Department of

Mechanical Engineering

Faculty of Engineering

Bayero University, Kano

Undergraduate Handbook

2024 Version 1

Foreword

This Prospectus is designed to provide general information on Department of Mechanical Engineering and on first degree programmes offered by the department. The publication is of great benefit to prospective students, staff members of the department and all those who seek information about the department.

There are other publications which contain sets of rules and regulations of the University, Faculty and the Department which are made available to the students of the University.

The Department urges those students who have been opportune to be students of this great department to put in the necessary determination, goals and effort that will ensure success in their quest for higher education.

You are most welcome. Have a happy and productive stay in the Department.

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1 BRIEF HISTORY OF THE DEPARTMENT

The Department of Mechanical Engineering became an autonomous Department in the *1981/82 session* when the first set of students was admitted into Part II of the 3-year Bachelor of Engineering (B.Eng.) degree programme. Part I courses were taught as common courses for all Students of the Faculty of Technology.

The aim of establishing the Department of Mechanical Engineering was to meet the growing need for manpower in the profession. The main objective was to train and produce Engineers with the required qualities and capabilities to meet the increasing need for professional Engineers in the country.

Until the *1984/85 session* the Department of Mechanical Engineering offered a 3-year degree programme following a 2-year pre-degree programme in the Faculty of Science. From the *1984/85 session*, however, the Department, like all other Departments in the Faculty of Technology, started admitting students for the 4-year programme after completing the pre-degree programme in the Faculty of Science or by direct admission through the Joint Admissions and Matriculation Board (JAMB).

The Department of Mechanical Engineering, starting from the *1988/89 session* runs a 5-year degree programme. In the 5-year degree programme, courses are grouped into levels each of which spans one academic session. Courses in the 100 and 200 levels are common to all the Departments in the Faculty.

The degree programme of the department of mechanical engineering is fully accredited by both the Council for the Regulation of Engineering in Nigeria, COREN and the Nigerian Universities Commission, NUC.

2 STAFF OF THE DEPARTMENT

Below are the current lists of staff in the department.

2.1 Academic staff

S/N	NAME	QUALIFICATION	RANK
1	Prof. Abdullahi Audu Adamu	B.Eng., M. Eng., PhD (BUK), MNSE, RE-COREN, MNIMechE, MSESN	Professor /HOD
2	Prof. Abdu Salihi	B.Eng , Msc, PhD (UK), MNSE, RE-COREN	Professor
3	Prof. Ibrahim Shehu Diso	Diploma D'etude(Province), Doctorat (Province), MNSE	Professor
4	Prof. Dalhatu Balarabe Yahaya	M.Sc(Bulgaria), PhD (BUK), MNSE, RE-COREN	Professor
5	Prof. Adamu Umar Alhaji	B.Eng (ABU), M.Eng. (ATBU), PhD (Uniben), MNSE, RE-COREN	Professor
6	Prof. Abubakar Baba Aliyu	B.Eng (BUK), M.Eng. (BUK), PhD (ATBU), MNSE, RE-COREN	Professor
7	Prof. Ibrahim Ahmed Rufa'I	B.Sc, M.Sc, PhD (Russia). MNSE, RE-COREN	Professor
8	Prof. Mahdi Makoyo	B.Sc, M.Sc, PhD (Russia), MNSE, RE-COREN	Professor
9	Prof. Ibrahim Abdullahi	B.Eng, M.Eng, PhD (BUK), MNSE, RE-COREN	Professor
10	Prof. Isa Garba	M. Eng. (BUK), PhD (BUK), MNSE, RE-COREN	Professor
11	Dr. Mohammed Tajudeen Jimoh	B.Eng (Ilorin), M.Eng (BUK), PhD (UK) MNSE, RE-COREN	Professor
12	Dr. Isa Aliyu Yola	B.Eng, M.Eng, PhD (BUK), MNSE, RE-COREN	Associate Professor
13	Dr. Ibrahim A. Rafukka	B.Eng., M.Eng.(Benin), PhD (UTM), MNSE, RE_COREN	Associate Professor
14	Dr. Umma Abdullahi	PGDE (FCE, KANO), B. Eng., M. Eng. (BUK), PhD (Malaysia), MNSE, RE_COREN	Associate Professor
15	Dr. Abubakar Muazu	B.Eng., MSc (ABU), PhD (Malasia), MNSE, RE_COREN	Associate Professor

16	Dr. Yusuf Tijjani	B.Eng. (BUK), M. Eng. (Benin), PhD (Malaysia), MNSE, RE-COREN	Associate Professor
17	Dr. Ibrahim Inuwa Jidda	B. Eng. (ABU), M. Eng. (BUK), PhD (BUK), MNSE, RE-COREN	Senior Lecturer
18	Dr. Sunusi Marwan Manladan	B. Eng. (BUK), M. Eng. (Benin), PhD (UM), MNSE, RE-COREN	Senior Lecturer
19	Dr. Abubakar Idris Bashir	B.Eng. (BUK), MSc (UK), PhD (Pretoria), MNSE, RE-COREN	Senior Lecturer
20	Dr. Mubarak Danladi Muhammad	B. Eng. (BUK)., MSc and PhD (UK), MNSE, RE-COREN	Senior Lecturer
21	Dr. Abba Abdulhamid Abubakar	B. Eng, (BUK), MSc and PhD (KFUMP)	Lecturer I
22	Dr. Dahiru Umar Lawan	B. Eng, (BUK), MSc and PhD (KFUMP)	Lecturer I
23	Dr. Hadiza Aminu Umar	B. Eng, M. Eng. (BUK), MNSE	Lecturer I
24	Engr. Abdulrahman Ahmad Umar	B. Eng, MSc (China), MNSE, RE-COREN	Lecturer I
25	Jamilu Saminu	B. Eng, MSc (India)	Lecturer I
26	Engr. Muhammad Tahir Said	B. Eng. MSc (Brunel), MNSE, RE-COREN, MNIMechE	Lecturer I
27	Dr. Abdulazeez Abdu Aliyu	B. Eng, (BUK), MSc (UTM), PhD (UTP), MNSE	Lecturer I
28	Dr. Najib Ahmad Muhammad	B. Eng, MSc (China)	Lecturer I
29	Zulfiqar Ibrahim Farouk	B. Eng, MSc (China)	Lecturer II
30	Adamu Bashir Gidado	B. Eng. (BUK), M. Eng (Malaysia)	Lecturer II
31	Dr. Hamza Sulayman Abdullahi	B. Eng, M Tech (India), PhD (China)	Lecturer II
32	Muhammad Salisu Kabir	B. Eng (BUK), M. Eng (BUK), RE-COREN	Assistant Lecturer

2.2 Senior technical and administrative Staff

S/N	Name	Rank
1	Salisu Abdulhamid	Chief Technologist
2	Shehu Tijjani Abdulkareem	Assistant Chief Technologist
3	Saminu Rabiu Haladu	Assistant Chief Technologist
4	Mustapha Usman	Assistant Chief Technologist
5	Marwan Saádu Inuwa	Principal Technologist

6	Ali Uba	Principal Technologist
7	Muhammad Garba Muhammad	Principal Technologist
8	Usman Idris Isa	Principal Technologist
9	Umar Ali Muhammad	Principal Technologist
10	Muhammad Jungudo	Senior Technologist
11	Ruslanu Abdulrashid	Technologist II
12	Bilyaminu Umar Adam	Technologist II
13	Kabiru Bappah	Higher Technical Officer
	Administrative Staff	
1	Bolajoko Esther Aina	Chief Typist
2	Muhammad Jamo Sani	Senior Executive Officer

2.3 Junior staff

S/N	Name	Rank
1	Yusuf Abubakar Ahmed	Senior Artisan/Foreman
2	Jamilu Abdu Ashiru	Cleaner/Messenger

3 THE BACHELOR OF ENGINEERING (MECHANICAL) DEGREE PROGRAMME

3.1 Philosophy

To achieve national goals and objectives of industrialization and self-reliance, the Engineering and Technology education should be geared towards:

- The development of a thorough practice in Engineering and Technology training.
- Broad - based training in general Engineering and Technology at the early stages of the programme.

- Practical application of Engineering, Technology and Manufacturing processes.
- Adequate training in human, organizational behaviour and management.
- Introduction to entrepreneurial education and training.
- Close association of the programme with industries in the country.
- The general philosophy therefore is to produce graduates with high academic standard and adequate practical background for self-employment as well as being of immediate value to industry and the community in general.

3.2 Aim and Objectives of the programme

The overall aim of the programme is in consonance with the realization of national needs and aspirations vis-à-vis industrial development and technological emancipation. The programme gives the minimum academic standards required to meet these needs and to produce graduates with sufficient academic background and practical experience who would be able to rise to the challenges of a developing economy like ours.

Some of the objectives of the programme include producing graduates who will be able:

- To design engineering projects and supervise their construction.
- To design and develop new products and production techniques in industries.
- To install and maintain complex engineering systems so that they can perform optimally in our environment.
- To adapt and adopt exogenous technology in order to solve local engineering problems.

- To exercise original thought, have good professional judgment and be able to take responsibility for the direction of important tasks.
- To manage people, funds, materials, and equipment.
- To improve on indigenous technologies so as to enhance local problem-solving capability.

3.3 Admission requirements

The main entry point into the programme is the Senior Secondary School Certificate or GCE O'level or its equivalent. Candidates must satisfy all University entry requirements plus passes at credit level in at least five subjects (including Mathematics, English Language, Chemistry, and Physics) all obtained at not more than two sittings.

3.3.1 Level 100:

Admission into Level 100 requires, in addition to the above, an acceptable performance in the University Tertiary Matriculation Examination (UTME) in the relevant subjects which include Physics, Chemistry, Mathematics and English Language.

3.3.2 Level 200 (Direct Entry):

Candidates who apply for direct entry are admitted into Level 200, provided they satisfy one or more of the following requirements in addition to the above general requirements.

a) They have at least three passes in subjects including Physics, Mathematics and/or Chemistry at GCE 'A' Level.

b) They have a National Diploma in Mechanical Engineering with a minimum of Upper credit plus:

   I. Relevant credits at 'O' Level, or

   II. Grade A in WAEC – Technical or City and Guilds

3.4 Duration of the programme

The minimum duration of the programme is five academic sessions for candidates who enter with Senior Secondary School Certificate or GCE 'O' Level or equivalent qualifications. Candidates admitted under Direct Entry and special entry will spend a minimum of four provided that they satisfy all the other University requirements.

3.5 Academic atmosphere

The Department encourages and supports conduct of and participation in seminars, workshops and conferences within and outside the Country. Students are encouraged to participate in various academic programmes relevant to their discipline.

