CATHOLIC UNIVERSITY INSTITUTE OF BUEA
P.O. Box 563 Buea,
South West Region,
Republic of Cameroon,
Central Africa
CUIB
The Entrepreneurial University
Tel: (237) 33 32 28 29
Fax: (237) 33 32 28 29
info@cuib-cameroon.net
www.cuib-cameroon.net

STUDENT'S HANDBOOK 2018-2019

"Think and Act Proactively"

UNDERGRADUATE PROGRAMS

Mgr. Immanuel B. Bushu
Bishop of the Diocese of Buea
Chancellor and Proprietor of the Catholic University Institute of Buea
CUIB: the Entrepreneurial University

MESSAGE FROM THE PRESIDENT

My happy duty as President of The Catholic University Institute of Buea (CUIB), **The Entrepreneurial University** is to thank the Group that has worked this edition of SENG Students' Handbook 2018 2019. Our goal as a University has been to prepare a kind of executive school handbook or **vade-mecum** that is not only meant to enhance our student learning and experience but also to help all our partners and stakeholders to understand our unique mission and identity as an entrepreneurial university based on the Focolare's Economy of Communion (EoC) philosophy. The EoC is a community of approximately 800 businesses world-wide that fosters a "culture of giving" within business so as to humanize the economy. By emphasizing Catholic Studies in our core curriculum and EoC in our Entrepreneurial curriculum , we in CUIB have attempted to institutionalize a unique and distinctively Catholic Entrepreneurial University by fostering a socially and spiritually-based understanding of sound entrepreneurial skills, techniques and practices. This has not been an easy task especially as such a model is so new not only to our immediate environment but to the Cameroon Nation in particular and the African Continent at large.

The reader going through this handbook will notice that two things stand out – our both/and culture versus either/or and conflict-driven-profit or social impact, poor against rich and our entrepreneurial culture which runs through the academic heartland of all our schools. In CUIB we emphasize both the ***Heart a***nd ***Soul*** of our Entrepreneurial Education. The heart of our Entrepreneurial education is that we train our students to be academically competent in their areas of specialization acquiring the right skills and techniques that are necessary for them to face a very competitive society. For instance, the needed skills within business of reading a balance sheet, calculating cost of capital, providing statistical analysis, targeting and segmenting markets, managing group dynamics, generating creative thinking, mediating conflicts and so forth are imperative in CUIB. However, while such skills and techniques are important, (the matter of Entrepreneurial education), they are insufficient as they do not move students to an "economy of Communion" which has the ability to foster not just economic development, but "integral human development". In our country, we continue to see and hear stories of corruption and misappropriation of funds meant for the common good. We continue to see and hear stories of Banks starting off well and collapsing because someone embezzled all the money. A true and genuine entrepreneurial education must also foster spiritual and moral values. The proper conduct of an entrepreneur is informed by his or her ethics, character and worldview. That is why in CUIB our curriculum is designed also to develop a moral compass that will enable our students to find the right solutions even when in uncharted territory and also address the ethical and economic challenges which they face every day in a coherent way. We think that this is the way forward for our nation if we have to effectively achieve ***Vision 2035*** of our current President Paul Biya. This approach that CUIB has adopted is truly the Catholic approach to life. It is not an either/or approach that enables the winner to take it all but an approach which is meant to be win-win. In CUIB it is about Faith and Reason, Spirituality and Work, prayer and hard work (study), vocation and business, leisure and study. This is what our Catholic faith teaches us. Think of the Eucharist where we have at the same time the Body and Blood of our Lord Jesus Christ, but also bread and wine. Is this an either/or situation? At first glance these seem to be mutually exclusive states, but with the eye and reason of our faith, it becomes a wonderful both/and. What is perceived to be opposed becomes a beautiful and complementary unity. In CUIB we have used this ancient insight of our mother Church and apply it to teaching, research and practice. In CUIB, we have what is called the "EoC hour". This hour begins with the celebration of the Holy Mass at midday, the greatest act of communion. From 12.30 -1,30 pm EoC is

reserved for sharing, meditation, ritual celebrations, conferences, birthdays, EoC base Group Work, tutoring, inspirational talks etc. Our interactions in the university be they economic, civic, or personal, are not aimed at winner-takes-all, but at win/win collaboration.

Another important aspect that the reader of this Students' Handbook will clearly appreciate is the fact that our entrepreneurial programs run through the academic heartland, that is, all the schools. Developing an entrepreneurial mindset and taking the risk in doing business through the University's Research and Business arm known as CUIB Centre for Entrepreneurship, Research and Innovation are the pathways that we have adopted in CUIB. It is my hope that this handbook will go a long way to foster this unique Catholic and Entrepreneurial culture.

Ad multos annos!!!

God bless you.

In Jesus and Mary,

Fr. George Nkeze

President, CUIB

FORWARD BY THE PROVOST

I am delighted to introduce this edition of the School of Engineering CUIB Students' Handbook. The handbook provided essential information about the activities of the school, which all students in the school or respective students need to have.

The School of Engineering , CUIB which has been in existence since 2010 is a center of excellence for the production of highly competent ,effective and efficient engineering graduates to meet the man power needs of the nation in engineering and other related sectors.

All students on admission must register properly in their respective Departments. The procedures for Departmental registration are detailed in the Handbook of the school. It is therefore important that students have a copy of the Students' Handbook for detailed information about the procedure for registration, and other activities of the school

Screening of credentials is done at least two times before a student graduates: usually in the first year and in the final year. You must be ready to submit your original credentials for screening at the appropriate time, when the university calls for them.

The essential facilities needed by the students to pursue their academic careers peacefully and successfully are available in the university. You must attend lectures regularly and promptly, do all your assignment and submit them before the expiration of the deadlines given by your lecturers: make the best use of the library and stay focused on your studies in order to actualize your academic ambitions. There are Academic Advisers in the Departments, whose responsibilities include guiding and counseling students in matters relating to their academic program. You should not hesitate to approach your Academic Advisers on any question or problem you may encounter about your academic work for necessary guidance.

While ensuring you have a pleasant stay in CUIB, it is very important for you to bear in mind the minimum requirements for graduation upon completion of your study program. In order to graduate from the Bachelor Engineering program, several partial requirements must be met, which are academic and non-academic. The partial academic requirements sum up to a minimum total credits earned of 180 credits and a maximum of 240 credits. These 178 - 210 credits are earned across seven different subject streams as follow: General University Requirements, Science, Foundations of Engineering, Core courses, Core electives, non-core electives and Projects (workshop practice/internships/Bachelor's Projects). The non-academic requirements include: volunteerism (community service), sports, and clearances indicating you do not owe the university any money as well as not in possession of university materials/equipment.

I wish you success in your academic pursuits.

Prof. Wilfred A. NDONGKO
Provost, CUIB

INTRODUCTION OF THE SCHOOL OF ENGINEERING

Upon the creation of the School of Engineering (SENG) in the Catholic University Institute of Buea (CUIB), an initial Academic Curriculum was prepared. After using the Curriculum for three years, it was realized that the curriculum had some major shortcomings. This was, in part, due to the management changes that had taken place in the university at the time. At the start of the 2015/2016 Academic Year, the Office of the Provost, through the various Schools, undertook a review of the Old Academic Programme. The outcome was a landmark achievement for the University despite the limited time for which the work was done. After a careful specialized review, there was need to review, most especially the number of course per Department and per Level, the qualification and specialties of the faculty and a need to give orientation towards teaching methods to the faculty. The school of Engineering then came out of this process with the course outlines and organigram which we think can boost our mission of training good entrepreneurial and hands-on servant leader of our community.

Dr. De Bortoli Maurizio
Special Assistant to the Dean.

BRIEF HISTORY OF THE SCHOOL OF ENGINEERING (SENG)

The **School of Engineering** was created as one of the four Schools that took off upon the creation of CUIB in May 2010. The main mission of the Institution is to prepare professional servant leaders with moral and spiritual values to contribute to sustainable development of their communities. The vision is to bring hope to the students and awaken in them a sense of purpose and direction, so that they may achieve social, economic, spiritual, cultural and environmental wellbeing in their communities in particular and the nation at large. The objectives and core values enshrined therein are a true reflection of the ideals of a Catholic Business/Professional University.

The School of Engineering of the Catholic University Institute of Buea (SENG) has been existing for seven years (2010-2017). Being a Catholic Entrepreneurial University, the Administration adopted for academic levels as well as offices follows the American system. Consequently, First Year Students are referred to as "***Freshmen"***, Second Year – "***Sophomore"***, Third year – "***Junior"*** and Fourth Year – "***Senior"***.

At the beginning of this academic year 2017/2018 CUIB *School of Engineering* and *College of Technology* were two separate administrative units, with separate Deans, Special assistants, Administrative Assistants, Faculty and students. Due to the ongoing crisis, both units were merged and given a Dean, a vice dean, one administrative assistants, and Faculty.

The School has witnessed a series of changes at the head as it was headed by Eng. Jacques Tabe Etchi from 2010 to 2013, Dr. Asong Fred Zisuh from 2013 to 2015, 2016 Dr. Sona Alfred Ndeme, 2017 Prof. Kaen, from November 2017 till now Dr. De Bortoli Maurizio. The School sticks to high standards and control in its teaching and conduct of examination. Examination questions are vetted internally by the School and externally by the mentor University, the University of Buea thereby ensuring hight quality standar and relevance. The students of the School have been making remarkable attempts to engaging in the concept of Entrepreneurship and Economy of Communion as evidenced in the several projects that have been undertaken by different student groups.

Table 1. Enrolment in the School of Engineering, CUIB: 2010-2018

	Cameroonian students			**Foreign students**			
Year	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Grand Total**
2010/2011	36	18	**54**	-	-	-	**54**
2011/2012	59	42	**101**	-	-	-	**101**
2012/2013	93	65	**158**	4	1	5	**163**
2013/2014	102	55	**168**	7	4	11	**168**
2014/2015	114	67	**182**	1	-	1	**182**
2017/2018 SENG/CT				1			**305**

Academic Philosophy of SENG

The Academic Philosophy of CUIB is based on six key pillars:

i) Spiritual and Moral Values,
ii) Entrepreneurial Spirit,
iii) Scientific and Technical know-how (Science-Technology-Engineering-Mathematic, *STEM),*
iv) Social, Environmental Awareness and Responsibility,
v) Integrated Education for Life,
vi) The Economy of Communion (*EoC*).

The Academic Curriculum comprises three main components: Academic, Entrepreneurship and Catholic Studies. Thus the underlying paradigm is *"the development of a complete person – holistic education".* Students are expected to take courses in the above three components. Within the Academic component, students are expected to take core courses with relevance to their intended degree study programme. Within the Catholic Studies component, students are expected to take courses related to religion, spirituality, humanities etc. The Entrepreneurial component consolidates students' skills to undertake business, develop business ideas etc. The three components have been carefully mapped out to facilitate the realization of the Vision and Mission of CUIB, which are:

Vision: to bring hope to students and awaken in them a sense of purpose and direction so that they may achieve social, economic, spiritual, cultural and environmental well-being in their communities in particular and the nation at large.

Mission: to prepare professional servant leaders with moral and spiritual values to contribute to the sustainable development of their communities.

CUIB's system is based on concepts from the United States and thus a good number of terminologies in used are similar to those in the US. For example, first year student are referred to as Freshmen and the year as Freshmen year; second year students are referred to as Sophomores; third year students as Juniors and final year students as Seniors.

OBJECTIVES OF CUIB ENGINEERING PROGRAMMES

The School of Engineering in CUIB specializes in educating and training students to become proficient engineers in the following areas: Chemical Engineering, Electrical and Information Engineering, Mechanical Engineering, and Civil/Environmental Engineering. The objectives of the Engineering Programmes offered at SENG involve;

i) Producing graduates who will demonstrate and establish an edge in academic and technical competence among colleagues and achieve professional recognition in their workplaces (either academia or industry).

ii)Training graduates who will utilize their skills and resourcefulness to invent, design and realize cost-effective technology to meet local needs; and eventually provide innovative solutions to engineering problems in Cameroon and beyond.

iii) Researching and solving new technical challenges in engineering and related fields.

iv) Training graduates in a way so as to enable them embrace cultural, societal, environmental, and ethical issues in their work by encouraging volunteerism activities, catholic education, entrepreneurship and civic education programs. This will help fulfill their professional responsibilities to themselves, employers, employees, co-workers, and the local and global communities. Graduates should be able to recognize the need for, and an ability to engage in life-long learning.

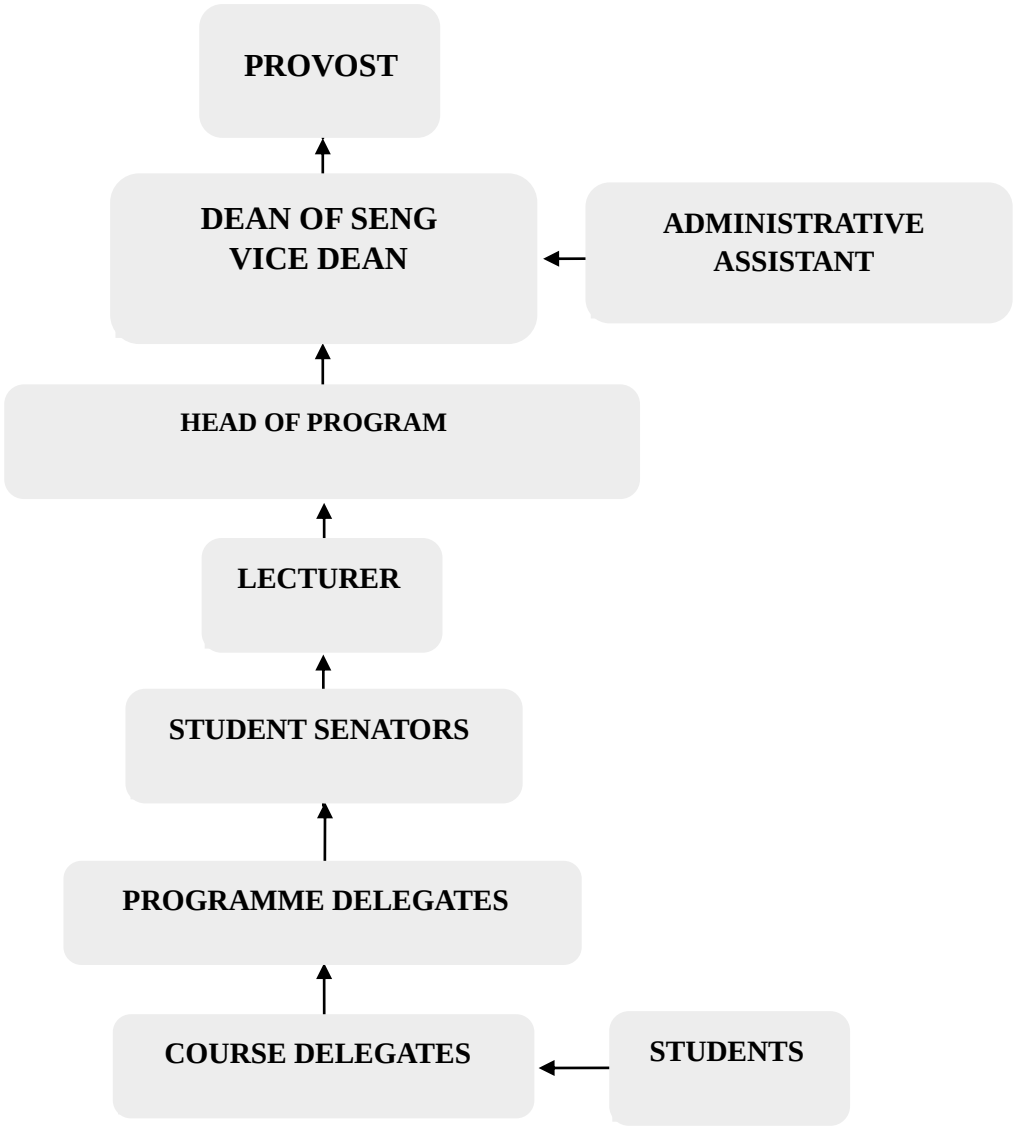
iv)Training students in a way to ensure excellence in multi-disciplinary teams and multi-cultural teams demonstrate leadership skills and effective communication (oral/written) to solve problems and to educate and persuade diverse audiences.

