.
4. Collect, analyze, and interpret data or other evidence generated from the research or project, demonstrating proficiency in data collection, analysis, and critical thinking skills.
5. Communicate the findings or outcomes of the research or project effectively through a final report, presentation, or

other appropriate medium, demonstrating strong written and oral communication skills and the ability to effectively disseminate research findings to both technical and non-technical audiences.

Learning Outcomes for Student Undergraduate Degree Project:

1. Develop a research proposal or project plan that clearly defines the research question or project objective, identifies the scope and significance of the work, and outlines the proposed methodology or approach.
2. Conduct a comprehensive literature review, synthesizing relevant scholarly sources and identifying key theories, concepts, or prior research findings that inform the research or project.
3. Apply appropriate research methods or project management techniques to collect and analyze data or evidence, demonstrating proficiency in data collection, data analysis, and the use of relevant software or tools.
4. Interpret and critically evaluate the findings or outcomes of the research or project, drawing valid conclusions and identifying implications or potential areas for further investigation.
5. Present the research or project findings effectively through a final report, presentation, or other appropriate medium, demonstrating clear and concise communication, adherence to academic standards, and the ability to engage and respond to questions or feedback from an audience.

Assessment methods:

Method	Weight

Exam	**0%**
Others (Project, Report, presentation)	**100%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 581: Advanced CAD/CAM (3 Units)

Course Learning Goals:

1. Understand the fundamental concepts and principles of Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM) systems.
2. Gain proficiency in programming numerical control (NC) machine tools for manufacturing operations.
3. Explore the advancements in NC machine tools, computer numerical control (CNC) systems, and programmable controllers.
4. Develop skills in utilizing CAD software for creating and modifying 2D and 3D models.
5. Learn the economic aspects of NC systems and their impact on manufacturing processes.

Course Learning Outcomes:

1. Demonstrate a comprehensive understanding of the basic design structure of numerical control (NC) machine tools and their operation.

2. Apply programming techniques for manual part programming, including linear and circular interpolations, for manufacturing jobs in NC systems.

3. Utilize special NC languages, such as Automatically Programmed Tools (APT), for programming complex machining operations.

4. Evaluate and analyze the advancements in numerical control machine tools, computer numerical control (CNC) systems, and programmable controllers.

5. Utilize CAD software effectively to create, modify, and visualize 2D and 3D models for manufacturing purposes.

Course contents

The basic design structure of numerical control (NC) machine tools, open-and-close loop NC. Input media and date coding in NC. Point to point manual programming. Economics of NC and selection of machines. NC manual part programming for manufacturing jobs requiring linear and circular interpolations. Continuous part programming. Special NC languages, the automatically programmed tools (APT) language. Advances in numerical control machine tools and computer numerical control machine tools and computer numerical control machine tools. Programmable controllers and robotics.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 591: Seminar (3 Units)

MEC 582: Engineering Management (2 Units)

Course Learning Goals:

1. Teach the fundamental principles and elements of organization, and their application in effective management practices.
2. Develop an understanding of the principles and concepts of engineering management, including its role in integrating technical knowledge and business practices.
3. Acquire knowledge and skills in project management, including planning, organizing, and controlling projects, and effectively managing resources, time, and budget.
4. Develop knowledge and skills in financial management

Course Learning Outcomes:

1. Apply the principles of organization and management by objectives to real-world organizational situations, demonstrating the ability to develop effective organizational structures and management strategies.
2. Analyze financial statements, apply accounting methods, and use cost planning and control techniques to make informed financial decisions and evaluate the financial health of an organization.
3. Demonstrate proficiency in budgeting and budgetary control, and effectively use depreciation accounting and asset

valuation methods to assess the value and performance of assets.

4. Apply principles of personnel management to effectively select, recruit, train, and evaluate employees, and demonstrate an understanding of the role of industrial psychology in managing human resources.
5. Apply resource management techniques, including contracts, interest formulae, and rate of return analysis, and use planning, decision-making, forecasting, scheduling, and production control techniques to optimize resource utilization and improve organizational efficiency.

Course outline

Principles of organization; elements of organization, management by objectives. Financial management, accounting methods, financial statements, cost planning and control, budget and budgetary control. Depreciation accounting and valuation of assets. Personnel management, selection, recruitment and training, job evaluation. Industrial psychology. Resource management; contracts, interest formulae, rate of return. Methods of economic evaluation. Planning decision making, forecasting, scheduling. Production control. Grant chart. CPM and PERT. Optimization, linear programming as an aid to decision makings, transport and materials handling, raw materials and equipment.Specific techniques introduced are: Transportation Model, Inventory control, Simulation, replacement analysis etc. Facility layout and location. Basic principles of work study. Principles of motion economy. Ergonomics in the design of equipment and process.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 583: Engineering Law (2 Units)

Course Learning Goals:

1. Explain comprehensively the common law system, including its history, nature, and division, and the role of legislation and interpretation in legal practice.
2. Expose students to the principles and concepts of equity, and its main spheres of application in the legal framework.
3. Gain a thorough understanding of contract law specific to engineering, including the elements of offer, acceptance, communication, and termination, and the legal implications of contractual obligations.
4. Develop knowledge and awareness of general principles of criminal law and their relevance to engineering practice, including an understanding of legal liabilities and obligations.
5. Gain a solid understanding of tort law, including its definition, classification, and liabilities, as well as the legal requirements, application, and infringement associated with patents.