3.6 Semester system

The Department, in line with the University Regulation operates a semester system which is defined as a quantitative organization of the curriculum where courses are divided into examinable units and for which a student earns credit if passed. The courses are arranged in a well-defined order that indicates the credits load as well as the semester in which they are taken. For instance, a course coded MEC 3201 where 3 indicates a 300 level course, 2 indicate credit units, and 01 indicates the course is taken at first semester. Usually odd numbers are assigned to courses in the 1st semester, while even numbers are assigned for 2nd semester courses.

3.7 Basic concepts

The main concepts used in the semester system are: Credit Unit (CU), Grade Points Average (GPA), Cumulative Grade Points Average (CGPA), Probation, Carry-over, Withdrawal, Spill over and Grading System.

3.7.1 Credit Units (CU)

Credit Unit (CU) represents the weight assigned to the course, and is recorded in credit hours. One credit is considered as one hour of classroom lecture per week or two hours of laboratory time per week. Thus, CU consists of specified number of student teacher hours/week/semester.

3.7.2 Grade Points (GP)

This involves assigning numerical or alphabetical letter to the scores of students at examinations, reports, projects or papers. Letter systems generally run from A (5 points), to B (4 points), C (3 points), D (2 points), E (1 point), and F (0 point).

3.7.3 Grade Point Average (GPA)

This refers to the evaluation of students' performance in any semester. It is the average of weighted grade points earned in the courses offered by a student in a semester. The GPA is calculated as follows:

$$GPA = \frac{CE}{CR}$$

Where;
CR = Total Credits Registered in a semester
CE =Total Credits Earned for the semester

3.7.4 Cumulative Grade Point Average (CGPA)

The CGPA represents an up to date average (i.e. cumulative) of the GPA earned by the student in at least two semesters. It is an indication of the student's overall performance at any point in his training at the university. CGPA is attained after two semesters or more in an academic programme.

3.7.5 Academic probation

A student who fails to earn a minimum of GPA of 1.0 point at the end of two semesters would be placed on probation for another academic session. Probationary status is removed if a student placed on probation attains a minimum CGPA of 1.0 or above in the following academic session. He will be notified by his level coordinator.

3.7.6 Incomplete status

If a student earns 75% lectures attendance in a course but due to sickness or accident or other acceptable reasons is unable to write the semester examination, he/she should apply for incomplete status to retain his/her CA and be allowed to write the examination for that course at a later date.

3.7.7 Withdrawal

A student, who is placed on probation the previous year and fails to earn a CGPA of 1.0 the following year, would be considered unfit for the course; accordingly, he/she would be advised to withdraw from the University. A student who fails to sit for examination scheduled for a particular semester without valid reason(s) would be considered to have voluntarily withdrawn from the University.

3.7.8 Carry over

A student who fails to earn a minimum of 40 marks in a course (continuous assessment and examination) will be asked to carry over the course to the next available period and get it registered bearing in mind that he/she will be allowed to register a maximum of 20 credit courses per semester. Continuous assessment (CA) carries 40/30 marks while examination carries 60/70 marks.

3.7.9 Spill over

A student who fails to pass a registered CORE course at the end of regular years of studies in the University will not graduate. i.e. he/she has exhausted the approved years of the programme by the University.

3.7.10 Deferment

If a student falls sick or suffers an accident after registering for a programme in the University, such a student should apply with relevant medical reports (subject of satisfaction of the Director, University Health Services) to the Dean of his/her faculty through the Head of Department for deferment of a semester or a session (as the case may be) to enable him/her fully recover. However, such request will be counted within his/her maximum allowable period of stay for a degree (7 years for students admitted into 100 level and 6 years for those admitted into 200 level).

3.7.11 Attendance requirement

Students must attain at least 75% attendance of lectures, tutorial and practical work before being allowed to sit for examination. Students who did not attain **75% attendance** of lectures in any course of the Department will not be allowed to sit for examination.

3.7.12 Calculation of CGPA/GPA

CGPA is calculated as follows:

$$CGPA = \frac{TCE}{TCR}$$

Where;

TCE stands for the cumulative (total) credits earned over a period under consideration (more than one semester)

TCR is the cumulative (total) credits registered in the same period.

3.8 Graduation requirements

All courses in Levels 100– 400 are compulsory. In the final year (Level 500), students are required to register for all the core courses and at least 9 credits of optional courses. To be eligible for the award of a degree, a student must pass a minimum total of credit units depending on programme entry point as follows:

(i)	Level 100 entry point	187 credit units
(ii)	Level 200 entry point	157 credit units

3.9 Grading of students' work

Grading of courses is done by a combination of percentage marks and letter grades translated into a graduated system of Grade Point Equivalent (GPE). For the purpose of determining a student's standing at the end of every semester, the Grade Point Average (GPA) system is used. Each course is graded out of maximum of 100 marks (made up of continuous assessment and written Examination) and assigned appropriate Grade point Equivalent as follows:

The Project is graded over 100% without any written examination.

Score	Letter Grade	Grade Point
70-100%	A	5
60-69%	B	4
50-59%	C	3
45-49%	D	2
40 – 44%	E	1
0 – 39%	F	0

3.10 Degree classification

Determination of the class of degree is based on the Cumulative Grade Point Average (CGPA) earned at the end of the programme. The CGPA

is used in the determination of the class of degree according to the following table:

Class of Degree	CGPA
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
Pass	1 – 1.49

3.11 Curriculum

In Levels 100 and 200 all Engineering students in the Faculty take the same courses. In the third year (Level 300) the students are separated so as to take courses in their respective degree programmes.

The long vacation (8 weeks) at the end of Level 200 is spent on the campus to expose students to practical work on the Students Work Experience Programme (SWEP). Also, during the long vacation at the end of Level 300 students spend 12 weeks on attachment with industries on the Students Industrial Work Experience Scheme, SIWES I programme. At the end of the first semester of Level 400 students embark on a further six months of industrial training (SIWES II programme).

3.11.1 Course coding

Each course in the Department is identified by a seven-character code of which the first three characters identify the programme e.g. MEC (for Mechanical Engineering), ELE (for Electrical Engineering), or EGR (for Faculty of Engineering). The last four characters in a course code are numeric. The first digit designates the level (e.g., '1' for level 100, etc.). The second digit designates the credit hours for the course. The last two digits designate the course number. For example, the code

MEC5405 represents a Mechanical engineering course (MEC) for level 500, with 4 credit hours which is serially numbered as No. 5.

3.11.2Core Courses:

Table 3. 1: Level 100 (First and Second Semesters)

COURSE CODE	COURSE TITLE	CREDIT UNITS	REMARKS
CHM1271	Practical Chemistry	2	CORE
CHM1231	Inorganic Chemistry	2	"
CHM1241	Organic Chemistry	2	"
CHM1251	Physical Chemistry	2	"
CSC1201	Intro. To Computer Science	2	"
GSP1201	Use of English	2	"
GSP1202	Study skills & ICT	2	"
MTH1301	Elementary Mathematics. I	3	"
MTH1302	Elementary Mathematics. II	3	"
MTH1303	Elementary Mathematics. III	3	"
PHY1170	Practical I	1	"
PHY1180	Practical II	1	"
PHY1210	Mechanics	2	"
PHY1220	Electricity & Magnetism	2	"
PHY1230	Behavior Of Matter	2	"
STA1311	Probability I	3	"
	TOTAL	**34**	

Table 3. 2: Level 200 (First and Second Semesters)

COURSE CODE	COURSE TITLE	CREDIT UNITS	REMARKS
EGR2207	Principles of Electrical Engineering I	2	CORE
EGR2208	Principles of Electrical Engineering II	2	"
GSP2204	Foundation of Nigerian Culture, Government and Economy	2	"
GSP 2206	Peace and Conflict Resolution	2	"
GSP2205	Logic and Philosophy	2	
*GSP 2201	Use of English	2	"

*GSP 2202	Study skills and ICT	2	
EGR2103	Experimental Methods & Analysis	1	“
EGR2205	Thermodynamics I	2	“
EGR2206	Material Science I	2	“
EGR2306	Applied Mechanics	3	“
EGR2101	Engineer in Society	1	“
EGR2102	SWEP	1	“
EGR2201	Fluid Mechanics I	2	“
EGR2202	Solid Mechanics I	2	“
EGR2203	Engineering Drawing I	2	“
EGR2204	Workshop Practice	2	“
EGR2304	Laboratory A	3	“
EGR2301	Engineering Mathematics I	3	“
EGR2302	Engineering Mathematics II	3	“
EGR2313	Computer Programming	3	“
EGR2305	Laboratory B	3	“
	TOTAL	***43/47**	

*** GSP 2201 and 2202 to be registered only by direct entry student**

Table 3. 3: Level 300 (First and Second Semesters)

Course Code	Course Title	Credit Units	Remarks
EGR3101	Engineer in Society II	1	Core
EGR3102	Tech. Writing and Presentation	1	Core
EGR3311	Computer Applications	3	Core
EGR3203	SIWES I	2	Core
EGR3301	Engineering Mathematics III	3	Core
EGR3302	Computational Techniques	3	Core
MEC3201	Thermodynamics II	2	Core
MEC3202	Materials Science II	2	Core
MEC3203	Engineering Drawing II	2	Core
MEC3218	Engineering Drawing III	2	Core
MEC3204	Fluid Mechanics II	2	Core
MEC3205	Machine Tools	2	Core
MEC3206	Metrology	2	Core
MEC3207	Mechanics of Machines I	2	Core
MEC3301	Solid Mechanics II	3	Core
ELE3300	Elect for Mech. Engineers	3	Core
MEC3401	Laboratory A	4	Core
MEC3402	Laboratory B	4	Core

	Total	**43**	

Table 3. 4: Level 400 (First and Second Semesters)

Course Code	Course Title	Credit Units	Remarks
EGR4101	Engineer In Society	1	Core
EGR4201	Engineering Statistics	2	Core
MEC4303	Thermodynamics III	3	Core
MEC4201	Innovative Design	2	Core
MEC4203	Fluid Mechanics	2	Core
MEC4302	Mechanics of Machines II	3	Core
MEC4202	Manufacturing Processes	2	Core
MEC4301	Design of Machine Elements I	3	Core
MEC4304	Laboratory B	3	Core
EGR4401	SIWES II	4	Core
	Total	**25**	

Table 3. 5: Level 500 (First and Second Semesters)

Course Code	Course Title	Credit Units	Remarks
MEC5405	Engineering Management	4	Core
MEC5401	Thermodynamics IV	4	Core
MEC5404	Fluid Mechanics IV	4	Core
MEC5402	Solid Mechanics III	4	Core
MEC5403	Control Systems Engineering	4	Core
MEC5311	Design of Machine Elements II	3	Core
MEC5309	Automotive Engineering	3	Core
MEC5310	CAD/CAM	3	Core
MEC5302	Laboratory	3	Core
MEC 5601	Project	6	Core
	Optional Courses	9	Optional
	Total	**47**	