ADMINISTRATION OF THE PROGRAMME

The Provost is the Chief Academic Officer of the University. He advices on every academic matter in the University including the SENG Programmes. Under him is the Dean of SENG who supervises the Secretariat and teaching. There are one Administrative Assistance who assist the Dean in the day-to-day running of the office. The Faculty (The Teaching Core) is made up of two arms namely;

The Head of Program who supervise teaching in the various Departments and who also act as Students advisers and the Lecturers.

ORGANIGRAM


PROVOST
DEAN OF SENG
VICE DEAN
ADMINISTRATIVE
ASSISTANT
HEAD OF PROGRAM
LECTURER
STUDENT SENATORS
PROGRAMME DELEGATES
COURSE DELEGATES
STUDENTS

Engineering Programmes Offered

SENG offers a four year Bachelor of Science degree in four engineering disciplines as follows:

- Bachelor of Science in Civil and Environmental Engineering (CEE)
- Bachelor of Science in Chemical Engineering (CME)
- Bachelor of Science in Electrical and Computer Engineering (ECE)
- Bachelor of Science in Mechanical Engineering (MEE)

ASSOCIATE of SCIENCE (AS) DEGREE (2 years).

- **IN CIVIL & STRUCTURAL ENGINEERING.**
- **IN POWER SYSTEM&RENEWABLE ENERGY.**
- **IN AUTOMOTIVE ENGINEERING.**

(After the two year the student can transit, if he/she wants, in the School of Engineering at the Junior year to obtain a Bachelor of Science Degree in his or her Specialized field of Engineering).

Why an ASSOCIATE of SCIENCEDEGREE (AS) in SENG?

The CUIB School of Engineering is designing three Associate of Science Degrees to be offered within the new CUIB two years Academic Programs tailored to the unique talents and needs of our students who have the potential to complete the four -year's degree program, but have not yet the opportunities to demonstrate this full potential.
These AS Degrees programs is an academically rigorous science curriculum offered within an environment that develops student success, integrating excellence in teaching, proactive and responsive students support and external partnership.
CUIB-SENG proposed AS degree integrates high-quality core curriculum courses into a comprehensive, cohesive program provide a clear, deliberate pathway that enable students to build skills, competencies, and intellectual habits to support their academic success.
The AS degree is corroboration of an important accomplishment on the way to a Bachelor's Degree.
The CUIB – SENG Associate of Science Degree is not the end of the academic career of our students. The Credits earned in SENG Associate of Science Degree can be transferred toward a SENG Bachelor of Science Degree.

Coming out of the SENG Associate of Science Degree program, students should be able to:

- *Solve technology problems using science, technology, engineering, and math (STEM).*
- *Communicate via written, graphical, and verbal media.*
- *Make professional decisions while applying ethical standards.*
- *Work efficiently as a member of a technical team.*
- *Demonstrate basic laboratory skills.*

SENG CURRICULUM 2018-2019 Academic Year

COURSES STRUCTURE:

- ***ASSOCIATE of SCIENCEDEGREE in CIVIL & STRUCTURAL ENGINEERING***

The Associate of Science Degree program in Civil Engineering is designed to give students the basics in the field. In other words, it will not explore deeply in one subject.
A student who wants to deepen a specific subfield related to civil engineering, can follow a bachelor's degree specialized in his field of choice. As for the associate's program, a student will get a good overview of the field necessary to open doors of opportunities in the industry. Some common coursework you can see in a civil engineering degree program include:

Land surveying, Engineering mechanics, Technical writing, Engineering materials, Highway construction and design, Auto/Archi CAD, Hydraulics, Infrastructure design, Buildings inspection, and estimating, Geotechnical design, Environmental science.
Some concentrations that students in civil engineering can explore include structural, architectural, traffic, and ocean.

FIRST SEMESTER / LIST OF COURSES

S/N	*Course Code*	*COURSE TITLE*	*C V*
1	MEG 101	Mathematics for Engineers	4
2	PHY 101	Physics for Engineers	6
3	CSE 103	Strength of Materials/Theory of Structures	6
4	CSE 107	Construction Processes	4
5	CSE 109	Reinforced Concrete Design	6
6	CSE 113	Civil Engineering Material Science	4
		TOTAL CREDITS VALUE	**30**

MEG101: Engineering Mathematics (Functions, Differential and Integral Calculus, Linear Algebra)

Functions: Linear functions, Quadratic functions, Polynomials, Inverse functions, Circular functions, Exponential functions, Logarithmic functions, Composite functions, hyperbolic functions, Rational functions , complex functions and curve sketching. Limits, Differentiation of functions and associated techniques. Integration of functions and associated techniques. Integrals of areas under a graph. ODEs and PDEs , their Classification, order, Analytical techniques of solving Differential Equations , Formulation of Engineering Problems in differential form. Other methods of solving differential equations: Matrix forms, Laplace transforms, Fourier series. Introduction to PDE, Fourier transforms. Vector Algebra, Matrix Algebra: Matrices, Determinants, Systems of Linear Equations,

and Linear Algebra (Vector Spaces, Bases and Dimensions, Linear Transformations and their Matrices, Change of Basis, Bilinear, Quadratic, Hermitian and Skew-Hermitian Forms, Eigenvalues / Eigenvectors, Eigenvalues of Hermitian, Skew-Hermitian and Unitary Matrices).

PHY 101: Physics for Engineers

Introduction, Mechanics, Electricity and Magnetism, Semiconductor Physics, Waves and Oscillation, Optics and Laser.

CSE 103: Strength of Materials /Theory of Structures

This course introduces engineering materials and concepts Stress-Strain Analysis: Stress and strain, transformations, principal stresses, and graphical representation by Mohr's circles of biaxial and triaxial cases, the concept of Elasticity and plasticity; Hooke's law, and the behavior of simple spring systems; definitions of normal stress, shearing stress, normal strain, shearing strain; shear force and bending moment diagrams; members subjected to axial loading; members subjected to torsional loading; generalized Hooke's law including thermal strains, equations of equilibrium and compatibility, plane strain and plane stress problems, Euler critical loads for columns. Energy Methods: Strain energy principles, Castigliano's theorem. Applications to cases of axial, bending, and torsional loadings and statically indeterminate problems.

CSE 107: Construction Processes / CSE 219 Technology

The general objective of the courses is to permit students to acquire the necessary competences (knowledge, skill and attitude) enabling them as front line managers to manage civil engineering construction projects taken into consideration. The state of the art in, materials, equipment and technology while respected the current practices and the repercussion of civil engineering project on the environment. Identify the most recent techniques and methods of constructions. Understand a technological situation, analyze the problem involve and proposed development solutions that correspond to modern technology. Suggest alternative remedies to diverse cases that may not be able solving by traditional methods.

Learning Objectives:

Understand the physiology of construction. The student will be able to supervise construction projects. Managing all the phases of construction. The student will be able to propose construction methodology for their execution. Develop evaluation knowledge and procedures to the construction processes. Demonstrate best practices approaches to construction processes preparation, interpretation and analysis. Identify potential sources of error in construction processes. Understand the business and ethical issues associated with construction processes. Communicate construction processes findings in an effective and professional oral and written format.

CSE 109 Reinforced Concrete Design

Design of Reinforced Concrete Elements; Introduction to reinforced concrete structures, types of slabs, beams and columns; Limit state design philosophy; Stress/strain properties for concrete and reinforcement; Design for flexure including moment curvature, ductility and redistribution of bending moments; Empirical methods for checking and Serviceability (i.e. cracking and deflection). Design of shear reinforcement; Design of columns for axial load and bending moment; Introduction to Safety, Stability and Robustness, Practical Design and the use of Codes of Practice.

CSE 113 Civil Engineering Material Science

Materials are evolving today faster than at any time in history. Industrial nations regard the development of new and improved materials – one which can stimulate innovation in all branches of engineering, making possible new designs for structures, appliances, engines, electrical and electronic devices, processing and energy conservation equipment, and much more. These initiatives are now being felt throughout engineering, and have already stimulated design of a new and innovative range of consumer products. So the engineer must be more aware of materials and their potential than ever

before. Innovation, often, takes the form of replacing a component made of one material (a metal, say) with one made of another (a polymer, perhaps), and then redesigning the product to exploit, to the maximum, the potential offered by the change. The engineer must compare and weigh the properties of competing materials with precision. It involves an understanding of the basic properties of materials; of how these are controlled by processing; of how materials are formed, joined and finished; and of the chain of reasoning that leads to a successful choice. Innovation in engineering often means the clever use of a new material - new to a particular application, but not necessarily (although sometimes) new in the sense of 'recently developed'. The professional engineer should know how to select materials which best fit the demands of the design - economic and aesthetic demands, as well as demands of strength and durability. The designer must understand the properties of materials, and their limitations. This course will give a broad introduction to these properties and limitations. The general objective of the material science course is to permit students to acquire the necessary competences, enabling them as front line managers to achieve civil engineering construction projects taken into consideration. At the end of the course the student will be able to understand the value of the materials in every phase of the construction. No engineer attempts to learn or remember tables or lists of data for material properties, but the student should try to remember the broad orders-of-magnitude of these quantities. The student will be able to supervise the choose of materials from the foundations, to the finishing of a building.

Learning Objectives:

Understand the physiology of construction. The student will be able to propose the best material for the construction projects. Propose the right material in all the phases of construction. Identify potential sources of error in the choose of materials. Understand the business and ethical issues associated with the choose of materials.

SECOND SEMESTER / LIST OF COURSES

S/N	Course Code	COURSE TITLE	C V
1	CSE 105	Steel and Timber Design	6
2	CSE 113	Geothecnics	6
3	CSE 115	Pre-Stressed Concrete	6
4	CME 101	Chemistry for Engineers	6
5	CSE 111	Civil Engineering Drawing (CAD)	6
		TOTAL CREDITS VALUE	**30**

CSE 105 Steel and Timber Design

This course, which is divided into two parts – **steel and timber.** The main emphasis in this course is the design of steel structures and an understanding or their structural behavior. Topics include: general objectives for design of steel structures; Eurocode 3; loads on steel building frames; floor and cladding systems for steel framed buildings; plane frame design: fabrication, joints, lateral bracing, collapse mechanisms and analysis. Element design - classification of steel sections; design and basis of capacity checks for struts and ties, trusses, restrained and unrestrained beams, columns and axial column with moments (tension/compression/local building/LTB); connection design: shear, shear and torsion connections.

It is seeks to nature and inherent characteristics of timber in relation to requirement of structural Euro codes leading to a practical design and detailing of timber structural components.

CSE 113 Geothecnics

In this course students are introduces to soils as engineering materials. Topics include: the main types of soils, their stress-strain behavior, strength characteristics and the use of these concepts, after appropriate development, in the field of lateral earth pressures, including the analysis of retaining walls.

CSE 115 Pre-Stressed Concrete

This course is intended to give students a good understanding of the concepts and theory underlying the use of prestressed concrete, and the ability to analyze and design prestressed-concrete structures. The course will focus on statically determinate prestressed concrete beams, because these are commonly used in bridges and buildings. It may also cover the design of statically indeterminate (continuous) structures. Topics covered will include: basic concepts and applications; materials; flexural analysis. Structures (plane and space trusses; beams and grids; plane and space frames) by the stiffness method, and also the flexibility method.

CME 101 Chemistry for Engineers

This course designed to provide a survey of inorganic and physical chemistry and an introduction to organic chemistry. Topics studied in this course include atomic structure, covalent and ionic bonding, chemical reactions, chemical calculations, acid, base and solution chemistry, radiochemistry, electrochemistry and introduction to the chemistry of hydrocarbons.

CSE 111 Civil Engineering Drawing (CAD)

The goal of the Course will be to enable the student to describe any object with a progression from the smallest (spoon…) to the biggest (buildings and so on…). The importance of the drawing in reproducing and analyzed the built environment different kind of drawing in the representation of the objects and buildings. The man as an index and reference point of the dimension of the building (Ergonomic Theory). The importance of the proportions in the project. The sizes of man in the definition of the objects and spaces. The student must be understand and be able to organize living spaces in different spacial situations, from the one-dwelling room till the major dwellings. Organization of the city public buildings (school, office, hospital, shop, church…). Analysis of the different spaces according to the function. Proposing modular solution. For all these reasons fundamental will be the knowledge of the principal elements of drawing in **Computer Aided Design (C.A.D.)** in order to reach a perfect managing of the forms and geometrical shapes, skill and creativity in the composition of the objects in the space in the maximum respect of the ergonomic aspect of human life, the wellbeing and the preservation of the environment. At the end of the course the student must mastering all the geometrical shape their graphical construction and the value of every shape in the space. The student will reach the capability of create spacial situation in order to have a better comprehension of the built environment and change, if is necessary, the already known shapes and be creator of new situation that can be the mirror of the contemporary time.

THIRD SEMESTER / LIST OF COURSES

S/N	Course Code	COURSE TITLE	C V
1	MEG 201	Mathematics for Engineers	4
2	CSE 211	Structural Analysis	6
3	CSE 213	Engineering Survey	6
4	CSE 215	Quantities Estimates / Site Management	6
5	CSE 217	Architectural Principles	6
TOTAL CREDITS VALUE			30

MEG 201 Mathematics for Engineers (Numerical Methods)

This course is aimed at enabling students understand the concepts and methods of resolving mathematical systems numerically on the computer. Numerical Analysis: Direct and iterative methods, discretization and numerical integration, generation and propagation of errors, round-off, truncation and discretization error, numerical stability and well-posed problems, computing values of functions, interpolation, extrapolation and regression, solving equations and systems of equations, solving eigenvalue and singular value problems, optimization, evaluating integrals and differential equations. The following numerical techniques not limited to the following should be considered: Newton Raphson method, False position, Runge Kutta, Lagrange Interpolation, Euler method, bisection method, Simpson, Trapezium rule, Aitken acceleration, Gauss sidle, the cord approximation.

CSE 211 Structural Analysis

This course mainly deals with matrix analysis of structures. In order to enhance students' understanding, the course will begin with a review of the basic concepts of structural analysis and matrix algebra, and students will be shown how the latter provides an excellent mathematical framework for the former. This is followed by detailed descriptions, and demonstrations through many examples, of how matrix methods can be applied to linear static analysis of skeletal.
Analysis and design of foundations, bearing capacity and settlement of foundations; stability of excavations and slopes; ground movements due to construction; analysis and design of excavations, retaining walls, slopes and underground structures in soil and rock.

CSE 213 Engineering Survey

A survey student (surveyor) is a professional person with the academic qualifications and technical expertise to conduct one, or more, of the following activities;
To determine, measure and represent the land, three-dimensional objects, point-fields, and trajectories; To assemble and interpret land and geographically related information; To use that information for the planning and efficient administration of the land, the sea and any structures thereon; To conduct research into the above practices and to develop them.

Learning Objectives: The surveyor's professional tasks may involve one or more of the following activities, and may be carried out in association with other professionals.

