VALLEY VIEW UNIVERSITY

A Seventh-day Adventist Institution of Higher Learning

ACADEMIC BULLETIN

2025-2030

(UNDERGRADUATE EDITION)

A PASSION FOR EXCELLENCE

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTING & ENGINEERING SCIENCES

Doctor of Philosophy (PhD): Computer Science

Master of Philosophy (MPhil): Computer Science

Master of Science (MSc): Computer Science

Bachelor of Science (BSc): Computer Science

Bachelor of Science (BSc): Information Technology.

Bachelor of Science (BSc): Business Information Systems

Diploma in Computer Science.

Diploma in Information Technology.

DEPARTMENT OF BIOMEDICAL ENGINEERING

Bachelor of Science, Biomedical Engineering

Diploma, Biomedical Equipment Technology

DEPARTMENT OF MATHEMATICAL SCIENCES

Bachelor of Science, Mathematics with Statistics

Bachelor of Science, Mathematics with Economics

DEPARTMENT OF SCIENCE

Bachelor of Science, Agribusiness

Bachelor of Science, Agriculture

Bachelor of Science, Nursing

Bachelor of Science, Midwifery

Bachelor of Science, Mental Health

Department of Nursing and Health Sciences-Techiman Campus

BSc Nursing

BSc Mental Health Nursing

BSc Midwifery

DEPARTMENT OF COMPUTING & ENGINEERING SCIENCES

DOCTOR OF PHILOSOPHY (PHD): COMPUTER SCIENCE

SEMESTER-BY-SEMESTER COURSE SCHEDULE

First Year (BSc Pre-Doctoral Entry Qualification)

First Semester -August			**Second Semester –January**		
Course Code	**Course Title**	**Credit**	**Course Code**	**Course Title**	**Credit**
COSC 607	Operating Systems	**3**	COSC 603	Intro to Complexity Theory	**3**
COSC 614	Design & Implementation of Programming Languages	**3**	COSC 618	Computer Organization	**3**
COSC 690	Research Methods	**3**	COSC 691	Pre-Doctoral Research Seminar	**3**
Total Credit		**9**	**Total Credit**		**9**

First Year (MSc / MPhil Qualification) – Core,
Listed with 6XX

First Semester -August			**Second Semester –January**		
Course Code	**Course Title**	**Credit**	**Course Code**	**Course Title**	**Credit**
COSC 703	Theory of Computation	**3**	COSC 714	Programming Language Foundations	**3**
COSC 718	Computer Architecture	**3**	COSC 707	Advanced Operating Systems	**3**
COSC 78X	Elective I	**3**	COSC 78X	Elective II	**3**
Total Credit		**9**	**Total Credit**		**9**

Second Year

First Semester -August			**Second Semester –January**		
Course Code	**Course Title**	**Credit**	**Course Code**	**Course Title**	**Credit**
COSC 720/730/740	Track I, II, III	**3**	COSC 722/732/742	Track I, II, III	**3**
COSC 721/731/741	Track I, II, III	**3**	COSC 723/733/743	Track I, II, III	**3**
COSC 791	Doctoral Research I	**3**	COSC 792	Doctoral Research II	**3**
Total Credit		**9**	**Total Credit**		**9**

Third Year

First Semester -August			**Second Semester –January**		
Course Code	**Course Title**	**Credit**	**Course Code**	**Course Title**	**Credit**
COSC 793	Doctoral Research III		COSC 714	Doctoral Research IV	
COSC 799	Dissertation		COSC 707	Dissertation	
Total Credit		**3-6**	**Total Credit**		**3-6**

Fourth Year

First Semester -August			Second Semester –January		
Course Code	**Course Title**	**Credit**	**Course Code**	**Course Title**	**Credit**
COSC 799	Dissertation		COSC 799	Dissertation	
Total Credit		**3-6**	**Total Credit**		**3-6**

Fifth Year

First Semester -August			Second Semester –January		
Course Code	**Course Title**	**Credit**	**Course Code**	**Course Title**	**Credit**
COSC 799	Dissertation		COSC 799	Dissertation	
Total Credit		**3-6**	**Total Credit**		**3-6**

COURSE DESCRIPTION

FOUNDATION COURSES (for MSc in non-CS Majors & BSc CS) (12 hrs)
[COSC 603, COSC 607, COSC 614, COSC 618]

COSC 603 Introduction to Computability Theory 3-0-3

Description:
This course introduces students to the fundamental concepts of computability theory, which is relevant to certain considerations in theorem proving, verifiable proofs, and accepting or (un)decidability of sets of functions (partial or total), whether a function is calculable as they relate to languages, complexity (of algorithms), and (in)tractability of computations.

COSC 607 Operating Systems 3-0-3
Description
This course builds on the introduction of operating system concepts. Advanced topics are introduced aimed at research-oriented thought, which permits students to understand the basis of OS concepts, virtualization model design, and the roles of OS in the hardware-software co-design interfacing. Types of OSs are also introduced: general OS, network OS, distributed OS, embedded OS, real-time OS, special-purpose OS for smartphone or handheld devices, including sensors and the modern communication systems

COSC 614 Design and Implementation of Programming Languages 3-0-3

Description:
The course is designed to provide students an exposure to the field of computer science as they develop skills for data structures and algorithm design, and writing programs. This course provides an explanation to how computer program has now become embedded into everything from dynamic web scripting, entertainment, graphics, video gaming, and writing secured programs for mining big data. The intersection of program design and development and other areas of computer science like computer organization, operating systems, database systems, graphics, object-oriented systems, among others, are be discussed.

COSC 618 Computer Organization 3-0-3
Description:
Given the multicore evolution in microprocessors, the course is focused on parallel hardware and software topics, and is designed with technical rigor to reflect the changes in the industry.
The goals of the course are to explore the principles of computer architecture using engineering fundamentals. It combines example systems that have realistic design alternatives. The main objective is to demonstrate that computer architecture could be understood by a computing science student and professionals in the field. It is therefore suited for compiler writers, OS designers, database programmers, and other software engineers who need a firm grounding in the principles discussed in the course

RESEARCH METHODS & SEMINAR (6 hrs)
[COSC 690 & COSC 691]

COSC 690 Research Methods 3-0-3
Description:
This course is seminar in style, requiring students to develop research skills that follow systematic research of the corpus of knowledge in computing sciences. The students are required to developed techniques for summarizing their findings into narratives structured according to acceptable format for publications or (master or doctoral dissertation) thesis development.

COSC 691 Seminar 3-0-3
Course topic, focus, objectives, content and delivery varies with offering and the lecturer.

CORE COURSES (12 hrs)
[COSC 703, COSC 707, COSC 714, COSC 718]

COSC 703 Theory of Computation **3-0-3**

Description

This course offers students the nuances of computability theory and the mathematical foundations of computing. It focuses on such concepts as grammar, verification, logic systems, proofs, and automata theory.

COSC 707 Advanced Operating Systems **3-0-3**

Description:

This course is on the fundamental concepts of computer operating systems. The concepts of OS architecture that models the major subsystems of the OS, process models and the calculus for modeling inter-process communication and synchronization to foster system protection are taught. Special emphasis is placed on memory systems and hierarchy, and on the design of paging and virtual paging system using locality of reference and working set models, and the formal statistical analysis.

COSC 714 Programming Language Foundations **3-0-3**

Description

This course is on the advanced topics of computer programming language design, with focus of syntax and semantic denotations, type systems and advanced data structures that form the basis of implementation. Various paradigms of implementation are discussed to build on the fundamental language concepts and features discussed in the basic OS course.

COSC 718 Advanced Computer Architecture **3-0-3**

Description:

Given the multicore evolution in microprocessors, the course is focused on parallel hardware and software topics, and is designed with technical rigor to reflect the changes in the industry. The course builds on the principles of computer organization fundamentals. It focuses on logic design, combinational and sequential logic/circuits, I/O devices, memory, processors, (micro) controllers, parallel architectures, among others.

SPECIALIZATION TRACKS (12 hrs)

The PhD CS curriculum offers three areas of specialization tracks for students to choose from. Each track has four courses (12 credit hours) to offer in-depth understanding of an integrated body of knowledge area in which the student seeks to develop a thesis.

The three areas of specialization tracks are:

A. Network and Security Systems [COSC 720, COSC 721, COSC 722, COSC 723]
B. Software Engineering and Embedded Systems [COSC 730, COSC 731, COSC 732, COSC 733]
C. Artificial Intelligence and Robotics [COSC 740, COSC 741, COSC 742, COSC 743]

Following are the course descriptions for each of the areas of Specialization or Tracks.

A. <u>Network and Security Systems Specialization Tracks</u>

COSC 720 Advanced Computer Networks **3-0-3**

Description

This course is on advanced topics in computer networking, and is designed to reinforce the understanding of network architectural specifications, design of network protocols, algorithms for data/message switching, error detection and correction, differences between wired and wireless networks, among others.

COSC 721 Wireless Networks and Mobile Computing **3-0-3**

Description

This course is on wireless communication networks and mobile computing. The focus on wireless communication technologies; protocols and architectures of various types of wireless network systems such as cellular, WLANS, wireless ad hoc networks, wireless sensor networks, NFCs, and other mobile communication systems.

COSC 722 Computer Security and Cryptography **3-0-3**

Description

Security is at the heart of modern communication systems, in particular networked systems including wireless systems. This course covers some of the fundamental principles of underpinning the design and operation of secure computer systems.

COSC 723 Grid and Cloud Computing **3-0-3**
Description
This course is designed as an advance topic to meet the growing demands for understanding the nuances of Big-Data and analytics, in particular, for data warehouses that are stored in the 'Cloud' over high-speed network for analysis and decision-making. The ubiquity of cloud computing – with its components: distributed data models, the analytics/tools, networking and distributed communication protocol requirements, and multiprocessor architecture that meet performance thresholds, makes it compelling for students to specialize in such fields. The course lays the foundation for cloud computing concepts, models, technologies, and mechanisms.

B. Software Engineering and Embedded Systems SpecialisationTracks

COSC 730 Software Requirements Engineering **3-0-3**
Description
The course is designed to support introductory software engineering, covered in a shorter period as a foundation to advanced topics. Specific intermediate topics are then covered to prepare students for a range of advanced courses that are software-intensive and project-oriented such as systems engineering, requirements engineering, systems of systems, distributed software engineering, embedded software and project management and planning. Metric-oriented topics germane to software engineering: reuse, reliability, modifiability, complexity, design patterns, software architecture, among others.

COSC 731 Software Design and Systems Architecture **3-0-3**
Description
This course is to equip students with the knowledge of software process focused on design and architecture, beyond requirements engineering. The focus is not on requirements specification, but rather on the framework and models (conceptual through detailed) for architectural designs and quality attributes that are germane to software systems design.

COSC 732 Embedded Systems Design, Development and Testing **3-0-3**

Description
This course focuses on the design and testing of embedded software systems. Topics taken from: review of basic logic functions; automatic systems; microprocessor- based systems and applications; embedded system software survey; microprocessor-based applications; digital communications; and embedded systems programming.

COSC 733 Software Project Management **3-0-3**
Description
This course is on the techniques and methods for managing large software projects. The focus is on how project managers equip themselves for organizing teams, assigning roles and responsibilities, components selection (including off-the-shelf purchases to minimize development time), and budgeting, pricing, contracting and managing time-cost requirements to meet project objectives and deliverables.

C. Artificial Intelligence and Robotics Specialization Tracks

COSC 740 Artificial Intelligence and Expert Systems **3-0-3**
Description
This course is on techniques and methodologies in the field of artificial intelligence and applications of fundamental theories and concepts in the design and implementation of expert systems. Formalisms of logic, induction, inference, and deductive reasoning and linguistics structures for building inference engines to support expert or domain knowledge elicitation and knowledge bases are covered.

COSC 741 Machine Learning **3-0-3**
Description
This course is on the theoretical foundation of machine learning, the mathematical and statistical methods or tools need to model data, analyze data and making recommendations from the information content of data as a result,

are discussed. Further, the course also covers deep learning concepts using neural networks for learning and recognizing patterns embedded in large data sets or images, and application of ML techniques in specific domains.

COSC 742 Robotics and Agent-Based Systems **3-0-3**
Description
The course focuses on programming robots. The course requires the application of robotic kits for the hardware component of the content, and programming of the robots using state-of-the-art robotic visual languages, such as EV3 APIs and UBTECH humanoid app-based programming.

COSC 743 Big Data Modeling and Visualization **3-0-3**
Description
Techniques for visualization that are useful for analyzing and presenting quantitative information are covered. Focus is on projects that analyze large, real-world publicly-available datasets, including understanding the data, visualizing it, creating hypotheses, and visually exploring and drawing or inferring conclusions from them. Application of statistical techniques to test hypotheses about data trends and visualize how well the hypotheses match with the analysis.

ELECTIVE COURSES (6 hours or maximum of 6hrs transfer)

Following are the elective course descriptions. On approval, a student may transfer up to 6 credit hours of closely related courses (to the specialization or track) from prior programs in lieu of the elective course requirement. Students are to take electives to broaden their knowledge base and/or strengthen the content of their thesis in the areas of specialization track.

(Students who receive transfer credits may opt to take additional Seminar Courses – listed at the end of this Elective Courses description, to further the development of their dissertation thesis proposal.)

COSC 780 Distributed Systems and Internet Programming **3-0-3**
Description
This course is designed to offer an in-depth knowledge about the methods for designing and development system of system which are interconnected by high-speed network for integration and interoperability. To this end, distributed software architectural paradigms, network protocols for interoperability, and algorithms and programming tools are taught. The commodity Internet as a framework for project development and experimentation is discussed.

COSC 781 Advanced Database Systems **3-0-3**

Description
This course explores the models for database design which are object-based, network-driven, and support for concurrency and schema integration. Topics that lead to advanced research in database design to support state-of-the-practice distributed services and required query languages are covered.