Course Learning Outcomes for "Engineering Law":

1. Analyze and interpret legal cases and statutes related to engineering law, demonstrating an understanding of the common law system and its application in legal practice.
2. Apply principles of equity in legal scenarios, recognizing and addressing the specific spheres where equitable remedies may be appropriate.
3. Analyze and evaluate contracts in an engineering context, identifying and interpreting the elements of offer, acceptance, communication, and termination, and assessing the legal implications of contractual obligations.
4. Evaluate and apply general principles of criminal law to engineering situations, recognizing legal liabilities and obligations, and demonstrating an understanding of the potential consequences of unlawful actions.
5. Assess and analyze legal issues related to tort law and patents in engineering practice, including requirements, application, and infringement, and demonstrate an understanding of legal strategies for protecting intellectual property and managing potential liabilities.

Course outline

Common law: its history, definition, nature and division. Legislation codification interpretation. Equity: Definition and its main spheres. Law of contracts for Engineers. Offer, acceptance, communication termination. General principles of criminal law. Law of torts: definition, classification and liabilities. Patents: requirements,

application, and infringement. Company law. Labour law and Industrial law.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 566: Heat and Mass Transfer II (2 Units) (2 Units)

Course Learning Goals for "Heat and Mass Transfer II":

1. Expose students to deep analysis of unsteady conduction heat transfer, including analytical, graphical, and numerical methods for analyzing and solving unsteady heat conduction problems.
2. Gain proficiency in applying electrical analogue circuits as a tool for modeling and analyzing heat transfer phenomena.
3. Teach laminar boundary-layer momentum and energy equations, and their application in analyzing laminar boundary-layer flows and heat transfer.
4. Develop an understanding of approximate solutions for the boundary-layer energy equation and their significance in predicting heat transfer characteristics.
5. Explore advanced topics in heat transfer, including energy transfer with phase change, radiation heat transfer, and heat conduction with moving boundaries.

Course Learning Outcomes for "Heat and Mass Transfer II"

1. Apply analytical, graphical, and numerical methods to solve unsteady conduction heat transfer problems, demonstrating

proficiency in analyzing and predicting transient heat transfer phenomena.

2. Utilize electrical analogue circuits to model and analyze heat transfer systems, demonstrating the ability to apply analogies and principles to solve complex heat transfer problems.
3. Analyze laminar boundary-layer flows and heat transfer using the momentum and energy equations, and evaluate the impact of different parameters on the boundary-layer characteristics.
4. Apply approximate solutions of the boundary-layer energy equation to estimate heat transfer characteristics in various engineering scenarios, considering factors such as flow separation and laminar-turbulent transition.
5. Analyze and solve advanced heat transfer problems, including energy transfer with phase change, radiation heat transfer, and heat conduction with moving boundaries, demonstrating an understanding of the underlying physical mechanisms and mathematical models associated with these phenomena.

Course outline

Unsteady conduction analytical, graphical and numerical methods. Electrical analogue circuits. Laminar boundary-layer momentum equation. Laminar boundary-layer energy equation. Approximate solutions of the boundary –layer energy equation. Approximate solutions of the bounary-layer energy equation. Integrated boundary –layer energy equation, separated laminar steam layers-velocity field and heat transfer. Energy equation and heat transfer in turbulent steam flow. Energy equation and heat transfer in turbulent steam flow.

Energy transfer with phase change. Nature of solid radiation, direct, diffuse and reflected radiance. Heat conduction with moving

boundaries – melting and solicitation, melting of solid with complete removal of melt (ablation). Moving heat sources.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 568:

Course Learning Goals

1. Describe the thermodynamics principles and their application to refrigeration and air-conditioning systems, including the understanding of ideal gases and vapors, properties of substances, and thermodynamic laws and relations.
2. Impart knowledge of the historical development of refrigeration, basic refrigeration systems (such as vapor compression, air-cycle, steam-jet, and absorption), and their thermodynamic processes.
3. Understand the thermodynamics of vapor compression refrigeration, including the analysis of the reversed Carnot cycle and the calculation of the coefficient of performance.
4. Acquire mathematical skills for analyzing vapor compression refrigeration systems, including considerations for compressor design and operation, cylinder design and fabrication, and selection of refrigerants.
5. Develop an understanding of the key components and design considerations in refrigeration and air-conditioning systems, such as condensers, evaporators, system equilibrium, cycling

controls, refrigerant flow controls, air conditioning systems, dehumidification, and estimation of space cooling load.

Course Learning Outcomes

1. Apply thermodynamic principles and laws to analyze and evaluate the performance of refrigeration and air-conditioning systems, demonstrating proficiency in solving problems related to ideal gases, vapors, and thermodynamic processes.
2. Describe the historical development of refrigeration systems and explain the operating principles of various refrigeration systems, including vapor compression, air-cycle, steam-jet, and absorption systems.
3. Calculate and analyze the thermodynamic parameters of vapor compression refrigeration cycles, including the reversed Carnot cycle and the coefficient of performance, and understand their significance in system performance.
4. Utilize mathematical methods to analyze and design vapor compression refrigeration systems, including considerations for compressor selection, cylinder design, and refrigerant selection, while considering factors such as efficiency and environmental impact.
5. Evaluate and design key components of refrigeration and air-conditioning systems, including condensers, evaporators, system controls, and air conditioning systems, and apply psychometric charts to estimate space cooling load and design conditions for air cooling, demonstrating an understanding of the underlying principles and considerations.