1. The determination of the size and shape of the earth and the measurements of all data needed to define the size, position, shape and contour of any part of the earth and monitoring any change therein.
2. The positioning of objects in space and time as well as the positioning and monitoring of physical features, structures and engineering works on, above the surface of the earth.
3. The acquisition and use of spatial information from close range, aerial and satellite imagery and the automation of these processes.
4. The determination of the position of the boundaries of public or private land, including national and international boundaries, and the registration of those lands with the appropriate authorities.
5. The study of the natural and social environment, the measurement of land and the use of such data in the planning of development in urban, rural and regional areas.
6. The planning, development and redevelopment of property, whether urban or rural and whether land or buildings.
7. The planning, measurement and management of construction works, including the estimation of costs.

In application of the foregoing activities surveyors take into account the relevant legal, economic, environmental, and social aspects affecting each project.

CSE 223 Practical of Civil Engineering Survey

Measurement and calculation of simple triangular network.
Realization of complete topography projects. Calculation and setting out of circular curves, spiral curves. Leveling.

CSE 215 Quantities Estimates / Site Management

Quantities and estimates: Evaluate the importance of the content of technical prescriptions and estimates on the design, the tender, the construction and control. Understanding laws and regulations related to bidding of contract and particularly the technical prescriptions and estimates Use techniques of estimates, quantities and estimates**.**Determine the estimate of a building construction project and super projects. Calculate the quantities and cost of realization Calculate machine costs

Site management: Write the site. Inspection and surveying report Determine, following the appropriate techniques, the working procedure and time of any construction **Determine** the working time for any piece of construction work Identify criteria used for the choice of equipment and machines Understand the principles of management of a building construction enterprise and of a site Establish a job pre-planning **Choose** or design moulds and formwork of reinforced concrete structures Organize the rotation of formwork

Description: This course focuses to prepare sites prior to the commencement of construction work (to set out the site and organise facilities), to plan projects and ensure that they meet agreed specifications, budgets and timescales and to oversee building work.

Learning Objectives: Concepts to address specific management needs at the individual, team, division and/or organizational level Practical applications of site management to formulate strategies allowing organizations to achieve strategic goals A perspective of leadership

effectiveness in organizations Team-building skills required to support successful performance Critical-thinking and analytical decision-making capabilities to investigate complex projects problems to propose project-based solutions Skills to manage creative teams and project processes effectively and efficiently Estimate quantities. Cost estimate of project selling price without taxes of project. Selling price with value added taxes of project.

CSE 217 Architectural Principles

Since time immemorial buildings have served not only as protective shelter, but also as places to find meaningful connections to nature, the cosmos, and the divine.

Taking a contemporary, reflective, and investigative approach to this area of study, this course concentration gives students the opportunity to examine architecture through inspiring experiences and conversations about life and architectural intention, matter and spirit, and the physical and metaphysical.

We strive to make our concentration an environment of rigorous yet open inquiry. Our goal is to create new architectural knowledge via the research, practice and design work of our students. We pursue this objective through the principles of collaboration, integration and personal connection.

We profess architectural design as a legitimate and sophisticated mode of inquiry that can probe, ponder, and respond to the most profound and concrete questions posed by humanity.

We approach the scholarly study of architectural design using two mutually dependent perspectives: (a) design as scholarship (i.e., building as the act of construing/embedding knowledge, beliefs, ethics, aesthetics) and (b) the scholarship of design (i.e., investigation of the various phenomena associated with building).

The course is dedicated to the professional education of those who will plan, design, build, and conserve the built environment.

The course provides an enriching educational climate in which students investigate the realms of planning, design, theory, building, and sustainability within the context of the world in which we live.

Specifically, this translates into the study of the three relationships at the heart of all human habitation: our relationship with others (*Social dimension*), our relationship with the environment (*Stewardship dimension*), and our relationship with God (*Sacred dimension*).

The attitudes, values, skills, and knowledge embedded in these dimensions are pursued through a philosophy devoted to the integration of artistic creativity, intellectual curiosity, technical acuity, cultural diversity, and spiritual maturity. In doing so, we aim to cultivate a holistic view of architecture, planning and design.

EXPECTED OUTCOME

As architecture must respond to the needs and aspirations of our society, the student today must understand the nature of the human being in time, space, and culture.

The students can assume a personal responsibility for the beauty, equity, and wellbeing of the world. Our ultimate goal is to forge inspiring contemporary attitudes toward building steward technician for society at large.

FOURTH SEMESTER / LIST OF COURSES

S/N	Course Code	COURSE TITLE	CV
1	CSE 219	Technology	6
2	CSE 202	Case Study in Civil Engineering Design (CED)	9
3	CSE 221	Principles of Environmental Engineering	6
4	CSE 223	Practical of Civil Engineering Survey	6
5	CSE 225	Programming for Engineers (Matlab)	6
		TOTAL CREDITS VALUE	**30**

GRAND TOTAL CREDITS VALUE (CV) = 120

CSE 202 Case Study in Civil Engineering Design (CED)

CSE 221 Principles of Environnemental Engineering

The application of basic principles and equations dealing with water, air, and solid and hazardous wastes; material and energy balances; and chemical and biochemical cycles. Topics include water resources, water quality and pollution, air quality and pollution, solid and hazardous wastes, and environmental legislation.

This course is intended to introduce the principles and aims of some of the main instruments and tools used in Environmental Management: Life Cycle Assessment (historical and present development of LCA as well as driving forces), Environmental Auditing/Policy/Management System, Reporting etc, market-based Instruments(polluter pays principle, carrot and stick, etc), legal aspects.

CSE 225 Programming for Engineers (Matlab)

➢ *ASSOCIATE of SCIENCE DEGREE in POWER SYSTEM and RENEWABLE ENERGY*

Program Description

The challenges faced today by the Power Systems and Renewable Energy world in providing solutions to the recent market situations of corporate industries, research and community development are greatly related to the integration of modern technology to activities in order to give the world a new face. These could easily be observed in small and mega scale projects

involved in automation, mass production, information management, communication, product quality, modelling and design, instrumentation, system management, etc. Solutions to the latter are very indispensable in improving the nature of industrialization, community development and research. The Associate Degree Program in Power Systems and Renewable Energy gives a hands-on training that exposes the student to a wide range of training modules aimed at providing root solutions that meet up to the expectations of the corporate world. The program consists of a platform that leads to two options: Electrical Maintenance and Renewable Energy. Specialization to each of the options is done at Level Two. Graduates with the aspirations to pursue further degrees are trained to take a vast variety of programs in Power Systems.

Program Objectives

The Associate degree program in Power Systems and Renewable Energy is aimed at helping students to develop a basic appreciation of engineering principles as prerequisite requirement needed to provide them with technical competences to meet up with the challenges in the rapidly expanding area of Electrical, Electronics, Information and Computer Engineering. Its polyvalent nature makes the student effectively dynamic to intervene to a wide variety of engineering problems.

Career Prospects

Graduates from the Power Systems and Renewable Energy Program have a great variety of opportunities for careers, ranging from design to project implementation making them potential professionals in parastatal, mega factories, Naval Plant projects, Computer aided design projects, military technology projects, Robotics/Telemechanisation, NGOs for Nanotechnological Research, Oil Rigs, Exploitation Rooms, Marine and Terrestrial Platform projects, Industrial and Domestic Electrification projects etc..

Careers include: Hardware designer, Electrical maintenance planner, Signal Traffic Map designer, Telemechanic Controller, Tele-special Programmer, Electrical Security personnel, Electrical network designer, Multiplex/Demultiplex Tele-system designer, Fault and Debug Routine Check Manager, System synchronizer, Numerical and Logic programmer for PLCs, Avionic Draft controller, Test bench Simulator, Software package designer, Hardware system Diagnostician, Urban and Rural Electrification planner, Electrical Safety Supervisor (both for marine and terrestrial platforms), Entrepreneurial Service Contractor, etc...

SEMESTER STRUCTURE

POWER SYSTEMS AND RENEWABLE ENERGY					
First Semester			**Second Semester**		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
PSR100	Power Systems Analysis	**4**	PSR108	Digital Electronics	**4**
PSR101	Power Systems Components	**4**	PSR109	Technology of Electronic Components	**4**
PSR102	Electrical Machines I	**4**	PSR110	Signals and Systems	**4**
PSR103	Fundamentals of Electrical Engineering	**4**	PSR111	Technical Drawing	**4**
PSR104	Power Electronics	**4**	PSR112	Mathematics for Engineers II	**4**
PSR105	Analog Electronics I	**4**	PSR113	French I	**4**
PSR106	Mathematics for Engineers I	**4**	COM101	Computer Programming	**4**
PSR107	English I	**2**	SCS102	Paths and Practices to Catholic Spirituality I	**4**
SCS101	Paths and Practices to Catholic Spirituality I	**2**			
Total		**32**			**28**

POWER SYSTEMS AND RENEWABLE ENERGY

Option: Renewable Energy

Third Semester			Fourth Semester		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
PSR200	Urban and Rural Electrification	**4**	PSR208	Photovoltaic Solar Technology	**4**
PSR201	Biomass Power Production	**4**	PSR209	Thermal Transfer Theory	**4**
PSR202	Renewable Energy Conversions	**4**	PSR210	Maintenance of Electrical Equipment	**4**
PSR203	Digital Electronics II	**4**	PSR211	Control Systems	**4**
PSR204	Analog Electronics II	**4**	PSR212	Power Safety	**2**
PSR205	Engineering Probability	**2**	PSR213	Industrial Automation	**4**
PSR206	Introduction to CAD	**2**	PSR214	French II	**2**
PSR207	English II	**2**	PSR215	Introduction to MATLAB	**2**
PSR208	Numerical Methods	**2**	PSR216	Microcontrollers and Microprocessors	**4**
SCS201	The Church and Culture	**2**	PSR217	Systems Engineering	**4**
Total		**30**			**30**

POWER SYSTEMS AND RENEWABLE ENERGY

Option: Electrical Maintenance

Third Semester			Fourth Semester		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
PSR218	Maintenance of Electrical Equipments	**4**	PSR229	Industrial Automation	**4**
PSR219	Electrical Grounding Systems	**4**	PSR230	Systems Engineering	**4**
PSR220	Electromagnetic Compatibility	**2**	PSR231	Feedback Systems	**2**
PSR227	Power Safety	**4**	PSR232	Frigorific Installations	**2**
PSR228	Electrical Machines II	**4**	PSR233	Control Systems	**2**
PSR221	Digital Electronics II	**2**	PSR234	Signal Processing	**2**
PSR222	Analog Electronics II	**2**	PSR235	Numerical Methods	**2**
PSR223	Engineering Probability	**2**	PSR236	Embedded Systems	**2**
PSR224	Introduction to CAD	**2**	PSR237	Introduction to MATLAB	**2**
PSR225	English II	**2**	PSR238	Logic System Design	**2**
PSR226	Numerical Methods	**2**	PSR239	Microprocessors and Microcontrollers	**2**
PSR241	Mathematics for Engineers II	**2**	PSR240	Technical Drawing	**4**
SCS201	The Church and Culture	**2**			
Total		**30**			**30**

➢ *ASSOCIATE of SCIENCE DEGREE in AUTOMOTIVE ENGINEERING*

1. *Justification*

Automotive Engineering is a branch of engineering incorporating elements in Mechanical Engineering for the design, development, manufacture and operation of equipments and their respective engineering subsystems.

This discipline is proposed for inclusion in the Associate of Science Degree program for the following reasons:

- This discipline is largely hands - on capable of equipping students to be entrepreneurial, self-employed and to easily integrate for a further bachelor' degree to compete internationally.
- This discipline is **quite uncommon** in Cameroon which will be a plus for CUIB to attract students over her competitors in the Higher Education.
- This discipline will be greatly cost effective by minimizing cost in running the program since practical work and design materials are greatly available within campus and without including; school cars, design and simulation software like AUTO CAD, SOLID WORKS, MATLAB and even common car garages in the Molyko neighborhood.
- This Discipline is a specialized branch of mechanical Engineering giving the students specific skills to be productive and professionals for the immediate market even after two years of intensive training.
- Also student intern placement becomes easier to manage.

ASSOCIATE DEGREE IN AUTOMOTIVE ENGINEERING (AUE)

		SEMESTER 1				SEMESTER 2	
	COURSE CODE	**COURSE TITLE**	**CREDIT VALUE**	**status**	**COURSE CODE**	**COURSE TITLE**	**CREDIT VALUE**
1	MAT101	Mathematics I (Calculus, Integrals and Differentials)	6	C	MAT102	Mathematics II (Linear Algebra, Numerical Analysis)	6
2	CHM 101	General Chemistry	6	C	AUE 108	Thermodynamics	6
3	APHY101	College Physics (Units, Mechanics, Electricity & Magnetism)	6	C	AUE 102	Fluid Mechanics	6
4	AUE 101	Materials Science	6	C	AUE 104	Applied Mechanics (Statics and Dynamics)	6
6	COM 101	Fundamentals of Computer Programming	6	C	AUE 103	Manufacturing Processes	6
8	AGP103	Introduction to Law and Fondamental Rights	2	C	AUE 112	Automation	6
9					AUE 110	Mechanical Drawing & CAD	6
		Total Credit Value	**32**			**Total Credit Value**	**42**

		SEMESTER 3				SEMESTER 4	
	COURSE CODE	**COURSE TITLE**	**CREDIT VALUE**	**status**	**COURSE CODE**	**COURSE TITLE**	**CREDIT VALUE**
1	MAT201	Introduction to Statistics	6	C	AUE 210	Case Study in Mechanical Fabrication	
2	AUE 201	Engine Maintenance	6	C	AUE 208	Practice of Automobile Maintenance	
3	AUE 205	Strength of Materials	6	C	AUE 298	Industrial Placement	
4	AUE 207	Automobile air conditioning	6	C			
5	AUE 209	Automotive Electical & Safety Systems	6	C			
		Total Credit Value	**30**			**Total Credit Value 20**	

Total Credit Value : 124

Career Opportunities

Chemical Engineering

- Biochemical Engineer, Food Technologist,Brewing Engineer, Manufacturing System Engineer, Production Manager,Process Engineer, Process Safety Consultant, Ceramic Engineer,Energy Engineer,Pharmaceutical, Petroleum Engineering.

Mechanical Engineering

- Automotive Engineer,Maintenance Engineer,Mechanical Design Engineer

Electrical and computer Engineering

- Electrical Engineer. Electronic engineering

Civil & Environmental Engineering

- Transportation engineers work with local and regional planning boards to identify areas of growth and development. They also look for opportunities to alleviate traffic snarls. Once they understand the needs of drivers in a region, they design plans and develop cost estimates for construction projects.
- Structural engineers work with architects and builders to assure that steel and other material used in construction projects exceeds the needs of a given project. With advances in technology and an abundance of creative new building materials, today's structural engineers work on a wider variety of projects than ever before.
- Geo-technical engineers help builders excavate underground projects and work with experts who manage challenging land renewal projects. When cities want to expand their underground mass transit systems, they call in geo-technical engineers to oversee the tunneling. As more developers erect skyscrapers and other large buildings in urban centers, geo-technical engineers assure that the bedrock can safely sustain the pressure of new structures and the people they will support.
- Hydraulic/Hydrology/ redirect water to benefit residents and businesses in a community. They construct canals to speed up shipping while preserving the natural flow of wild fish through a region, and build dams that generate vital electricity while opening up potential new parcels of land for development. Some hydraulic engineers design pipelines that safely transfer fresh water to remote areas, allowing new communities to prosper.
- Compliance officers' work in both corporate and government settings to ensure that local and federal laws are observed in the construction, maintenance, and operation of all kinds of facilities. Compliance officers working in the private sector help their employers prepare for upcoming inspections by anticipating and eliminating sources of pollution or substandard construction. In-house compliance officers simulate visits from official inspectors, saving their companies significant amounts of money through their proactive approach.