COSC 782 Advanced Data Structures and Algorithms Analysis **3-0-3**
Description
This course covers advanced topics in data structures and algorithm design and analysis. It builds on the foundations of data structures, and goes deeper into Abstract Data Type (ADT) concepts for developing algorithms at the abstract level, and still permits the space-time complexity analysis of the related algorithms (basic and distributed). Techniques for proof-of-correctness and heuristic or approximation algorithms are also covered.

COSC 783 Simulation Modelings and Techniques **3-0-3**
Description
The course is focused on models and techniques for simulating complex system interactions. In such systems, often characterized as system of systems, simulation provides a viable method of modeling the interactions, using top-down or bottom-up approaches, and often using state-of-the-art methodologies like object-oriented or agent-based to model and simulate the complex system's behavior.

COSC 791 Doctoral Research I **3-0-3**

This course will focus on developing the original synopsis or other agreed topic into a full PhD proposal. The ultimate aim of this seminar is to enable students to obtain feedback from the supervisory team on what directions to take to successfully complete a quality dissertation. The full proposal should (1) define a problem of interest to the student, (2) summarize past work, (3) outline work on an approach to solving the problem and (4) present initial results obtained. Ideally the subject matter of this proposal should be publishable in conference proceedings ranked at C or above in the ERA list.

COSC 792 Doctoral Research II **3-0-3**

This seminar will provide candidates with the opportunity to demonstrate knowledge they have gained through experience. Opportunities will be provided, as far is possible, to enable candidates gained industrially or commercially relevant experience and to demonstrate that through their work.

COSC 793 Doctoral Research III **3-0-3**

This seminar, in the third year of the scientific research period, provides an opportunity for the supervisors to check that work is progressing satisfactorily and that candidate is on course for a successful completion. Candidates will be required to report on the progress of their work. For this an internal examiner shall be appointed. Candidates must see this as preparation for the real viva in the final year. The assessment result for this course shall be classified as either "Very Good", "Good" or "Satisfactory". In each case student shall be provided guidance on what to do next. The PhD student, under the leadership of the PhD coordinator should publish at least 2 papers in national or international conferences or journals (Refer to Appendix B – Article 14 & 16)

COSC 794 Doctoral Research IV **3-0-3**

This is one of the seminars, a public presentation of the major findings of the research. The presentation ready to be subjected to scrutiny by an external examiner, an internal examiner, the supervisory team and the general public. The aim is to ensure that the work is of an acceptably high standard deserving of an award of the degree of doctor of philosophy.

COSC 799 Dissertation **0-4-8 (varying)**

This is the final part of the work, a public presentation of the major findings of the research. The presentation will be subject to scrutiny by an external examiner, an internal examiner, the supervisory team and the general public. The aim is to ensure that the work is of an acceptably high standard deserving of an award of the degree of doctor of philosophy.

Assessment of students' performance and achievements

Forms of Assessment:
In the case of individual study, the student will be examined in front of a committee of at least two specialists one being the doctoral coordinator and the other being a specialist (lecturer, researcher) having also a PhD in Computer Science. It is not required that the other specialist should be from the same university as the one supervising the doctoral program. Students are rated as "very good", "good", "satisfactory". Letter grades will be determined using a standard percentage point evaluation as outlined in the grading school policy.

A student who obtains two "satisfactory" grades in a semester or in a roll will be dropped from the PhD program. Only one "satisfactory" grade of a course can be re-taken, and passed on the second attempt, by a student while in the program.

Programme Objectives

In view of the above stated rationale, philosophy and goals, the objectives of the programme are:

- To prepare exceptionally qualified individuals for research careers in industry, but especially in academia.
- To equip students with scientific knowledge and analytical thinking in computing sciences.
- To offer students a solid background in core areas and exposure to cutting-edge research in specialized areas of computer science.
- To provide students with the tools and professional skills needed to compete in any marketplace.
- To offer students opportunities to study the philosophical and theoretical foundations underlying the discipline.
- To educate highly qualified researchers required for the expansion of fundamental knowledge and technological innovation through research and development, as well as the needs of institutions of higher learning.
- To train students with research capabilities that foster innovation and contribute to the body of knowledge in the field.

The philosophy and objectives of the program fit into the mission of Valley View University and the Department of Computing Sciences and Engineering: "*To serve as an international center of excellence in the provision of high-quality holistic education, and professional training in computing sciences; as well as serve as a leading center for cutting-edge advanced research and development work in current and emerging subject areas of Computing Science. By integrating faith and learning, it is hoped that graduates will be equipped to exert positive intellectual, moral and professional influence in the practice of Computing Science.*"

8) **Students' admission, progression and graduation:**

a) Entry Requirements for Admission

Applicants for the Masters in Computer Science are expected to have met the following prerequisites:

- The minimum requirement for admission shall be the possession of a relevant Baccalaureate Degree (BSc. CS, BSc CE, BSc. IT) (First class and Second Class only)
- Admission to university master's program is made by competition. Candidates must be successful at an interview to be scheduled by the department. [***Pre-selection:*** *An examination-interview, will be conducted for each candidate to further ascertain their eligibility into the programmes. The Chair should give his/her agreement for each of the candidates prior to the examination. The* ***competition*** *is in the form of an examination-interview in front of a committee formed by at least two professors and the representative of the university usually from the Graduate School. Every student is admitted or rejected to the program after the examination in front of the committee and as would be determined by the interviewing committee.*
- Master of Philosophy candidates must demonstrate that they have the relevant background and competencies to conduct independent academic research in Computer Science.

A complete application packet must include:

i. A completed Valley View University graduate application form;
ii. Official transcripts of the applicant's previous academic record at the university level
iii. A full curriculum vitae
iv. Three letters of recommendation commenting on the applicant's ability to do the programme

b) Progression and Graduation of Students

i. Duration

University graduate studies are usually for a duration of 1-3 years, depending on the entry point and prior degree(s). In special cases, the cycle of university graduate studies can be extended by 2 years, up to 5 years, with the approval of the university. The milestones and corresponding deliverables, or completion of requirements, are outlined in the graduate Handbook).

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ii. Work Load

The typical workload for students in the first year of the programme is 9 credit hours per week. A minimum of 30 credit hours of coursework must be done and passed to make a student eligible for graduating from the master programme. (*See Appendix A for detailed, semester-by-semester course schedule and Catalog Course Descriptions.*)

iii. Progression

Time required to complete the master's programme shall be 1-2 years (on the average) for full time students and 3-5 years for part time students.

iv. Qualifying Examination

During the advanced university training program, the student develops further the theme of the scientific research program. The student continues to the second phase of the MPhil program only after successfully passing the Qualifying Review/Comprehensive Examination. The preparatory requirements and format of the Qualifying Examination are outlined in the following:

- Upon successfully completing at least 24 credit hours.
- The student applies to sit for the Qualifying Examination (based on the core course).
- The student passes the qualifying examination, and becomes officially admitted into the MPhil program.
- The student who fails the qualifying examination is given a second chance to retake the examination in accordance with the provisions in the *Graduate School Handbook*.

v. Candidacy

- The student identifies a prospective thesis advisor, and develops a formal thesis proposal, which is then presented for defense in front of a Thesis Advisory Committee. The Committee consists of at least two specialists one being the chair and the other being a specialist (lecturer, researcher) having a PhD. The candidacy defense is open to the public.

Coursework Structure –

Coursework (including the core courses	30-36 credit hours
Elective courses	0-6 credit hours
Thesis	6 credit hours
Total	**48 credits**

Detail Structure:

1. Foundational Courses (18 hours):
   i. Operating Systems
   ii. Object Oriented Programming with Java
   iii. Discrete Mathematics & Numerical Methods
   iv. Computer Organization
   v. Research Methods
   vi. Research Seminar

2. Core Computer Science Courses (12 hours):
   i. Advanced Operating Systems
   ii. Theory of Computation
   iii. Programming Language Foundations
   iv. Advance Computer Architecture

3. Specialization Tracks (12 hours):

a. Network and Security Systems

i. Advanced Computer Networks
ii. Grid and Cloud Computing
iii. Computer Security
iv. Wireless Networks and Mobile Computing

b. Software Engineering and Embedded Systems
i. Software Design and Systems Architecture
ii. Software Requirements Engineering
iii. Embedded Systems Design, Development and Testing
iv. Software Project Management

c. Artificial Intelligence and Robotics
i. Artificial Intelligence and Expert Systems
ii. Machine Learning
iii. Big Data Modeling and Visualization
iv. Robotic and Agent-Based Systems

4. Elective Course (0-6 hours):
a. Simulation Modeling and Techniques
b. Advanced Database Systems
c. Advanced Design and Analysis of Algorithms
d. Distributed Systems and Internet Programming

v. Requirements for Graduation

- In order to graduate from the MPhil programme, the student should undergo a thesis defense.
- At least three months before the defense date, the student should submit the thesis to the Thesis Advisory Committee.
- The student must submit the thesis to the Committee only after his/her thesis Chair has read and approved the thesis.
- The Committee consists of at least 3 university professors that act as reviewers of the thesis, including the thesis Chair.
- Each reviewer within 5 weeks after receiving the thesis submits to the Chair for his/her approval or rejection for the thesis to go for a public defense.
- In the case of a rejection, the reviewer sends to the student the comments to be taken care of and the period should be prolonged accordingly, not more than one (1) semester.
- Upon completing all corrections, the student must submit a new draft of the thesis, with the approval of the Chair, to the Committee for review. Once approved, the student undergoes a final public thesis defense.
- Four (4) weeks before the public defense the thesis is made available for public reading in the university.
- The public defense is organized as an open event. Everyone interested can participate, but the number thereof is only limited by the capacity of the room where the event is organized,
- The defense consists of a short presentation from the candidate, the reading of reports of the reviewers and the answering of the questions from the candidate if questions are put by the reviewers or from the public.
- A student must address questions related to the thesis content. The questions will be moderated by the Chairman.
- The defense should take a maximum of one hour.
- Based on presentation, reports and answers to the questions, the committee shall evaluate and discuss the qualification that is awarded to MPhil thesis: "Very Good," "Good," or "Satisfactory".
- If the student has fulfilled all the requirements of programs and the defense of the thesis is awarded with a grade of "Very Good" or "Good", the defense committee submits a recommendation to the Dean of Graduate School, Valley View University.

- Upon recommending a "Satisfactory" grade, the committee will submit in writing the specific content elements that must be restored or completed by the student in the thesis report; which will require a new public support of the thesis.
- The thesis may be resubmitted within 1 semester after the initial defense and after having made all the necessary corrections, following the Committee's recommendation of a "Satisfactory" grade.
- The decision of the Committee from the defense is recorded in minutes.

c) Assessment Areas in the Final Thesis Defense

Students will be assessed in the following areas with focus on the student's area of specialization track and the overall knowledge of the Computer Science field:

- **Knowledge:** Ability to understand and apply Computer Science theory, concepts and their applications, and significance of the contributions of the thesis work to the CS corpus of knowledge, or specialization area
- **Research Techniques and skills**: ability to identify Computer Science research challenges and opportunities, and design innovative solutions, and originality of work that address them.
- **Command:** Ability to synthesize, analyze and evaluate area-specific problems, to review relevant literature pertaining to them, and to write sound proposals on innovative solutions that can address them.
- **Oral presentation and persuasion:** Ability to articulate the background literature review, methodology of the research investigation, and the outcomes with soundness and clarity of the innovative solution and its application to the sub-domain.

d) Grading System

The graduate grading system of the Valley View University will be used to grade students in this programme. (See section (13) below.)

9) Employment:

The master's degree prepares students for the most challenging and often most highly-compensated work in the field of Computer Science. Typically, graduates become faculty members in Computer Science departments throughout the world, become self-employed, become consultants, or become employed in commercial or industrial settings.

The courses of this programme are designed to undergird the graduates' confidence and readiness to tackle problems in computing sciences. The courses are to prepare and empower the students to become productive in both academia and industry, in particular graduates from this programme will ameliorate the acute shortage of CS professions in government and the private sector. Further, the contents and structure of the courses are such that they will prepare students to take up computer science research and development roles at the national scientific laboratories or agencies; fill management positions in the Information and Communication Technology (ICT) sector; or start their own technology businesses to positively impact the national economy and growth.

Graduates will also acquire strong independent research skills and begin to develop their own reputation as a research scientist. They will be able to initiate ICT adoption projects in organizations. Their in-depth ICT knowledge and skills will enable them to propose innovative software, hardware and network solutions with societal impact. Above all, graduates from the programme will be recognized at the international arena through publications, workshops, conferences, and external collaborators.

1) **Consultations:**

The programme has been designed in consultation with the board of faculty of the VVU Faculty of Science, in alignment with the Accreditation Board of Engineering and Technology (ABET) publications on Computer Science Curriculum Design Guidelines, experts advice from the University of Groningen and Polytechnic University of Bucharest, and assistance from the Carnegie Foundation's African Diaspora Fellowship (CADF) programme, which is administered through the International Institute of Education (IIE) in New York, USA.

2) **Components of the programme:**

This is a 2-3 year programme consisting of 1-2 years of course work leading to a Masters Science degree

and 1 year original research work and developing a dissertation/thesis report leading to a Master of Philosophy (MPhil) degree.

3) **Entry Points / Pathway Options**
Table I provides the requirements for entry into the Master of Science and Master of Philosophy in Computer Science program. The semester-by-semester details of the schedule of courses are presented in Table II. This follows with the catalog of individual course descriptions.