Course contents

Refrigeration and Air-Conditioning (2 Units)
Review of thermodynamics: ideal gases and vapors. Properties and of a substance. Internal energy, enthalpy and entropy. Thermodynamics laws, thermodynamics relations for gases and vapors. Historical development of refrigeration, basic refrigeration systems and vapour compressions, air-cycle, steam-jet and absorption. Thermodynamics of vapour compressions, air-cycle, steam-jet and absorption. Thermodynamics of vapor refrigeration. The reserved can not cycle and the coefficient of performance. Rotary compressor. Mathematical consideration of vapor compression refrigeration. Compressor. Cylinder design and inebriation. Refrigeration. Compression cylinder design and fabrication. Refrigerants – types and comparison. Psychrometric charts. Condensers and evaporators functions, theory, design etc, system equilibrium and cycling controls. Refrigerant flow controls. Air conditions systems and dehumidification. Estimation of space cooling load. Design conditions for air-cooling, items of space cooling load.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

MEC 543: Control System (2 Units)
An introduction to the theory common to all feedback control systems, system dynamics control loops errors single, transfer functions, block diagram, stability, system response, simple control

loops. Three term controller stability criteria, measurement to transfer function, response time of instruments.

Course Learning Goals for "Control Systems":

1. Expose students to a solid understanding of the fundamental principles and concepts underlying feedback control systems, including system dynamics, control loops, and the concept of errors.
2. Gain proficiency in analyzing control systems using transfer functions, block diagrams, and stability criteria, and understanding their role in system performance and stability.
3. Teach the methods and skills to evaluate and interpret system responses and characteristics, including response time, damping, and steady-state error, and understand their significance in control system design and operation.
4. Develop the ability to design and implement simple control loops, including the selection and tuning of three-term controllers, and understand the factors that influence stability and performance in control systems.
5. Gain knowledge of the measurement and instrumentation aspects of control systems, including the transfer function of measurement devices and the impact of response time on system behavior.

Course Learning Outcomes for "Control Systems":

1. Analyze and interpret the dynamics of control systems, including the identification of system components, the determination of transfer functions, and the representation of control systems using block diagrams.

2. Evaluate the stability of control systems using stability criteria, such as the root locus or frequency response analysis, and determine the impact of stability on system behavior and performance.
3. Interpret and analyze system responses, including transient and steady-state responses, and determine key characteristics such as response time, overshoot, damping, and steady-state error.
4. Design and implement control loops using three-term controllers, considering factors such as proportional, integral, and derivative gains, and apply tuning methods to optimize system performance and stability.
5. Understand the principles of measurement and instrumentation in control systems, including the transfer function of measurement devices, the impact of response time on system behavior, and the limitations and constraints of measurement instruments in control applications.

Course contents

An introduction to the theory common to all feedback control systems, system dynamics control loops errors single, transfer functions, block diagram, stability, system response, simple control loops. Three term controller stability criteria, measurement to transfer function, response time of instruments.

Assessment methods:

Method	Weight
Exam	**70%**
Others (Quiz, problem sets, labs)	**30%**

Feedback methods: Feedback on the Assessed tutorial work both class-wide and individual

ORIENTATION PROGRAMME

The Orientation Programme is the first exposure of fresh students to social and academic life both within and outside the University. It is a period within which students are introduced to the various activities that they will be exposed to in the course of their academic programme.

Orientation also affords students the opportunity to familiarize themselves with the rules, regulations and procedures of the University. The orientation activities offer students a singular opportunity to avoid unnecessary embarrassments.

As part of the orientation week activities, freshers are able to meet the officers of the University and the DLC. They are introduced to various facilities in the University such as Health Center, and Library etc.

MATRICULATION AND MATRICULATION NUMBER

Only candidates who have satisfied the minimum educational requirements of Enugu State University of Science and Technology are admitted as students. Such candidates are eventually matriculated as students of the University on the Matriculation day. Each fresh student must sign the Matriculation Oath for Admission to the University and affirm that he/she will observe the statutes and rules of the University.

All matriculants are required to be formally dressed. Each matriculant is assigned a matriculation number upon registration. No official student paper or document may be regarded as complete or valid unless it carries the correct matriculation number of the student. As a

result, students are strongly advised to know and be definite at all times with their matriculation numbers.

Once a student has been given a matriculation number, he/she must retain it even if he/she changes his/her Programme of study. He/She must use his/her undergraduate matriculation number when registering for any undergraduate course in the University. Disciplinary procedures will be taken against any student who attempts to obtain a second matriculation number.

IDENTITY CARD

Each registered student of the Centre, upon payment of a prescribed fee, is issued with an official student identity card valid for required numbers of session he is to spend in school. Students may be required, at any time, to identify themselves upon request by authorized University officials acting in the performance of their duties.

Some University facilities are open to only students who are able to show valid cards. Students are required, therefore, to take very good care of their identity cards, carry them always and be ready to produce them at any time on demand.

Students must surrender their identity cards to the centre upon their graduation or withdrawal from the University. Failure to do so shall attract appropriate disciplinary action.

Special information on the identity cards

(a) No student will be allowed into examination hall without identity card.

(b) The identity card is a security document and students are advised to keep it securely against loss or theft.

(c) Students are advised to report loss or theft of their identity cards to the security unit or Student Affairs Unit without any delay.

LEAVE OF ABSENCE

Any student of the centre who, after one or two semesters or at any other point in time of his studies, is unable to continue with his/her studies on account of ill-health or financial difficulties, may apply through centre Director for leave of absence for a semester, subject to a maximum period of two semesters.

WITHDRAWAL FROM THE PROGRAMME

Any student who is absent from the University for two consecutive semesters without official permission will be deemed to have withdrawn from the University. Also, a student whose CGPA falls below 1.00 at the end of a semester shall be on probation during the following semester. If he/she fails to achieve a CGPA of at least 1.00 at the end of that semester, he/she shall be required to withdraw from the University.

REGISTRATION FOR COURSES

Rules Governing Course Registration

(a) Any student who fails to register within the specified period will be deemed to have absented himself/herself from the course for the semester. Absence from the course without permission will lead to forfeiture of the semester by the student and disqualification from writing the University examination at the end of the semester.