- Construction managers use their engineering and leadership skills to ensure that building projects are completed on time and under budget. Construction managers must coordinate the efforts of teams of engineers and laborers to meet tight production schedules. They are often the most visible boss of connection between architects, developers, and construction specialists.
- Government and urban planning engineers often use a combination of skills and specialties to coordinate public works and private construction in their communities. Traditionally, government planning engineers forged relationships with state agencies that would provide funding or construction of major projects. Local planning engineers would help residents understand the potential environmental impact of new highways or infrastructure projects.

Total marks earned /100	**Grade**	**Grade Point**	**Evaluation**		
				Range (GPA)	**Class**
80 – 100	A	4.00	Excellent	3.60 - 4.00	Summa cum Laude
70 – 79	B+	3.50	Very Good	3.00 - 3.59	Magna cum Laude
60 – 69	B	3.00	Good	2.50 - 2.99	Cum Laude
55 – 59	C+	2.50	Fair	2.25 - 2.49	Bene Probatus
50 – 54	C	2.00	Average	2.00 - 2.24	Probatus
45 – 49	D+	1.50	Below Average	Below 2.00	Fail

Table 2. Course grading system in CUIB

Graduation Requirements

In order to graduate from the Bachelor of Science in Engineering program, the following must have been respected;

- a minimum of **180** credits must have been earned by a student. A breakdown of these 180 credits is presented in the table below. These 180 credits are earned across seven different subject streams as follow: General University Requirements, Science, Foundations of Engineering, Core courses, Core electives, non-core electives and Projects (workshop practice/internships/Bachelor's Projects).

Table 3. Minimum Requirements for Graduation in the School of Engineering

Department		Chemical Engineering	Mechanical Engineering	Civil and Environmental Engineering	Electrical and Computer Engineering
Levels	**Semesters**	**Min CV**	**Min CV**	**Min CV**	**Min CV**
Freshman	**First**	24	24	24	24
	Second	22	22	22	22
Sophomore	**First**	20	28	24	20
	Second	22	22	22	22
Junior	**First**	20	20	20	20
	Second	16	16	16	16
Senior	**First**	20	20	16	20
	Second	34	28	26	26
TOTAL CREDITS EXPECTED		**178**	**180**	**170**	170

DESCRIPTION AND STATUS OF ACADEMIC PROGRAMS

Majors: CUIB's Four Year Programs

The following majors are offered in SENG:
Bachelor of Science in Engineering in Chemical Engineering
Bachelor of Science in Engineering Electrical and computer Engineering
Bachelor of Science in Engineering Mechanical Engineering
Bachelor of Science in Engineering Civil and Environmental Engineering
The four-year program is broken down into two semesters per year (first and second semesters) making a total of eight semesters as a minimum for completion of the degree program.

Program Description

In the first year, known as the Freshman Year, concepts constituting the basics to prepare students for a degree in engineering are introduced i.e. in the fields of sciences (maths, physics and chemistry), foundation engineering. More so, students are required to take up some general courses in, general education and catholic studies. Thus in the Freshman Year, students begin to develop a global vision of their area of study and basic intellectual abilities in engineering, physical and natural sciences, technology, entrepreneurship and catholic studies are strengthened. Courses offered in the foundation year are common to all engineering programs.

In the second year, Sophomore Year, students consolidate and deepen their knowledge and skills in their respective major fields of their study. Thus practice is introduced. They also continue to develop basic concepts and abilities in the sciences and foundations of engineering while continuing with general courses.

In the Junior Year, students begin to specialize in specific areas of their choice and have the opportunity to apply

their knowledge and skills in the sustainable management of a business in that domain. The curriculum also strengthens students' professional attitudes and skills to assure positive interactions with others in the Business world. Academically, the third year focuses on the development of practical skills (hands-on) and a more in-depth understanding of the business and entrepreneurial world. Thus at this level practice is re-inforced.

During the fourth year, Senior Year, students must exhibit their intellectual and professional abilities in analysis, synthesis, critical thinking and creativity by identifying and solving problems related to their areas of specialization to enhance sustainable management processes. The learning process is structured to provide students the opportunity to demonstrate their professional abilities by writing project based on the work the experience or cooperative education. Thus at this level, students demonstrate and integrate practice.

SENG CURRICULUM 2018-2019 Academic Year

FRESHMEN YEAR (Foundation Year)
All SENG students take the same courses in this year.

SENG FRESHMAN 2018-2019:						
First Semester			**Second Semester**			
Code	**Course Title**	**CV**	**Couse Code**	**Course Title**	**P**	**Total**
EMA:101	Engineering Maths I (Differential/Integral Calculus)	**4**	EMA102	Engineering Maths II	C	**4**
CME: 101	General Chemistry	**4**	MEE:102	Fluid Mechanics I	C	**4**
COM: 101	Introduction to Computer Programming	**4**	MEE:106	Materials Science	C	**4**
PHY: 101	Physics for engineers	**4**	ECE: 102	Principles of Electronics	C	**4**
ENP: 101	Entrepreneurial Project I	**2**	ENP: 102	Entrepreneurial Project II	U	**2**
SCS: 101	The Search for Happiness I	**2**	SCS: 102	The Search for Happiness II	U	**2**
SPT:100	Sports[1]	**0**				
EPR:101	Introduction to Methodology of Scientific Research	**4**				
TOTAL		**24**				**22**

Note: [1] these are compulsory but noncredit requirement for all freshmen. They are graded either PASS or FAIL.
[2] It is done during the summer holidays for a period of one month. And the results sent to the first semester of next the next year

Course Descriptions
First Semesters Courses for Freshman

EMA 101: Engineering Mathematics I (Functions, Differential and Integral Calculus)

Functions: Linear functions, Quadratic functions, Polynomials, Inverse functions, Circular functions, Exponential functions, Logarithmic functions, Composite functions, hyperbolic functions, Rational functions , complex functions and curve sketching. Limits, Differentiation of functions and associated techniques. Integration of functions and associated techniques. Integrals of areas under a graph. ODEs and PDEs , their

Classification, order, Analytical techniques of solving Differential Equations , Formulation of Engineering Problems in differential form. Other methods of solving differential equations: Matrix forms, Laplace transforms, Fourier series. Introduction to PDE, Fourier transforms.

PHY 101: Physics for Engineers

Introduction, Mechanics, Electricity and Magnetism, Semiconductor Physics, Waves and Oscillation, Optics and Laser.

COM 101: Fundamentals of Computer Programming

This course is intended to establish a foundation for Computer Programming with specific emphasis on Engineering problems and applications. The course will cover the introductory aspects of Object-Oriented Analysis, Design, and Implementation (using C++) techniques, along with Testing according to the specified requirements of the program. Computer Programming will be treated as part of the Engineering Process, and as such will be contextualized through the course according to the Engineering Profession.

CME 101: General Chemistry

This course designed to provide a survey of inorganic and physical chemistry and an introduction to organic chemistry. Topics studied in this course include atomic structure, covalent and ionic bonding, chemical reactions, chemical calculations, acid, base and solution chemistry, radiochemistry, electrochemistry and introduction to the chemistry of hydrocarbons.

Second Semester Courses for Freshman

EMA 102: Engineering Mathematics II (Linear Algebra)

Vector Algebra, Matrix Algebra: Matrices, Determinants, Systems of Linear Equations, and Linear Algebra (Vector Spaces, Bases and Dimensions, Linear Transformations and their Matrices, Change of Basis, Bilinear, Quadratic, Hermitian and Skew-Hermitian Forms, Eigenvalues / Eigenvectors, Eigenvalues of Hermitian, Skew-Hermitian and Unitary Matrices).

ECE 102: Principles of Electronics

Basic concept of electronics, semi-conductors: intrinsic & extrinsic semi-conductor; P-N Junction diode, types of diode and their applications. Transistors and applications

This course introduces the student to basic electrical principles of AC and DC electrical systems, electronic devices and applications. The course includes the study of electrical measuring instruments, electrical safety and protection, DC control equipment, AC control equipment, programmable logic controllers, and electrical troubleshooting.

MEE 102: Fluid Mechanics I

Basic concepts and properties of fluids, Fluid Statics: Hydrostatic pressure distribution; Application to manometry; Hydrostatic forces on submerged plane and curved surfaces; Buoyancy and stability. Fluid Kinematics: Lagrangian and Eulerian description; Deformation of fluid element; Reynolds transport theorem; Fundamentals of flow visualization. Integral Relations for a control volume: Conservation equations for mass, momentum and energy; Bernoulli equation. Conservation equations in differential form: Stream function; Velocity Potential; vorticity. Dimensional analysis and similitude: Buckingham Pi theorem; Modeling and similarity. Viscous Flow in Ducts: Reynolds number regime; Head loss and friction Factor; Laminar fully developed pipe flow; turbulent pipe flows; Flow in non-circular ducts; Minor losses in pipe systems.

MEE 106 MATERIALS SCIENCE

COURSE DESCRIPTION:

Structure of materials, chemical composition, phase transformations, corrosion, degradation and mechanical properties of metals, ceramics, polymers and related materials. Electrical, thermal, magnetic and optical properties of materials. Materials selection in engineering applications.

Bachelor of Science in Chemical Engineering (B.Sc. CME Honours)

11.2.1 Program Overview

Chemical Engineering deals chiefly with industrial processing to produce value-added products from raw materials. Chemical Engineering therefore embodies the processing of organic (crude oils, natural gas, lumber), inorganic (ores, air, salts) and biological (starches, cellulose, fats) materials into a wide range of useful commodity products, such as fuels, plastics, pharmaceuticals, fertilizers, and foods. At the heart of Chemical Engineering activities is the need for occupational health and safety. In the department, there is emphasis on design, control, optimization and economic operation of equipment in these areas, and on related research and development. Students are expected to ensure they follow the program of study that was in place at the time of their entrance to the School. They should however recognize that program and course changes might result in modification to the original program of study. It is recommended that students contact the School secretariat to confirm their program of study on a regular basis.

11.2.2 Program Objectives and Career Options

This undergraduate degree program prepares professional engineers for successful careers in chemical and related process industries whereby they apply a combination of their knowledge of mathematics, science, chemistry as well as engineering knowledge to overcome technical problems safely and economically - food, pharmaceuticals, materials, fuel and energy. Specifically, chemical engineers apply the principles of chemistry (as a basic foundation) to solve problems involving the production or use of chemicals and other related products. They can also design equipment and processes for large-scale chemical manufacturing, plan and test methods of manufacturing products and treating by-products, and supervise production.

DEPARTMENT OF CHEMICAL ENGINEERING (CME)

CME SOPHOMORE 2018-2019					
First Semester			**Second Semester**		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
EMA 201	Engineering Maths III (Numerical Methods)	4	EMA 202	Engineering Maths IV (Statistics and Probability)	4
CME 205	Organic Chemistry	4	CME 204	Unit operations I	4
CME 209	Fluid Mechanics II	4	CME212	Computer Applications for Chemical Engineers	4
CME 211	Process Analysis	4	CME 210	Chemical Engineering Thermodynamics	4
EPR:299	Internship I[2]	2	EPR 298	Internship II*	2
ENP 201	Entrepreneurial Project III	2	ENP 202	Entrepreneurial Project IV	2
SCS 201	SCS III	2	SCS 202	SCS IV	2
TOTAL		**22**	TOTAL		**22**

*Internship II done during summer holidays.

CME JUNIOR 2018-2019					
First Semester			**Second Semester**		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
CME 301	Unit Operations II	4			
			EPR 398	Work Experience	16
CME 307	Transport Phenomena	4			
CME 303	Chemical Reaction Engineering	4			
CME 321	Chemical Engineering Laboratory I	4			
EPR:399	Internship I²	2			
ENP 301	Entrepreneurial Project V	2			
SCS 301	SCS V	2			
TOTAL		**22**			16

CME SENIOR 2018-2019					
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
CME 411	Process Design and Optimisation	4	CME 404	Process Dynamics and Control	4
CME 403	Chemical Process Modeling and Simulation	4	CME 407	Chemical Engineering Laboratory II	4
CME 407	Biochemical Engineering	4	CME 498	Senior Year Project - CME	12
	Elective	4		**Elective**	4
ENP 401	Entrepreneurial Project VI	2	ENP 402	Entrepreneurial Project VII	2
SCS 401	SCS VI	2	SCS 402	SCS Project	8
TOTAL		**20**	TOTAL		**34**

GRAND TOTAL=178
i.e 132 + 46 (freshman year)

LIST OF ELECTIVE COURSES

List of Electives in CME 2018-2019:				
Code	**Course Title**	**Status**		**CV**
CME 413	Food Process Technology	E		4
CME 410	Chemical Process Industries	E		4
CEE 407	Solid waste and Wastewater Engineering	E		4

CME 101: General Chemistry (Freshman/Foundation course)
This course designed to provide a survey of inorganic and physical chemistry and an introduction to organic chemistry. Topics studied in this course include atomic structure, covalent and ionic bonding, chemical reactions, chemical calculations, acid, base and solution chemistry, radiochemistry, electrochemistry and introduction to the chemistry of hydrocarbons.

EMA 201: Engineering Mathematics III (Numerical Methods)

This course is aimed at enabling students understand the concepts and methods of resolving mathematical systems numerically on the computer.
Numerical Analysis: Direct and iterative methods, discretization and numerical integration, generation and propagation of errors, round-off, truncation and discretization error, numerical stability and well-posed problems, computing values of functions, interpolation, extrapolation and regression, solving equations and systems of equations, solving eigenvalue and singular value problems, optimization, evaluating integrals and differential equations. The following numerical techniques not limited to the following should be considered: Newton Raphson method, False position, Runge Kutta, Lagrange Interpolation, Euler method, bisection method, Simpson, Trapezium rule, Aitken acceleration, Gauss siedle, the cord approximation.

CME 205: Organic Chemistry
Organic compounds: structures and properties, nomenclature, stereochemistry, functional groups, resonance and inductive effects, basic organic reaction mechanism, synthesis and inter-conversion: alkanes, alkenes, alkynes, benzene, alkyl halides, organometallic compounds, alcohols, carbonyls compounds. Functional groups: amines, carboxylic acids and derivatives.

CME 207: Fluid Mechanics II

Introduction to fluid flow fields in kinematics, Fluid friction in pipes, flow in chemical engineering equipment, Boundary layer and other nearly unidirectional flows, turbulent flow, Non-Newtonian fluids.

CME 211: Process Analysis
The course is aimed at giving the student the capacity to objectively analyze processes, calculate and evaluate efficiencies of the various units and the process as a whole. It is concerned with the nature of chemical processes, giving elements on how to design and develop processes and plants. Furthermore, energy and material balances, technical, thermodynamic and kinetic analyses of the chemical process will be presented.

EMA202: Engineering Mathematics IV (Probability and Statistics)

Nature and Purpose of Mathematical Statistics; Tabular and Graphical Representation of Samples; Sample Mean and Sample Variance; Random Experiments, Outcomes, Events; Mathematical Probability of an event (its Axioms, Permutations and Combinations); Random Variables, Discrete and Continuous Distributions; Mean and Variance and standard deviations of a Distribution; Binomial, Poisson and Hypergeometic Distributions; Normal Distribution; Random Sampling, Random Numbers; Estimation of Parameters; Confidence Intervals; Testing of Hypotheses, Decisions; Quality Control; Acceptance Sampling; Analysis of variance, t-test , Z-test, Goodness Fit. X^{2-} Test; Nonparametric Tests; F-test, Pairs of Measurements; Fitting Straight Lines. Other plots for data representation: bar graphs, histograms, box and whisker diagram, statistical process control charts.

CME 204: Unit operations I

This course is aimed at enabling students understand heat transfer processes as well as the equipment involved in these processes. It entails processes such as distillation, liquid-liquid extraction, evaporation, drying.