***Level 500 Students are expected to select three optional courses from the following groups.**

3.11.3Optional courses

Group I – Thermo-fluids

Course Code	Title	Credits	Remarks
MEC 5301	Refrigeration and Airconditioning:	3	Optional

MEC 5302	Heat and Mass Transfer:	3	Optional
MEC 5303	Alternative Energy Sources:	3	Optional

Group II - Production

Course Code	Title	Credits	Remarks
MEC 5304	Operational Research:	3	Optional
MEC 5305	Manufacturing and Industrial Finishing:	3	Optional
MEC 5306	Theory of Metal Cutting:	3	Optional

Group III - Applied Mechanics

Course Code	Title	Credits	Remarks
MEC 5307	Fracture Mechanics:	3	Optional
MEC 5308	Mechanics of Metal Forming:	3	Optional
MEC 5309	Vehicle Dynamics:	3	Optional

3.11.4Pre-requisite courses

Level 200

Course Code and Title		Pre-requisite Course Code and Title	
EGR 2207	Principles of Electrical Engineering I	PHY 1220	Electricity & Magnetism
EGR 2301	Engineering Mathematics I	MTH 1301	Elementary Mathematics I
EGR 2313	Computer Programming	CSC 1201	Intro. To Computer Science
EGR 2208-	Principles of Electrical Engineering Ii	PHY 1220	Electricity & Magnetism

Level 300

Course Code and Title		Pre-requisite Course Code and Title	
MEC 3201	Thermodynamics II	EGR 2205	Thermodynamics I
MEC 3202	Material Science II	EGR 2206	Material Science I
MEC 3204	Fluid Mechanics II	EGR 2201	Fluid Mechanics I
MEC 3301	Solid Mechanics II	EGR2202	Solid Mechanics I
MEC 3203	Engineering Drawing II	EGR 2203	Engineering Drawing I
EGR 3311	Computer Applications	CSC 1201	Intro. To Computer Science
EGR 3302	Computational Techniques	EGR 2302	Mathematics II

EGR 3101	Engineer in Society II	EGR 2101	Engineer In Society I

Level 400

Course Code and Title		Pre-requisite Course Code and Title	
MEC 4303	Thermodynamics	MEC 3201	Thermodynamics
MEC 4203	Fluid Mechanics	MEC 3204	Fluid Mechanics
MEC 4301	Design of Machine Elements	MEC 3203	Engineering Drawing II
EGR 4101	Engineer In Society	EGR 3101	Engineer In Society

Level 500

Course Code and Title		Pre-requisite Course Code and Title	
MEC 5401	Thermodynamics	MEC 4303	Thermodynamics
MEC 5404	Fluid Mechanics	MEC 4203	Fluid Mechanics
MEC 5301	Design of Machine Elements	MEC 4301	Design of Machine Elements
MEC 5402	Solid Mechanics	MEC 3301	Solid Mechanics

4 DETAILED SYLLABUS

Level 100 and 200 courses are common to all students of Faculty of Engineering. They are part of the core courses for students of the Faculty.

4.1 Level 100 courses

4.1.1 CHM1230: Inorganic Chemistry

Principles of atomic structure, isotopes, empirical and molecular formulae. Electronic configuration, periodicity and building up of the periodic Table. Hybridization and shapes of simple molecules. Extraction of metals. Comparative chemistry of groups IA, IIA and IVA elements. Preparation, properties, structure and application of some of the selected compounds. Introduction to transition metal chemistry and nuclear chemistry.

4.1.2 CHM1240: Organic Chemistry

Historical survey of the development and importance of organic chemistry; IUPAC Nomenclature and classification of organic compounds; homologous series; Covalent bonds and hybridization to reflect the tetravalency of carbon in Organic compounds, electronic theory in Organic chemistry. Qualitative and quantitative Organic chemistry, Determination of empirical and molecular formulas; isolation and purification of Organic compounds; saturated hydrocarbons; structural isomerism, properties and reactions of alkanes and cycloalkanes, mention of their chemistry and uses in petroleum; unsaturated hydrocarbons; alkenes; alkynes, cyclo-alkenes; cis-trans isomerism, simple electrophilic addition reactions, polymerization.

4.1.3 CHM1250: Physical Chemistry

Principles of atomic structure; Isotopes, empirical and formula, Nuclear structure, atomic fission and nuclear energy. The electronic structure and arrangement of electrons in atoms. Electronic configuration 1^{st} and 2^{nd} rows of elements. Properties of gases: equation of state, kinetic and molecular theory of gas and Heat capacities of a gas. Equilibrium and Thermodynamics; Thermochemistry, Enthalpy of reactions, bond energies, thermodynamic cycles, Hess's law Born Herbert cycle, the meaning of Ka, K and K Lech atelier's principle pH, ionic equilibrium, buffers, indicators, solubility product, common ion effect, redox reactions.

Electrode potentials, electrolytes and electrolysis. Kinetics: the positions of equilibrium and the rate at which at which is attained. Factors influencing rate of reactions. Introduction to activation and catalysis.

4.1.4 CHM1270: Practical Chemistry

Laboratory instruction and Experimental products shall be conducted for the candidates from the following subject areas:

Physical: Determination of heats of reaction, effect of solute on boiling point of solvents, partition coefficient. Determination of molecular mass by Dumas and Victor Meyer methods. Measurements of rate equation and Activation energy. Other experiments based on the scope of the lectures and as approved by the Department.

Organic: Safety precaution instructions, classification of Organic compounds by their solubility's in common solvents. Qualitative analysis for common elements in Organic compounds. Identification and classification of acids and bases functional groups. Identification of the following: natural function groups; alcohols, aldehydes, ketons, esters, anhydrides and ethers. Acetylation of aniline as an example of the preparation of solid aniline derivative. An electrophilic addition reaction.

Inorganic: Qualitative and quantitative analysis, molarity, concentration and percentage purity.

4.1.5 CSC1201: Introductory Computer Science

History of computers, functional components of computer, characteristics of a computer, problem solving; flow charts, Algorithms. Computer programming. Statements, symbolic names; arrays, subscripts, expressions and control statements. Introduction to BASIC or FORTRAN programming language, computer applications

4.1.6 MTH1301: Elementary Mathematics I [Algebra & Trigonometry]

Elementary set theory: subsets, union, intersection, complements, Venn diagram; Real numbers: algebra of the complex irrational numbers; complex numbers algebra of the complex numbers, the Argand diagram, De Moiver's theorem, n-th roots; mathematical Induction; real sequences and series; theory of quadratic equations; binomial theorem; circular measure; trigonometric functions of angles of any magnitude, addition and factor formulae.

4.1.7 MTH1302 Elementary Mathematics II [Vectors, Geometry & Dynamics]

Geometric representation of vectors in 1,2, and 3 dimensions, components, direction cosines, addition, scalar multiplication of vectors, linear independence. Scalar and vector product of vectors. Differentiation and integration of vector functions with respect to scalar variables. Two-dimensional co-ordinate geometry: straight lines, circles, parabola, ellipse, hyperbola, tangents, normal. Kinematics of a particle: component of velocity and acceleration of a moving particle in a plane. Force momentum, laws of motion under gravity, projectiles, resisted vertical motion, elastic string, simple pendulum impulse. Impact of two smooth spheres, and of a sphere on a smooth surface.

4.1.8 MTH1303: Elementary Mathematics III [calculus 1]

Function of real variable, graphs, limits and idea of continuity. The derivative, as limit of rate of change. Techniques of differentiation. Extreme curve sketching; integration as an inverse of differential. Methods of integration, Definite integrals. Application to areas, and volumes.

4.1.9 PHY1210: Mechanics

Space and time, frames of reference, units and dimension, kinematics; fundamental laws of mechanics Statics and dynamics; Galilean invariance; universal gravitation; work and energy; rotational dynamics and angular moment; conservation laws.

4.1.10 PHY1220: Electricity and Magnetism

Electrostatics; conductors and currents; dielectrics; magnetic fields and induction; Maxwell's equations; electromagnetic oscillations and waves; applications;

4.1.11 PHY1230: Behaviour of matter

Molecular treatment of properties of matter elasticity; Hooke's law; young's shear and bulk moduli. Hydrodynamics; streamlines, Bernoulli and continuity equations, turbulence, streamlines, Bernoulli and continuity equations, turbulence; Reynold's number. Viscosity; laminar flow, Poiseuille's equation. Surface tension; adhesion, cohesion, capillarity, drops and bubbles, Temperature; the zeroth law of thermodynamics; heat; gas law; laws of thermodynamics; kinetic theory of gases. Applications.

4.1.12 PHY1170/1180: Physics Practical I/II

This introductory course emphasizes quantitative measurements, the treatment of measurement errors, and graphical analysis. A variety of experimental techniques will be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, etc. covered in the above physics courses.

4.1.13 STA1311: Probability I

Generation of statistical events from set-theory and combinatorial methods. Elementary principles of probability. Types and distribution of random variables; the binomial, Poisson, hypergeometric and normal distributions. Expectations and moment, random variables; probability sampling from table of random numbers; selected applications.

4.2 Level 200 courses

4.2.1 EGR2301: Engineering Mathematics I

Vector and matrix algebra: Basic definitions and operations. The inverse of a non-singular matrix.

Theory of linear equations, Eigenvalue and eigen-vectors. Consistency dependence, and solution of simultaneous linear equations (including cramer's rule).

Analytic geometry: Coordinate transformation, solid geometry, polar cylindrical and spherical co-ordinates, curves and surfaces, plane curves and quadric surfaces.

Multivariable calculus: Vector functions, continuity and derivatives, Elementary partial differentiation, multiple integrals. Various applications including maxima, minimum, volumes, tangent planes and normal lines.

4.2.2 EGR2302: Engineering Mathematics II

Vector analyses: Vector theory, dot product, cross product, vector fields, line and surface integrals. Grad. div, and curl. Green’s and Stoke's theorems.

Series and sequence: Basic definitions. Tests for convergence.

Power series and Taylor's expansion of various elementary functions.

Complex number, their representation and algebra. Fourier series. Euler coefficients; even and odd functions; sine and cosine functions.

Calculus: Complex analysis. Elements of complex algebra, trigonometric, exponential and logarithmic functions.

Analytic and harmonic functions. Integration of complex variables, Cauchy theorem. First order equations, special types of second order equations.

4.2.3 EGR2306: Applied Mechanics

Statics:

Laws of statics; System of forces and their properties; Application and simple problem.

Friction and its applications: Nature and types of friction; Application of friction in machines-wedges, belt drives, screws and simple problems.