(b) The Electronic registration for courses shall take place at a specified period (not more than two weeks) at the beginning of each semester.

(c) A student must register for the required number of courses/units (including compulsory and required courses) as prescribed by the Faculty/Department concerned at the beginning of each semester.

(d) Each student must register for the specified General Studies courses, which he/she must pass in order to qualify for the award of the University Degree.

Submission of Registration Forms

- **First Semester**

The submission of Registration Forms for the First Semester shall end before matriculation in the cases of fresher's and two weeks after the University official date of resumption in the case of returning undergraduates.

- **Second Semester**

Students are expected to complete their registration for the semester two weeks after the University official date of resumption.

Documents to be attached to Student Course Registration Forms

Students must attach the following documents to their Course Registration Forms:

(i) **Fresh Students**

(a) E-payment Fees Receipt
(b) Medical Clearance
(c) Academic Clearance
(d) General Clearance
(e) Student Data Forms
(f) One Recent Passport Photograph
(g) All relevant credentials such as: Birth certificate, WASSCE certificate etc.

(ii) **Stale Students**

(a) E-payment fees receipt

PENALTIES FOR LATE REGISTRATION

(a) Students who submit their Registration Forms within one week after the stipulated two weeks free registration period shall pay a fine as may be determined by the University.

(b) Any student who fails to register for courses within the two-week period of registration in any semester shall forfeit his/her studentship for that semester.

(c) Any student who does not register for a course in any semester would not be allowed to sit for examination in that course. No Registration! No Examination! No Result!

EXAMINATIONS REGULATIONS

(1) Most of the examination shall be computer based. Students must arrive punctually at the times assigned to their papers and must be ready to be admitted into the examination hall thirty

(30) minutes before the time the examination is due to start. Students shall not, in any circumstance, enter the examination hall later than thirty minutes after the time appointed for the commencement of the examination. Students arriving later than thirty minutes after the examination has started shall be admitted only at the discretion of the Chief invigilator.

(2) Students are expected to complete examination attendance register in case of paper and pencil examinations.

(3) Students should not leave the examination hall during the first hour of the examination; outside the period, candidates, with the permission of the invigilator, may leave the room temporarily only if accompanied by an attendant.

(4) Students must display their University identity and Examination Cards on the desk during each examination.

(5) The invigilator may search students before they are allowed into the Examination Hall.

(6) Students must bring their own writing materials (in case of paper and pencil examination) including Calculator (not mobile phones) to the examination hall but they are not allowed to bring any other book or paper. Students are warned in their own interest to ensure that anything that can implicate them such as lecture note, text books, bags, mobile phones and electronic gadgets are not brought into the examination hall.

(7) Student should endeavor to read the instructions on their question paper and adhere strictly to them.

(8) While the examination is in progress communication between candidates is strictly forbidden.

(9) Silence must be observed in the examination hall. The only permissible way of attracting the attention of the invigilator is by the candidate rising up the hand.

(10) All rough work must be done on the answer scripts and crossed neatly thereafter (in case of paper and pencil examination).

(11) Students are advised in their own interest, to write legibly and to avoid using faint ink. The answer to each question must be on a fresh page of the answer script.

(12) Students are to write their matriculation numbers only on the answer scripts and not to write names.

(13) Students are to submit their answer scripts to the invigilator before leaving the examination hall. They are not allowed to remove or mutilate any paper or materials supplied by the University.

(14) Any student found to be involved in any examination malpractice will be invited to appear before the Examination Malpractices Panel and may subsequently be expelled from the University, depending on the gravity of the offence.

EXAMINATIONS MALPRACTICE

As part of the on-going campaign to rid ESUT of the menace of examinations malpractice and to maintain credibility and integrity of the conduct of examinations in the University generally, Senate of the

University has considered all forms of Examinations Malpractices and prescribed appropriate sanctions.

Any student caught to have cheated or aided and abetted cheating in any examination or possessed incriminating materials at the examination or involved in any other examination misconduct before, during or after an examinations including impersonation, will be made to appear before the Examination Malpractices Panel.

PROCEDURE FOR INVESTIGATING ALLEGED EXAMINATION MISCONDUCT

1. Whenever a student is caught for any examination offence, the case shall be reported to the Invigilator/Supervisor in the Hall immediately.

2. The invigilator shall fill the necessary forms reporting the case of examination misconduct and the student should be made to write a statement on his/her involvement. Thereafter, the student shall be allowed to continue with the examination.

3. The Invigilator/Supervisor shall then report formally to the programme coordinator.

4. The student will then be invited to appear before the Examinations Malpractices Panel to defend himself/herself verbally.

5. The Examinations Malpractices Panel shall read the offence(s) alleged to have been committed by the student and allow him/her to defend himself/herself in the light of his/her statement, which he/she had earlier on submitted.

6. The report and recommendation of Examinations Malpractices Panel shall be forwarded to the Senate for consideration and approval.

7. Student may appeal against the decision of the Senate within 14 days of communication of the decision to him/her through the Programme Coordinator Board Secretary through the Director to the Senate.