CME 212: Computer Applications for Chemical Engineers

This is to impart computational skills for the mathematical description and resolution of Engineering Problems. It presents an overview about some software and their applications (Excel, Chemcad, Aspen, DWSIM, Matlab). These softwares or two of them are then used for the following operations: Matrix & scalar operations, solving systems of linear equations, Graphing, Writing Programs, Numerical Intergration & Differentiation (solutions to ODEs).

CME 210: Chemical Engineering Thermodynamics

This course is aimed at imparting knowledge of thermodynamics with reference to chemical industries. The concepts presented here include: thermodynamic system (concepts), work and energy, the first law of thermodynamics, Equilibrium (chemical and mechanical), The second law of thermodynamics, heat transfer and temperature; the general and steady flow energy equations; the thermodynamic properties of idealized and real fluids, simple property relationships, reversible and irreversible processes, entropy and the concept of a thermodynamic temperature scale.

CME 301: Unit Operations II

This course is aimed at enabling students understand equilibrium stage operations and its application in community based processes. It constitutes fluid flow through granular beds, filtration, sedimentation and coagulation – flocculation. It could also include other processes like chromatography, centrifugation, fluidization, etc.

CME 303: Chemical Reaction Engineering

It is concerned with the rate at which chemical reactions take place, together with the mechanism and the rate-limiting steps that control the reaction process. The sizing of chemical reactors to achieve production goals is an important segment. How materials behave within reactors, both chemically and physically, is significant in chemical processes and the course also takes care of how the data from chemical reactors are recorded, processed and interpreted.

It presents an overview in reaction rates, solutions, Raoult's and Henry's laws, phase rule, colligative properties. Furthermore, concepts in kinetics of homogeneous reactions, variable and constant volume systems, batch reactors and reactor design: ideal reactors, non-ideal flow reactors.

CME 307: Transport Phenomena

Stationary media, Conservation Laws: Laws of Fick, Fourier and Newton; unified principle of transport phenomena; steady and unsteady state conductive heat transfer, molecular mass transfer, molecular diffusion, radiative heat transfer, fluid fields, conservation of mass, momentum and energy, laminar and turbulent incompressible viscous fluids, convective mass transfer, compressible flow, convective heat transfer, simultaneous heat and mass transfer, multiphase phenomena, thermal analysis of heat exchangers, open channel flow, flow through permeable media.

CME 305: Chemical Engineering Laboratory I

To impart practical skills relevant for planning, executing and reporting experimentation and quality control activities in industry and for research purposes in chemical and related engineering domains.

EPR 398: Work Experience
Each student will carry out studies on an installed industrial process under the supervision of, at least, an industry-based staff and, at least, an academic staff. The subject of study will be mutually established by the collaborating industry and the university and the student will submit a report on his study for grading by both industrial and university supervisors.

CME 411: Process Design and Optimisation

Introduction to chemical process designs, Nature/organization/methodology, anatomy of chemical manufacturing processes and their designs, design variables and safety factors in designing chemical processes, Mathematical representation of design problems, design information flow, flow-sheeting, piping and instrumentation (the engineering flow-sheet) and applications in various chemical processes/industries, optimization (LP, experimental design).

CME 403: Chemical Process Modeling and Simulation
Process Modeling: formulation of microbalance using physio-chemical conservation laws, physical transport laws and equilibrium relations, application to chemical engineering system; process simulation: analog and digital languages, numerical instability, distributed systems, use in analysis of controller behaviour, selected examples; process identification: review of linearisation techniques, methods-pulse, step and sine-wave testing, etc.

CME 405: Biochemical Engineering
This course is aimed at introducing finalist in Chemical Engineering to biological systems and their applications in food, chemical and waste management applications. It presents concepts such as: The Cell, cell growth, cell kinetics , Biomolecules, Biochemical reactions, Biochemical reactors: BATCH, CSTR, FED-BATCH, EXTENDED FED BATCH, Biochemical processes for food production, biochemical, fine chemicals, wastewater treatment, Enzyme kinetics, Downstream and upstream processing, Bioreactor reactor design and operation.

CEE 407: Solid Waste and Wastewater Engineering

See CEE program

CME 404: Process Dynamics and Control
This course is aimed to introduce process dynamics & control and develop a general understanding of the subject. It presents concepts such as: the importance of dynamic effects; steady-state and non-steady state balances; review of solution of ODEs; the concept of models; the role of dynamic simulation; Laplace Transforms; transfer functions; parameters of transfer functions; transfer function block diagram algebra, typical linear systems responses, linear systems stability and analysis. Open loop dynamics; Closed loop elements; On/off control; PID control; Feedback control; Introduction to stability analysis (root locus); Basic feedback controller design; Introduction to frequency response analysis and its applications.

CME 406: Chemical Engineering Laboratory II
To impart practical skills relevant for planning, executing and reporting experimentation and quality control activities in industry and for research purposes in chemical and related engineering domains.

CME 498: Senior Year Project
As a partial fulfillment of the requirement for graduation, the student plans and develops a project in which he/she demonstrates the ability to analyze and synthesize information. He/she learns to effectively communicate the results of his/her study through an academic document as well as through a presentation.

CME 413: Food Process Technology
The course introduces students to the major arms of the food process industry. Brewery and dairy industries. It is aimed at ensuring an efficient translation of the knowledge in unit operations in specific food industries.

410: Chemical Process Industries
The course introduces students to two major arms of the chemical industry. Cement and petroleum industries. It is aimed at ensuring an efficient translation of the knowledge in unit operations in specific chemical process industries, identification of bottlenecks on chemical process plants and to understand process operability and enhance principle of safety in industrial processes.

Bachelor of Civil and Environmental Engineering (B.Sc. Eng. CEE Honors)

11.3.1 Program Overview
Civil and Environmental Engineering represents a very broad field and encompasses a variety of interrelated disciplines including: structural engineering, environmental engineering, hydraulics, transportation, water resources, geotechnical engineering, construction, surveying, waste management technology and engineering. Civil engineering evolved from civil works and today it is still dedicated to the needs and progress of humankind. Civil and Environmental engineers engage in the design and construction of facilities that we use every day such as: buildings, roadways, railroads, water supply pipe networks, drinking water treatment plants, solid waste landfills, wastewater treatment plants, bridges, tunnels, subways, canals and waterways, dams and reservoirs. They also analyze and solve problems of water, land and air pollution and oversee the operation of water supply systems, pollution control and hazardous waste control facilities. Civil and environmental engineers participate in city planning and in planning the uses of natural systems and other public areas within constraints to ensure safe and economically efficient outcome. Typically, environmental engineering is the planning, design, construction, operation, and maintenance of constructed facilities for the protection of human health and safety and the preservation of wildlife and the environment. It includes water supply and resources, environmental systems modeling, environmental chemistry, wastewater management, solid waste management, hazardous waste management and remediation, atmospheric systems and air pollution control, and environmental and occupational health. Graduates of civil and environmental engineering programs are found in engineering and administrative positions in industry, construction, research, government, and consulting firms.

The core courses offered in the department of Civil and Environmental Engineering are designed along the following core areas: construction core, structural core, geotechnical core, transportation core, hydrology and hydrodynamics, environmental core. Technical electives are also selected along from these core areas.

11.3.2 Program Objectives and Career Options
The Department of Civil and Environmental Engineering seeks to educate graduates whose education will be basis for professional and personal development after graduation. Graduates will be expected to apply their acquired knowledge in: i) engineering careers in the public and private

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING (CEE)

	CEE SOPHOMORE 2018-2019				
	First Semester		Second Semester		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
EMA 201	Engineering Maths III	4	EMA 202	Engineering Maths IV	4
MEE 203	Applied Mechanics	4	CEE 206	Geotechnical Engineering	4
CEE 205	Strength of Materials	4	CEE 208	Construction Materials	4
CEE 207	Engineering Geology	4	CEE 212	Hydrology	4
CEE 203	Architectural Principles	4	ENP 202	Entrepreneurial Project IV	2
EPR 399	Internship II	2			
ENP 201	Entrepreneurial Project III	2	SCS 202	Paths and Practice of Catholic Spirituality II	2
SCS 201	Paths and Practice of Catholic Spirituality I	2			2
TOTAL		24	TOTAL		22

	CEE JUNIOR 2018-2019				
	First Semester		Second Semester		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
CEE 303	Structural Engineering I (Concrete and steel)	4	EPR 398	Work Experience	16
CEE 305	Transportation Engineering	4			
CEE 331	Pre-stressed Concrete	4			
CEE 313	Environmental Engineering I	4			
ENP 301	Entrepreneurial Project V	2			
SCS 301	The Church and Culture	2			
TOTAL		20			

	CEE SENIOR 2018-2019				
	First Semester		Second Semester		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
CEE 403	Structural Engineering II(Timber/Masonry)	4	CEE 406	Advanced Structural Engineering	4
CEE 405	Construction Economics	4	CEE 410	Environmental Engineering II	4
CEE 411	Municipal Solid Waste and Wastewater Engineering	4	CEE 408	Foundation Engineering	4
ENP 401	Entrepreneurial Project VI	2	CEE 498	Senior Year Project	12
SCS 401	Sexuality in marriage I	2	SCS 402	Sexuality in Marriage II	2
TOTAL		16	TOTAL		26

GRAND TOTAL= 160

CEE SOPHOMORE YEAR - FIRST SEMESTER COURSES

EMA 201: Engineering Mathematics III (Numerical Methods)

CEE 203: Applied Mechanics

This course teaches the fundamental principles of mechanics relevant to Civil Engineering which underlie subsequent courses in Structural Analysis and Geotechnics. Typical topics include; Moment distribution method, influence lines, analysis of building frames under lateral load with the use of portal method and cantilever method; principles of virtual forces in trusses, beam and frames. Force and moment vectors, resultants; principles of statics and free-body diagrams; applications to simple trusses, frames, and machines with method of joint resolution and method of section; statistical determinacy – instability – degree of indeterminacy of beams, trusses and frames.

CEE 205: Strength of Materials

This course introduces engineering materials and concepts Stress-Strain Analysis: Stress and strain, transformations, principal stresses, and graphical representation by Mohr's circles of biaxial and triaxial cases, the concept of Elasticity and plasticity; Hookes law, and the behaviour of simple spring systems; definitions of normal stress, shearing stress, normal strain, shearing strain; shear force and bending moment diagrams; members subjected to axial loading; members subjected to torsional loading; generalized Hooke's law including thermal strains, equations of equilibrium and compatibility, plane strain and plane stress problems, Euler critical loads for columns. Energy Methods: Strain energy principles, Castigliano's theorem. Applications to cases of axial, bending, and torsional loadings and statically indeterminate problems.

CEE 207: Engineering Geology

In this course, emphasis is on the geologic materials and processes that shape our earth and environment how these materials and processes relate to our everyday lives. Topics include: global tectonics; earthquakes and other geologic hazards; glacial, river and coastal processes that form our landscapes; water, mineral and energy resources; and waste disposal and pollution. Typical examples of geological phenomena taught shall be drawn from Cameroon alongside other areas.

CEE SOPHOMORE YEAR - SECOND SEMESTER COURSES

CEE206: Geotechnical Engineering

In this course students are introduces to soils as engineering materials. Topics include: the main types of soils, their stress-strain behavior, strength characteristics and the use of these concepts, after appropriate development, in the field of lateral earth pressures, including the analysis of retaining walls.

CEE 208: Construction Materials

This course focuses on the fundamental properties of construction materials especially those used in civil engineering projects. Fundamental concepts of materials science and engineering are introduced and applied to materials commonly encountered in civil engineering construction, including Portland cement concrete, metals and alloys, ceramics, polymers and polymer composites, and other materials such as wood, asphalt concrete, and soils. However focus is on cement as a construction material - manufacture and properties of cements; properties of aggregates, fresh concrete, hardened concrete and methods of testing; durability of hardened concrete materials; structural behavior and movements of masonry; durability and non-structural properties of masonry; sustainability in civil engineering materials.

CEE 212: Hydrology and Hydraulics
Physical processes governing occurrence and distribution of precipitation, infiltration, evaporation, and surface water runoff. Statistical hydrology, unit hydrograph theory, and tershed modeling. Floodplain hydrology and open channel hydraulics. Urban hydrology, hydraulics and design of storm sewers, and design of detention structures for flood control. Future challenges.

CEE223: Software Applications in Civil Engineering (Engineering Drawing and CAD)
Course covers the discussion of available software related to construction engineering topics; knowledge based expert systems and their relevance to construction engineering planning and management.

CEE JUNIOR YEAR – FIRST SEMESTER COURSES

CEE 303: Structural Engineering I (Steel and concrete)
The main emphasis in this course is the design of steel structures and an understanding or their structural behavior. Topics include: general objectives for design of steel structures; Eurocode 3; loads on steel building frames; floor and cladding systems for steel framed buildings; plane frame design: fabrication, joints, lateral bracing, collapse mechanisms and analysis. Element design - classification of steel sections; design and basis of capacity checks for struts and ties, trusses, restrained and unrestrained beams, columns and axial column with moments (tension/compression/local building/LTB); connection design: shear, shear and torsion connections.
Design of Reinforced Concrete Elements; Introduction to reinforced concrete structures, types of slabs, beams and columns; Limit state design philosophy; Stress/strain properties for concrete and reinforcement; Design for flexure including moment curvature, ductility and redistribution of bending moments; Empirical methods for checking and Serviceability (ie cracking and deflection). Design of shear reinforcement; Design of columns for axial load and bending moment; Introduction to Safety, Stability and Robustness, Practical Design and the use of Codes of Practice.

CEE 305: Transportation Engineering
Introduction to basic concepts in transportation engineering including planning, design, and operations. Introduces the challenges and issues in modeling transportation problems. Studies of various concepts related to the design of highway facilities, level of service, and demand for transportation services. Concepts related to signal optimization. Policy implications. Basics of transportation planning.

CEE 331: Prestressed Concrete
This course is intended to give students a good understanding of the concepts and theory underlying the use of prestressed concrete, and the ability to analyze and design prestressed-concrete structures. The course will focus on statically determinate prestressed concrete beams, because these are commonly used in bridges and buildings. It may also cover the design of statically indeterminate (continuous) structures. Topics covered will include: basic concepts and applications; materials; flexural analysis. structures (plane and space trusses; beams and grids; plane and space frames) by the stiffness method, and also the flexibility method.

CEE 313: Environmental Engineering I
The application of basic principles and equations dealing with water, air, and solid and hazardous wastes; material and energy balances; and chemical and biochemical cycles. Topics include water resources, water quality and pollution, air quality and pollution, solid and hazardous wastes, and environmental legislation.

CEE SENIOR YEAR- FIRST SEMESTER COURSES

CEE 403: Structural Engineering II (Timber/Masonry)
This course, which is divided into two part – timber and masonry, is intended to cover the basic design of structural elements constructed of masonry and timber. The course seeks to introduce the nature and inherent characteristics of masonry in relation to BS 5628 leading to a practical design and detailing of masonry building structures. It is seeks to nature and inherent characteristics of timber in relation to requirement of structural Euro codes leading to a practical design and detailing of timber structural components.

CEE 405: Construction Economics
Construction Organizations: Formation of construction organization; organizational responsibilities to stakeholders; and construction project finance. Construction Project Appraisal: Cash flow; economics-based appraisal methods; and non-economics based appraisal methods. Feasibilty analysis, value added, economic value added, and the market value added on money earned and spend upon perceived economic utility. Understanding management view on financial statement. Financing cooperate ventures.

CEE 411: Municipal Solid Waste and Waterwaste Engineering
Classification of wastes, generation rates, avoidance, recycling potential; properties of wastes; objectives of waste logistics; systems and equipments for collection, transportation, storage; fundamentals of waste treatment and recycling technologies; landfill design; landfill operation; introduction to hazardous waste management; Legal aspects of SWM.