Table I: Programme Entry Point

Entry Degree	***Foundational***	***Core***	***Research***	***Track***	***Electives***	***Thesis***	***Total***
BSc in CS	6	12	0-6	12	6	0-6	36-48
BSc in IT*	12	12	0-6	12	6	0-6	42-54
MSc in CS/MPhil IT	0	0	0-6	0-12	0-6	6	12-30
MSc in IT**	0	12	0-6	12	6	0-6	30-42
MPhil/MSc Non-CS (e.g., Math, Phy, Electr/CpEng)****	12	12	0-6	12	6	0-6	42-66

**Students with BSc in CS are required to take 2 Foundational courses (4 for IT majors) in the areas that impact their specialization, and 2 elective courses to bolster their concentration; and are expected to complete the program in 1-3 years*

*** Students with MSc in CS or MPhil IT take 4 track courses and 2 elective courses to bolster their concentration, and are expected to complete the program in 1-2 years.*

***** Students with MPhil/MSc in closely related non-CS fields (e.g., Math, Physics, or Electrical Engineering) are expected to take the 4 Foundation courses, 4 track courses and are expected to complete the program in 1-3 years depending on the background.*

Table II: Semester-by-Semester Course Schedule

COURSES	**Credits**	**Tutorials**	**Practical**	**Year 1 & 2**
NON-CS Background				
A. Year 1 Semester 1				
COSC 607 Operating Systems	**3**	**0**	**3**	***x***
COSC 605 Object Oriented Programming with Java	**3**	**0**	**3**	***x***
COSC 609 Discrete Mathematics & Numerical Methods	**3**	**0**	**0**	***x***
COSC 618 Computer Organization	**3**	**0**	**3**	***x***
Total Credits	**12**	**0**	**0**	
Year 1 Semester 2				
COSC 703 Theory of Computation	**3**	**0**	**3**	***x***
COSC 718 Advanced Computer Architecture	**3**	**0**	**3**	***x***
COSC 6XX I	**3**	**0**	**3**	***x***
COSC 690 Research Methods	**3**	**0**	**0**	***x***
Total Credits	**9**			
CS BACKGROUND				
B. Year 1 Semester 1				
COSC 703 Theory of Computation	**3**	**0**	**3**	***x***
COSC 718 Advanced Computer Architecture	**3**	**0**	**0**	***x***
COSC 6XX I	**3**	**0**	**3**	***x***
COSC 690 Research Methods	**3**	**0**	**3**	***x***
Total Credits	**12**			

Year 1 Semester 2				
COSC 714 Programming Language Foundations	**3**	**0**	**3**	***x***
COSC 707 Advanced Operating Systems	**3**	**0**	**3**	***x***
COSC 691 Research Seminar	**3**	**0**	**3**	***x***
COSC 6XX II	**3**	**0**	**3**	***x***
Total Credits	**12**			
C. Year 2, Semester 1				
COSC 720/730/740 Track I, II, III	**3**	**0**	**3**	***x***
COSC 721/731/741 Track I, II, III	**3**	**0**	**3**	***x***
COSC 78X Elective I	**3**	**0**	**3**	***x***
COSC 699 Dissertation	**3**	**0**	**3**	***x***
Total Credits	**12**			
Year 2, Semester 2				
COSC 722/732/742 Track I, II, III	**3**	**0**	**3**	***x***
COSC 723/733/743 Track I, II, III	**3**	**0**	**3**	***x***
COSC 78X Elective II	**3**	**0**	**3**	***x***
COSC 699 Dissertation	**3**	**0**	**3**	***x***
Total Credits	**12**			
Total Credit year 1, 2	**48**	**0**	**45**	
Total Credit year 1, 2&3	**66**	**0**	**57**	

CATALOG and COURSE DESCRIPTIONS

FOUNDATION COURSES **(18 hours)**
[COSC 607, COSC 609, COSC 605, COSC 618, COSC 690, COSC 691]

COSC 607 Operating Systems **3-0-3**
Description
This course builds on the introduction of operating system concepts. Advanced topics are introduced aimed at research-oriented thought, which permits students to understand the basis of OS concepts, virtualization model design, and the roles of OS in the hardware-software co-design interfacing. Types of OSs are also introduced: general OS, network OS, distributed OS, embedded OS, real-time OS, special-purpose OS for smartphone or handheld devices, including sensors and the modern communication systems

COSC 605 Object-Oriented Programming with Java **3-0-3**
Description
Object-Oriented Programming with Java is an introductory course designed to teach students the fundamentals of object-oriented programming (OOP) using the Java programming language. The course covers basic programming concepts, including data types, control structures, and object-oriented principles such as encapsulation, inheritance, and polymorphism. Students will learn to design, implement, and test Java programs using industry-standard tools and techniques.

COSC 609 Discrete Mathematics & Numerical Methods **3-0-0**
Description
This course introduces students to the fundamental mathematical structures and techniques that underpin computer science and related fields. Emphasis is placed on mathematical reasoning, problem-solving, and the development of rigorous proof skills, providing a foundation for advanced study in mathematics and computer science. Further, the Numerical Methods is an introductory component designed to provide students with fundamental techniques for finding approximate solutions to mathematical problems that cannot be solved analytically. This will focus on algorithms used to solve common mathematical problems such as root finding, integration, differentiation, and solving systems of linear equations. Emphasis is placed on understanding the theoretical underpinnings of each method, as well as implementing and analyzing their performance using computational tools.

COSC 618 Computer Organization **3-0-3**
Description:
Given the multicore evolution in microprocessors, the course is focused on parallel hardware and software topics, and is designed with technical rigor to reflect the changes in the industry.

RESEARCH METHODS & SEMINAR (6 hours)
[COSC 690 & COSC 691]

COSC 690 Research Methods **3-0-3**
Description:
This course is seminar in style, requiring students to develop research skills that follow systematic research of the corpus of knowledge in computing sciences. The students are required to develop techniques for summarizing their findings into narratives structured according to acceptable format for publications or (master or doctoral dissertation) thesis development.

COSC 691 Research Seminar **3-0-3**
Course topic, focus, objectives, content and delivery varies with offering and the lecturer.
The course is designed to equip students with essential knowledge and practical skills for developing, presenting, and defending their research proposals and dissertations. The seminar emphasizes both the theoretical foundations and the applied aspects of academic research, with a strong focus on student-led presentations and peer feedback.

CORE COURSES (12 hours)
[COSC 703, COSC 707, COSC 714, COSC 718]

COSC 703 Theory of Computation **3-0-3**

Description

This course offers students the nuances of computability theory and the mathematical foundations of computing. It focuses on such concepts as grammar, verification, logic systems, proofs, and automata theory.

COSC 707 Advanced Operating Systems **3-0-3**

Description:

This course is on the fundamental concepts of computer operating systems. The concepts of OS architecture that models the major subsystems of the OS, process models and the calculus for modeling inter-process communication and synchronization to foster system protection are taught. Special emphasis is placed on memory systems and hierarchy, and on the design of paging and virtual paging system using locality of reference and working set models, and the formal statistical analysis.

COSC 714 Programming Language Foundations **3-0-3**

Description

This course is on the advanced topics of computer programming language design, with focus of syntax and semantic denotations, type systems and advanced data structures that form the basis of implementation. Various paradigms of implementation are discussed to build on the fundamental language concepts and features discussed in the basic OS course.

COSC 718 Advanced Computer Architecture **3-0-3**

Description:

Given the multicore evolution in microprocessors, the course is focused on parallel hardware and software topics, and is designed with technical rigor to reflect the changes in the industry. The course builds on the principles of computer organization fundamentals. It focuses on logic design, combinational and sequential logic/circuits, I/O devices, memory, processors, (micro) controllers, parallel architectures, among others.

SPECIALIZATION TRACKS (12 hours)

The MPhil CS curriculum offers three areas of specialization tracks for students to choose from. Each track has four courses (12 credit hours) to offer in-depth understanding of an integrated body of knowledge in which the student seeks to develop a thesis.

The three areas of specialization tracks are:

A. Network and Security Systems [COSC 720, COSC 721, COSC 722, COSC 723]
B. Software Engineering and Embedded Systems [COSC 730, COSC 731, COSC 732, COSC 733]
C. Artificial Intelligence and Robotics [COSC 740, COSC 741, COSC 742, COSC 743]

Following are the course descriptions for each of the areas of Specialization or Tracks.

A. Network and Security Systems Specialization Tracks

COSC 720 Advanced Computer Networks 3-0-3

Description
This course is on advanced topics in computer networking, and is designed to reinforce the understanding of network architectural specifications, design of network protocols, algorithms for data/message switching, error detection and correction, differences between wired and wireless networks, among others.

COSC 721 Wireless Networks and Mobile Computing 3-0-3

Description
Wireless devices now permeate every aspect of modern day life. From wireless systems that span the globe or even interplanetary to personal area networks or body area networks. This course provides an in-depth introduction to the fascinating world of digital and mobile wireless networks. Theoretical concepts will be reinforced through the use practical applications and latest research findings. The course will review propagation phenomena, modulation techniques, bit error rate, DPSK, DSCDMA, diversity, fading, multiple access schemes, cognitive radio and coding techniques.

COSC 722 Computer Security and Cryptography 3-0-3
Description
Security is at the heart of modern communication systems, in particular networked systems including wireless systems. This course covers some of the fundamental principles of underpinning the design and operation of secure computer systems.

COSC 723 Grid and Cloud Computing 3-0-3
Description
This course is designed as an advanced topic to meet the growing demands for understanding the nuances of Big-Data and analytics, in particular, for data warehouses that are stored in the 'Cloud' over high-speed network for analysis and decision-making. The ubiquity of cloud computing – with its components: distributed data models, the analytics/tools, networking and distributed communication protocol requirements, and multiprocessor architecture that meet performance thresholds, makes it compelling for students to specialize in such fields. The course lays the foundation for cloud computing concepts, models, technologies, and mechanisms.

B. Software Engineering and Embedded Systems Specialization Tracks

COSC 730 Software Requirements Engineering 3-0-3
Description
The course is designed to support introductory software engineering, covered in a shorter period as a foundation to advanced topics. Specific intermediate topics are then covered to prepare students for a range of advanced courses that are software-intensive and project-oriented such as systems engineering, requirements engineering, systems of systems, distributed software engineering, embedded software and project management and planning. Metric-oriented topics germane to software engineering: reuse, reliability, modifiability, complexity, design patterns, software architecture, among others.

COSC 731 Software Design and Systems Architecture 3-0-3
Description
This course is to equip students with the knowledge of software process focused on design and architecture, beyond requirements engineering. The focus is not on requirements specification, but rather on the framework and models (conceptual through detailed) for architectural designs and quality attributes that are germane to software systems design.

COSC 732 Embedded Systems Design, Development and Testing 3-0-3

Description
This course focuses on the design and testing of embedded software systems. Topics taken from: review of basic logic functions; automatic systems; microprocessor- based systems and applications; embedded system software survey; microprocessor-based applications; digital communications; and embedded systems programming.

COSC 733 Software Project Management 3-0-3
Description
This course is on the techniques and methods for managing large software projects. The focus is on how project managers equip themselves for organizing teams, assigning roles and responsibilities, components selection (including off-the-shelf purchases to minimize development time), and budgeting, pricing, contracting and managing time-cost requirements to meet project objectives and deliverables.

C. Artificial Intelligence and Robotics Specialization Tracks

COSC 740 Artificial Intelligence and Expert Systems 3-0-3
Description
This course is on techniques and methodologies in the field of artificial intelligence and applications of fundamental theories and concepts in the design and implementation of expert systems. Formalisms of logic, induction, inference, and deductive reasoning and linguistics structures for building inference engines to support expert or domain knowledge elicitation and knowledge bases are covered.

COSC 741 Machine Learning 3-0-3
Description
This course is on the theoretical foundation of machine learning, the mathematical and statistical methods or tools need to model data, analyze data and make recommendations from the information content of data as a result, are discussed. Further, the course also covers deep learning concepts using neural networks for learning and recognizing patterns embedded in large data sets or images, and application of ML techniques in specific domains.

COSC 742 Robotics and Agent-Based Systems 3-0-3
Description
The course focuses on programming robots. The course requires the application of robotic kits for the hardware component of the content, and programming of the robots using state-of-the-art robotic visual languages, such as EV3 APIs and UBTECH humanoid app-based programming.

COSC 743 Big Data Modeling and Visualization 3-0-3
Description
Techniques for visualization that are useful for analyzing and presenting quantitative information are covered. Focus is on projects that analyze large, real-world publicly-available datasets, including understanding the data, visualizing it, creating hypotheses, and visually exploring and drawing or inferring conclusions from them. Application of statistical techniques to test hypotheses about data trends and visualize how well the hypotheses match with the analysis.

ELECTIVE COURSES (6 hours or maximum of 6hrs transfer)

Following are the elective course descriptions. On approval, a student may transfer up to 6 credit hours of closely related courses (to the specialization or track) from prior programs in lieu of the elective course requirement. Students are to take electives to broaden their knowledge base and/or strengthen the content of their thesis in the areas of specialization track.

(Students who receive transfer credits may opt to take additional Seminar Courses to further the development of their dissertation thesis proposal.)

COSC 780 Distributed Systems and Internet Programming 3-0-3
Description
This course is designed to offer an in-depth knowledge about the methods for designing and development system of system which are interconnected by high-speed network for integration and interoperability. To this end, distributed software architectural paradigms, network protocols for interoperability, and algorithms and programming tools are taught. The commodity Internet as a framework for project development and experimentation is discussed.

COSC 781 Advanced Database Systems 3-0-3

Description
This course explores the models for database design which are object-based, network-driven, and support for concurrency and schema integration. Topics that lead to advanced research in database design to support state-of-the-practice distributed services and required query languages are covered

COSC 782 Advanced Data Structures and Algorithms Analysis 3-0-3
Description
This course will help students to understand some of the highly efficient algorithms and data structures which are fundamental to solving a range of computational problems across a variety of specialist areas. This course covers advanced topics in data structures and algorithm design and analysis. It builds on the foundations of data structures, and goes deeper into Abstract Data Type (ADT) concepts for developing algorithms at the abstract level, and still permits the space-time complexity analysis of the related algorithms (basic and distributed). Techniques for proof-of-correctness and heuristic or approximation algorithms are also covered.