EXAMINATIONS OFFENCES AND SANCTIONS

The offences and sanctions to be imposed are as follows:

S/N	OFFENCES	SANCTIONS
1	Examination Leakage	Student – Expulsion Staff – Dismissal
2	Illegal possessions of answer script by student	Expulsion
3	Examination scripts with more than one handwriting	Expulsion
4	Staff-complicity in multiple handwriting	Dismissal
5	Possession of illegal materials relating to Examination inside the examination venue	Suspension for four semesters
6	Involvement of mercenary in writing examination	Expulsion of all parties concerned
7	Impersonation	Expulsion of all parties concerned
8	Student's assault on invigilator	Expulsion
9	Harassment of co-students for not cooperating in malpractice	Suspension for one academic session

10	Falsification of identity i.e. Names and matriculation Number, etc. by culprit.	Expulsion
11	Giraffing	Suspension for two semesters
12	Exchange of scripts	Expulsion of all parties
13	Refusal to submit examination answer script	Suspension for one academic session
14	Falsification of official document such as E-payment School Receipt, Identity card and Course Registration form e.t.c.	Expulsion

THE COURSE UNIT SYSTEM AND REGULATIONS GOVERNING THE AWARD OF A DEGREE

Description of the course system

The Course Unit System is an operation system in which the entire number of courses required by a student for a particular degree is packaged into a number of modules. Each consisting of a prescribed number of units, usually, one module is to be offered in one semester.

GRADING OF EXAMINATION UNDER THE COURSE UNIT SYSTEM

It is important to note the following:

(i) **Pattern of Examination:** Each course shall be examined at the end of the semester (or session as the case may be) in which it is offered. This shall mostly be computer-based test, theory

paper of two or three hours, in addition to which there may be a practical paper and/or an oral examination;

(ii) **Qualification for Examination:** To be qualified to sit for an examination, the student must be dully registered, pay his/her school fee fully and obtain examination card for the examination.

(iii) **Measurement of Performance:** A student's performance in a course shall be measured in terms of:

(a) The scores in the Continuous Assessment usually 40%

(b) The results of the prescribed theory and/or practical examination in the course which is usually 60%.

(iv) **Levels of Performance:** The grades awarded for a course are as follows:

Mark Range (%)	Letter Grade	Interpretation
70-100	A	Excellent
60-69	B	Very Good
50-59	C	Good
45-49	D	Satisfactory
40-44	E	Weak Pass
0-39	F	Failure

(v) **Semester Performance:** A student's performance in a semester is calculated as Grade Point Aggregate (GPA). This involves the awarding of credit points in respect of each course taken during the semester. To this end, numerical values are attached to the letter grades earlier mentioned as follows:

S/N	Course	Grade Point Aggregate (GPA)	Numerical value
1	A	5	Credit points per unit of course
2	B	4	Credit points per unit of course
3	C	3	Credit points per unit of course
4	D	2	Credit points per unit of course
5	E	1	Credit points per unit of course
6	F	0	Credit points per unit of course

The semester GPA is then obtained as the ratio of total number of credit points (TCP) to the total number of units (TNU) of courses offered during the semester. Thus, GPA=TCP/TNU.

(vi) **Cumulative Performance:** While the GPA specified above is used to measure the performance of a student in a given semester, the Cumulative Grade Point Average (CGPA) is the one that really determines the student's overall academic standing and, therefore, his continued stay or otherwise in the University after the semester examination. It is also CGPA that is used to classify the degrees awarded to students.

The CGPA is obtained as the ratio of all the credit points accumulated since entering the University to the total number of units registered for since coming into the University.

In other words, the CGPA is equal to the cumulative credit points (CCP), divided by the cumulative load units, (CLU), thus CCP/CLU=CGPA.

All CGPA calculations are to decimal places. Sample computation of GPA and CGPA is presented later in this booklet.

(vii) **Incomplete Grade:** When a student is unable to complete all the prescribed requirements for a course in which he/she is formally registered, his/her result may be deemed to be incomplete by the offering department until the department certifies that all prescribed requirements have been met but, in all cases not later than one semester after the course had been offered.

(viii) **Academic Probation:** A student whose CGPA at the end of a Semester is less than 1.00 shall be placed on academic probation during the subsequent semester.

(ix) **Release of Examination Result**

At the end of each semester the final results of the semester examination shall be published by the centre after Senate approval and posted on the University's website.

REPETITION OF COURSE

Any course failed by a student must be repeated until it is passed. A student shall repeat only those courses in which he/she has obtained

a grade of F. The grade earned for a repeat course shall be recorded and used in the computation of GPA and CGPA in usual way.

REQUIREMENTS FOR THE AWARD OF A DEGREE

To be eligible for the award of a degree, a student must satisfactorily complete the minimum number of units prescribed for the degree. He/she must, in addition, complete successfully, all compulsory courses as well as required and elective courses for the degree as prescribed.

RESIDENCY REQUIREMENT

To qualify for a degree in the ESUT DLC of the University, each student shall normally be required to spend a minimum period of three to five academic years depending on the mode of admission and course of study.

CLASSIFICATION OF DEGREE

The degrees awarded by University are Honours degree and are classified according to CGPA as follows:

Class of Degree	***CGPA Range***
First Class	4.50-5.00
Second Class Upper	3.50-4.49
Second Class Lower	2.40-3.49
Third Class	1.50-2.39

SAMPLE COMPUTATION OF GPA AND CGPA

The following hypothetical results obtained by a student in his/her first year in the University are used to illustrate the computation of GPA and CGPA.