Classification of liquid emissions into the environment, generation rates, minimization and recycling potential; Legal and statutory fundamental instruments of water conservation; Properties of waste water; Sewage systems in residential and industrial areas; Basic technologies in waste water purification; Engineering design of waste water treatment systems; Process optimization, cost control.

CEE SENIOR YEAR- SECOND SEMESTER COURSES

CEE 406: Advanced Structural Engineering
This course mainly deals with matrix analysis of structures. In order to enhance students' understanding, the course will begin with a review of the basic concepts of structural analysis and matrix algebra, and students will be shown how the latter provides an excellent mathematical framework for the former. This is followed by detailed descriptions, and demonstrations through many examples, of how matrix methods can be applied to linear static analysis of skeletal

CEE408: Foundation Engineering

Analysis and design of foundations, bearing capacity and settlement of foundations; stability of excavations and slopes; ground movements due to construction; analysis and design of excavations, retaining walls, slopes and underground structures in soil and rock.

CEE 410: Environmental Engineering II
This course is intended to introduce the principles and aims of some of the main instruments and tools used in Environmental Management: Life Cycle Assessment (historical and present development of LCA as well as

driving forces), Environmental Auditing/Policy/Management System, Reporting etc, market-based Instruments(polluter pays principle, carrot and stick, etc), legal aspects.

.

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING (EIE)

11.4 Bachelor of Electrical and Computer Engineering (B.Sc. ECE Honours)

11.4.1 Program Description

It is unarguable that in this present age, Electronics and Electrical Engineering comprise a fundamental cornerstone to the economic and social prosperity of the world. Thus each society needs professionals in these fields either for production or operation of systems in these fields for human wellbeing. The Bachelor program in Electrical and Computer Engineering in UIDB prepares students for professional careers in the areas of Electrical, Electronics, Telecommunication, Internet, and Computer Engineering. The Chair of Electrical and Computer Engineering has as its long-term plan to offer four options under this program: Electrical and Electronic Engineering; Electronic and communications Engineering; Electronics and Computer Engineering. At the moment, for logistic, infrastructural and human resource reasons, the Chair offers only the first two options. Students in this Chair take similar courses in the first three years and in the senior year they take specialized courses in their options. Typical courses offered in this Chair include: digital and analogue electronics, electromagnetism, power engineering and analysis, electrical machines, signal processing, communications, microprocessor and radio, optical and digital communications, embedded computer systems and other electrical and electronics engineering subjects

11.4.2 Program Objectives and Career Options

The degree program in Electrical and Computer Engineering is aimed at helping students to develop a basic appreciation of engineering principles and to provide them with technical competences to meet up with the challenges in the rapidly expanding area of Electrical, Electronics, Telecommunication, Internet and Computer Engineering. Graduates from the Chair of Electrical and Computer Engineering have many opportunities for exciting careers, ranging from designers of telecommunication systems used in service industries such as the

ECE SOPHOMORE 2018-2019					
First Semester			**Second Semester**		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
EMA201	Engineering Maths III (Numerical Methods)	**4**	EMA202	Engineering Maths IV	**4**
ECE207	Eletronic Devices & Applications	**4**	ECE202	Digital Systems Design	**4**
ECE203	Fundamentals of Electrical Engineering	**4**	ECE206	Electrical Machines	**4**
ECE211	Signals and Systems Theory	**4**	ECE210	Measurement & Instrumentation	**4**
EPR 299	Internship I	**2**			
ENP201	Entrepreneural Project III	**2**	ENP202	Entrepreneural Project IV	**2**
SCS201	Paths and Practices to Catholic Spirituality I	**2**	SCS 202	Paths and Practices of Catholic Spirituality II	**2**
Total		**22**	EPR298	Internship II*	**2**
			Total		**22**

* Done during summer holiday for a period of two months.

ECE JUNIOR: 2018-2019					
First Semester			**Second Semester**		
Code	**Course Title**	**CV**			**CV**
ECE309	Control Systems	**4**	EPR398	Work Experience	16
ECE301	Miroprocessors & Microcontrollers	**4**	Total		
ECE303	Electrical Power Systems Analysis	**4**			
ECE307	Telecommunications Egineering I	**4**			
EPR 399	Internship II	**2**			
ENP301	Entrepreneural Project IV	**2**			
SCS 301	The Church and Culture	**2**			
Total		**20**			16

ECE SENIOR: 2018-2019					
First Semester			**Second Semester**		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
ECE 411	Telecommunications Egineering II	4	ECE402	Signal Processing	4
ECE 405	Integrated Circuit Design	4	ECE406	Electromagnetic Compatibility	4
ECE 421	Computer Aided Design in EE	4	ECE498	Senior Year Project (Bachelor Thesis)	12
ECE 413	Embedded Systems	4	ECE 404	Photovoltaic and Solar Technology	4
ENP 401	Entrepreneurial Project VI	2	SCS402	Sexuality in Marriage II	2
SCS401	Sexuality in Marriage	2			
Total		**20**			**26**

TOTAL CREDIT = 170
LIST OF ECE CORE ELECTIVES

CORE ELECTIVES – ELECTRICAL ENGINEERING							
Code	**Course Title**	**Status**	**L**	**T**	**P**	**S**	**Total**
ECE305	Electrical Power Systems Analysis and Design	E*	2	2	0	0	4
ECE 311	Power Electronics	E*	2	2	0	0	4
	Measurement Technology						4
ECE 401	Utilization and Conservation of Electrical Energy	E*	2	2	0	0	4
ECE 403	Practicals in Energy Engineering	E*	0	0	4	0	4

* Done during summer holiday for a period of two months.

ECE207: Electronic Devices & Applications

In this course, students will study the construction, theory and characteristics and applications of electronic devices. Topics include: PN junction devices; bipolar junction transistors; amplifiers; multistage and differential amplifiers; feedback amplifiers and oscillators.

ECE203 Fundamentals of Electrical Engineering

The course focuses on the creation, manipulation, transmission, and reception of information by electronic means. The topics covered include elementary signal theory; time- and frequency-domain analysis of signals; conversion of analog signals to a digital form; and how information can be represented with signals. Signal processing, both analog and digital, allow information to be extracted and manipulated. The course then turns to information theory, which demonstrates the technological advantages of digital transmission.
The course text was written by the instructor for this course and is entirely online. You can print your own hard copy or view the material entirely online.

ECE208: Signals and Systems Theory
This course stresses the appreciation and use of certain transform techniques in the analysis of signals, and their related systems. Emphasis is placed on Fourier methods within the context of continuous time signals and signal processing, and the use of linear difference equations and Z transforms when signals are discrete.

ECE202: **Digital Systems Design**

This course covers the design and analysis of digital systems with Combinational and Sequential logic: logic gates and families, flip-flops, counters, registers and other memory devices.
Topics include: number systems; logical expressions and simplification using Boolean algebra, basic minimization methods; combinational circuits; asynchronous and synchronous sequential circuits; memory devices; analog to digital (AD) and digital to analog (DA) conversion, Introduction to digital simulation techniques for development of application oriented logic circuits

ECE206: Electrical Machines
The main emphasis of this course is on the principles of electrical machines – DC and AC machines. Topics include: characteristics of DC machines and transformers; machine windings; DC machines/motors; theory, operation and performance of AC machines.

ECE210 Measurement & Instrumentation

The lecture teaches the basics of metrology and measurement technology and presents the fundamental procedures of error analysis and statistical data analysis. The methods of measurement for electric quantities in the DC and low frequency AC range are considered in the sub division: passive measurement techniques, active measurement techniques and digital measurement techniques. The methods are explained on practical examples. Finally, sensors are introduced in order to extend the electrical measurement technique to the measurement of non-electrical quantities.

The students are able:
• to describe measurement problems and questions within the correct terminology
• to choose the adequate methods to measure electric quantities in the DC and AC range and to consider critically systematic errors related to the measurement method
• to estimate the error of a measurement
• to perform a statistical data analysis
• to select simple sensors for the measurement of non-electrical quantities and to optimize their sensitivity

ECE301 Miroprocessors & Microcontrollers

The course begins with an overview of microcontroller-based systems, including applications, architecture, number systems, and languages. The main subjects covered in detail are: microcontroller hardware, CPU registers, internal/external RAM memory, internal/external ROM memory, I/O ports, timers and counters, serial ports, hardware interrupts, clock systems, A/D and D/A converters, connecting the microcontroller to external devices, LCD and LED displays, power devices, measurement of external analog signals and signal processing. Considerable attention is paid to C programming. Students will learn different capabilities of the microcontroller through in class exercises. By the end of this course, the student should be able to write code in C language, respond to input from the user (via buttons or keypad), perform basic binary arithmetic, perform table lookups, display output to the user (via LCD display, LEDs or PC display), control external devices, respond to internal and external interrupts, acquire and analyze analog signals in real-time.

ECE303 Electrical Power Systems Analysis
The course will help students understand how power systems are modeled both at the distribution and transmission levels. The course covers long-distance transmission of electric power with emphasis on admittance and impedance modeling of components and system, power-flow studies and calculations, symmetrical and unsymmetrical fault calculations, economic operation of large-scale generation and transmission systems. Emphasis is on applications of computer-based methods to power-system problems.

ECE 309: Control Systems
This course covers the concepts of linear systems theory and analysis. Topics include: mathematical models of physical systems; time response analysis and locus technique; frequency response analysis; stability concept and analysis; state variable analysis.

ECE 405: Integrated Circuit Design
The course covers: C fabrication technology: Lithography, diffusion, vapour deposition, ion implantation. Design rules. Yield. CMOS processes. Design methodology: Gate array, standard cell and full custom design. The design/simulate/test cycle. Programmable Logic Devices. CMOS design: CMOS gates and logic interconnection and layout. CMOS design problems and solutions. Other IC tecnologies: BiCMOS, GaAs, SiGe. CAD techniques: Layout languages and custom design software. Logic simulators and Circuit simulators. Hardware design and description languages. Verilog. VLSI architectures testing: Design for test. Concepts of testability. State of the art in IC design

ECE 413 Embedded Systems Design
Emphasis in this course in on embedded systems design and its applications to various fields. To covered include: embedded systems terminologies and devices; embedded software tools; design and architecture of memories; architecture of processor and memory organizations; input/output interfacing; processor scheduling algorithms; basics of Real time operating systems, introduction to PIC and its application.

ECE421 Electronic circuit development Lab

Design of amplifiers and other electronic systems to satisfy specifications: Bipolar and field-effect transistors, diodes integrated circuits and passive components are part of the hardware needed. Gain, bandwidth, feedback, stability are some of the design concepts needed.

ECE 402 Digital Signal Processing

Advances in integrated circuit technology have had a major impact on the technical areas to which digital signal processing techniques and hardware are being applied. A thorough understanding of digital signal processing

fundamentals and techniques is essential for anyone whose work is concerned with signal processing applications.

Digital Signal Processing begins with a discussion of the analysis and representation of discrete-time signal systems, including discrete-time convolution, difference equations, the z-transform, and the discrete-time Fourier transform. Emphasis is placed on the similarities and distinctions between discrete-time. The course proceeds to cover digital network and no recursive (finite impulse response) digital filters. Digital Signal Processing concludes with digital filter design and a discussion of the fast Fourier transform algorithm for computation of the discrete Fourier transform.

ECE 404: **Photovoltaic and Solar Technology**

Properties of solar radiation: Sun and earth; incidence on horizontal earth surface, calculation of radiation on suitable surfaces, measurement of incident radiation. Solar panels and solar generators: solar cells, interconnection of solar panels, connection of solar panels with solar generators, construction of solar generators. Photovoltaic energy construction: photovoltaic island construction, mains connected photovoltaic system, electrical power converter for photovoltaic systems. Dimensioning of photovoltaic systems, thermal solar systems (solar collectors, components of thermal solar systems, cost effectiveness in private homes), Thermal solar station: properties and state of technology.

ECE 406 Electromagnetic Compatibility

As digital circuits continue to be produced at increasingly smaller size and with higher speeds, electromagnetic interference become much severer in a digital system. Therefore, the need for effective electromagnetic compatibility (EMC) design has become more critical than ever. In order to avoid unnecessary costs in bringing products into compliance with governmental regulations, many solutions are proposed to improve the interference of systems. In this course, basic concept and design method for a digital system will be illustrated elaborately.
Topics include: Fundamental Behavior of Electrical Systems; Signals and Spectra; General Formulation of Electric Circuit Theory; Non-Ideal Behavior of Circuit Components; Antennas; AM, FM, and the Spectrum Analyzer; EMC Regulations; Radiated Emissions; Radiated Immunity; Conducted Emissions and Immunity; Network Analysis and Directional Couplers; Cabling; Shielding; Printed Circuit Boards; Electrostatic Discharge

Bachelor of Science in Mechanical Engineering (B.Sc. MEE Honours)

11.5.1 Program Description
The B.Eng. Mech. Eng. degree program in CUIB is built on the four major areas of mechanical engineering which are: Design and Manufacturing, Mechanics and Materials, Dynamics and Controls, and Thermal Sciences. Thus typical courses offered in the program include: heat transfer, mechanics of machines, stress analysis, fluid mechanics, energy, controls, dynamics, vibrations and acoustics, communications, electronics, production/operations management and materials science.

11.5.2 Program objective and Career Options
This B.Eng. degree program Mechanical Engineering prepares professional engineers for successful careers in mechanical engineering with emphasis on the design of physical or mechanical systems, application of computers to machines, advances in materials technology and process development.
Mechanical engineers concern themselves most often with design of machines and processes. In so doing, they use the principles of mechanics and energy. Areas of work for mechanical engineers include: manufacturing,

automotive, engine design, building systems, material science, mining, oil refining, biomechanics, air quality control/pollution control processes. They may also specialize in aerospace design and technology

MEE SOPHOMORE 2018-2019					
First Semester			**Second Semester**		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
EMA 201	Engineering Mathematics III	4	EMA 202	Engineering Mathematics IV	4
MEE 203	Applied Mechanics	4	MEE 204	Mechanical Design I	4
MEE 201	Manufacturing Processes	4	MEE 210	Mechanical Vibrations	4
MEE 205	Engineering Drawing and CAD	4	MEE 204	Strength of Materials	4
EPR 299	Internship I	2	ENP202	Entrepreneurial Project IV	2
EPR202	Methodology of Scientific Research	**4**	SCS202	Paths and Practices of Catholic Spirituality I	2
ENP 201	Entrepreneurial Project III	2	TOTAL		20
SCS 201	Paths and Practices of Catholic Studies I	2			
EPR 297	Engineering Innovation[4]	4			
TOTAL		30			

[4] this is an open course. All the students are grouped and given projects that they shall do for 6 months to enhance the engi-preneurship.

[3] It is done during the summer holidays for a period of one-two month. And the results are sent to the first semester of the next academic year.

	MEE JUNIOR 2018-2019				
	First Semester		**Second Semester**		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
MEE 301	Electrical Technology	4	EPR 398	Work Experience	16
MEE 303	Systems Dynamics and Control	4			
MEE 307	Mechanical Design II	4			
MEE 305	Fluid Mechanics II	4			
EPR 399	Internship II[3]	2			
	Departmental Elective	4			
ENP 301	Entrepreneurship Project V	2			
SCS 301	The Church and Culture	2			
TOTAL		22			

	MEE SENIOR 2018-2019				
	First Semester		Second Semester		
Code	**Course Title**	**CV**	**Code**	**Course Title**	**CV**
MEE 401	Thermodynamics	4	MEE 404	Power Electronics	4
	Departmental Elective	4		Departmental Elective	4
MEE 402	Heat Transfer	4	ECE 498	Senior Year Project	12
ENP 401	Entrepreneurial Project VI	2	ENP 402	Entrepreneurial Project VI	2
SCS 401	Sexuality in Marriage I	2	SCS 402	Sexuality in Marriage II	6
TOTAL		20	TOTAL		28

[3] It is done during the summer holidays for a period of one-two month. And the results are sent to the first semester of the next academic year.