COSC 783 Simulation Modeling and Techniques 3-0-3
Description
The course is focused on models and techniques for simulating complex system interactions. In such systems, often characterized as system of systems, simulation provides a viable method of modeling the interactions, using top-down or bottom-up approaches, and often using state-of-the-art methodologies like object-oriented or agent-based to model and simulate the complex system's behavior.

COSC 699 Dissertation 3-0-6
This is the final part of the work, a public presentation of the major findings of the research. The presentation will be subject to scrutiny by an external examiner, an internal examiner, the supervisory team and the general public. The aim is to ensure that the work is of an acceptably high standard deserving of an award of the degree of Master of philosophy.
However, students completing with Master of Science will compete 3 credit hours of Dissertation which will be scrutinize internally.

13) **Assessment of students' performance and achievements:**

Forms of Assessment:
In the case of individual study, the student will be examined in front of a committee made by at least 2 specialists one being the program chair and the other being a specialist (lecturer, researcher) having also a PhD. It is not required that the other specialist should be from the same university. The student is rated as "very good", "good" or "satisfactory". The student is considered passed if the ratings get one of "very good" or "good".

Letter grades will be determined using a standard percentage point evaluation as outlined below.

GRADING SYSTEM

The University has a unified grading system. The grading system is as outlined below:
Grades and Grade Points
Grades shall be given as symbols with quality points per symbol as shown below:

SCORES	*GRADES*	*GRADE POINTS*	*DESCRIPTION*
80-100	A	4.00	***Very Good/Superior***
75-79	A -	3.67	
70-74	B +	3.33	
65-69	B	3.00	***Good/Above Average***
Below 65	F		**Satisfactory/ Failing**
-	FA	00.0	***Failing Due to Inadequate Attendance***

ADDITIONAL GRADES

65-100	P	00.0	***Pass***
00-64	F	00.0	***Fail***
	AU	00.0	***Audit***
	I	00.0	***Incomplete***
	W	00.0	***Withdraw***

Grade Point Average (GPA)
The Grade Point Average is calculated by dividing the total number of grade points (see Grading System above) earned by the number of credit hours attempted.

Semester GPA
The semester GPA is calculated by dividing the total number of grade points earned during a semester by the number of credit hours attempted during the semester. Current Semester's GPA is the GPA of the semester just ended.

Cumulative Grade Point Average (CGPA)
The Cumulative GPA (CGPA) is computed by dividing the total number of grade points earned since enrolling at VVU by the total number of credit hours attempted during the same period. The CGPA is used to qualify students for graduation and for academic honors. The CGPA appears on the student's official transcript. The minimum CGPA required for graduation is 3.00.

Certifications:

a) **A student would be awarded an MSc in Computer Science degree upon completing the Advanced Training program component.**

A student would be awarded an MPhil in Computer Science degree upon completing successfully the Advanced Training program component and the Individual Research component, beyond the candidacy status.

DEPARTMENT OF COMPUTING SCIENCES AND ENGINEERING

BACHELOR OF SCIENCE (BSC) IN COMPUTER SCIENCE

The underlying and guiding philosophy of the Department of Computer Science and the BSc. (Computer Science) programme is to promote scholarship, as well as the search for and the application of scientific knowledge through education, training research and community extension. The Department is committed to pursuing this philosophy through the provision of a world-class programme in Computer Science aimed at training highly skilled and globally employable computer scientists and conducting cutting-edge research in the field of Computer Science.

MISSION STATEMENT

To serve as an international centre of excellence in the provision of high-quality holistic education, and professional training in computing sciences; as well as serve as a leading centre for cutting-edge advanced research and development work in current and emerging subject areas of Computer Science. By integrating faith and learning, it is hoped that graduates will be equipped to exert positive intellectual, moral and professional influence in the practice of Computing Sciences.

THE RATIONALE

The need for trained computer scientists is one of the challenges that face the rapidly growing Ghanaian economy. The world economy is experiencing the effects of rapid globalization and the impact of the emerging information age characterized by information and communication technologies (ICTs). The role that the Computer Science field and industry can play to support the socio-economic development process has been recognized by governments worldwide including the government of Ghana.

It has also been acknowledged that the worldwide shortage of qualified human resources in the computer field had been one of the main obstacles to the deployment, exploitation and the development of ICTs to accelerate economic and social development. This problem is more felt in developing countries like Ghana, as compared to the industrialized countries.

NATIONAL DEMAND FOR THE PROGRAMME

In Ghana, the need for trained personnel of integrity, good work ethics, excellent professional skills and positive human relations to contribute towards the realization of Ghana's socio-economic development cannot be over-emphasized. Specifically, there is an urgent need in Ghana to meet the shortfall in Computer Science graduates with the requisite skills. This programme is, therefore, designed to address the major area of manpower requirements of the nation by preparing qualified youth for Computer Science careers in the public and private sectors of the economy.

EMPLOYMENT PROSPECTS OF STUDENTS

The worldwide shortage of computer professionals is a well-known phenomenon. In Ghana, as in other countries, there is an acute shortage of qualified computer personnel.

The market for Computer Science graduates in Ghana and elsewhere is large and growing. Almost every sector need computer personnel and as such the employment prospects of Computer Science graduates are great in every country, including Ghana. Experience from elsewhere shows that graduates in this field are in high demand and most students on this type of programme usually are offered jobs before graduation.

We, therefore, expect very high demand in Ghana and elsewhere for graduates of the VVU Computer Science programme. Graduates of the programme can go on to pursue professional career in computer science in basically any type of establishment in both the private and the public sector. Graduates will typically be employed as systems analysts, computer system administrators, network managers, analyst programmers, software or system developers, software support staff, hardware support staff, computer systems engineers or technicians, business system analysts, among others. The field of computer science has one of the most attractive career advancement prospects in both the private and public sector.

There are also numerous opportunities for pursuing postgraduate studies up to the PhD-level in the field of computer science in leading universities worldwide. Graduates may also have the opportunity both within and outside Ghana to join R&D teams involved in cutting-edge research and development work in advanced computer systems.

THE OBJECTIVES

The objectives of the Computer Science Department are:

- To teach students the underlying fundamentals of computer software, computer hardware, computer-related mathematical systems and how computers interact with the rest of society.
- To encourage graduates of the programme to go into self-employment by creating their own computer-based businesses, for example: local and off- shore software development and maintenance; computer hardware system assembling, repair and maintenance and emerging computer services like, mobile, Web-hosting and publishing services, desktop publishing services, information provision services, computer design services, and e-commerce services.
- To create opportunities for students to apply their theoretical knowledge through work-study and practicum programmes;
- To develop in students the ability to think critically and to develop the highest levels of human values;
- To encourage students to appreciate the dignity of labour through work-study programme;
- To encourage students to dedicate their lives to leadership in selfless service to God and to humanity through participation in community service.

ENTRY REQUIREMENTS FOR ADMISSION OF STUDENTS

Applicants must have one of the following academic requirements to be admitted to the degree programme.

1. *Senior Secondary School Certificate Examination (SSSCE)*: Compulsory Subjects - Grade D or better in three (3) core subjects (English, Mathematics, Integrated Science or Social Studies and Elective Subjects – Grade D or better in three (3) elective subjects. The two electives should be science subjects. For Non-science students, elective mathematics is required.
2. *West Africa Senior School Certificate Examination (WASSCE)*: Compulsory Subjects - Grade C6 or better in three (3) core subjects (English, Mathematics, Integrated Science or

Social Studies) and Elective Subjects – Grade C6 or better in three (3) elective subjects. The two electives should be science subjects. For Non-science students, elective mathematics is required.

3. *General Certificate of Education (GCE) Advanced Level*: Passes in three (3) subjects including Mathematics and/or Science (at least, one of the passes should be Grade D or better). Also, the applicant must have had credit passes (Grade 6) in five GCE Ordinary Level subjects including English, Mathematics and a Science subject (for non-science students) and an Arts subject for Science students.
4. HND holders in Computer Science from recognized institutions with at least second-class lower division may be considered for admission into level 200 or 300 in their area of specialization depending on the subjects passed.
5. Diploma or other certificates from recognized institutions assessed to be equivalent to (1), (2) or (3) may be considered for admission into level 200 or 300 where applicable.
6. International Students having equivalent qualifications as stated in (1), (2) or (3) may apply for admission. Foreign Certificates must receive authentication and equivalencies from the Ghana National Accreditation Board. Foreign students must have their high school certificates/diplomas translated into English if they are not written in English.
7. *Mature Students*: The applicant must:
    a. Be at least 25 years old;
    b. Show proof of age with birth certificate or any legitimate documentary proof of birth date which is a least 5 years old at the time of application; applicant must demonstrate relevant professional and working experience for 2-5 years.
    c. Pass Mature Students' Entrance Examinations conducted by Valley View University with three subjects (English Language, Mathematics and General Paper). In lieu of entrance examination, the applicant should show proof of passes in English and Mathematics in WASSCE, SSCE, GCE or any other nationally recognized standard High School level examinations. Applicants will also be required to attend an interview to determine their eligibility into the program.

1. **Aims and Objectives:**

Aims

The aims of the Computer Science programme are:

a) To prepare graduates for a career in Computer Science.

b) To expose students to a wide range of computer skills to prepare them for the job market as professional and practicing Computer Scientists in areas ranging from the design and construction of microprocessor systems, the writing of complex computer software and application systems to design the next generation operating systems, other systems and application software.

c) To provide students with a high quality programme that confers skills required for initial job placement or entrance into graduate degree programmes of professional careers in Computer Science.

d) To provide students the opportunity for a balanced development of the intellectual, spiritual, and social dimensions of life in harmony with the Christian heritage.

e) To enhance the relationship between the University and the business community in order to continue to provide opportunities for faculty research and service.

Objectives

The objectives of the Computer Science programme are:

a) To teach students the underlying fundamentals of computer software, computer hardware, computer-related mathematical systems and how computers interact with the rest of society.

b) To encourage graduates of the programme to go into self-employment by creating their own computer-based businesses, for example: local and off-shore software development and maintenance; computer

hardware system assembling, repair and maintenance and in new emerging computer services like Web-hosting and publishing services, desktop publishing services, information provision services, computer design services, and e-commerce services.

c) To create opportunities for students to apply their theoretical knowledge through work-study and practicum programmes;

d) To develop in students, the ability to think critically and to develop the highest levels of human values;

e) To encourage students to appreciate the dignity of labor through work-study program;

f) To encourage students to dedicate their lives to leadership in selfless service to God and to humanity through participation in community service.

2. **Components of the programme:**

(a) Core course (s): **45**

COSC115 Intro to Computer Science I	NC (**3)	
COSC116 Intro to Computer Science II	NC (**3)	
COSC130 Digital Electronics		3
COSC214 Computer Organization	3	
COSC210 Numerical Methods	3	
COSC230 Database Systems Design	3	
COSC250 Computer Ethics		3
COSC271 Data Communication & Computer Networks I	3	
COSC280 Information Systems	3	
COSC331 Computer Graphics	3	
COSC355 Operating Systems	3	
COSC361 Data Structures and Algorithms I	3	
COSC480 Compiler Design		3
COSC445 Entrepreneurship and Human Development	3	
PHYS103 Physics		3

(b) Elective course (s): **09**

COSC432 Advanced Computer Graphics	3	
COSC436 Computer & Cyber Forensics	3	
COSC440 Computer Vision		3
COSC450 Advanced Systems Analysis and Design	3	
COSC456 Introduction to Machine Learning	3	
COSC458 Advanced Computer Architecture	3	
COSC462 Data Structures and Algorithms II	3	
COSC466 Systems and Network Administration	3	

(c) Mandatory course(s) **46**

ACCT210 Introduction to Accounting		3
MGNT234 Principles of Management	3	
MATH171 Introductory Maths for Computer Science	3	
MATH172 Discrete and Continuous Mathematics	3	
STAT384 Probability and Statistics		3
ENGL111 Language and Writing Skills I	2	
ENGL112 Language and Writing Skills II	2	
FREN121 French for General Communication I	2	
CMME115 Intro to Communication Skills	2	

RELB163 Life and Teaching of Jesus 3
RELB251 Principles of Christian Faith 3
RELB385 Biblical Foundation of Ethics 3
RELG451 Bible and Family Dynamics 3
PEAC100 Physical Activity NC (**1)
BIOL 140 Human Body in Health & Disease OR 3
HLTH200 Health Principles
SOCI105 Principles of Sociology OR 3
PSYC105 Introduction to Psychology
GNED230 Career Exploration and Planning OR NC (**1)
GNED468 Job Search Strategies and Techniques (optional)
GNED125 Study Skills NC (**1)
AFSTxxx African Studies courses [Group A] 1
AFSTxxx African Studies courses [Group B] 1

(d) Research component: 09

COSC364 Research Methods 3
COSC491 Final Year Project I 3
COSC492 Final Year Project II 3

(e) Competence-Based Training(CBT) component 24

COSC272 Data Communication and Networks II 3
COSC328 Mobile Application Development 3
COSC330 Computer Simulation and System Modelling 3
COSC357 Computer Architecture and Microprocessor Systems 3
COSC360 Web Applications Development 3
COSC425 Computer Security 3
COSC429 Cloud Computing Systems 3
COSC455 Introduction to Artificial Intelligence 3

(f) Problem-Based Learning(PBL) component 24

COSC113 Elements of Programming 3
COSC124 Procedural Programming 3
COSC224 Object-Oriented Programming 3
COSC340 Systems Programming 3
COSC356 Project Planning and Management 3
COSC447 Software Engineering 3
COSC320 Systems Analysis & Design 3
COSC370 Operations Research 3

(g) Practical training, industrial attachment, internship, clinical experience, etc., 03

COSSC390 Internship 3

(h) Structure of the programme (Semester-by-semester schedule/structure of course, showing the credit value of each course).