For 1st Semester

Course Code	***Unit***	***Grade***	**Credit Point**	***Point= Unit x Credit Point.***
ECO 111	5	F	0	5 x 0 =0
ECO 121	4	E	1	4 x 1 =4
LAW 111	1	C	3	1 x 3 =3
ECO 181	4	E	1	4 x 1 =4
PSC 111	1	C	3	1 x 3 =3
PSY 111	3	F	0	3 x 0 =0
SOC 111	1	D	2	1 x 2 =2
GST 111	2	C	3	2 x 3 =6
GST 112	2	D	2	2 x 2 =4
TOTAL	23	-		26

TCP = 26 **(TCP means Total Credit Point)**

TNU = 23 **(TNU means Total Number of Units)**

GPA = TCP/TNU = 26/23 = 1.13 **(GPA means Grade Point Average)**

For 2nd Semester

Course Code	*Unit*	*Grade*	*Credit Point*	*Point = Unit x Credit Point.*
ECO 122	5	F	0	5 x 0 =0
ECO 124	4	F	0	4 x 0 =0
ECO 182	1	C	3	1 x 3 =3
ECO 112	4	E	1	4 x 1 =4
GST 118	1	C	3	1 x 3 =3
BIO 102	3	E	1	3 x 1 =3
BIO 104	3	E	1	3 x 1 =3
GST 116	2	F	0	2 x 0 =0
GST 118	2	E	1	2 x 1 =2
TOTAL	25	-		18

For 2nd Semester

TCP = 18, TNU = 25

GPA = TCP/TNU = 18/25 = 0.72

CCP = TCP 1st Semester + TCP 2nd Semester (CCP means Cumulative Credit Point)

CCP = 26 + 18

CCP = 44

CLU = TNU 1st Semester + TNU 2nd Semester (CLU means Cumulative Units)

CLU = 23 + 25

CLU = 48

CGPA = CCP/CLU = 44/48 (CGPA means Cumulative Grade Point Average)

CGPA = 0.9

Repeat: ECO 111, PSC 111, ECO 122, ECO 124, GST 116.

Remark: PROBATION.

Comment

Note that the candidate will be on PROBATION during the third semester since his CGPA has fallen below 1.00 at the end of the second semester. Furthermore, if the CGPA still falls below 1.00 at the end of the semester that followed, he/she will be advised to WITHDRAW from the University.

CHANGE OF NAMES BY STUDENTS

The following guidelines are adopted in respect of the procedure for change of names by students in the University.

(a) That all students should graduate with the names by which they were admitted to the University.

(b) That only female students may be allowed to change their names, as a result of change in marital status and with acceptable documentary proof.

(c) That for the avoidance of doubt, no change of name by any male student is allowed by the university. Male students are advised to take special note of this. All enquiries on the procedures for change of name can be obtained from the Student Affairs Unit.

GUIDELINES ON CHANGE OF PROGRAMME/CHANGE OF UNIVERSITY

Request for transfer should be made only at the completion of 100 level and it is based on fulfillment of requirements of the department where the student wishes to transfer to.

TRANSCRIPT

The ESUTDAR keeps official record of students' grades and transcripts. Students and parents may obtain official transcripts or records directly related to them upon request as provided for and approved by Senate, from time to time. In all cases, obligation to ESUT, Agbani must be fulfilled before any transcript could be issued.

REGULATIONS ON STUDENTS CONDUCT AND DISCIPLINE

The University is established primarily to educate the student and to inculcate cultural values and good character.

An acceptance of offer of admission by a student to the University automatically implies that he/she has accepted to abide by the rules and regulations that may from time to time be made for governance of the University. Such acceptance also carries with it an obligation that the student shall conduct himself/herself as a law abiding and responsible member of the academic community, in accordance with University's standards, rules and other conditions established by legally constituted Authority of the University.

Every student of the University is required to maintain a high standard of personal integrity. Each student shall conduct himself/herself peacefully in expressing his/her view on any changes, which he/she may consider necessary. The University regards as serious offences any act of unethical, immoral, dishonest, disloyal, dehumanizing and destructive behaviour as well as violation of University's regulations. It is, therefore, the responsibility of each student not only to acquaint himself/herself with these regulations but also to assist in upholding them at all times.

The University is committed to the full support of the legitimate right of its members. The University has an equal obligation to protect its educational purpose and the interest of its entire community. For this reason, the University is naturally concerned about the action of some individuals which may be in conflict with the welfare and integrity of the University or in disregard of the right of other members of this community.

The legitimate expression of differing opinion and concerns is an essential part of the academic community. But the imposition of opinion and concern upon those who, in turn, dissent from them shall not be tolerated. It is emphasized that all members of the University community, including students, are subject to the laws of the nation whether within or outside University campus, like all other citizens. They are expected to learn to cope with problems intelligently, reasonably and with understanding and consideration for the right of others. Each member shall recognize that as he/she values his/her right and freedom so is he/she expected to respect the right and freedom of others.

The University reserves the right to discipline a student or to require, through established disciplinary processes, his/her withdrawal from the University based on evidence of a student's failure to abide by its rules. Upon matriculation, every student must obtain and complete bio-data and Denunciation / Renunciation of membership of cult group form at the office of Dean of Student Affairs.

THE DISCIPLINARY SYSTEM

The law governing the University vests the Vice-Chancellor with the power to discipline students. In practice, there is a statutory Students Disciplinary Committee with the general function of dealing with individual cases of indiscipline. The Vice-Chancellor has delegated

power to the Dean of Student Affairs, Deans of Faculties, Heads of Departments and some officers of the University to impose disciplinary measures on students for certain defined offences.

Sanctions for Violation of University Regulations

The following are some of the disciplinary sanctions, which may be imposed for violation of University regulations:

(a) Disciplinary Probation:

Disciplinary probation is a trial for a specific period of time during which a student must behave in a manner acceptable to the University. The Disciplinary Committee may impose terms, which will restrict the student's participation in extra-curricular and/or other activities.

(b) Suspension:

Suspension is an action which excludes the student from registration, attendance of lectures, practical classes, examinations and the use of University facilities for a specified period of time. This action means that the student must immediately leave the Campus and shall not return to the University until the suspension period is over.

(c) Expulsion:

Expulsion is the permanent withdrawal of student from the university. The privileges of registration, attendance of lectures, practical, examinations as the use of University facilities are withdrawn from the student. This action means that the student must leave the Campus immediately and cease to be a student of the University.