Virtual Works: Works principle of virtual work; Application and simple problems

Particle Dynamics:

Kinematics of plane motion, Kinetics of particles (equation of motion, momentum and energy method); Kinematics of Rigid Bodies; Types of rigid bodies; Velocity and acceleration diagrams for simple mechanisms; Kinetics of rigid bodies; Two-dimensional motion of rigid bodies,

Energy and momentum:

Moment of inertia and simple problems. Simple harmonic motions

4.2.4 EGR2206: Materials Science I

Structure of the Solid State:

Review of the theory and structure of the atom; Primary and secondary bonds in solids. Crystalline solids; Common crystal structures in elements; Miller notation for crystallographic planes and directions;

Crystal defects:

Point defects (vacancy, substitutional and interstitial stems.); Line defects (dislocations); Plane defects (grain boundaries).

Single-Phase and Multi-phase Materials:

Solid solutions and intermediate phases; Equilibrium diagrams; Some important commercial alloy systems.

Deformation in Solids:

Elastic deformation, plastic deformation and motion of dislocations;

Properties of Materials:

Mechanical properties; Thermal properties; Electrical properties; Magnetic properties; Optical properties.

4.2.5 EGR2202: Solid Mechanics I

Fundamentals of equilibrium. Statical determinacy with reference to pin-jointed frames. Force analysis of pin-jointed plans and space frames. Shear force and bending moment. Shear force and bending moment diagrams Relations between load, shear and bending moment.

Normal stress and strain. The stress strain relationship Poisson's ratio. Thin cylinders and spheres.

Shear stress. Complementary shear stress. Shear strain torsion of shafts of circular section.

Bending theory. Deflection of beams, Macaulay's, method. The moment Area Method. Simple applications of strain energy to single load systems. Close coiled helical springs.

4.2.6 EGR2203: Engineering Drawing

Introduction:

The importance of drawing in the engineering process; Standards, units and paper sizes; equipment and drawing instruments; scales, lettering and dimensioning; good draughts-manship and drawing procedure.

Representation of three-dimensional objects:

Freehand sketching; first and third angle orthographic projections; isometric drawing and projectional representation of hidden detail and sections; Construction and dimensioning of circles and areas; oblique (cavalier and cabinet) drawing; axonometric and perspective projections.

Engineering Practice:

Introduction to the various branches of engineering drawing; common engineering terms, conventions, abbreviations and symbols; electrical engineering symbols and circuit diagrams.

4.2.7 EGR2204: Workshop Practice

Workshop Hazard. Hand processes and bench work. Joining and Fastening, Welding, Hand tools, Measurement Systems and devices, Marking out, Sheet carpentry and joinery, Electrical tools and usage, Simple Electrical Installation

Cement and concrete preparation. Concrete block making. Shuttering and concrete casting. Wall building.

Introduction to machine tools, practical marking out and filling exercise, Manufacture of a simple bolt, Construction of a simple amplifier, Exercise in battery maintenance and charging. Cement and concrete preparation

Block making: Column casting, Block and brick wall building,

4.2.8 EGR2101: Engineer in Society I

Historical Background:

The development of engineering as the response to the increasingly complex problems of the individual, the community and society. Significant technological discoveries which have affected the progress of civilization. The industrial revolution and the harnessing and exploitation of various fuel sources: coal, oil, and generation of electricity, nuclear power and renewable sources (solar energy, wind power, etc). The impact of engineering activities on the environment and its resources.

The Engineering Profession

The evolution of the different branches of engineering, and the structure, organization and ethics of the professions, the specific responsibilities to society of the civil engineer, Electrical Engineer, and the Mechanical Engineer. Other engineering disciplines and their

interrelationships; multi-disciplinary projects. The contrast between the Engineer and the Scientist, and the engineering approach to the solution of practical problems.

Engineering Projects:

The role of engineering activities and industry in the nation's economy. Introduction to economics, management and law as relating to engineering and industrial practice. The planning, construction and operation of engineering projects and facilities.

NOTE; Films and seminars by practicing engineers will comprise part of the above lecture course, which will also be supplemented by work visits to illustrate the major branches of engineering as far as local opportunities allow.

4.2.9 EGR2313: Computer Programming

Introduction to Programming Languages (3 hrs)
Operating Systems (DOS & Windows) (3 hrs)
Introduction to Microsoft DOS: Copy, Delete, Dir, MD, RD commands etc. creation of Batch files. AUTOEXEC. BAT and CONFIG. SYS files
Windows Desktop (Taskbar, Start a program, Switch between running programs, Opening a file or folder, copy a file or folder, create a folder, change the name of a file or folder, Searching for files, back up your files.
Customizing Windows Desktop (change the background of the desktop, change the ways items on the desktop look, set up a screen saver, to show all files and file name extension, to add a program to the Start or Program menu)
Using Windows Accessories (Calculator, Games, Notepad, Entertainment, Using scandisk, Multimedia
The Concept of a Program, Preparation, Execution. Algorithms, Flow Charts and Pseudocodes (3 hrs)
Elements of Fortran: (24 hrs)

Characters, symbolic names, types of variables, Arithmetic expressions, Logical expressions, assignment
Control within a program unit: Simple loops, logic IF, unconditional transfer, (GO Assigned GO To.
Arrays: Types of arrays, subscripts, simple functions, basic external functions, statements functions
Function and subroutine subprograms: Functions subprogram, subroutine, subprograms, external, use and abuse of local variables and arguments.
Common storage: Common statement, stacks, equivalence statement
Initialization: Data, Block Data, Characters.
Input/output: Read, write, general, I/O list, format, FW.d, EW.d, DW.d, GW.d, IW, AW, Banks, Free-format input.
Files: Formatted files, unformatted files, end file, REWIND and Backspace
Exercises: Numerical calculations; Solution of certain equations, numerical integration, vectors and matrices, linear equations.

Introduction to PASCAL (6 hrs)

4.2.10 EGR2201: Fluid Mechanics I

Properties of Fluids:

Characteristics of liquids, mass and the "ideal" fluid, viscosity: compressibility; surface tension and capillarity; vapour pressure and solubility of gases. Dimensions and units.

Static Fluids:

Intensity of pressure and hydrostatic pressure on plane and non-plane surfaces; forces on floating and immersed objects; stability and height.

Fluid in Motion:

Definition: Steady, unsteady, uniform and non-uniform flow; steady, unsteady, uniform and non-uniform flow; velocity distribution and discharge; the concepts of a fluid particles; streamlines and streamtube. The continuity (conservation of mass) equation. The

energy (Bernoulli's) equation for incompressible steady flow: applications to orifices, nozzles, venturi meters, Pilot tubes, notches and weirs, Time of emptying tanks.

Fluid Friction:

Laminar and turbulent flow, and the experiments of Reynolds. Head loss due to friction in pipes and closed conduits: the Darcy equation and the concept of hydraulic gradient: other losses in pipe appurtenances.

Introduction to flow in open channels: the Chezy formula.

4.2.11 EGR2103: Experimental Methods and Analysis

Principles of measurement, standard deviation, method of least squares and its application. Curve fitting, Theory of errors. Binomial and other distributions, `Goodness of fit, Chi-squared test.

Experimental Methods:

Experimental methods. Displacement and strain measurement. Force and torque measurement. Temperature measurement. First and second order system. Dynamic response.

4.2.12 EGR2201: Thermodynamics I

Fundamental Concepts:

Introduction to Thermodynamics. The System. Thermodynamic properties. Heat and work. Energy resources. Heat sources and heat sinks.

The First Law of Thermodynamics: The cycle. The statement of the first law of thermodynamic. Corollaries of the first law. The non-flow energy equation application of the I to various processes.

The Steady flow Energy Equation:

The derivation of the steady flow energy equation from the first law. Simple applications of the steady flow energy equations. The Second Law of Thermodynamics:

Cycle efficiency:

Definition of a heat engine. Statements of the Second Law of Thermodynamics. Reversibility. Carnot cycle and other cycles. Corollaries of the Second Law.

Properties of Substances:

Definition of a pure substance. Phase changes. Relationship between properties. The perfect gas and the semi-perfect.

4.2.13 EGR2207: Principles of Electrical Engineering I

Fundamentals of Electrical Engineering:

Electric Current. Coulomb's Law. Potential difference. Faraday's law of Electromagnetic induction. Chm's law. Kirchhoff's Laws. Ampre's Law.

Circuit Elements:

Energy and Power. Resistance. Capacitance and Inductance parameters. Circuit Elements in practice. Construction, materials, colour-code and preferred values. Series and parallel combination of resistors, capacitors and inductors Series-parallel circuits.

Elementary Network Theory:

Superposition Theorem. Thevenin's Theorem. Norton's Theorem. Network Analysis by Mesh Current and Node par voltages Conversion of voltage sources to current source. Network reduction by Delta-star (D-Y) transformations.

Steady State Sinusoidal Response:

Sinusoidal Functions. 1 stantenous and average power. Power Factor. Phasor Representation of sinusoids. Sinusoidal Steady State Response of single elements. R-I, R-C, and R-I-C Circuits. Applications

Network Theorems to complex impedances. Balanced three phase circuits.

Semi-Conductor Devices:

Conductors. Insulators and Semi-conductors. Conduction in Semi-Conductors. Types of semi-conductors. Charge carrier density in Semi-conductors. Semi-conductor Diodes-characteristic and Equivalent Circuits. The Diode Equation. Zener Diode, Tunnel Diodes. Varicap Diodes, Schottky (Hot Carrier) Diodes (LEDds), Liquid Crystal Displays (LCDS).

Junction Transistors:

Transistors Characteristics. C.B., CE and CC configurations. Transistors biasing, the operating point, load line, stability factors, design of DC bias circuits, phototransistors.

Introduction to Measurement:

Units and standards. Direct and comparative measurements. Analogue and digital Measurements. Measurements of Current, voltage, resistance, capacitance and inductance.

4.2.14 EGR2208: Principles of Electrical Engineering II

Electromechanical Energy Conversion:

Magnetic theory and circuits. Permeability magnetic flux, magnetic field intensity, derived relationships. Theory of magnetism. The magnetic circuit, concepts and analogies. Units for magnetic calculations. Magnetic circuit computations. Hysteresis and Eddy Current Loss.

Transformers:

Theory of operation and development of phasor, the equivalent circuit, parameters from no-load tests. Efficiency and voltage regulation; mutual inductance.

Basic Analysis of Electromagnetic Torque:

Analysis of induced voltages. Construction features of electric machines. Practical form of torque and voltage formulae.

Single Phase Motors: Types, principles of operation. Characteristics and typical applications.

Three-Phase Induction Motor:

The revolving magnetic field. The induction motor as a transformer, the equivalent circuit. Computation of performance Torque-speed characteristics.

Three Phase Synchronous Machine:

Generation of a three-phase voltage system. Synchronous generator-phase diagram and equivalent circuit. The synchronous motor. Synchronous motor -operator diagram and equivalent circuit. Computation of performance. Applications.

D.C. Machines

D.C. generator analysis, D.C. motor analysis, motor speed torque characteristics, speed control. Application. Starters.