Table 1: Semester-by-semester schedule/structure of course

FIRST YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
ENGL111 Language and Writing Skills I	2	**ENGL112** Language and Writing Skills II	2

RELB163 Life and Teachings of Jesus	3	**CMME115** Introduction to Communication Skills	2
FREN121 French for General Communication I	2	**SOCI105** General Sociology	
PEAC100 Physical Activity	NC (**1)	***OR***	3
GNED125 Study Skills	NC (**1)	**PSYC105** Intro to Psychology	
COSC119 Introduction to Computer Science	3	**GNED230** Career Exploration and Planning	1
COSC113 Elements of Programming	3	**COSC130** Digital Electronics	3
MATH171 Introductory Mathematics for Computer Science	3	**COSC214** Computer Organization	3
		COSC124 Procedural Programming	3
		MATH172 Discrete and Continuous Mathematics	3
		PHYS103 Physics	3
Total Credits	**16+(3)=19**	**Total Credits**	**20**
SECOND YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
AFSTxxx African Studies – Group A	1	**AFSTxxx** African Studies – Group B	1
RELB251 Principles of Christian Faith	3	**HLTH200** Health Principles	3
ACCT210 Introduction to Accounting	3	**MGNT234** Principles of Management	3
COSC210 Numerical Methods	3	**COSC234** Artificial Intelligence	3
COSC230 Database Systems Design	3	**COSC224** Object-Oriented Programming	3
COSC271 Data Communication & Computer Network I	3	**COSC250** Computer Ethics	3
COSC280 Information Systems	3	**COSC272** Data Communication & Computer Network II	3
Total Credits	**19**	**Total Credits**	**19**
THIRD YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
RELT385 Introduction to Biblical Foundation Ethics	3	**COSC328** Mobile Application Development	3
COSC320 Systems Analysis and Design	3	**COSC330** Computer Simulation & Systems Modeling	3
COSC331 Computer Graphics	3		
COSC340 Systems Programming	3	**COSC356** Project Planning and Management	3
COSC355 Operating Systems	3	**COSC360** Web Application Development	3
COSC357 Computer Architecture & Microprocessor Systems	3	**COSC364** Research Methods	
		COSC370 Operations Research	3
COSC361 Data Structures & Algorithm I	3	**STAT384** Probability and Statistics	3
			3
Total Credits	**21**	**Total Credits**	**21**
SUMMER 1			

COSC390 Internship 3 credits			
FOURTH YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
COSC425 Computer Security	3	**RELG451** Bible and Family Dynamics ***COSCxxx(Elective 1)***	3
COSC429 Cloud Computing Systems	3	***COSCxxx(Elective 2)***	3
COSC445 Entrepreneurship and Human Development	3	***COSCxxx(Elective 3)***	3
COSC447 Software Engineering	3	**COSC480** Compiler Design	3
COSC456 Introduction to Machine Learning	3	**COSC492** Final Year Project II	3
COSC491 Final Year Project I	3		
Total Credits	**18**	**Total Credits**	**18**

3. **Course Description:**

GENERAL COURSES

ENGL 111 LANGUAGE AND WRITIGN SKILLS I 2 CREDITS
This course aims at developing the basic skills in the grammatical systems of English language and to use these effectively in writing for university and professional pursuits. Coverage includes Introduction to Parts to Speech, Vocabulary Development, Vocabulary Usage, Nouns: Identification, Types, Functions; Plural Formation, Pronouns: Types, Functions, Adjectives: Types, Functions/position, sequencing, comparison; Determiners/interjections, Verbs: Identification, Types, Tenses : Types, Sequencing; Concord : Types of Concord, Adverbs and Prepositions: Formation, Types, Functions, Conjunction / Transitional devices, Sentences : Types, Parts, Sentence errors : Fragments, Run-on and Punctuation.

ENGL 112 LANGUAGE AND WRITING SKILLS II 2 CREDITS
Prerequisite for this course is Language and Writing Skills 1 (ENGL 111). The course deals with the application of the grammatical systems studied in Language and Writing Skills I. The course is designed to enable students acquire writing skills, skills to analyse and critique written forms and to grasp information and meaning from recommended text for personal and academic writing. Topics covered include: Writing Process, Paragraph Development, Note Taking, Paraphrasing, Quoting, Summarising, Reading, Sources of Documentation / Information Search and Types of Composition, Introduction to Parts of Speech and Vocabulary Usage, grammatical elements, nouns, pronouns, adjectives, adverbs, determiners, verbs, tenses, concord, prepositions, conjunctions and transitional devises, sentence components, and sentence errors.

FREN 111 FRENCH FOR GENERAL COMMUNICATION I 2 CREDITS
This course provides a basic foundation on which to build the skills of listening, speaking, reading and writing simple material in French. The approach is essentially communicative and accurate pronunciation is stressed. The following topics will be studied: Greetings ; Alphabets and Phonetics ; Accents ; Introduction ; Articles ; Countries and Nationalities; Numbers (1 – 100); Days of the week; Months of the year; Time; Demonstrative adjectives; Possessive adjectives; Prepositions (à, de, en, au, aux, à la, à l', du, des, etc.); Expressing the past; Expressing the future; Giving general information about a person (name, age, origin, residence, marital status, occupation, etc.); Describing a person (General outlook, First impressions, Height and structure, Hairs, Eyes, Clothing); Talking about one's health and physical status.

GNED 125 STUDY SKILLS NC
The course is about tools and techniques for success in the university and beyond. It covers skills and strategies designed to improve study behaviour. Upon completion, students should be able to apply appropriate study strategies and techniques to the development of an effective study plan. Coverage include: Time management, Scheduling tools, Information Search, Self-assessment, Personality styles, Learning styles, Goal setting, Study skills, listening skills, Note taking searching for information, Active reading, Memory techniques, preparing for examination, Test/examination taking and Critical thinking.

PEAC100 PHYSICAL ACTIVITY NC
This course is designed to train the body as 'the temple of God' and to develop a positive attitude towards exercise for the improvement and maintenance of overall health and fitness. Objectives of the course include improving cardio-respiratory endurance and other components of physical fitness.

CMME 115 INTRODUCTION TO COMMUNICATION SKILLS 2 CREDITS
This course is designed to assist students acquire oral, written skills and nonverbal communication skills in order to communicate effectively. The course is also to raise students' level of proficiency as well as prepare them to function effectively on their own. Topics include: Fundamentals of communication; Elements of communication; Models of communication; Context, Functions and Uses of

Communication; Levels of communication; Verbal and nonverbal communication; Factors of effective communication; Language and Meaning; Communication and culture; Writing-Letters, Memos, Resumes, Minutes and Reports.

PSYC 105 INTRODUCTION TO PSYCHOLOGY 3 CREDITS

This course introduces students to the study of behaviour and mental processes. The course will focus on the evolvement of psychology into a scientific study and some psychological principles that explain human behaviour and mental process. In addition, there will be application of these principles to everyday life to help students appreciate how these psychological principles affect their daily lives and interaction with other. This course covers the basic principles and concepts in psychology, including the principles of motivation, learning, and perception, Psychology as a science, sensation and perception, memory, learning, personality, consciousness and altering consciousness, social psychology, stress, abnormal behaviour, sexuality and Gender. It is designed to introduce University students to history, development, and present scope of psychology with additional emphasis on non-western psychological approaches.

SOCI 115 PRINCIPLES OF SOCIOLOGY 3 CREDITS

This course is designed to assist students gain knowledge on the theoretical perspectives and subject matter of sociology. The main focus of the course is to help students develop sociological imagination in understanding, explaining and addressing every-day, common place issues and behaviour especially within the Africa context. The course looks at an objective approach to the analysis and understanding of the social world. Consideration is given to the dynamic nature of African society and social institutions. Emphasis is placed on the study of social groups including the family, its history, and current place in society. Course coverage include: Introduction to sociology, Sociological methods, Pioneers of sociology, Concept of culture, Socialization, Social groups and social institutions, Families, African Concept of Marriage etc.

HLTH200 HEALTH PRINCIPLES 3 CREDITS

This course deals with the study of basic health practices which seek to improve health and longevity. It focuses on holistic health which includes the physical, mental, social and spiritual aspect of the human being. It also encourages students to apply these principles for achieving and maintaining good health in their various communities. It also studies physiology, including the principles governing community and personal health and the methods of applying these principles to successful daily living. Course coverage includes: Introduction to health, S. D. A. Philosophy of health and Biblical Concept of health, Understanding the levels of human Body Organization, Application of "CELEBRATIONS" to Healthy Lifestyles etc.

AFST XXX AFRICAN STUDIES 2 CREDITS

This course is about our way of life as Africans and its implications for development. The course, therefore, aims at creating a learning space for students to critically examine the interplay between African culture and development by highlighting on how these concepts shape or influence each other. It also seeks to develop positive attitude to African cultures and ways of life. Themes for discussion focus on the cultural issues that arise in the quest for socio-political, economic, religious and technological advancement and the need to preserve certain traditional values while pursuing new ones. There are several African Studies courses out of which students are to choose two of them. Students are encouraged to be punctual at lectures and make their own notes. Readings will be provided to support all discussions at lectures.

RELB163 LIFE AND TEACHINGS OF JESUS 3 CREDITS

A comprehensive study of the life and teachings of Jesus as unfolded in the four gospels with analytical attention to the gospel writers and their writings in an attempt to reveal the impact of His self-revelation in that age and ours.

RELB 251 PRINCIPLES OF CHRISTIAN FAITH 3 CREDITS

This course surveys the fundamentals of Christian teachings: Revelation, Inspiration, the Godhead,

Angels, the Devil and the origin of sin, Creation, man's Original condition in and fall, his condition in death, Incarnation, Ministry, Redemption. The Covenant, the Sanctuary, the essentials of Christian living, Baptism, and Christian growth, the Sabbath, God's Church in the world, the coming crisis, Christ's second coming, the Millennium, and Heaven.

RELT385 INTRODUCTION TO BIBLICAL FOUNDATIONS OF ETHICS 3 CREDITS
This course studies the structure and content of Christian ethics: goal, motive, and norm of the Christian life; with an analysis of ethical issues of practical decision-making, authority, life, and sexuality. Ethical considerations of business decisions are examined in light of a Christian value system. This course covers topics such as different approaches to decision making in ethical situations, development of appropriate organizational responses to ethical problems, morality and issues of right and wrong, etc.

RELG 451 BIBLE AND FAMILY DYNAMICS 3 CREDITS
Bible and Family Dynamics focuses on the role of the Bible in aiding family members find meaning and purpose in life. From the biblical perspective, the course highlights relevant issues that are incidental to the life of family members as they strive to function effectively in an increasingly global society. Issues for discussion include dynamics of family life, individual development, life relationships, responsible parenting, family worship, crisis management, resource management, civic responsibility, healthy living, housing decisions, career planning, and trends affecting African families.

ACCT210 INTRODUCTION TO ACCOUNTING 3 CREDITS

This course is designed to cover the fundamentals of accounting applicable to different business entities with emphasis on the accounting cycle, the preparation of financial statements, bank reconciliations, and payroll. The process of recording, summarizing and reporting financial information is covered in detail for decision making. The course focusses on the study of analyzing, classifying, and recording business transactions in both manual and computerized environments.

MGNT234 PRINCIPLES OF MANAGEMENT 3 CREDITS

A beginning course designed to study business management theory and practice including topics such as, functions of management, history of management thought, executive functions of a manager (planning, organizing, directing, coordinating, staffing and controlling). This course also introduces students to the functional areas of business such as marketing, financial, personnel and operations. It further applies the study of the principles of management theory and practice in organizations, with emphasis placed on the challenges of management in diverse and complex environments.

MAJOR COURSES

COSC113 ELEMENTS OF PROGRAMMING 3 CREDITS
This course introduces students to the principles of problem solving using fundamental algorithmic techniques and design, structured programming, and computer systems concepts. The course covers the techniques necessary to write well-documented, structured computer programs. The course is intended to emphasize the planning process using examples involving sequence, selection, iteration, and basics of computer arithmetic, data structures, sorting and searching. The course is designed to promote good programming practices for further study of programming languages. Upon successful completion of this course, the students should be able to design simple, structured, well-documented computer programs. Evaluation instruments will include written and/or skills-based examinations and individual in-class and/or take-home assignments. Evaluation methods may also include group in-class and/or take-home assignments.

COSC124 PROCEDURAL PROGRAMMING 3 CREDITS
The course is design to introduce the principles and concepts of programming and teach problem-solving methods and algorithm development; high-level, structured programming using a recent procedural

programming language such as C/C++ etc. Data types, variable declarations, arithmetic expressions, conditional statements, macros, function prototypes, standard libraries, file processing, pointers, structures, unions and dynamic memory management are discussed.
Prerequisite: COSC113

COSC224 OBJECT-ORIENTED PROGRAMMING 3 CREDITS
This course introduces the concepts of object-oriented programming to students with a background in the procedural paradigm. The course begins with a brief review of control structures and data types with emphasis on structured data types and array processing. It then moves on to introduce the object-oriented programming paradigm, focusing on the definition and use of classes along with the fundamentals of object-oriented design. Other topics include an overview of programming language principles, simple analysis of algorithms, basic searching and sorting techniques, event-driven programming, memory management and an introduction to software engineering issues. The course also covers a variety of other advanced topics, including developing graphical user interface (GUI), and graphics in both AWT and SWING. Depending on the interest of the students and time permitting, a number of more advanced topics will also be discussed. These may include: Creating database connectivity with JDBCD; Manipulating databases with JDBC; Programming for Internet and World Wide Web; Servlet's overview and architecture; Handling HTTP get requests containing data and handling HTTP post requests; redirecting requests to other resources; Multi-Tier applications; and Using JDBC from a Servlet.
Prerequisite: COSC124 [Java or Python may be considered to teach this course]

PHYS103 Physics for Computing 3 CREDITS
This course introduces students to Physics as required for computer science. The course forms the fundamental to computer science courses which are related to the field of physics. The course is to make the students appreciate these related courses and reduce the learning curve to these courses.