(d) Appeal:

In disciplinary cases, students concerned have a right of appeal to the Vice-Chancellor, Senate and ultimately to the Council against the decision of the University Senate.

CODE OF CONDUCT FOR STUDENTS

(i) University Property Disciplinary Measure:

(a) A student shall not convert University property to personal use illegally.
(b) Student's demonstration resulting in the seizure and/or vandalisation of the University Property and those of staff will attract appropriate sanctions.

(ii) Interpersonal Relationship:

(a) A student shall not engage in any act that can constitute an offence under the law of the country.
(b) A student shall not constitute a threat to the life of other students. Physical combat will attract expulsion.
(c) A student shall not be rude to the University Principal Officers and other authorized officials.
(d) A student shall not be a member of any proscribed organization.
(e) A student shall not hold any illegal or secret meeting organized by secret societies/fraternities. Membership of cult or secret societies will attract expulsion from the University.
(f) A student shall not engage in sexual harassment.

(g) A student shall not molest, intimidate or harass any University staff.

(h) Immodest dressing by any student will attract disciplinary sanctions and such student (male or female) could be asked to leave the lecture room or University function.

(i) Offenders shall face the Students Disciplinary Committee, depending on the seriousness of the misconduct.

(iii) Discipline of Students

Subject to the provision of this section, where it appears to the Vice-Chancellor after due investigation, that any student of the University has been found guilty of misconduct, the Vice-Chancellor may, without prejudice to any other disciplinary powers conferred on him by statute or regulation, direct:

(a) That the student shall not, during such period as may be specified in the directive, participate in such activities of the University or make use of such facilities of the University, as may be so specified; or

(b) That the student be suspended for such period as may be specified in the directive

(c) That the student be expelled from the University.

Whatever the directive given under paragraph (b) or (c) of the above in respect of any student, the student may in the prescribed manner, appeal against the directive through the Registrar to Senate or Council and where such an appeal is brought, the Senate or Council shall, after due consideration, either confirm or set aside the directive or modify it in such a manner as the Senate or Council deems fit. The fact that an appeal against a directive of the Vice-Chancellor is brought in pursuance of the preceding sub-section, operation of the directive shall not be affected while the appeal is pending.

The vice-Chancellor may exercise his power under the Section through a Disciplinary Board or Committee consisting of such members of the University as he may nominate. Nothing in this Section shall be construed as preventing the restriction or termination of a student's activities at the University other than on the ground of misconduct. Any student who has been advised to withdraw from the University for any reason shall neither attend lectures nor participate in other students' activities.

(iv) Attendance at any official University Engagement:

(a) A prompt attendance is required.
(b) Students should be neatly and well dressed.
(c) Students should conduct themselves in orderly manner and follow the instruction of the management closely. Any student misconduct that could disrupt official University engagement shall attract appropriate disciplinary sanction.
(d) Students are encouraged to express their mind freely on any issue but they should do nothing to embarrass the authority of the University publicly.

(v) Movement around the University

(a) The Lawns should be respected. There should be no movement across the lawns.
(b) All litter must be dropped at appropriate waste dumps
(c) Students should ease themselves at places designated for the purpose.
(d) Students who possess any form of vehicular transport shall obey all existing traffic rules and regulations of the nation, respect the right of the pedestrians and conduct themselves in orderly manner and without undue noise making. In

addition, such vehicle should be registered with the University security Unit.

(e) Eating and drinking must be done at appropriate designated places.

(f) Loitering in and around the university premises after 12 midnight and before 6:00am shall not be tolerated. Student are, however, encouraged to make use of the library facilities and lecture theaters/halls in preparation for examination).

(g) There shall be no religious gathering, poster or any other religiously motivated action in or around the lecture halls, offices and laboratories except in places officially designated for religious activities and with an official approval of the school Authority.

(h) There shall be no soliciting for alms within the vicinities of academic activities,

(vi) Relationship with staff

(a) Students should not act in a manner that compromises their self-integrity and honour.

(b) Students shall obey the academic instruction of the staff in a polite and respectful manner.

(c) Students should be neatly and well-dressed when meeting with the Heads of Departments, Deans/Provost of the Faculties/College, Vice-Chancellor or any other University Official.

(d) There should be no noise making around the offices, lecture halls and rooms, Health Center and Library.

(e) When students object to or complain about any staff/departmental action, such objection/complaint should be brought to the notice of the Head of Department who if

unable to resolve the crisis/issue shall refer the matter to the Dean of Student Affairs 24 hours after the complaint/objection was raised for appropriate solution.

(viii) Dress Code for Students

Preamble

Enugu State University of Science and Technology, Agbani continues to be determined to provide an all-round academic, intellectual and character moulding environment for its students in order to produce graduates that are indeed worthy both in character and learning. The University is therefore concerned with the quality of social and cultural image portrayed both inside and outside the campus by its students.

Cleanliness, neatness, modesty, decency and appropriateness in dressing are important values which reflect individual dignity and sobriety through which students, as well as members of staff and portray professionalism in their respective disciplines.

The saying that "the apparel oft proclaims the man" is a truism for everybody – men and women, boys and girls, old and young. Though the University cares about the good physical appearance of its students, their dressing must, however, be in conformity with what is considered decent and appropriate for every occasion.

Principles of Dress Code

Current trends in Students' styles of dressing on University campuses (ESUT inclusive) tend to portray some form of deviant/aberrant norms of social/cultural behaviour. Indeed, most of these trends are either a passing fad, negative cultural trait or fanaticism, which actually should not be allowed in an academic environment such as ours.

Dress Code

Students should maintain cleanliness on campus and wearing of inappropriate outfits of any sort are to be discouraged and avoided.