4.3 Level 300 courses

4.3.1 EGR 3101: Engineer in Society II

Basic Economics:

Business organization, industrial combinations, public utilities and finance, industrial concentration and Government Control. The Location of West African industry and trade. The background of the West African economy, planning of development, financing of development. The banking system, Money and Capital markets, inflation, cost benefit analysis.

4.3.2 EGR 3102: Technical Writing and Presentation

Principles of effective communication. Professional use of the English language. Principles of technical writing. Oral presentation of technical ideas.

4.3.3 EGR 3311: Computer Applications

Revision of operating systems and programming concepts (3 hrs), Word Processing (6 hrs + 3 hrs of exercises), Types and Uses, Details of Microsoft word: ile Management (Starting MS-Word, Open, Saving, Exiting, Editing (Select text, Inserting symbols not on the keyboard, Formatting (Font selection, Bold, Italic and Underline formats, Paragraph Spacing, Indent, Page setup (Page Margin, Paper Size, Page Orientation, Page Numbers etc. Graphics (adding Auto shapes, Grouping Resizing, Moving and Rotating objects, Crop or Trim portions, Introduction to Spreadsheets (9 + 3 hrs of exercises hrs), Types and Uses of Spreadsheets, Details of Microsoft Excel, Creating Worksheets (Opening, Saving and Closing Workbook, Data Entry, Cell and range Selection, Series Entries, Editing Worksheets (Worksheet Data Copying, Data , Management, Column, Row and Cell insertion and deletion, Worksheet insertion and deletion, Formatting Worksheets (Cell formatting, Numerical formatting, Column , width and Row Height formatting, Data Alignment etc), Formulas and functions (Formula Creation, Formula Operators, Debugging, Range Names, Creating Functions. Charts (Creating a Chart, Using Chart Wizard, Change a Chart Placement, Editing Charts. Printing (Printing a particular area, Inserting and Removing Page break, Modifying the Page Setup, Creating Headers and Footers, Printing Worksheet by page. Data Management (9 + 3 hrs of exercises hrs). Types and Uses of Database

Details of Microsoft Access. Starting MS-Access Creating, Opening and Saving Database, Quitting MS-Access. Microsoft Database (Tables, Field Names, field and Records Tables (Creating a new Table, Modify Table Design, Set File Properties, Set Table Properties, Set Relationships, Viewing and Editing Data (Datasheet view, Perform

Basic data entry tasks, Locate, sort and filter data, Import and Export data, Change the Datasheet Layout), Forms (Creating Forms, Uses of Forms and Planning a form Design, Modify a Form Design, Set Control and Form Properties, Query (Create and Save a Query, Perform Query calculations, Specify Query criteria, Modify data with Action Query, Reports (Creating a new Report, Use Report Wizards, Modify sections of a Report, use groups and subtotals, Introduction to Computer , Communication (6 + 3 hrs of exercises hrs), LAN, WAN. Internet, Terms and Usage (ISP, Sever, WWW, Cookies etc. E-mail,

4.3.4 EGR 3103: SIWES I

4.3.5 EGR 3301: Engineering Mathematics III

Differential Equations:

First order equations, special types of second order equations. Higher order linear equation with constant coefficients. Partial differential equation. Poisson's and Laplace's equation. Simple solutions, Legendre functions and Hermite functions. Application problems in heat transfer (parabolic equations), wave propagation (hyperbolic equation), steady-state (elliptic equation). Problems in different coordinate systems, boundary value problems. Laplace and Fourier Transforms.

4.3.6 EGR 3302 : Computational Techniques

Numerical analysis: Linear and non-linear equations. Finite differences operators. Flow diagrams and charts. Solution of simple algebraic and transcendent equations. Direct methods for the solution of linear equations. Iterative methods of matrix inversion. Numerical integration and differentiation - Newton coetes formulae. Introduction to linear programming.

Polynomials and their zeros - methods of bisection, Newton, Bairstow, synthetic division and Lehiner and Convergence. The Eigenvalue

problem solution of ordinary differential equation methods of Taylor, Euler, Predictor-corrector and Runge-Kutta.

4.3.7 MEC3201: Thermodynamics II

Application of the steady flow Energy Equation:

Boiler and condensers. Turbines. Adiabatic steady flow processes. Throttling. Isothermal steady flow processes.

Vapor Power Cycles: The Carnot Cycle. The Rankine Cycle. Comparison of Cycles. The Reheat Cycle. The Regenerative cycle. The economizer and the air preheater.

Gas Power Cycle: Internal combustion engines and air standard cycles. The simple gas turbine cycle. The jet engine. Reciprocating engine cycles. Otto and Diesel Cycles.

Properties of Mixtures: Mixtures of gases. The mixing processes. Gas and vapor mixtures. Hygrometry. Cooling towers.

4.3.8 MEC3202: Materials Science II

Iron and steel:

The manufacture of iron and steel - iron - carbon equilibrium diagrams - Alloy steels - stainless steels - Heat resisting steels. Wrought and cast irons.

Non-ferrous metals and alloys:

Copper and its alloys - aluminum and its alloys - other important alloys.

Heat treatment Processes:

Stress relieving - annealing - Normalizing - Tempering - Hardening - Core refining - isothermal transformation. Curves - Hardenability - mass effect - ruling section - age hardening of metals.

Corrosion of metals:

Types of corrosion - cause - Prevention.

4.3.9 MEC3203: Engineering Drawing II

a) Geometrical Drawing:

The Vertical and the horizontal plane. Representation of a point and of a line. The determination of the true length of a line. Representation of a solid. First and third angle projections Auxiliary projections Isometric projections. Construction of conic sections, loci, gear teeth, cams. Intersection of surfaces Developments.

b) Methods of joining Mechanical parts: Fasteners (thread, bolts, nuts) -Types & Technical reps, Riveting, Welding, Keys, Set screws

c) Methods of support: Journal, Roller, and Ball Bearings

d) Power Transmission: Gears, Pulleys

e) Fits, Limits, and Tolerances: Representation of Fits, tolerances, and surface finish.

4.3.10 MEC3204: Fluid Mechanics II

Properties of Real Fluids:

Viscosity. Compressibility and elasticity. Surface tension and capillarity. Vapor pressure. Stresses in a viscous fluid. Relationship between stress and rate of strain.

Flow of an Incompressible Fluid:

Velocity and acceleration steady and unsteady flows. One dimensional flow: Euler's equation, Bernoulli’s equation. Two dimensional flows: Euler's equation, Bernoulli’s equation. Navier Stokes equation. Newton's Second law of motion (control volume approach) Application of the impulse - momentum principles. Fluid flow in pipes. Fundamental equation. Friction factor. Pressure losses in pipes. Applications.

Elementary Hydrodynamics:

Streamline, streamtube and stream function. Basic flow fields. The velocity potential. Flow superposition.

4.3.11 MEC3205: Machine Tools

Construction of Machine tools. Bed, spindle, change gears. Tool lubrication. Rigidity and alignment. Tool attachment chucks.

Theory of Metal Cutting: Economics of metal cutting. Effects of speed, feed, depth of cut. Types of chips and chip breakers. Cutting fluids.

Lathe work: Taper turning. Eccentric turning. Form turning. Collet chuck. Leadscrew accuracy. Boring. Slotting.

Milling work: Horizontal machine. Cutter support. Types of cutter. End and face Mills. Choice of cutter. Fixtures. Dividing Head. Simple and angular indexing. Vertical milling. Jig boring.

Shaping, Planning and Slotting: Hydraulic shaper. Use of Dividing head. Planers. Table drive. Slotting. Slotting tools.

Grinding: Abrasive, artificial and natural wheels. Bonding. Grit and grade. Wheel mounting. Truing and dressing. Wheel speed. Hand grinding. Lathe grinding, attachments. Cylindrical grinding. Centreless grinding. Steadies. Taper grinding, Surface grinding.

Drilling:

4.3.12 MEC3206: Metrology

Accuracy:

Conditions for accuracy. Types of error. The effect of averaging results. The evolution of a length standard. Interferometry applied to flatness testing. The N.P.L. flatness interferometer. The pitter - N.P.L. Gauge Interferometer.

Linear Measurement:

Slip and block gauges. Length bars. Design and operation of linear measurement instruments (i.e. "effects of" Principles of alignment, sensitivity, accuracy, variances and inertia of moving parts). Principles of kinematics (complete constraint and one degree of Freedom). Design of comparators. High-magnification gauge comparators. (Brookes level comparator and the Eden-Rott `Millionth' comparator).

Angular Measurement and Circular Division:

Protractors, Sine bars. Angle gauges. Levels, Clinometers. Autocollimators and Angle Dekkors. Reflectors and optical square. Calibrating circular divided scales and indexing equipment, Precision Polygons and their calibration. Testing straightness, flatness and squareness. Taper measurement.

Screw Thread Measurement: Types of Thread. Thread measurement. Errors in Thread. Thread gauges.

Gear Measurement: Pitch measurement. Tooth thickness measurement, etc.

Measurement of Surface Finish: Methods of measurement (Peak to Valley, R.M.S., and C.L.A.). Effect of sampling length, Measuring Instruments.

4.3.13 MEC3207: Mechanics of Machines

Mechanics: Acceleration in mechanisms: Coriolis compartment. Forces required to accelerate machine elements. Torque diagram. Flywheel. Cams. Governors.

Power Transmission: Hookes Universal Joint. Friction clutch. Gearing systems. Spur/Helical Gears, Epicyclic gearing. Gyroscopic effect and Euler's equations.

Balancing of Machinery: Static and Dynamic balance. Reciprocating engine balancing.

Friction and Lubrication:

Dry friction, Boundary Lubrication. Film Lubrication. Thrust bearings. Hydrostatic bearings.

4.3.14 MEC3301: Solid Mechanics II

Part A:

Complex systems for stress and strain. Thermal effects and combined stresses. Mohr's circle for stress and strain. Theories of Elastic failure. Thick cylinders; Lame's Theory; Force fits; compound cylinders. Bending of thick curved beams; the Winkler Theory. Unsymmetrical bending. Composite beams.

Part B:

Force analysis of statically indeterminate beams. Column and beam-column theory; Euler columns and real columns. Introduction to energy methods of structural analysis, complementary energy and strain energy. Castigliano's and Engesser's theorems; the theorem of stationary complementary energy; potential energy; stationary potential energy; Rayleigh-Ritz method; approximate methods of solution.

4.3.15 MEC3300: Electrical Eng. for Mechanical Engrs.

Electronics:

Transistor equivalent circuits. R-C amplifiers. Direct coupled amplifiers. Power amplifiers. Feedback in amplifiers. Oscillators. Thyristors and Triacs. Operational amplifiers. Analogue computers.

Digital systems:

Logic gates. Basics of Boolean algebra. Simplification and mechanization of Boolean functions. Flip-flops. Microprocessors.