EMA 201: Engineering Mathematics III (Numerical Methods)

This course provides a physical a practical foundation for the use of numerical methods to solve engineering problems. The topics studied in this course are error estimation, Taylor series, solution of linear algebraic equations, interpolation, linear regression, numerical integration and differentiation, initial value and boundary value problems, finite difference methods for parabolic and elliptic partial differential equations. Personal computers are extensively used in this course, and the student is expected to program the numerical analysis techniques studied. In this class, the MATLAB is used to write programs and solve problems involving the topics mentioned above.

MEE 201: Manufacturing Processes

Use of measuring (Basic concepts : Definition of terms, calibration, standards, generalized measurement systems, static and dynamic performance characteristics; Analysis of experimental data; Instrumentation for measurement of position and displacement, force, pressure, velocity, temperature, proximity and range. Concept of feedback; Open and closed loop control systems, Transducers and devices for engineering applications, digital readouts, data acquisition and processing. Metrology: Standards, Slip gauges, Measurement of angles, tapers, threads, coordinates, inspection of straightness, flatness, alignment and surface finish, Gear Measurements, Measurements of various product features using Mechanical, Pneumatic, Optical and Electronic Instruments, Interferometry and use of optical flats.) and layout tools, interpretation of blueprints and drawings, identification of engineering materials. Operation of machine tools, including calculation of machining parameters; Modern Machining; Operation of gas and MIG welding equipment; Laboratory experiments and written reports are required.

MEE 203: Applied Mechanics

This course provides a comprehensive knowledge and insight into the study of Mechanics. Topics to be covered include: Statics: equilibrium; internal and external forces, Analysis of Structures. Friction. Centroid and Center of Gravity. Mass Moment of Inertia. Kinematics, particle dynamics, (application of Newton's Laws); impulse and momentum, work, energy and power. Rigid body dynamics.

MEE 205: Engineering Drawing and CAD

Introduction to engineering drawing, Concept of lines, Orthographic Projection, Projection of points, Projection of lines, Solids of revolution, Introduction to AutoCAD/Solid edge, Drawing of 2D figures and 3D modeling, assembly & drawing using solid works.

EPR 297: Engineering Innovation

Organization, planning, economics, and the use of creativity and optimization in solving mechanical design problems. Design and/or construction of engineering problems.

EMA 202: Engineering Mathematics III (Probability and Statistics)

This course covers the role of statistics in engineering, probability, discrete random variables and probability distributions, continuous random variables and probability distributions, joint probability distributions, random sampling and data description, point estimation of parameters, statistical intervals for a single sample, and tests of hypotheses for a single sample.

MEE 202: Mechanical Design I

Design of gears – Spur, Helical, Bevel and Worm gears – Design of multistage speed reducers. Design of shafts, keys, couplings, journal bearings – Selection of rolling element bearings – Design of pin, iveted and welded joints – Screw fasteners – Power screws. Design of IC engine parts: Design of piston - Connecting rod - Crankshafts – Flywheels. Design of Springs: Helical springs –Compression and tension – Leaf springs.

MEE 204: Strength of Materials

This course introduces engineering materials and concepts Stress-Strain Analysis: Stress and strain, transformations, principal stresses, and graphical representation by Mohr's circles of biaxial and triaxial cases, the concept of Elasticity and plasticity; Hookes law, and the behaviour of simple spring systems; definitions of normal stress, shearing stress, normal strain, shearing strain; shear force and bending moment diagrams; members subjected to axial loading; members subjected to torsional loading; generalized Hooke's law including thermal strains, equations of equilibrium and compatibility, plane strain and plane stress problems, Euler critical loads for columns. Energy Methods: Strain energy principles, Castigliano's theorem. Applications to cases of axial, bending, and torsional loadings and statically indeterminate problems. Laboratory experiments and written reports are required

MEE 210: Mechanical Vibrations

Explores continued development of problem-solving ability in dynamics, free and forced vibration of undamped and damped one and multiple-degree-of-freedom systems. Topics includes viscous and non-viscous damping, support motion, rotational unbalance, vibration isolation, vibration measuring instruments, general periodic excitation, and general excitation using numerical methods. Laboratory experiments and written reports are required.

MEE 301: Electrical Technology

Introduces the basic concepts related to circuits and circuit elements; current, voltage, and power; models for resistors, capacitors, and inductors; and circuit analysis using Kirchhoff's laws. Discusses selected topics that illustrate a variety of applications of electrical engineering, such as AC circuits and electric power, the basics of semiconductor devices with applications to transistor amplifier models, transients in circuits with energy

storage, mechanical controls and mechatronics, digital signals, logic circuits, and some basic concepts of computer operations, specifically, number coding, arithmetic operations, and memory circuits.

MEE 303: System Dynamics and Control

Introduction to modeling, analysis, and control of dynamic systems. Modeling of mechanical, electrical, and electromechanical systems. Time-domain and Laplace-Transform solutions. Block diagrams and transfer functions. Analysis and design of feedback control systems. Control system representation and characteristics. System performance specifications. Absolute stability criteria. Root-Locus and frequency response analysis and design methods. Systems compensation and controller design.

MEE 305: Fluid Mechanics II

Viscous Flow and Boundary Layer Theory: Introduction to Navier-Stokes Equations; Boundary-layer equations; Momentum integral estimates; Laminar flat plate boundary layer –Blasius equation; Displacement and momentum thickness; Boundary layers with pressure gradient; Flow separation; Turbulent flat plate boundary layers. Compressible Flow: The speed of sound; Adiabatic and isentropic steady flow - Mach-number relations, Isentropic flow with area changes; Normal-shock wave - Rankine-Huguenot relations; Mach waves, oblique shock wave, Prandtl Meyer expansion waves; Performance of nozzles; Fanon and Rayleigh flow. Turbomachines: Euler-equation for turbo-machines; Impulse turbine- Pelton wheel; Reaction turbine- Francis turbine, propeller turbine; Centrifugal pump; Performance parameters and characteristics of pumps and turbines; Cavitation; Net positive suction head (NPSH); Role of dimensional analysis and similitude; Positive displacement pumps.

MEE 307: Mechanical Design II

Failure analysis and design of machine components: topics includes : Stress review; Stress analysis; Static failure theory; Fatigue failure (fully reversed and fluctuating loads); Dynamic shaft design; Gears; Springs; Bearings.

EPR398: Junior Year Project

Each student will be assigned any of the following project/thesis work:
(a) Industrial case study
(b) Preparation of a feasibility report
(c) Thesis by experimental research, and
(d) Design and development of equipment.
Each report must contain student's own analysis or design presented in the approved format.
Session marks will include
(a) Evaluation of the student's progress,
(b) Degree of involvement and participation,
(c) Merit of the project,

SENIOR YEAR

MEE 401: Thermodynamics

Available and reversible work, machine and cycle processes; real gas behavior; nonreactive gas mixtures; reactive mixtures; and thermodynamics of compressible fluid flow. Laboratory experiments and written reports are required.

MEE 402: Heat Transfer

A treatment of conductive, convective, and radiative energy transfer using control volume and differential analysis and prediction of transport properties, Heat exchanger; Laboratory experiments and written reports are required.

MEE 404: Power Electronics

An introduction to switched-mode dc-dc converters: the course treats basic circuit operation, including steady-state converter modeling and analysis, switch realization, discontinuous conduction mode, and transformer-isolated converters. Laboratory experiments and written reports are required.

EPR498: Senior Year Project

Part I of the two-semester capstone design project sequence. Senior students select a project with multiple realistic constraints, develop the necessary technical background, and write a proposal, progress reports, and a preliminary design report. Includes an oral presentation on the development and progress of the project.
Part II Students complete the project design, incorporating engineering standards, build and test a prototype, write a mid-term report and a final design report, and give an oral presentation

Departmental Electives

MEE 403: Maintenance Engineering

This course introduces the concepts and utilization of maintenance as applicable to industrial and service systems. The course also covers types of maintenances systems, maintenances activities, and performance measurement for maintenance system improvement.

MEE 405: Quality Control

Quality is one of the key competitive advantages in many enterprises. It is a powerful strategic business weapon in highly competitive markets. This course introduces the basic concepts of quality control as well as the need to use statistical analysis in quality control and improvement. Advanced quality control techniques and various sampling techniques for quality inspection are also covered.

MEE 407: Automation

This course introduces students to the concepts and components that constitute an industrial automation system in manufacturing. The basic knowledge on tools and methods used for realization, analysis and assessment of automation systems are also covered.

MEE 407: Refrigeration and Air-Conditioning

Psychrometry; Heating- and cooling-load calculations; Air-conditioning systems; Fan and duct systems; Pumps and pumping; Cooling and dehumidifying coils; Air-conditioning controls; Vapour-compression cycles; Compressors; Condensers and evaporators; Expansion devices; Vapour-compression-system analysis; Refrigerants; Multipressure systems; Absorption refrigeration; Heat pumps; Cooling towers and evaporative condensers.

MEE 406: Fundamentals of Renewable Energy
An examination of the fundamentals and the impact of renewable energy technology, including wind, solar, hydroelectricity, and alternate fuels

GUIDELINES

Registration of Students

Registration

- Admitted students must pay at least 75% of the total fees before registration for First Semester Courses or take an engagement for a differ payment with the University. Furthermore, students must complete their fee before registration of second semester courses.
- Students on scholarship must present a duly signed letter by the Provost indicating the terms of the scholarship or take an engagement with the University's Finance Division.
- Upon presentation of Non-cash receipt at the Secretariat from Finance Division, students are given four Form A2.
- Students are expected to present their non-cash receipts at the Centre for Information and Technology Services (CITS), where a code will be issued to them for online registration of courses.
- After reception of their codes, students should login to the Online Course Registration (OCR) website to register their courses and submit their A2 Forms for approval.
- Upon approval of the A2 forms, students are expected to print 4 copies and submit at the office of the Dean. (*Note:* Students are reminded to print the **"UNDERTAKING"** at the back of their A2 Forms)
- Each student will be given a stamped copy of form A2 signed by the Dean, while the other three copies would be retained by SENG for administrative use.
- Students who do not register on or before the registration deadline (2 weeks after the start of Semester) will pay a Late Registration Fee to be determined by the University Authority.

Fee Engagement

- Students who are unable to respect deadlines for fee payment are advised to take an engagement with the University's Finance Division, with the concern and approval of a parent or sponsor of the student. More information on fee engagement and finance related issues can be found on the Office of Finance webpage at www.cuib-cameroon.org

Student Commitment

- All Student of SENG MUST sign a commitment form to abide to all CUIB rules and regulations and also to validate all courses offered in their specialization with at least a "C" grade (all University requirements inclusive) before requesting for an Academic Transcripts and/or Attestation of Completion of Studies.
- All SENG freshmen are required to attend the university wide orientation program
- All SENG students are requested to attend the SENG orientation program at the start of the Academic year.
- All freshmen are allowed to register only after they present a non-Cash receipts with an amount set by the university.
- All returning students are required to present Non-cash receipt with the set amount and all up till date result slip for the previous Semester.
- All registration at SENG will be done online in partnership with the CITS for support.
- All approved course registration form (Form A2) will be printed by the student and three copies will be at the SENG Secretariat for approval by the Dean.

Course Evaluation and Validation

- Line of communication for each course is as follows: Course Delegate, Course Master, Program Supervisor, Administrative Assistant, Vice Dean and the Dean.
- Students who do not attend 75 % of lectures will not be allowed to sit in for Semester Exams.
- At SENG, the minimum Grade for a student to validate a course is a "**C**".

Transfer from one Department to another or change of School/College

- Students are expected to apply for change of Department/College not later than one month from the Reopening Date of the First Semester of the academic year.

Withdrawal from SENG

- Students wishing to withdraw for any reason must do so in writing to the Provost through the Dean.
- Students can as well suspend a semester upon expressing in writing to the Provost through the Dean.

Dismissal from SENG

- Students with unacceptable behaviors such as stealing, severe disrespect of Authority, disrespect for the University's flagship traditions, rape or indulging in any activity which tarnishes the reputation (image) of the University will be advised to withdraw from the University.

Absence from Continuous Assessment

- Any student who stays away from Continuous Assessment will be scored a zero. However, if a student fails to take a CA for health reasons, then a catchup CA will be given to the student upon presentation of a valid medical report signed by the CUIB Medical Department.

Examination (Correction of CA Marks, Malpractice)

- Any student having problems with CA marks is required to present the original script to the Faculty concerned who will then make the necessary corrections and submit to Exams and Records.
- Student involved in Examination malpractice will be scored zero in the course concerned or might be suspended depending on the gravity of the offence.

Working Hours

- Work in SENG begins at 8:00 a.m. each day from Mondays to Fridays and continues till 4:00 p.m. with a one hour break which runs from 12:30pm to 1:30pm for all Faculty and staff members.
- Consult the offices for Faculty contact hours (lectures).

Health and Safety

- The University gives special considerations to students with physical disabilities. However, all such cases should be reported to the Dean, who will then channel them to the appropriate quarters.
- Faculty, staff and students with minor health issues can consult a medical practitioner at the University's Health Unit.
- Access to the Laboratories is usually prohibited to students, except under the supervision of an attendant or a competent authority

General

- The University's professional dressing day is Monday. While Wednesdays are set aside as Corporate Dressing day. These days must be strictly respected by Faculty, Staff and Students of SENG otherwise they will not be allowed access into the University Campuses (Molyko and Wokaka)

Industrial Placement

- All students admitted into SENG will be expected to carry out a minimum of eight (8) weeks industrial placement in any accredited organization/enterprise related to their specialized programme and submit an evaluation form alongside an attestation of service all duly signed and sealed by the field supervisor from the accredited organization or institution.
- Students are advised to propose at least three industries, institutions or organizations where they intern to carry out their industrial placements and communicate this information to SENG no later than five months in advance for necessary preparations to be done.

Research Project/ Defense

- The industrial placement as described above will be preceded by a case study or research project which will be supervised by a competent academic Supervisor, assigned to the student by SENG and approved by the Provost.
  The Supervisor **MUST** supervise the research project at least THREE times before the date of submission and give a writing report to the SENG Secretariat and copy to the student.
- Upon completion of the research project, students will submit four copies of their dissertation (report) at least two weeks in advance preceding to the date of their defense.
- All Students **MUST** prepare a PowerPoint presentation of their Dissertation (report) and present/defend in front of a Jury.
- **Students who will fail to submit their dissertation within the designated deadline will not defend and will not sit for the Graduation exams as this in an important part of the exams.**

FORMAT FOR THE REPORT/PROJECT WRITING

Cover page

DECLARATION – declaring originality of the work (declare that this is my original work and has never been presented for any academic award in any university). For example

I, Njie Clinton hereby declare that this project is a record of my own efforts and has not been presented before for any academic function. All borrowed ideas have being given proper acknowledgement by means of references and quotations.

Student

Njie Clinton SIGN_____

The declaration is confirmed by

Supervisor,

Name SIGN_____

- A place for, Field Supervisor and Dean to sign

DEDICATION – you dedicate to a particular person (one person - indicate the person name), **do not dedicate to God (that's a common mistake).** For example

This research project is dedicated to my parents Mr. AND Mrs. ……..

CERTIFICATION – The University is giving the authorization or approval of the work you have done. For example

This is to certify that Njie Clinton of the department of Civil and Environmental Engineering, CUIB is the author of this piece of work which is a prerequisite for the award of a Bachelor in Science Degree

SIGN_____ DATE_____

(Name of supervisor)

It has been read and approved as meeting the requirement of Civil and Environmental Engineering upon an award of a Bachelor in Science Degree.