COSC115 INTRODUCTION TO COMPUTER SCIENCE 3 CREDITS
This course introduces students to the basic principles, concepts and practice of computer science. The course provides an overview of key topics in computer science emphasizing on: the underlying mathematical concepts and principles of computer science, topics relating to hardware as well as system development components and aspects of computer science which will include Data Encoding, Machine Architecture and language, Operating Systems, Networking, Databases, Graphics, Artificial Intelligence, Computational Theory, Algorithms Discovery, Programming languages historical, Software Engineering and Data Abstractions, Careers in Computing Sciences, Emerging Technologies. architectures and their operation. It covers the following topics: number systems; basic computer components; the instruction cycle; functions and subroutines; input output; interrupts; exceptions. Applications of the various programming languages – Software Development Methodologies, Data Structures and Algorithms, File Systems, Sorting Systems, Numerical Systems, Machine Cycle, Numerical Methods.

COSC 130 DIGITAL ELECTRONICS 3 CREDITS

This course is designed to introduce students to the theory and practice of digital electronics. The first part of course deals with a comprehensive study of the principles and techniques of digital electronics. The second part of the course aims at providing students with strong foundation in the core fundamentals of digital electronics with emphasis on digital logic designs and troubleshooting.

COSC 210 NUMERICAL METHODS 3 CREDITS
The course concentrates on: derivation, analysis and implementation of methods of numerical solution of mathematical problems. Topics include: Error Analysis, Various Polynomial Approximations, Iterative Techniques for solving equations, numerical integration and differentiation equation

MATH 171 INTRO. MATHEMATICS FOR COMPUTER SCIENCE 3 CREDITS
This course provides students with the basic concepts of algebra and calculus, which are essential for further works in mathematics, with reference to their applications to computer science. Students are introduced to mathematical problem-solving techniques and obtain awareness of interactive techniques in the use of computers in mathematical problem-solving.

MATH 172: DISCRETE AND CONTINUOUS MATHEMATICS 3 CREDITS
The course presents a study of mathematics that falls outside the realm of Calculus. Calculus is the study of continuous mathematics concepts, whereas discrete mathematics is the study of separable, countable or quantified objects. It involves mathematical reasoning along with creativity and problem solving.

COSC 230 DATABASE SYSTEM DESIGN 3 CREDITS

The course is aimed at introducing students to the management of database systems. It emphasizes on the theoretical and practical issues in management, retrieval and organization of large quantities of data. The course also facilitates students understanding of database architectures, data models and database manipulations. It includes representing information with the relational database model, manipulating data with an interactive query language (SQL) and database programming, database development including internet applications and privacy, security and integrity issues

COSC 271 DATA COMMUNICATION & COMPUTER NETWORK I 3 CREDITS
This course concentrates on: the fundamentals of computer communications and networks and telecommunications; digital, voice and video signals and transmission; protocols for error and flow control; capacity utilization; multiplexing and concentration; local area networks (LANs), wide area networks (WANs). Also covered in this course are: network design, installation and maintenance issues; switching, local area networks and structured architectures, modulation/demodulation techniques; high speed modems; data-link layer issues; High Level Data Link Control Protocol (HDLC).

COSC 272 DATA COMMUNICATION & COMPUTER NETWORK II 3 CREDITS

This course follows-on from COSC271 and deals with detailed look at the upper layers in the OSI model, protocols, application services, network management and security and the wireless infrastructure. Topics covered include: routing protocols, transport layer services, congestion control, quality of service, network services, Software Defined Networks (SDNs), programmable routers and overlay networks, wireless and mobile networking, security in computer networks, multimedia networking, and network management.
Prerequisites: COSC124, COSC224, and COSC271

COSC214 COMPUTER ORGANIZATION 3 CREDITS
This course introduces students to an Assembler Language, the structure and functions of computers, how programming constructs are encoded in bits and bytes, how to manipulate and manage memory and how computers compile programs. Topics include introduction to computer and systems organization; detailed examination of addressing, instruction execution, data representation and program coding and debugging.

COSC 250 COMPUTER ETHICS 3 CREDITS
This course is intended to give students a chance to reflect on the humanitarian, social, and professional impact of computer technology by focusing on ethical issues faced by and brought about by computing professionals, including those related to networking and the internet, intellectual property, privacy, security, reliability, and liability. The course further examines the code of ethics and professional conduct as published by technical organizations such as ACM and IEEE. The course thus equips students with the tools to build information systems to the highest ethical and moral standards. It will also focus on issues raised by the possible emergence in the future of highly intelligent machines and internet of things.

COSC280: INFORMATION SYSTEMS 3 CREDITS
The course is designed to provide students with a foundational understanding of Information Systems (IS) as they apply to organizations and industry. It covers an in-depth study of the concepts, principles and practice of information systems. The course covers wide range of topical areas such as Information Systems for commerce and collaboration; business intelligence and Enterprise Information Systems. The

various types of information systems including MIS, EIS, DSS, KBIS, TPS, trends towards integration in user-organizations, how the basic building blocks of organizations and design forces combine to form user-oriented information systems are covered.

COSC320: SYSTEM ANALYSIS AND DESIGN 3CREDITS

This course introduces students to the concepts, principle and practice of systems analysis and design. A number of systems analysis methodologies, techniques and tools are covered with emphasis on prescriptive models, agile models, use case models, computer aided software engineering (CASE) tools, object-oriented models and commercial off-the-counter tools. The course covers the system development life cycle (SDLC) and consider practical issues involved in the development of implementable systems for user organizations. The course provides the students with the skills to identify business problems and opportunity statements which may be solved by technology-based solutions by determining requirements, provision solutions, and develop designs and translating designs into construction and implementation and maintenance of the systems.

COSC340 SYSTEMS PROGRAMMING 3 CREDITS

The major goal of the course is to give students principles, skills, and experience in implementing complex, layered systems. A substantial portion of the course focuses on giving students in-depth C and C++ skills and experience with practical engineering tools such as debuggers, unit testing frameworks, and profilers. This course teaches students how to think about, build, debug, and test large computer programs. The course stresses learning how to use tools such as debuggers, profilers, source version control systems, and integrated development environments as an essential part of developing large programs. The course also stresses the understanding of how programs execute on today's computers and how to measure and optimize performance.

Prerequisite: COSC 224

COSC331 COMPUTER GRAPHICS 3 CREDITS

This course will introduce students to all aspects of computer graphics including hardware, software and applications. The aim of this course is to develop an understanding of the mathematics and algorithms used in the synthesis of computer graphic imagery and animation. This is an introductory level course covering aspects of computer graphics including: techniques of graphic data input and output in terms of display devices and software; computer display of mathematical forms; animation, text processing and related topics; graphics display hardware image processing; 2D systems and transformations, etc

Prerequisite: **MATH172**, **COSC124, COSC224**

COSC357 COMPUTER ARCH. AND MICROPROCESSOR SYSTEMS 3 CREDITS

The course presents to the student the key technologies and components employed in modern processor and computer architectures. it covers various architectural decisions in computer configurations optimization. The Microprocessor Systems component of the course aims to introduce students to hardware design and construction. Students will design and build a working microprocessor system from IC components. The course describes how such components are brought together to produce a functioning system, and illustrates the sort of low-level software necessary to support the hardware for basic I/O and monitor services.

Course Objectives

The main objective of the course is to help the student gain a firm grasp of the computer architectures currently used in a wide variety of digital systems. The student will also develop an understanding of the relevant trends in architectural technology currently underway.

COSC328 MOBILE APPLICATIONS DEVELOPMENT 3 CREDITS

This course focuses on the fundamental aspects of mobile computing, application architecture, and design. Students will learn the benefits and challenges of mobile application planning, design, development, and management. Students will also acquire advanced technical skills that focus on designing, developing, and implementing a mobile application to meet organizational and / or end-user needs. Students will complete a hands-on project building a prototype mobile application. The course ensures that students are exposed to the most current mobile technologies and examines emerging issues and trends in the field.

COSC330 COMPUTER SIMULATION & SYSTEMS MODELING 3 CREDITS
This course introduces the student to the methodologies used in the Computer Simulation of Continuous and Discrete Systems. Topics include: Mathematical Modelling, Systems Analysis, Random Number Generation, Monte Carlo and other Simulation Techniques, Simulation Programs and Analysis of Simulation Output. Applications would be drawn from among the Physical, Biological, Socio-economic and Computer Sciences.

COSC355 OPERATING SYSTEMS (OS) 3 CREDITS
This course provides a thorough understanding of the principles and design of operating systems. The aim is to illustrate the algorithms and approaches which can be taken in developing operating system functionalities. The course compares and contrasts the approaches taken in several modern operating systems. This course leads to a deep knowledge of the problems and solutions in developing modern concurrent systems. Topics covered in this course include: Operating Systems Overview and History – Process Management – Threads – Processor Scheduling – Process Synchronisation – Deadlocks – Memory Management – Virtual Memory – 1/0 Management – File Management – Protection and Security – Distributed Systems. The course compares and contrasts the approaches taken to achieve the above facilities in a number of operating systems.

COSC360 WEB APPLICATION DEVELOPMENT 3 CREDITS
This course concentrates on the development of application systems and tools using the resources of the Internet as a development, implementation and delivery platform. Students are exposed to the emerging area of developing Internet-based (in particular Web-based) application systems for service delivery in the area of business, education, health, entertainment, etc. The course will introduce students to current Web-based systems development tools like Wordpress and Joomla and programming languages like PHP, Python or JavaScript for building responsive web applications. Students will be required to undertake projects involving the development of working systems using these tools and programming languages.

INFT 356: PROJECT PLANNING AND MANAGEMENT3CREDITS
This course provides students with a comprehensive introduction to project management in an information technology / information systems context. It will highlight the key phases of the project management cycle and describe the various tools and methods used in each of those phases. Key areas such as project selection methods, work breakdown structures, network diagrams, critical path analysis, and critical chain scheduling, time and Cost estimates, earned value management and motivation theory and team building will be emphasized. The course will consider both theoretical and practical perspectives and equip students with the necessary skills to be able to better manage or participate in Technology-based projects.

COSC370 OPERATIONS RESEARCH 3 CREDITS
This course covers a range of operation research topics including: Optimization Techniques, Game Theory, Linear and Non-Linear Programming, Transportation problem. Network Analysis, Simulation, System Reliability, Queuing Theory, Line Series Analysis, Scheduling Systems etc.

COSC361 DATA STRUCTURES AND ALGORITHMS I 3 CREDITS
Covers the design, analysis, and implementation of data structures and algorithms to solve engineering problems using an object-oriented programming language.

COSC364 Research Methods 3 CREDITS
This course is designed to provide the fundamentals of research methodology applicable to Computer Science and its related areas. Analysis, case studies, critical reading, re-engineering, redesign, evaluation, and application of research needed for the development of skills in research projects are emphasized. It examines how to plan, conduct and report on empirical investigations. In addition, the focus of the process is on the steps for conducting a research project, including formulating research proposals, building conceptual models, data analysis (using both qualitative and quantitative methods), designing innovative solutions, constructing evidential artefacts, evaluating the validity, and reporting.

COSC380 COMPILER DESIGN 3 CREDITS

This component of the course provides the basics of compiler design. The course will discuss the major ideas used today in the implementation of programming language compilers. The course explains how a program written in a high-level language designed for humans is systematically translated into a program written in low-level assembly more suited to machines. The course also explains how programming languages are designed, programming language semantics, and why there are so many kinds of programming languages.

COSC440 COMPUTER VISION 3 CREDITS

The aim of this course is to give students a firm understanding of the theory underlying the processing and interpretation of visual information and the ability to apply that understanding in a wide variety of situations. Students who successfully complete this course will be well placed to pursue subsequent work either in research or in industry.

COSC425 COMPUTER SECURITY 3 CREDITS

This course introduces the student to the threat environments that threaten users of personal computers and managers of corporate computers. Various countermeasures for protecting and defending computer and information systems against such threats are exhaustively discussed.

COSC429 CLOUD COMPUTING SYSTEMS 3 CREDITS

This course is aimed at introducing the main concepts in cloud computing and to examine the fundamental problems in the area and look at the various models and solutions that have been proposed. Extensive use is made of real system case studies. The course will cover topics like software defined architectures, virtualization, IaaS, PaaS, SaaS, serverless architectures, cloud middleware technologies, cloud storage services

COSC447 SOFTWARE ENGINEERING 3 CREDITS

This course introduces the students to relevant software engineering techniques that are relevant for software product engineering. The course will explore the concepts and techniques of software engineering modelling and on software products and apps that are familiar to students, rather than on project-based techniques. Topics to be covered includes modelling, personas and scenarios, cloud-based software, microservices, security and privacy and DevOps.

COSC455 INTRODUCTION TO ARTIFICIAL INTELLIGENCE 3 CREDITS

This is an introductory course on Artificial Intelligence. The topics may include: AI methodology and fundamentals; intelligent agents; search algorithms; game playing; supervised and unsupervised learning; decision tree learning; neural networks; nearest neighbour methods; dimensionality reduction; clustering; kernel machines; support vector machines; uncertainty and probability theory; probabilistic reasoning in AI; Bayesian networks; statistical learning; fuzzy logic. Several assignments will be given to enable the student to gain practical experience in using these techniques.

COSC456 INTRODUCTION TO MACHINE LEARNING 3 CREDITS

This course is an introduction to deep learning, a branch of machine learning concerned with the development and application of modern neural networks. Deep learning algorithms extract layered high-level representations of data in a way that maximizes performance on a given task. For example, asked to recognize faces, a deep neural network may learn to represent image pixels first with edges, followed by larger shapes, then parts of the face like eyes and ears, and, finally, individual face identities. Deep learning is behind many recent advances in AI, including Siri's speech recognition, Facebook's tag suggestions and self-driving cars. We will cover a range of topics from basic neural networks, convolutional and recurrent network structures, deep unsupervised and reinforcement learning, and applications to problem domains like speech recognition and computer vision.