Measurement of Instrumentation:

Basic instrumentation system. Accuracy of transducers. Electrical pressures, displacement and temperature transducers. Bridges. Measurement of speed. On-line data acquisition and data logging.

4.3.16 MEC3209: Mechanical Eng. for Electrical Engineers:

Application for the Steady Flow Energy Equation:

Boiler and condensers. Turbines. Adiabatic Steady Flow Processes.

Vapour Power Cycles:

The Carnot Cycle. The Rankine Cycle. The Reheat Cycle. The Regenerative Cycle. The Economiser and the Air Pre-heater.

Gas Power Cycles:

Internal Combustion engines and air standard cycles. The simple gas turbine cycle. The free power turbine. Reciprocating engine cycles. Otto and Diesel cycles. Spark ignition and fuel infection. Supercharging.

Hydro-Plants

Location - Technical and economic consideration - Hydrograph and Flow duration curves: catchment area and simple power calculations. Advantages and disadvantages of Hydro Plant heads (high, Medium and Low) of water and Power and Plant capacity. Review of dam types and Hydro - Plant types. Components of Hydro Plant. Water Hammer and Surge Tanks. Type of Turbines and their characteristics.

Solar - Energy Conversion - Thermal Plants:

The motion of the sun. Direct and diffuse radiation. Flat plate collectors. Concentrating collectors. The low temperature Rankine cycle. The Sterling Cycle.

Machines:

Mechanical Transmission systems:

Brakes, gears, clutches, hydraulic clutches, flywheels.

Balancing: Dynamic and static balancing of reciprocating machines.

4.3.17 MEC3401: Laboratory A

4.3.18 MEC3402: Laboratory B

4.4 Level 400 courses

4.4.1 EGR 4101: Engineer in Society III

Law:

A brief introduction to the following topics:

The Nigerian Legal System:

Industrial Safety Laws:

Engineering Bye Laws:

Electricity Supply Laws. Water and Public Health Laws.

Company and Partnership Law:

Nature and functions of companies. Formation and floatation of companies. Nature and type of partnership.

Copyrights, Patents and Trademarks:

The Law relating to employers and employees Contract Law:

Formation of contract. Discharge of Contracts. Remedies. Land Acquisition Law.

4.4.2 EGR 4201: Engineering Statistics

Sampling, frequency tables and their graphs, center of distribution, spread of distribution, outcomes and their probabilities, conditional probability. Independence and standard deviation. Random variables. Expectation, variance, specific discrete and continuous distributions. Higher dimensional random variables. Multinomial and Bivariate normal probability distributions. Correlation and regression. Law of

large numbers and central limit theorem. Sampling and sampling distributions. Test hypothesis and quality control.

4.4.3 MEC4201: Innovative Design

Introduction to the design cycle and production consumption cycle. Market Analysis and Market research. Feasibility, preliminary design and detailed design phases of the design cycle. Problem formulation with restraints and constraints. Creativity and concept hunt. Evaluation of concepts and alternatives on the basis of physical realizability, economic viability, financial feasibility, and social acceptability tests.

Introduction to the concepts of maintenance, safety, and Ergonomics. Introduction to computer Aided Design. Simple design exercises involving creativity and innovative design process will be assigned to students.

4.4.4 MEC4202: Manufacturing Processes

Technology of Industrial Casting: Sand moulds, properties of sand. Cores and core sands, Design of Mould, centrifugal casting. Precision Casting, die casting, shell molding and investment casting.

Powder Metallurgy: Methods of producing metal powder, sintering, Products Applications, etc.

Metal Forming Methods: Rolling: Hot and Cold rolling. Defects in rolled metals. Drawing and deep drawing. Wire and tube drawing. Extruding and extrusion molding. Forging. Defects in Forging.

Welding and Joining Methods:

Gluing. Pressure welding. Cold welding and resistance welding processes. Fusion welding, electric arc and gas welding. Neutral, oxidizing and carbonizing flames. Welding with a chemical heat source. Thermit welding, Electron beam Welding. Introduction welding.

New developments and Special machining processes:

- Electrochemical machining, Laser beam machining, Electric Discharge Machining.

4.4.5 MEC4203: Fluid Mechanics III

Flow of a Real Fluid:

Laminar and turbulent Flows. Effects of Viscosity on fluid motion. Non-Newtonian fluids. Reynold's modification of Navier-Stokes equations. Turbulent mixing process. The concept of Boundary layer. Boundary layer thickness. Boundary layer equations. Exact and approximate solutions. Turbulent boundary layer on a flat plate. Boundary layer separation. Wakes, form drag, profile drag and lift. Boundary layer control. Steady flows in pipes and annuli. Friction coefficients and wall shear stress in laminar and turbulent pipe flows.

Gas Dynamics:

Conservation of mass. Dynamic equations of motion. Momentum and energy equations. Propagation of disturbances. Speed of sound in a medium. Mach number. Compressible flow regimes. Concept of static and total conditions. Isentropic flow through ducts of varying area. Nozzles and diffusers. Choked flow. Shock waves. Normal shock waves. Pressure, temperature, density, velocity and entropy changes across a normal shock wave.

4.4.6 MEC4301: Design of Machine Elements I

Introduction. Design factors, Materials selection, lubrication and lubricants, stress concentration and fatigue. Strength under combined loads. Design/selection consideration for screws, fasteners, and connections, springs, shafts, brakes, clutches, and couplings.

Design exercises relating to real engineering problems are to be undertaken by students.

4.4.7 MEC4302: Mechanics of Machines II

Vibrations of Linear System with one degree of Freedom:

Introduction. Degrees of Freedom. Undamped free and forced vibration. Damping (viscous). Damped free and forced vibration. Vibration isolation and transmitted force. The centrifugal pendulum. Torsional damped vibration at critical speed.

Vibration of Linear System with Two or More degrees of Freedom: Equations of motion and solution. Undamped free and forced vibrations. Dynamic vibration absorber. Transmission of force and motion.

Torsion Vibration: Discrete systems. Undamped free and forced torsional vibration. Oscillation of geared systems.

Transverse Vibration: Natural frequency of distributed system in transverse vibration whirling shafts. Exact and approximate method.

Introduction to Non-linear Vibrations.

4.4.8 MEC4303: Thermodynamics III

Principles of Combustion:

Fuels, The chemical equation of Combustion. Stoichiometry. Exhaust gas analyzers. Application of the First Law to combustion. Energy released by combustion. Flame temperatures. Dissociation. The Van't Hoff equilibrium.

Introduction to Heat transfer: Modes and basic laws of heat transfer. Conduction. Convection and Radiation. Heat exchangers. Counter, parallel and mixed flow.

Refrigeration: The reversed Carnot cycle. The mechanical vapor compression cycle. The absorption refrigeration cycle. Air cycle refrigeration. Heat pumps. Air conditioning processes.

Solar Energy:

The motion of the sun and the solar constant - Direct and diffuse radiation. Solar collectors. Solar tracking systems. Storage systems. Power towers. The low temperature Rankine cycle. The Sterling engine. Other solar applications.

4.4.9 MEC4304: Laboratory

4.4.10EGR 4301: SIWES II

Industrial attachment for six months. Students keep a log book and write a comprehensive technical report on their experience in industry.

4.5 Level 500 courses

4.5.1 MEC5301: Design of Machine Elements II

Design of gear systems, belt, rope, and chain drives. Sliding and rolling contact bearings, Cam design. Failure analysis. Optimization in design. Design exercises relating to real engineering problems are to be undertaken by students.

4.5.2 MEC5312: Laboratory

4.5.3 MEC5401: Thermodynamics IV

Steam and Gas turbines:

Blade velocity diagrams. Efficiency. Impulse and reaction stages. Pressure and velocity compounding. Free power gas turbines. Twin spool and ducted fan jet engines. Turbo-compressors.

Positive Displacement Compressors:

Reciprocating air compressors. Indicator diagram. Rotary compressors.

General Thermodynamics Relations:

Properties to be related. Exact differentials. Some general thermodynamic relatives. Processes undergone by solids and liquids. Availability and the Gibbs function. Availability as a criterion of cycle performance.

4.5.4 MEC5402 - Solid Mechanics II

Introduction: Introduction to general elasticity and general plasticity. Uniaxial tensile test with Preference to elasticity and plasticity problems; Nominal and true stress. Engineering and logarithmic strains. Equilibrium equations. Strain- displacement relations. Compatibility equations. Stress-Strain relations in the elastic region, Material's stress strain relations. Boundary conditions. Any stress functions. Stress concentration.

Elasticity:

Analysis of thin rotating discs. Bending of thin plates. Membrane theory of thin shells. Torsion of uniform bars, exact theory based on Saint-Venant stress function and Brandtl's membrane analogy. Approximate theory for thin walled tubular sections. The Bredt-Batho equation. Distribution of shear stresses in beams. Thermal stresses, contact problems and deformation of springs.

Fundamentals of Plastic deformation:

Review of the structure of metals. Elastic and plastic deformation in metals. Flow stress determination. Cold and Hot working. Effects of strain rate and Hot working on the properties of metals.

Fundamentals of Metal forming:

Classification of forming processes. Mechanics of metal working. Friction and lubrication. Workability, Residual stresses. Experimental techniques for measuring loads and deformations.

4.5.5 MEC5403: Control System Engineering

Linear Control Theory:

Concepts of open-loop and closed-loop linear control systems. Concept of transfer function. Block diagrams and their reduction techniques. Signal Flow Graphs. Mason's rule.

Regulator and Servomechanism:

System classification. Steady-State error. Transient response of first and second order systems. Performance specification - peak time, Percentage overshoot, Settling time.

Control Systems and Components:

Governors. Hydraulic pumps and motors. Hydraulic valves. Hydraulic feedback systems. Pneumatic bellows, flapper-valve (baffle-nozzle pair), relays and actuators. Pneumatic feedback systems. Electronic PID controllers. Control motors. Synchronous. Hybrid feedback systems. Basic speed and position control systems.

Stability Analysis:

Routh-Hurwitz Criterion. Frequency Analysis Techniques - Nyquist. Bode Diagram.

Root Locus.

Design: 3 Term (PID) Controllers. Compensation Circuits and applications. Determination of class of servomechanism by means of asymptotic plots. Design using

Bode Diagrams.

Introduction to Non-Linear Systems:

Common types of non-linearities. Some effects of non-linearities on closed-loop control systems.

4.5.6 MEC5404: Fluid Mechanics IV

Rotordynamic Machines: Flow through rotating passages. Euler's turbine equation and hydraulic efficiencies. Velocity diagrams. Practical Impellers. Centrifugal machines. Types of turbines.
Performance Curves. Specific speeds and scale ratio. Turbine Selection. Net positive suction head. Cavitation. Detection of cavitation and avoidance.

Advanced Gas dynamics: Review of normal shock wave. Prandtl-meyer relation. Oblique shocks. Attached and detached shock waves.