SIGN_____ DATE_____

(Name of Dean of SENG)

- A place for academic supervisor, Field Supervisor and Dean to sign

ACKNOWLEDGEMENT – expressing your gratitude to your loved ones and people who assisted you through your work. **Start by appreciating your supervisor**

ABSTRACT – brief summary of what the research is all about (2 paragraphs max)

TABLE OF CONTENTS

CHAPTERS

REFERENCES

APPENDIX

LIST OF FIGURES

LIST OF GRAPHS

LIST OF TABLES

TABLE OF CONTENTS

CHAPTER ONE- GENERAL INTRODUCTION / BACKGROUND OF THE STUDY

1.1 Background of the Study

- History leading to the topic
- How did the student come about the topic
- Transition from the general to the specific topic

1.2 Problem Statement

- Highlighting the issues surrounding the topic
- What particular problems will be researched under the topic
- e.g. a significant drop in company sales

1.3 Research Questions

- Formulations of questions whose answers will enable the student solve the problem mentioned in 1.2. e.g. Why are the sales of product xxx dropping?
- A maximum of 4 fundamental questions should be stated
- Research questions must be numbered

1.4 Objective of the Study

- Primary Objectives and - Secondary Objectives

- What the student intends to achieve in carrying out the project
- Must be numbered for easy referencing
- A maximum of 4 study objectives should be stated
- In most cases should stem from research questions
- Should start with "To"

E.g. to find out what has caused the fall in the demand for product xxx

1.5 Scope of Study

- The scope is geographical (the geographical area in which the study or research takes place) and contextual (given the broad topic), it refers to the specific area of research on which the student intends to carry out further research.

1.6 Significance of Study

- The importance of the study in solving the problems raised in 1.2
- What it will contribute to society – what added value in academics does this study have?

1.7 Limitations of Study

- Obstacles encountered while carrying out the research – setting aside personal difficulties.

CHAPTER TWO – Literature Review

2.1 Definition of Key Words

- Should not be mistaken for the list of abbreviations
- Technical terms that are particular to the research area
- Should be presented in a list form – each term should be stated and defined

2.2 Theoretical Literature

- Theories related to the topic, which have been learned in class including recent theories relating to the topic

2.3 Conceptual Literature – Discussions of concepts

2.4 Empirical Literature

- Previous and recent research, papers, seminars, studies, and publications relevant to the topic of research

CHAPTER THREE - RESEARCH METHODOLOGY

3.1 Area of Study (Case-Study – General Background)

3.1.1 History of Company

3.1.2 Organigram – Organizational Structure

3.1.3 Functions in the Company

3.1.4 Products and Services

3.1.5 Activities performed in the Company

3.2 Research Survey / Design – (Qualitative and Quantitative Research)

- Here the student chooses and justifies the method used in carrying out the research – exploratory, survey etc.

3.3 Sources of Data

- Explain where the data is coming from?
- Sources include both primary and secondary sources
- Research Sample, size, sample methods

3.4 Methods of Data Collection

- Detailed information on how the data was collected (questionnaire, observation and interview etc.)

3.5 Analysis Method / Methods for Data Analysis

- Discuss how the data will be presented and analyzed in chapter 4
- Can be presented using descriptive statistics - tables, charts, graphs, percentages etc.
- Students should only state the methods they will use to analyses

CHAPTER FOUR- DATA ANALYSIS

4.1 Data Presentation and Result Analysis

- Data is presented and analyzed using the methods stated in chapter 3.4
- the descriptive and frequencies statistics of the research findings

4.2 Discussion of Results or Data interpretation

- Interpretation means giving meaning to the analysis
- Obtaining information from data, which can help in a decision making process
- Based on the research, what does the analysis represent?
- It must be in line with the research objectives and should be answering the research questions

CHAPTER FIVE - CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS

5.1 Summary of Research Findings

- Presentation of the major findings in point forms
- Gives a better focus to tackle the next chapter

- Must be answering the research questions
- Must be numbered for referencing

5.2 Conclusion

- Major and minor conclusions that can be drawn from the research
- A general overview of the study/project in terms of the outcomes i.e. what can be deduced from the study?

5.3 Recommendation

- Proposed solutions to the problems identified in the study
- The way forward following the findings identified in Chapter 4
- NB: Recommendations MUST be in line with the findings

References

In this part all sources of information quoted directly or indirectly in the text **MUST** be listed in alphabetical order. There are a number of ways of doing this, but the most commonly accepted method is the American Psychological Association (APA) system and the Harvard Style. Basically, after the citation in the text, all items are listed in alphabetical order of author's surname. The reference should have the following format: Name(s) of Author(s), Year of Publication, Book Title, Edition, Place of Publication: Name of Publication House.

Example:

Sama, V., & Bansah, A.E (2014). Success in Higher Education. 2nd Edition. Buea: Presprint Limbe

See more examples in your notes

Note!!

Get friends to read your work

Writing is creative and exciting, but checking our work is not. The importance of getting someone else to read through your material cannot be over-emphasized. Your project tutor should not be the first person who reads your report, even in its draft form.

Style

The Supervisor will read only soft copies and kindly email him all what you have done through email. Please write properly and avoid typing/grammatical errors. Make sure you read through your work properly before emailing to the Supervisor.

- Everything typed should be 12 pt. *"Times Roman"* with 1" margins, top, bottom, left and right.

- Use full justification and double space between paragraphs -Title at the top in all caps.
- Initial pages (contents, abstract, etc., and appendices) should be in Roman numerals (I, II, III, IV, V…..). All page numbers should be placed at the bottom center of the page.
- Begin your paragraphs at the margin
- All your chapters should have a heading and they should all have an introduction explaining what the chapter is all about
- Each chapter should be sectioned into subsections, and the subsections numbered and given a title. For example, section eight in Chapter 2 would appear as: 2.8 The Value of the Audit.
- Clearly indicate your Research Title at the begin of your research
- Use 1.5 single line spaces
- Dissertation Title: Bold, Capitals, 18 point
- Chapter Titles: Bold, Capitals, 14 point
- Sub-headings: Bold, Initial Capitals, 12 point
- The dissertation may be printed on one side of the paper. A4-sized paper of good quality should be used

Figures and Tables:

Figures and tables should be included in the main text and referred to by the chapter number. For example, referring to a Pie chart, the fourth figure in Chapter 3 might be referred to as Figure 3.4. After the figure, a caption should appear, that is Figure 3.4 - Pie Chart. A similar presenting style is followed with tables.

Citing Literature (Reference)

You must reference all the literature which you discuss in the dissertation. You should use the Harvard referencing system or APA style of referencing. The reason for this is that others can refer to your sources; so it must be traceable.

For web information/literature reference, present this as:

Guerra A.S., Laitana R.F. and Pimpinella M., (1996), Characteristics of the Absorbed Dose to Water Standard. http://www.iop.org/EJ/abstract. (Accessed 17 July 1998)

Note that authors with two or more publications in a year would appear, for example, Smith, (1996a) and then for the other publication Smith (1996b).

Diagrams, charts and tables should be titled and numbered relevant to the chapter in which they appear. That is, diagram 3.2 is the second diagram in Chapter 3. All illustrations (diagrams, charts, tables) should appear on or close to the text page in which they are discussed. They should not be confined to an appendix. Appendices should only be used for items such as questionnaires, essential extracts, substantial computer output and other data tables which are too detailed for the body of the text. You are not allowed to use a photocopy of an illustration from an original source without copyright permission

References

The references in the dissertation should be referred by name and date in the text and listed alphabetically in the bibliography at the end.

For example the following statement: This finding is supported by Smith (1990) and Jack (1987) would appear in the bibliography as:

Jack, B. 1987, Quality Improvement, Wiley, Chichester.

Hence, for a book, the reference style is as follows: author's name, date, title, publisher, where published.

For a journal reference, the layout is: name, date, title of article, title of journal, volume number, part number and inclusive page numbers. For example:

Smith, V.T. 1990 'Improving Quality', International Journal of Quality Improvement, 6, 2, 10–21.

Binding

It is important that the front and back cover of the dissertation should be resilient to fading and bending.

Hope this notes has given you some key ideas in what a dissertation should contain and how it should be presented. As stated earlier, every student is different in terms of writing style and approach, but although your project may not look exactly as described in this chapter it should not look very different.

SENIOR PROJECT GUIDE

Introduction

The senior project is undertaken in the School of Engineering as a partial requirement in fulfillment of the minimum requirements to graduate. This guide is an indispensable tool for Senior Year students who must carry out a project, present and defend a write-up of the project to a panel and jury of approved competence. The project could either be research-based or a developmental project that focuses on answering questions and or offering potential solutions to significant problems encountered by our stakeholders in their work environment. These stakeholders are primarily companies that engage in different engineering activities, various members of our local community who make use of engineering appliances in different economic activities.

This guide addresses issues such as:

- Procedures that will enable success in the execution of the senior project.

- What constitutes plagiarism.
- How students should work with their advisers and supervisors as well as their interaction with the review board.
- What should go into the write-up.
- How students should plan their presentation and defense.

Getting Started

Where to start is usually the biggest hurdle and most students think it is all about the write-up and defense. The biggest obstacle lies in the fact that students wait until their senior year to identify what they want for their senior project. That should not be the case. It is important to start the thinking process early enough. The second semester of the sophomore year is a good time. Ask other people what they think about your project. Remember that the project's community impact is vital. So talk to people outside the university.

Identifying and creating a rapport with your supervisors and advisers is the next big step. Keep sentiments aside. Choose supervisors who are working in the same topic/area of interest. However, the School may reserve the right to assign supervisor(s) to students as the case may be. It is possible to have multiple supervisors for your project but more than three will be considered an excess. Your advisers should be people who are interested in the work you are doing. Preferably members of the community/group of persons your project intends to impact. In the engineering field there is the possibility of students doing a group project. And in such a case, no more than four persons can comprise a group.

Keep a journal with multiple backups of everything related to your project. It is common for students to wake up on the morning of the defense and complain about data loss. Document every reference cited, modifications, tentative results, drafts, etc as soon as they are made, failure to do so you might not remember them later on. You may think you have a lot of time left but truly time flies.

The final step of the thinking phase is to complete and sign the project proposal which must be signed and approved by at least one of the supervisors as well as the departmental Chair. This must be done at least four months before the defense date.

The Write-up

It is important to maintain some uniformity in the Senior Project write-ups within the School of Engineering. In this regard, the general guidelines for the write-up are as follows:

Acceptable page range: for single project, 25 – 45 pages for the main text only (i.e. excluding Roman numeral (preliminary) pages and pages for appendices). For group projects, 50 – 75 pages for the main text only (i.e. excluding Roman numeral pages and pages for appendices)

Margins: 1.5 inches on the left, top and bottom. 1 inch on the right
Font Size: for chapter headings – 16 and bold; for major sections within chapters – 14 and bold, for any other sub-divisions within chapters – 12 and bold; for normal body text either 11 or 12 and not bold. Italics may be used as need be.

Font Style: the use of bold, italics and underlie goes with need especially for emphasis. Avoid committing "fallacy of emphasis" whereby for example, you have a text bold, itlalicised and underlined! Be moderate and modest. Remember you are trying to be professional as required by journal publishers.

Font Type – either Arial or Times New Romans

Lines Spacing: 1.5 spacing for normal body text. Add space between major title and normal text

Paragraph Indentation: you may choose to either indent or not. In the case of the former use 0.75 inches. In the case of the latter you add space between paragraphs.

Order of Materials: Title Page, Dedication page, Certification/declaration Page, Acknowledgements, Abstract, List of Figures, List of Tables, List of Plates, List of Abbreviations, Table of Content, The Main Text, References, Appendix.

Preliminary Pages: These include all pages before the main text i.e. before chapter one.

Page Numbering: Should be chronological at the bottom right corner of the page. Preliminary pages are numbered with lower case roman numerals. There are no page numbers on the Title, Signature and Acknowledgements pages but they are assumed to be i, ii, iii.

Abstract: Abstract should be between 150 and 250 words. It provides a summary of the overall study stating the purpose of the study, the methods used, results description and a short abstract conclusion.

Project write-up Structure: Chapter One is usually the introduction which should be 5 – 7 pages. It gives the background and setting needed to put the problem into proper context and justifies the need for the study. It equally provides a statement of the relevant assumptions made if any and logically lead to a clear statement of the problem, followed by the purpose of the study / project as well as the objectives that will be pursued.

Chapter Two reviews, in about 4 – 6 pages, the relevant and related studies / projects done by others, presenting their objectives, theories, methodology and results. Comparisons should be made to what your own project is all about to highlight, in strong terms, the uniqueness of your project.

In about 9 – 15 pages, Chapter Three describes your procedures and methodologies presenting conceptual models in the various phases of the project / study. This chapter also includes the project / research design, instrumentation, data collection, data analysis, etc. Students are advised to collaborate closely with their supervisors in writing this chapter.

In the subsequent Chapters after Chapter Three, all the results and findings of your study are presented. It is a matter of choice and agreement between student and supervisor/advisor to decide how many chapters may comprise this section. It includes the facts found / impressions and opinions on the impact of the project in the context of its application.

The last Chapter, conclusions based on the findings as well as recommendations and suggestions are presented. Complete bibliographic and reference information for all text cited in the project report are

presented and should follow APA standards. The appendices include installations and user manuals, copies of all correspondence, special lists, etc.

Production of Project write-ups: The printing and binding of the project write-up is handled by the University's Center for Entrepreneurship, Research and Innovation CUIB-CERI. Special students' rates shall apply.

Deadlines will be strictly followed and extensions of deadlines will only be granted in properly documented circumstances of ill health or severe personal problems.

Project Write-up Review/Examination: The write-ups shall be strictly reviewed by the main supervisor and a second reviewer on or before the defense. External examiners shall have the opportunity to look at the write-up and participate in examining the candidate.

A review board for examining the write-up as well as the student(s) shall be proposed by the School and approved by the Provost. This board shall constitute specialists of diverse disciplines who shall examine, primarily for ethical concerns, and approve the study / project. Students should work with their chairs to ensure that their projects get approved.

The unacknowledged use of other people's work – Plagiarism, is considered a capital crime and has serious consequences!

The Project defense: The student will be invited to an official project defense (Viva) by email, phone and direct verbal communication on the date of the defense. For health reasons such a date may be changed. The student(s) will be expected to do a 20 minutes PowerPoint presentation (case of single student) or not more than 40 minutes for group presentation before a panel (board) as approved by the Provost. This is then followed by a question and answer session that may last for not more than 45 minutes. In CUIB academic defense is open to the public hence Viva. The student(s) is free to invite family members, friends, etc. The student may take a few questions (generally not more than two) from the public.

Handling of Project Marks: Immediately after the question answer session, the panel takes a short leave to deliberate the results. The student(s) is(are) thereafter called up to get the results of the project. They may choose if they want such results to be announced to the public or not. The defense marks must enter the Examinations and Records office system no later than two working

CONTACT US:

SCHOOL OF ENGINEERING

P.O. Box 563 Buea, South West Region

Republic of Cameroon, Central Africa.

Email: seng.office@cuib-cameroon.net

Phone: 678.379.564

WhatsApp: 678.379.564

Website: http//cuib-cameroon.org/school.of.engineering/

For housing facilities contact the Student Services: 657.166.447/673.550.388

CUIB / School of Engineering Faculty Members:

- Dr. Ngaungoum Eric, PhD
  (Dean of School of Engineering). *Chemical Engineering.*
- Dr. De Bortoli Maurizio, PhD
  (Special Assistant to the Dean). *Civil Engineering.*
- Eng. Gouater Issiola Loic. *Civil & Structural Engineering.*
- Eng. Ekang Rene. *Electrical Engineering.*
- Mr. Ojong Humphrey Mbeng. *Computer Engineering.*

Buea October 2018