Prerequisites: COSC455 Introduction to Artificial Intelligence and a strong mathematical

background in calculus, linear algebra, and probability & statistics (students will be required to pass a math prerequisites test), as well as programming in C/C++ and Python. There will be assignments and a final project.

COSC450 ADVANCED SYSTEM ANALYSIS AND DESIGN. 3 CREDITS
This course course is to examine the design and application of systems in business for routine data processing, management reporting, and decision support at various levels within the organization and will explore how to use object-oriented techniques to analyze real-world requirements and to design solutions that are ready to code. The course therefore, provides an in-depth understanding of object-oriented systems analysis and design techniques, use cases and UML. The tools and processes used by systems developers to analyze, design, manage and construct information systems will be presented incorporating contemporary methods and effective organizational and global project management practices. Among other things the course will focus on technical business system analysis and design techniques, and covers key software engineering principles, methods and frameworks, including project and risk management, estimation, requirements engineering and analysis, advanced modeling concepts such as Designing reusable software components, Refactoring techniques, system and software architecture, design patterns, elaborate testing, security and quality systems. Teamwork is heavily emphasized in the course.

COSC 445 ENTREPRENEURSHIP AND HUMAN DEVELOPMENT 3 CREDITS
This course is designed to introduce students to the fundamental issues related to starting and managing technology-based new ventures. The course is design to equip students to study how technology-based solutions can be applied to solve economic and socially oriented problems. It prepares students for more intensive entrepreneurship courses, such as Venture Creation and Entrepreneurial Growth Strategies, which focus on testing, developing, and growing new technology businesses. The course places s*pecial emphasis on decision-making and problem solving in society through an understanding of opportunity recognition, economic/financial models, value creation, and basic entrepreneur-related concepts.*

COSC462 DATA STRUCTURES AND ALGORITHMS II 3 CREDITS
Prerequisite: COSC361 Data Structures and Algorithms I
Covers the advance design, analysis, and implementation of data structures and algorithms to solve engineering problems using an object-oriented programming language.

COSC458 ADVANCED COMPUTER ARCHITECTURE 3 CREDITS
This course provides an in-depth understanding of the hardware aspects of an advanced multiprocessor system. It also introduces the design techniques for integrated circuits. In particular, contrast is drawn with hardware design using discrete devices, exploring RISC-V a free and openly adoptable standard instruction set. Topics covered include: Parallelism, RISC CPUs; memory management units, translation look aside buffers (TLBs); Unix memory management (hardware); cache theory and organization; cache analysis, victim caches; shared memory multiprocessors; cache coherency protocols; spin-lock algorithms; load locked/store conditional instructions; main memory (DRAMs, DRAM refreshing, DRAM interfacing, ECC, etc); graphics subsystems (VRAMs, colour palettes, monitors, mice). Also covered are: MOS Technology; nMOS Processes vs. CMOS Processes; Static CMOS; Dynamic CMOS; Pass Transistor Logic; Floor planning; Power Routing; Control and Data Routing; Area Estimation; Design Rules; Basic Gate Layout; Regular Layout Styles; Sticks Diagrams. The course will also introduce students to VLSI technologies and systems.

COSC432 ADVANCED COMPUTER GRAPHICS 3 CREDITS
his course will be a hands-on class on advanced computer graphics. It will cover major aspects of digital image generation: geometric modeling, computer animation, and rendering. The goal of the course is to provide a strong foundation for computer graphics principles, and provide a hands-on introduction to recent advanced topics, e.g., subdivision surfaces, real-time global illumination, and physically based animation. Also, advanced topics in computer graphics and image processing real-life rendering, animation, techniques of image enhancement, data compression and aspects of pattern recognition and computational geometry will be discussed.

Prerequisite: **COSC331**

4. **Requirements for graduation:**

The following are requirements for graduation:

a. Course Requirements

Students are required to obtain a total of 160 credits to qualify for graduation.

b. Credits Requirements

Table 2: Credits Requirements

	Major Curriculum **Major Curriculum Sub-Divisions –divisions**	**Credits** **Requirements**
A.	Core courses	45
B.	Elective Courses	09
C.	Mandatory courses	46
D.	Research Components	09
E.	Competence-Based Training(CBT) component	24
F.	Problem-Based Learning(PBL) component	24
G.	Practical training, industrial attachment, internship, clinical experience, etc.,	03
	Total	160

c. Additional requirements for graduation e.g. attendance.

CITIZENSHIP GRADE

Each graduating student is to fulfil citizenship requirement of non-credit [though graded]. Citizenship grade is awarded to student who satisfies University requirements with respect to decent behaviour and conduct in lifestyle on-campus and off-campus and regular attendance to University gatherings. Students are expected to follow all regulations stipulated in the Valley View University Students Handbook.

LABORATORY SESSIONS AND PROJECT

Students are required to take a number of Non-Credit Courses, take Computer Laboratory sessions and do projects that form part of the Credit Courses.

FINAL YEAR RESEARCH PROJECT

Each graduating student is to carry out under supervision of a faculty member a practical Computer Science project on a topic or subject previously approved by the Head of Department.

RESEARCH COMPONENT

Final Year Research Project is a pre-requisite for graduation. Practical training, internship, clinical experience, etc. are all required. Practicum in Computer Science is required of all students.

5. **Assessment Regulations:**

Details of assessment regulations are:

a. **Students' performance and achievement**:

Students shall earn degrees by completing the prescribed number of credit hours. The student shall earn credits only if all the course requirements have been fulfilled and the student succeeding by obtaining an acceptable grade for the course. A student shall not be able to receive credits for a course in which he/she obtained an unacceptable grade [C-, D and F in Major courses].

Students Assessment Regulations*: Students are assessed using the following criteria:*

i. **Continuous Assessment:** Students are required to participate in class tests, quizzes, mid-semester examinations, term papers, oral presentations and discussions in class.

ii. **Final Examinations:** A comprehensive examination covering materials presented during the entire semester is administered to students and graded as shown in Table 3.

iii. **Grading System:** Final Semester Grades are based on the grading system that provided a Grade Point Average (GPA) for the Semester. Table 1 provide details of the letter grading system. The evaluation and grading of the final grade of each course will be determined as given in Table 1 and Table 4:

Grading System: Refer to the Policies and Academic Affairs Section

Class Evaluation: refer to the Policies and Academic Affairs Section

Classes Awards: refer to the Policies Section

b. **Mode of certification:** Regular
c. **The certificate awarding institution:** Valley View University

COMPUTER SCIENCE MINOR

COMPUTER SCIENCE MINOR 24 CREDITS

The Department of computer Science offers a minor to students majoring in areas other than Computer Science. Candidates planning to take a minor in Computer Science would have to meet the admission requirements for the Computer Science Department. For Computer Science minor the 24 credits must be selected from the courses listed below. Given that a number of the required courses for the Computer Science Minor have prerequisites it is anticipated that the total number of required credit will be excess of 24.

REQUIRED COURSES FOR MINOR

COSC 210 Numerical Methods	3	
COSC 240 Systems Programming	3	
COSC214 Computer Organization	3	
COSC 230 Database Systems	3	
COSC 355 Operating Systems	3	
COSC 280 Information Systems		3
COSC 271 Data Communication & Computer Network I	3	
COSC 361 Data Structures and Algorithms	3	

PREREQUISITE COURSES

COSC 115 Introduction to Computer Science I	NC
COSC 116 Introduction to Computer Science II	NC
COSC 113 Elements of Programming	3
COSC 124 Procedural Programming	3
COSC 130 Digital Electronics	3
PHYS 103 Physics	3
MATH 171 Introductory Maths for Computer Science	3
MATH 172 Discrete and Continuous Mathematics	3

DIPLOMA (DIP.) IN COMPUTER SCIENCE

The underlying and guiding philosophy of the Department of Computer Science and the Diploma in Computer Science programme is to promote scholarship, as well as the search for and the application of scientific knowledge through education, training and research. The Department is committed to pursuing this philosophy through the provision of a world-class programme in computer science aimed at training highly skilled and globally employable computer scientists and conducting cutting-edge research in the field of computer science.

ENTRY REQUIREMENTS FOR ADMISSION OF STUDENTS

Applicants must have one of the following MINIMUM REQUIREMENTS FOR ADMISSION TO DIPLOMA PROGRAMME

A. SSSCE Holders

i. Six (6) Passes (A –D) in all subjects, including English and Mathematics.
ii. This programme requires mandatory passes or better, in three electives. The three electives should include Elective Mathematics for non-science applicants

B. WASSCE Holders

i. Six (6) Passes (A1 – D7) in all subjects, three (3) of which should be credit Passes (C6) or better
ii. It must be noted; however, this program requires mandatory passes or better, in three electives. The three electives should include Elective Mathematics for non- science applicants.

C. DIPLOMA IN BUSINESS STUDIES (DBS) CANDIDATES

Four (4) WASSCE credit passes (A1-C6) or four SSSCE passes (A-D) including English Language and Mathematics, plus the DBS qualification could be used as entry qualification for this Diploma programme.

D. PROFESSIONAL AND OTHER ENTRY QUALIFICATIONS

All professional certificates and any other qualifications beyond the ones specified above are to be referred to the National Accreditation Board for the establishment of their equivalencies, to determine their eligibility for admission to tertiary education institutions.

E. Two (2) GCE Advanced Level passes and five (5) GCE Ordinary Level PASSES.
Two of the GCE Ordinary Level credits should be English and Mathematics.

F. Mature Students:

Applicants lacking the necessary academic qualifications may be considered for admission if they are 25 years and above and show proof of age with birth certificate or any legitimate documentary proof of birth date which is at least 5 years old at time of application. The mature applicants are required to take and pass an entrance examination and attend an interview to determine their eligibility for the programme.

OR

Holders of Teacher's Certificate 'A' 3-year Post Secondary AND Equivalent Certificates

REQUIREMENT FOR GRADUATION

To successfully graduate from the programme and qualify for the award of the Diploma in Computer Science, candidates must satisfy the following:

A. Total Credits required – 77 semester credits
B. Breakdown of total credits into major curriculum sub-divisions – See Table I below.

Diploma [Computer Science] Major Curriculum Sub-Divisions

	Major Curriculum Sub-Divisions – divisions	Credits Requirements
A.	General Education	14
B.	Computer Science Courses	51
C.	Cognates	9
D.	Project Work	3
	Total	**77**

ADDITIONAL REQUIREMENTS FOR GRADUATION

a) Have passed all required courses of the programme with a C grade in all courses
b) Have obtained Cumulative Great Point Average CGPA of 2.0 or more
c) Have attended lectures and have his/her results and performance confirmed by Academic Board.

Laboratory Sessions and Project

Students are required to take a number of Non-Credit Courses, take Computer Laboratory sessions and complete supervised project work that form part of the Credit Courses.

SEQUENCE OF COURSES

FIRST YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
ENGL111 Language and Writing Skills I	2	ENGL112 Language and Writing Skills II	2
FREN111 French for Oral Communication I	2	SOCI105 General Sociology ***OR*** PSYC105 Intro to Psychology	3
RELB163 The Life and Teachings of Jesus	3	CSCD130 Digital Electronics	3
PHYS103 Physics	3	CSCD114 Programming with C++	3
CSCD113 Elements of Programming	3	CSCD116 Microsoft Office Applications	3
CSCD115 Intro to Computer Science I	3	CSCD250 Computer Ethics	3
MATH171 Intro to Maths for Computer Science	3	MATH172 Discrete and Continuous Mathematics	3
GNED125 Study Skills	**NC(*1)**		
Total Credits	**19+1 =20**	**Total Credits**	**20**
SECOND YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
PEAC100 Physical Activity	NC	HLTH200 Health Principles	3
RELB251 Principles of Christian Faith I	3	CSCD231 Web Engineering	3
CSCD211 Computer Organization	3	CSCD260 Systems Analysis and Design	3
CSCD256 Operating Systems	3	CSCD271 Computer Network Engineering	3
CSCD240 Programming with Visual C#	3	CSCD280 Information Systems	3
CSCD210 Numerical Methods	3	CSCD299 Project Work	3
CSCD230 Database Systems Design	3	CSCD226 Computer Security	3

MGNT234 Principles of Management	3		
Total Credits	**21**	**Total Credits**	**21**

The detailed description of the courses can be referenced from the catalog description of the BSc Computer Science program above.

PHILOSOPHY

The underlying and guiding philosophy of the Department of Information Technology and the BSc (Information Technology) Programme is to promote scholarship, as well as the search for and the application of scientific knowledge through education, training and research.

The Department is committed to pursuing this philosophy through the provision of a world-class programme in Information Technology aimed at training highly skilled and globally employable IT personnel and conducting cutting-edge research in the field of Information Technology.

MISSION STATEMENT

The mission of the Department of Information Technology is to serve as an international centre of excellence in the provision of high-quality holistic education, and professional training in computer science; as well as serve as a leading centre for cutting-edge advanced research and development work in current and emerging subject areas of Information Technology. By integrating faith and learning, it is hoped that graduates will be equipped to exert positive intellectual, moral and professional influence in the practice of Information Technology.

THE RATIONALE

The need for trained information technologists is one of the challenges that face the rapidly growing Ghanaian economy. The world economy is experiencing the effects of rapid globalization and the impact of the emerging information age characterized by information and communication technologies (ICTs). The role that the Information Technology field and industry can play to support the socio-economic development process has been recognized by governments world-wide including the government of Ghana.

It has also been acknowledged that the world-wide shortage of qualified human resources in the computer field had been one of the main obstacles to the deployment, exploitation and the development of ICTs to accelerate economic and social development. This problem is more felt in the developing countries like Ghana, than is the case in the industrialized countries.