Measurement of temperature in high speed gas flows. Pitot-tube in compressible flow. Prandtl-Meyer flow. Shock expansion theory.

Intermediate Hydrodynamics: General equations of flow in vectorial form. This airfoil terminology. Properties of a symmetrical airfoil of infinite length. Wings of infinite length. Practical airfoils (shape, data and performance).

4.5.7 MEC5405: Engineering Management

Productivity: Definition, factors affecting productivity in industry, how to increase productivity, measurement of productivity in industry.

Work study: (a) Motion study: Method study objectives, basic procedure of method study, recording technique process chart, time chart, multiple activity chart, process examination procedure, human factors, work study report and installation.

(b) Time study: Recording information, dividing the operation into elements numbers of cycles, the rating factor, allowance, norm and standard time.

Wage Incentives: Incentive plans, day rate plan, full participation plans, less than full-participation plan, the step plan.

Production Planning and Control:

Production control in intermittent manufacturing, production control in continuous manufacturing, Planning and controlling in project management - PERT.

Statistical Quality Control:

Kinds of control, acceptance sampling by attributes, operating characteristics curves, sampling, control charts for attribute, control charts for variables.

Cost Data for Decision:

Fixed and variable costs, break-even analysis and construction of break-even chart.

Capital costs and investment criteria:

Capital costs, common criteria of comparing economic alternatives, present value criterion, average investment criterion, rate of return criterion, pay off periods.

4.5.8 MEC5601: Project.

4.5.9 MEC5301: Refrigeration And Airconditioning:

Refrigeration Cycles: Revision of single stage vapor compression systems. Analysis of absorption refrigerators.

Refrigeration and Air-Conditioning Applications: Domestic, commercial, industrial, marine and transportation applications of both refrigeration and air-conditioning.

Properties of Refrigerants: Toxicity, inflammability, chemical activity, odor and oil solvent properties, Thermodynamic characteristics.

Compressors: Reciprocating and rotary types. Hermetically sealed compressors. Lubrication. Fans.

Heat Exchangers: Condensers and evaporators. Water and brine spray chambers. Evaporative condensers. Cooling coils and air washers.

Refrigeration Load: Convected heat. Product load. Infiltration and ventilation effects. Radiation effects.

The Psychometry of Air-Conditioning Processes: Revision of dehumidification and humidification. Water injection. Steady injection. Mixing and adiabatic saturation with reheat.

Comfort and inside design conditions: The metabolic rate. Bodily mechanisms of heat transfer. Environmental influences on comfort. Environmental refreshness.

4.5.10MEC5302: Heat And Mass Transfer:

Heat and Mass by Conduction: The general conduction equation. Steady one-dimensional conduction with and without generation.

Steady quasi one-dimensional conduction. Steady two-dimensional conduction. Numerical solution of two-dimensional conduction equation. One-dimensional transient conduction.

Heat Transfer by Convection: Forced convection-consideration of thermal boundary layer. Forced convection-Reynolds analogy and dimensional analysis. Natural convection. Separated flow convection. Convection with phase change. Mass transfer by convection. Processes of diffusion. Mass transfer in laminar and turbulent convection. Combined heat and mass transfer.

Combined Conduction and Convection Heat Transfer: Extended surfaces. The straight fin and spine. Limit of usefulness of the straight fin. Fin effectiveness and overall coefficients. Heat exchangers. Determination of heat transfer coefficients from heat exchanger tests.

Heat Transfer by Radiation: The laws of black and grey body radiation. Absorption and reflection of radiant energy. Emission, radiosity and irradiation. Black and non Black bodies. Kirchoff law. Intensity of radiation. Radiation exchange between black surfaces. Grey-body radiation exchangers. Radiation coefficients.

Solar Energy: The fundamentals of solar energy. Solar energy collectors, Receivers and concentrators. Radiation transmission through glass and selected heat transfer topics. Analysis of pipe and fin type flat plate collector with a glass cover. Collector design.

4.5.11 MEC5303: Alternative Energy Sources

Nuclear Power Plant:

Revision of nuclear reactions. Decay processes. Neutron activation. Reaction cross sections. Nuclear fission. Reactor theory. Reactor types. Component design and materials.

Neutron life cycle in a thermal reactor. Liquid cooled reactors pressurized water reactors, boiling water reactors, fast breeder reactors. Gas cooled reactors - Magnox Type, advanced gas cooled reactors, high temperature reactors.

Wind Power: Windmill designs. Wind powered generators and pumps.

Hydro-Systems: Pumped storage systems. The hydraulic ram. The hydraulic air compressors.

Direct Conversion: Thermionic converters. Semi-conductor (Thermoelectric) converters. Magneto hydrodynamic converters. Fuel cells.

Other Sources: Tidal Power. Geothermal energy, micro-biological conversion of plant material.

4.5.12MEC5304: Operational Research

Introduction to Operational Research: Definition and historical development of

Operational research.

Simulation Models for Decision Making: Types of models - ionic, analogue, and symbolic. The need for simulation. Manual simulation. Analogue and Digital computer simulation.

Linear Programming:

Introduction to linear programming. Formulating and solving a linear program - Geometric method, standard and revised simplex method. Post optimality and sensitivity.

Replacement Theory:

Replacement of equipment which deteriorates. Replacement of items which fail expensively. Renewal theory.

Scheduling and Loading:

Types of Scheduling - Single project planning, continuous process planning, (Assembly line balancing). Job shop scheduling, and batch production scheduling. Performance criteria, and priority rules used in scheduling.

Forecasting:

The need for forecasting, sales forecasting, Demand Patterns. Criterion for comparing forecasting methods. Time series analysis - Arithmetic averages, correlation techniques, exponentially moving averages. Exponential smoothing, and the effect of seasonal trends.

Role of Computers in Production Control:

Data collection, Production planning. Production control, and data presentation.

4.5.13MEC5305: Manufacturing and Industrial Finishing

a) Miscellaneous Cold Working Processes:

Shearing, bending, spinning, stretching, coining, processing,

Powder Metallurgy: Metal powders. Mining and blowing. Pressing. Sintering. Sizing and impregnation. Applications.

Plastics: Plastic materials. Plastic processing. Design of moulded plastic parts.

b) Surface Treatment:

Burnishing, diamond tools, wire brushing, polishing, buffing, harperizing, barreling, vibratory finishing, electro-mechanical polishing, chemical polishing, electrolytic polishing, abrasive blast polishing (hydrodynamic) and blasting, metal shoot, anodizing.

Metal Cleaning:

Alkaline cleaning, emulsion cleaning, vapor degreasing, solvent cleaning, acid cleaning, pickling, descaling, derusting, dipping, etching.

Electro-Plating: Principles of electro-plating, electro- plating standards, Cadmium zinc, copper, nickel chromium plating, including applications, preparation and maintenance of plating solutions, also equipment. Quality control stripping of faulty deposits. Design of the process chart.

Other Metallic Coating:

(Hot dipping, metal spraying, cladding, vacuum coating). Conversion coats. Phosphating, chromating, anodizing, oxide blacking. Organic coats: Lacquers and varnishes. Paints: Oot type stoving enamels, synthetic enamels, plastics.

4.5.14MEC5306: Theory Of Metal Cutting

Detailed geometry of cutting tool angles. Cutting forces and temperatures. The variables of metal cutting (speed, feed rake angle, energy power, tool wear and life). Cutting - tool materials. Cutting fluids (coolants). Economics of metal cutting (cutting speed, feed and depth of cut and their effect on tool life, criteria of selection of suitable machine tool, example). Machine tool acceptance test. Machine tool foundation. Vibration in machine tools.

4.5.15MEC5307: Fracture Mechanics

Fracture Mechanics Concept:

Fracture mechanics and strength of solids, stress and displacement fields in cracked bodies, The Griffith - or wan-Irwin concept, Stable and unstable crack growth.

Fatigue Crack growth:

Stress intensity factor range, Empirical expressions for crack growth rate, factors affecting fatigue crack growth rate.

Fracture Mechanics design approach:

Crack detection techniques, Initial flaw sizes, Design procedure in the presence of cracks, Examples of designing with cracks, Stress Intensity Factor (SIF), Basic characteristics of cracked Bodies.

4.5.16MEC5308: Mechanics of Metal Forming

Rolling of Metals, Forging, Extrusion, Drawing, Sheet metal forming.

4.5.17MEC5309: Vehicle Dynamics

Vehicle performance:

Engine characteristics, resistance to motion, maximum speed and acceleration performance, gradeability, fuel consumption.

Power train:

Clutch, gear box, determination of gear ratios, prop shaft, Unusual and constant vel joint, differential and rear axles.

Brakes:

Basic requirements, directional stability, weight transfer, brake, force distribution, types of brakes shoe factors and materials.

Tyres: Tyres and construction material. Manufacture of tyres, tread patterns, tyre designation, speed rating, ply rating, aspect ratio, rules of tyre mixing.

Wheel and vehicle handling: Basic dimension and designation. Tyre cornering force characteristics, plane motion and stability of vehicles.

Steering and suspension systems: Basic types, geometrically correct steering, Ackerman linkage, turning circle radius, steering gear requirements. Basic functions and components, geometry of dependent and independent suspension.

4.5.18 MEC5312: Laboratory

Fifteen 3-hour laboratory sessions

5 GENERAL CONDUCT AND DISCIPLINE

The Department of Mechanical Engineering and the university as a whole expect students to conduct themselves in an exemplary manner during their interactions with members of the university community and to live peacefully with them.

5.1 Degree classification and academic standing

Misconduct is any action that is contrary to University Regulations, some of which are as follows:

a) belonging to, or participating in the activities of unregistered/illegal associations including secret cults;
b) physical assault and/or causing bodily harm on any other person, whether a student or not;
c) fighting;
d) rioting and unauthorized assembly;
e) organizing and/or taking part in demonstration by any student without permission;
f) examination related misconduct;
g) drug abuse and the use of prohibited substances;
h) persistent rowdy and/or anti social behaviour;
i) reckless and/or dangerous driving;
j) insulting and/or attacking university officials in the pursuit of their legitimate duties; and
k) willful damage to university property.

5.2 Examination regulations

Credible examination is the only measure used in determining the success or failure of any University system. That is why students found to be engaged in examination irregularities are out rightly disciplined.

The University has drawn examination regulations to clarify the legitimate expectations and corresponding responsibilities of all staff and students. It is intended to ensure that the University's examinations are organized and conducted in a consistent and professional manner. These regulations apply at all examinations/assessments in the University (including continuous assessment test, tutorials and take home assignments.)