For the avoidance of doubt, male and female students are not allowed to wear the following.

i. All tight-fitting clothes including skirts, trousers and blouses.
ii. All clothes which reveal sensitive parts of the body such as the bust, chest, belly upper arms and the buttocks. Example of such dresses are transparent clothing, “Spaghetti tops”, “Wicked Straps”, “Mono straps”, “Tubes”, and “Show me your belly”. Skirts and dresses with slits above the knees fall into this category.
iii. Outfits such as knickers and mini-skirts and dresses which are not, at least, at knee-length.
iv. Outfits such as T-shirts, jeans, special arm-bands, special caps by males, special scarf and tattooed jeans by females which carry obscene and subliminal messages.
v. Trousers such as hip-riders and low waist jeans.
vi. Inappropriate outfits such as, party-wears, beach-wear and bathroom slippers should not be worn to lectures.
vii. Traditional dresses that contravene the general dress code.

In addition to the above:

(a) Students should dress in a way that will not hide their identity. However, students who dress according to their religious dictates should be allowed for their fundamental Human rights. Such students should subject themselves for identification in examination halls, laboratories and libraries when the need arises.

(b) Students may be allowed to put on religious/denominational dress, but it should conform to the acceptable principles of dress code already discussed.
(c) Faculties and Departments which require special safety of protective dress modes, such as, apron, overalls, gloves, nose and head-covers should have them officially prescribed for their students.
(d) Sports and Games wears for athletes, sportsmen and sportswomen should be officially prescribed for this category of students to be worn in sports and games areas.
(e) The wearing of earrings and plaiting of hair by male students is banned.

Matriculation and Graduation Ceremonies

During matriculation and graduation ceremonies, students are expected to dress formally and wear academic gowns.

Implementation of the Dress Code

(i) Lecturers and Administrative staff are empowered to correct/exclude students from the lectures, library, examination halls, etc. and official business when they are not properly dressed.
(ii) Violators, depending on the specific circumstances, would be counseled and if necessary will face the Students' Disciplinary Committee and have their records endorsed accordingly.

Caution

Any student who is found to contravene any of these dress code prescriptions will face immediate disciplinary action.

SANCTIONS FOR VIOLATORS

1st Offender - Verbal warning and Counseling which would be recorded in any appropriate medium.

2nd Offender - Warning letters issued to the student and copies of the letter to be sent to the student's parents, Faculty and Department of student.

3rd Offender - The violator be sent to the Students Disciplinary Committee for further investigation and action. If such a violator is found guilty, a suspension of one (1) semester be awarded.

RULES GOVERNING PAYMENT OF FEES

Students are expected to pay their stipulated tuition fees online at the ESUTDLC Website using the interswitch enabled debit card at the beginning of each academic session.

Note further that:

(a) Except where special permission has been granted in writing, no student whose fees for the session have not been paid will be admitted into the University. Students who claim to be on Scholarship or other awards will be expected to pay their fees in full at the time of registration. Such students should therefore endeavour to obtain from their sponsor(s) their full fees (in the form of certified Cheques payable to the Bursary Department, Enugu State University of Science and Technology, Agbani) before reporting at the University for registration.

(b) Students who are compelled to be absent from the University because they are unable to pay their stipulated fees stated

above at the specified time will not be absolved from paying their fees for the period of such absence.

STUDENT INFORMATION AND GUIDANCE SERVICES

The Philosophy which guides careers placements, Guidance and Counseling Unit in discharging its primary functions is to view the undergraduate years as one of the most crucial development periods in the lives of our students.

During the first few years, the average student faces the task of taking some major steps towards maturity and adulthood. Generally, this involves establishing a clearer identity of himself/himself and his/her relationship to the world around him/her.

The objectives of the information and guidance services are to facilitate the development of students and to help them make the most of their University experience. Specifically, these may include counseling towards enhancing self-understanding, selecting appropriate educational and vocational goals, improving effectiveness in working towards these goals, increasing social competence and resolving personal difficulties which interfere with general functioning and development.

The counseling process includes individual interviews with professionally trained counseling psychologists. The service is free and is available to all students. Appointments are arranged on an individual or group basis to suit students' convenience. All information are strictly confidential. A service is supported by other resource personnel.

The counseling members of staff are there physically and online to assist students to make intelligent decisions regarding their time, money, skill, sex, vocation, education and social plans.

The centre has made arrangements to assign each student to a counselor for consultation. Students needing academic assistance are encouraged to seek help before their problems become critical or chronic.

HOSTEL ACCOMODATION

Enugu State University of Science and Technology is primarily non-residential for students and members of staff. To this end, each student is expected to arrange for his/her own accommodation. Assistance in locating housing is available at the student's union offices. Financial arrangement for rooms and apartments are made on an individual basis between the student and the landlord/agent. Students are constantly reminded not to keep money in their rented quarters. They are also reminded to take home their costly luggage during vacations, semester breaks or any public holiday.

CAMPUS SECURITY

With increasing crime waves all over the country, even at the best of times, it has not been possible for the Nigerian police, with its limited manpower resources to provide all the security for life and property required by corporate communities like Enugu State University of Science and Technology, Agbani.

To complement the efforts of the police, a University Security Unit was created as far back as the inception of the University. The Security Unit is charged with the responsibility of enforcing all University bye laws and regulations in addition to the protection of lives and properties on the University's campuses.

As a routine, all incidents such as crimes, disturbances, accidents, fire outbreak etc. are first reported to the security unit, which deals with such reports or directs appropriate cases to the police for

investigation. The security unit is headed by an Assistant Chief Security Officer. A security man could be identified with a prescribed uniform.