Some of the regulations are as follows:

a) Students are expected to read all notice boards, bulletins and other related media in the University to keep them abreast with what is the happening. REFUSAL TO READ NOTICES from the designated media is not an excuse for not performing any academic activity.
b) Attendance at lectures, practicals and examinations are compulsory, and anyone who does not attend a lecture, practical and examination at the time and place published in the examination time table will be deemed to have failed in that part of the assessment.
c) Students who have clashes in examinations based on the timetable should immediately inform their departmental examinations officer before the commencement of the examination. Students who fail to inform the appropriate officers of the University of likely clash in examinations shall blame themselves for any difficulty or eventuality that may arise.
d) It will be the responsibility of each student to make sure that he is aware of the final examination timetable. Students are to expect changes of date, time and venue of examination before the examinations start.

5.3 Examination procedure and disciplines

a) It shall be the responsibility of each student to make sure that she/he is registered for the appropriate examinations and be sure of the dates, times and places of the examinations for which he is registered, also to ensure that he is in possession of any identity document prescribed for the examination.
b) Each candidate should be at the examination venue at least fifteen minutes before the commencement of the examination. Lateness will not be tolerated.
c) Each candidate is required to supply his own drawing instruments and any other examination aids for which provision is prescribed. A student shall bring his identity document to each examination and display it in a prominent position on his desk.

d) Any book, paper, document, examination aid, handbag or briefcase which is brought to the examination room must be deposited at the invigilator's desk, or a place designated for the purpose before the start of the examination. In no circumstances must it be placed on or near any candidate's writing desk.

e) Each student shall write in the attendance register his/her registration number, name, answer booklet number and department and then sign. Students are advised to note their serial number and attendance register number (in case there are more than one registers) for ease of signing out.

f) Student shall write his examination number, but not his name, distinctly on the cover and on every page of the answer book, as well as on any extra sheets used.

g) The use of scrap paper, question paper, toilet tissue, etc. for rough work is not permitted. All rough work must be done in answer booklets and crossed neatly or in supplementary answer booklets which must be submitted to the invigilator.

h) A student leaving the examination hall must sign out and hand his script to the invigilator before leaving if he does not intend to return.

i) A student who leaves the examination room shall not be readmitted unless throughout the period of his absence, he has been continuously under the supervision of an invigilator or examination attendant.

j) No student shall be allowed to leave during the first thirty minutes or the last ten minutes of the examination.

k) No student shall speak to any other student or make any noise or disturbance during the examination. A student must not indirectly give assistance to any other student or permit any other student to copy from or otherwise use his/her papers. A student must not directly or indirectly accept assistance from any other student or use any other student's paper.

l) No student shall enter the examination hall with a handset/phone or any ICT gadget.

m) A student is responsible for protecting his work so that it is not exposed to other students.

n) Smoking is forbidden in the examination hall during any examination and in the university premises.

o) At the end of the time allotted, each student shall stop writing. He shall gather his scripts together and remain seated until all candidates' scripts have been collected. It shall be the candidate's responsibility to ensure that his answer scripts are collected. Except for the printed question paper, a student must not remove from the examination room or mutilate any paper or other materials supplied.

5.4 Examination and academic misconduct

Misconduct as mentioned earlier is any action that is contrary to University regulations. Therefore, candidates for any examination are to conduct themselves properly in and around the examination halls. Deviations from proper conducts may constitute examination misconduct.

The vicinity of an examination hall is considered to be part of the examination hall. Thus, any student caught with unauthorized materials or writing in the vicinity of the examination hall (after the student has seen the question paper) shall be treated as if the materials are found on him/her in the examination hall. Similarly, any student caught cheating in any way in students' hostels or other areas shall be appropriately treated.

Examination misconduct discovered during the marking of the examination scripts are also subject to appropriate investigations and further necessary action.

5.5 Categories of examination misconduct

The following are some of the categories of examination misconduct.

i. Impersonating another student, or being impersonated by another student at an examination.
ii. Exchanging names and/or numbers on answer scripts/sheets.

iii. Introduction and use of relevant unauthorized materials into the examination hall.
iv. Exchange of materials (such as question papers, examination cards) containing jottings which are relevant to the ongoing examination in the examination hall.
v. Theft and/or illegal removal of examination scripts.
vi. Any kind of mischief likely to hinder the smooth conduct of the examination, e.g. engaging in physical violence.
vii. Collaborating with, or copying from, another candidate.
viii. Cheating outside the examination hall, such as in toilets, hall of residence, etc.
ix. Destruction of exhibit by candidates.
x. Facilitating/abetting/aiding cheating by another candidate.
xi. Acts of misconduct (such as speaking/conversation) during the examination which is likely to disrupt the conduct of the examination.
xii. Writing on the question paper.
xiii. Any other misconduct deemed by the senate to warrant appropriate punishment.

These misconducts carry punishments ranging from written warning, to rustication or outright expulsion.

5.6 Misconducts related to projects, essays, etc.

Students of the Department of Mechanical Engineering and the University as a whole are reminded to strictly adhere to the universally accepted high standards of academic integrity while writing any work related to their programmes. Deviations from these high standards may constitute misconducts which are punishable by expulsion, rustication or warning depending on the nature of the misconduct. Some of the offences include the following:

a) Submitting a final year project that was written by someone else.
b) Submitting, as final year project, a work submitted earlier for another purpose by her or by others, at the university or somewhere else.

c) Repackaging a whole project as his or her product.
d) Substantial plagiarism of the work of others in final year projects.
e) Fabrication or intentional misrepresentation of data used in final year projects.
f) Intentional sabotage of the final year project (or part thereof) of other students.
g) Failure to credit sources in final year projects
h) Faking of citations in final year projects.

5.7 Dressing and dress code

Dress Code is here defined as any appropriate or formal or informal dress and dressing style in which there is no attempt or will to expose the body's intimate parts. A dress should have sleeves and extend from the neck to just below the knees. Students of the Department of Economics and the University as a whole are required to dress decently at all times.

The following types of dresses are prohibited

1. Transparent dress that highlights or emphasizes the body's, sensual parts, such as the thighs, breasts, etc.
2. Unbuttoned shirts without a t-shirt or a singlet, or an under wear cloth.
3. Clothes that illustrate, enhance, or depict drugs, alcohol or have offensive and violent messages.
4. Clothes that display weapons or any gang-related illustrations and messages.
5. T-shirts or clothes with obscene captions.
6. Shorts and skimpy dresses e.g. body hugs, show-one-your-chest, and dresses exposing sensitive parts.
7. Tights, shorts and skirts that are above the knees (except for sporting purposes).
8. Wearing of ear-rings by male students,
9. Plaiting or weaving of hair by male students.

10. Wearing of colored eye glasses, not on medical grounds in the classroom.

5.8 Penalties for violation of the dress code

1. Violators will not be allowed into classrooms, lecture halls, laboratories, and offices of the university.
2. Violators will not be allowed in examination halls.
3. Repeated offenders will face disciplinary action**.**

6 ADDITIONAL INFORMATION

6.1 Orientation

At the beginning of the session, the Department of Mechanical Engineering usually organizes an orientation programme for new students. This is in addition to the orientation programme that is organized by the university. The purpose of the programme is to acquaint the new students with the peculiarities of the Department and introduce the officers of the Department. Fresh students also freely interact with lecturers and are encouraged to ask questions on anything they would like to know about the Department and its programmes.

6.2 Add/drop of courses

At the discretion of University Authorities through the Directorate of Examinations Administration and Records (DEAR), and Heads of Programmes and course lecturers, a student may be allowed to make minor changes in registration at the beginning of a semester as long as these changes do not contravene any current University, Faculty, and Departmental Regulations. No course change will be allowed if more than one-fifth of the course material has been covered.

6.3 Change of department/programme

The university does not allow interfaculty transfer. However, a student may be allowed by the Dean of the Faculty to change from one programme to another programme within the Faculty on the following conditions:

- Not later than the 2nd week in level 300
- The appropriate document(s) is/are obtained from the MIS (Management Information Services) and duly completed after paying the necessary fees.
- Approval of the two Heads of programmes involved;
- The student was not admitted on the basis of OND or HND qualifications.
- The student has spent more than a year in the current programme.

6.4 Suspension of studies

Where a student misses a substantial part of a semester for health (and other) reasons, the Faculty board shall, at its discretion, recommend 'suspension of studies'for senate approval. Where a student is given suspension of studies, he/she shall be required to take courses afresh (but not as carry-overs), or undertake alternative ones where applicable on his/her return. No GPA shall be computed for a semester where the student is on suspension of studies. However, if the suspension is only for one semester, performance in the other semester shall be used in computing the Cumulative Grade Point Average (CGPA).

6.5 Withdrawal from studies

Withdrawal from studies may be either compulsory or voluntary.

6.5.1 Compulsory

Compulsory withdrawal from a programme shall be recommended by the Faculty to the Senate on any of the following grounds.

i. Failure to register for the prescribed number of credits within the prescribed period.
ii. Failure to attain the required standard in English language within the stipulated time limit
iii. Failure to attend classes for a period, which exceeds 30 consecutive days except on, certified medical grounds.
iv. Failure to get a CGPA of 1.50 or better at the end of the probation period.
v. Failure to complete the programme within the maximum permissible period of study i.e. 4 semesters beyond the minimum allowable period.

6.5.2 Voluntary Withdrawal

A student may withdraw voluntarily from the programme by applying to the Faculty, stating the reasons for the withdrawal. The Faculty Board will then make the appropriate recommendations to the University Senate for its final approval.

6.6 Lecture and examination time table

Before the commencement of each semester, a lecture Time Table containing the lecture timings and venues for all Faculty courses is released by the Faculty Time Table Officer. Departments thereafter produce their Time Tables in accordance with the Faculty Time Table.

6.7 Transcript/partial transcript

Transcripts of examinations results shall be signed and stamped by Deans of Faculties and countersigned by the Registrar or his/her representative and shall be in such a form as may be approved from time

to time. Numerical marks in individual courses shall not be given but letter grades, GPA and GCPA.
A student who applies for a change of institution and has his/her application approved shall be entitled to collect a partial transcript showing the courses taken up to the time of leaving institution and the results obtained thereof.

6.8 Notification of results

No results of examinations may be normally announced until after they have been approved by the Senate Business Committe (SBC) or Senate, as the case may be. However, the Chairman of Senate may give approval in advance for the earlier announcement of results on a provisional basis and subject to Senate approval, to be made where special urgency exists. The results of semester examinations for all levels is usually released after the approval of senate for final year examinations, or SBC in case of lower level examinations.

6.9 Correction of results

If an incorrect result of a student is mistakenly submitted and approved by the senate, the Department shall, after having detected the mistake correct the result and reflect the correction in the semester of the course taken. Normal approval process shall thereafter be followed to get the corrected results approved and recorded in all concerned units.

6.10 Verification of results

Where a student observes that an incorrect result has been recoreded for him/her (for example, he/she is reported absent after having sat for an examination) he/she should report the matter to his/her level coordinator. The level coordinator shall then follow the laid down verification process to ascertain the correct result. Where a mistake is confirmed, the process of correction of result shall then be started.