NATIONAL DEMAND FOR THE PROGRAMME

In Ghana, the need for trained personnel of integrity, good work ethnics, excellent professional skills and positive human relations to contribute towards the realization of Ghana's socio-economic development cannot be over-emphasized. Specifically, there is an urgent need in Ghana to meet the short fall in Information Technology graduates with the requisite skills. This programme is, therefore, designed to address the majorarea of manpower requirements of the nation by preparing qualified youth for Information Technology careers in the public and private sectors of the economy.

EMPLOYMENT PROSPECTS OF STUDENTS (ENROLLED)

The worldwide shortage of computer professionals is a well-known phenomenon. In Ghana as in other countries, there is an acute shortage of qualified computer personnel.

The market for Information Technology graduates in Ghana and elsewhere is large and growing. Almost every sector needs computer personnel and as such the employment prospects of Information Technology graduates are great in every country including Ghana. Experience from elsewhere shows that graduates in this field are in high demand and most students on this type of programme are normally offered jobs before graduation. We, therefore, expect a very high demand in Ghana and elsewhere for graduates of the VVU Information Technology programme. Graduates of the programme can go on to pursue professional career in Information Technology in basically any type of establishment in both the private and the public sector.

Graduates will typically be employed as: systems analysts, computer system administrators, network managers, analyst programmers, software or system developers, software support staff, hardware support staff, computer systems engineers or technicians, business system analysts,

among others. The field of Information Technology has one of the most attractive career advancement prospects in both the private and public sector. There are also numerous opportunities for pursuing postgraduate studies up to the PhD. level in the field of Information Technology in leading universities world-wide. Graduates may also have the opportunity both within and outside Ghana to join an R&D team involved in cutting-edge research and development work in advanced computer systems.

THE OBJECTIVES

The objectives of the Information Technology Programme are:

- To teach students the underlying fundamentals of computer software, computer hardware, computer-related mathematical systems and how computers interact with the rest of society.
- To encourage graduates of the programme to go into self-employment by creating their own computer-based businesses, for example: local and off- shore software development and maintenance; computer hardware system assembling, repair and maintenance and in new emerging computer services like Web-hosting and publishing services, desktop publishing services, information provision services, computer design services, and e-commerce services.
- To create opportunities for students to apply their theoretical knowledge through work-study and practicum programmes.
- To develop in students the ability to think critically and to develop the highest levels of human values.
- To encourage students to appreciate the dignity of labour through work-study programme.
- To encourage students to dedicate their lives to leadership in selfless service to God and to humanity through participation in community service.

ENTRY REQUIREMENTS FOR ADMISSION OF STUDENTS

Applicants must have one of the following academic requirements to be admitted to the degree programme.

1. *Senior Secondary School Certificate Examination (SSSCE)*: *Compulsory Subjects* - Grade D or better in three (3) core subjects, including English and Mathematics (Core) and *Elective Subjects* – Grade D or better in three (3) elective subjects.
2. *West Africa Senior School Certificate Examination (WASSCE)*: Compulsory Subjects - Grade C6 or better in three (3) core subjects including English and Mathematics (Core) and Elective Subjects – Grade C6 or better in three (3) elective subjects.
3. *General Certificate of Education (GCE) Advanced Level*: Passes in three (3) subjects (at least, one of the passes should be Grade D or better). Also, the applicant must have had credit passes (Grade 6) in five GCE Ordinary Level subjects including English, Mathematics and a Science subject (for non- science students) and an Arts subject for Science students.
4. HND holders from recognized institutions with at least second-class lower division may be considered for admission into level 200 or 300 in their area of specialization depending on the subjects passed
5. Diploma or other certificates from recognized institutions assessed to be equivalent to (1), (2) or (3) may be considered for admission into level 200 or 300 where applicable.
6. International Students having equivalent qualifications as stated in (1), (2) or (3) may apply for admission. Foreign Certificates must receive authentication and equivalencies from the Ghana National Accreditation Board. Foreign students must have their high school certificates/diplomas translated into English if they are not written in English.
7. *Mature Students*: The applicant must:
    a. Be at least 25 years old.

b. Show proof of age with birth certificate or any legitimate documentary proof of birth date which is at least 5 years old at the time of application.

Pass Mature Students' Entrance Examinations conducted by Valley View University with three subjects (English Language, Mathematics and General Paper). In lieu of entrance examination, the applicant should show proof of passes in English and Mathematics in WASSCE, SSCE, GCE or any other nationally recognized standard High School level examinations. The mature applicants are required to take and pass an entrance examination and attend an interview to determine their eligibility for the programme.

PROGRAMME OFFERED

The Department of Information Technology offers Bachelor of Science [BSc] in Information Technology.

REQUIREMENT FOR GRADUATION

A. Total Credits required – 144 semester credits
B. Breakdown of total credits into major curriculum sub-divisions – See Table I below.

BSc. [Information Technology] Major Curriculum Sub-Divisions

	Major Curriculum Sub-Divisions	Credits Requirements
A	General Education	30
B	Cognates	09
C	Computer Science Courses Required	30
D	IT Concentration Courses	63
E	Information Technology Electives	09
F	Final Year Project	06
	Total	**147**

ADDITIONAL REQUIREMENT FOR GRADUATION

Non-Credits Courses and Laboratory Sessions and Projects

Students are required to take a number of Non-Credit Courses, take Computer Laboratory sessions and do projects that form part of the Credit Courses.

Final Year Research Project

Each graduating student is to carry out under supervision of a Faculty member a practical Information Technology project on a topic or subject previously approved by the Head of Department.

Research Component

Final Year Research Project is a pre-requisite for graduation. Practical training, internship, clinical experience, etc. Practicum in Information Technology is required of all students.

INFORMATION TECHNOLOGY MINOR

INFORMATION TECHNOLOGY MINOR 21 Credits

The Department of Information Technology offers a minor to students majoring in areas other than Information Technology. Candidates planning to do a minor would have to meet the admission requirements for the Information Technology Department, including WASSCE/SSSCE passes in three (3) core subjects, and three (3) electives in any of the follow areas Science, Business, Technical Skills, Vocational Skills and Agriculture. For Information Technology Minor the 21 credits must be selected from the required courses listed below. Given that a number of the required courses

Minor have prerequisites it is anticipated that the total number of required credits will be excess of 21.

Required Courses for Minor

INFT 240 Advanced Programming with Applications Development 3 INFT 211	
Computer Architecture & Organization	3
INFT 280 Information Technology Systems	3
INFT 360 Web Engineering & Application Systems	3
COSC 230 Database Systems Design	3
COSC 255 Operating Systems	3
COSC 271 Data Communication & Computer Network I	3

Prerequisite Courses

INFT 115 Information Technology Foundation I	3
INFT 116 Information Technology Foundation II	3
COSC 113 Elements of Programming	3
COSC 221 Programming with C++	3
COSC 222 Programming with Java	3
COSC 130 Digital Electronics	3
MATH 125 Algebra II	3

1. **Components of the programme:**

COURSES	Credits	1st Year	2nd Year	3rd Year	Final Year
A. MANDATORY COURSES					
1. Language and Communications					
ENGL111 Language and Writing Skills I	2	*x*			
ENGL112 Language and Writing Skills II	2	*x*			
FREN111 French for General Communication	2	*x*			
CMME105 Intro to Communication Skills	2	*x*			
2. Religion					
RELB163 Life and Teaching of Jesus	3	*x*			
RELB251 Principles of Christian Faith	3		*x*		
3. Health and Physical Education					
PEAC100 Physical Activity	(NC)*1		*x*		
4. Behavioral and Social Science					
SOCI105 Principles of Sociology OR	3	*x*			
PSYC105 Introduction to Psychology					
6. Counselling, Career Planning, Human Development					
GNED225 Study Skills	(NC)*1		*x*		
B. CORE COURSES					
MGNT234 Principles of Management	3		*x*		
MATH141 Algebra	3	*x*			
MATH172 Discrete and Continuous Mathematics	3	*x*			
INFD142 Critical Thinking and Practical Reasoning	3	*x*			
ACCT210 Introduction to Accounting	3		*x*		
MATH282 Introduction to Statistics and Probability	3		*x*		

INFT115 Information Technology Foundation I	3	*x*			
INFT116 Information Technology Foundation II	3	*x*			
INFT211 Computer Architecture and Organization	3		*x*		
INFT250 Computer Ethics IT Legal Issues	3		*x*		
INFT280 Management Information Systems	3		*x*		
INFT331 Multimedia Application Systems Development I	3		*x*		
INFT340 Computer Vision: Concepts & Applications	3			*x*	
COSC130 Digital Electronics	3	*x*			
COSC230 Database Management Systems	3		*x*		
COSC271 Data Communication & Computer Network I	3		*x*		
COSC355 Operating Systems	3			*x*	
INFT365 Design & Theory of Algorithms	3			*x*	
INFT360 Web Application Development	3			*x*	
INFT420 Human Computer Interaction	3				*x*
INFT445 IT Entrepreneurship	3				*x*
COSC272 Data Communication and Computer Network II	3			*x*	
INFT328 Mobile Application Development	3			*x*	
INFT361 Internet-Enabled Application Systems Development	3			*x*	
INFT459 Enterprise Information Security	3				*x*
INFT439 Cloud Computing Systems	3				*x*
COSC455 Artificial Intelligence	3				*x*
COSC113 Elements of Programming	3	*x*			
COSC124 Procedural Programming	3	*x*			
COSC224 Object-Oriented Programming	3		*x*		
COSC320 Systems Analysis & Design	3		*x*		
INFT346 DotNet Programming	3			*x*	
INFT356 IT Projects Management	3				*x*
INFT370 Management Science	3			*x*	
INFT447 Software Engineering	3			*x*	
INFT454 Advanced Database System Implementation & Admin	3				*x*
INFT466 Systems and Network Administration	3				*x*
INFT470 Computer and Cyber Forensics	3				*x*
INFT480 Data Mining	3				*x*
C. ELECTIVE COURSES					
INFT432 Multimedia Application Systems Development II	3				*x*
INFT456 Machine Learning	3				*x*
INFT454 Advanced Database System Implementation & Admin	3				*x*
INFT466 Systems and Network Administration	3				*x*
INFT470 Computer and Cyber Forensics	3				*x*
INFT480 Data Mining	3				*x*
Research, Practical training, industrial attachment, internship					
INFT364 Research Methods	3			*x*	
INFT491 Final Year Project I	3				*x*
INFT492 Final Year Project II	3				*x*
INFT390 Internship	3			*x*	

(a) Structure of the programme (Semester-by-semester schedule/structure of course, showing the credit value of each course, Lecture (L)).

First Year, 1st Semester

Course Code	Course Title	L	T/P	Credits
ENGL111	Language and Writing Skills	2		2
RELB163	Life and Teaching of Jesus	3		3
MATH141	Algebra	3		3
GNED125	Study Skills	1		NC (*1)
PEAC100	Physical Activity	1	1	NC (*1)
FREN121	French for General Communication I	2		2
COSC113	Elements of Programming	2	1	3
INFT115	Information Technology Foundation I	3		3
INFT142	Critical Thinking and Practical Reasoning	3		3
Total				**18+(2)=20**

First Year, 2nd Semester

Course Code	Course Title	L	T/P	Credits
ENGL112	Language and Writing Skills II	2		2
CMME115	Introduction to Communication Skills	2		2
SOCI105 OR PSYC105	General Sociology ***OR*** Introduction to Psychology	3		3
GNED1230	Career Exploration and Planning	1		1
COSC124	Procedural Programming	1	2	3
INFT116	Information Technology Foundation II	2	1	3
COSC130	Digital Electronics	2	1	3
MATH172	Discrete and Continuous Mathematics	2	1	3
Total				**20**

Second Year, 1st Semester

Course Code	Course Title	L	T/P	Credits
AFSTxxx	African Studies – Group A	1		1
RELB251	Principles of Christian Faith	3		3
ACCT210	Introduction to Accounting	2	1	3
INFT211	Computer Architecture and Organization	2	1	3
COSC230	Database Management Systems	1	2	3
COSC271	Data Communication & Computer Network I	2	1	3
MATH282	Introduction to Statistics and Probability	2	1	3
Total				**19**

Second Year, 2nd Semester

Course Code	Course Title	L	T/P	Credits
AFSTxxx	African Studies – Group B	1		1
HLTH200	Health Principles	3		3
MGNT234	Principles of Management	3		3
INFT250	Computer Ethics & IT Legal Issues	3		3
COSC224	Object-Oriented Programming	1	2	3
COSC272	Data Communication & Computer Network II	2	1	3
INFT280	Management Information Systems	2	1	3
Total				**19**

Third Year, 1st Semester

Course Code	Course Title	L	T/P	Credits
RELT385	Biblical Foundation of Ethics	3		3
COSC320	Systems Analysis and Design	2	1	3
INFT331	Multimedia Application Systems Development	1	2	3
COSC355	Operating Systems	2	1	3
INFT365	Design & Theory of Algorithms	2	1	3
INFT360	Web Application Development	1	2	3
Total				**19**

Third Year, 2nd Semester

Course Code	Course Title	L	T/P	Credits
INFT328	Mobile Application Development	1	2	3
INFT340	Computer Vision: Concepts and Applications	2	1	3
INFT346	DotNet Programming	3		3
INFT361	Internet-Enabled Application Systems	3		3
INFT364	Research Methods	1	2	3
INFT370	Management Science	2	1	3
INFT447	Software Engineering	2	1	3
Total				**19**

Third Year, Summer

Course Code	Course Title	L	T/P	Credits
INFT390	Internship		3	3
		2	1	3

Fourth Year, 1st Semester

Course Code	Course Title	L	T/P	Credits
INFT439	Cloud Computing Systems	2	1	3
INFT445	IT Entrepreneurship	3		3
INFT356	IT Projects Management	3		3
COSC455	Artificial Intelligence	2	1	3
INFT459	Enterprise Information Security	2	1	3
INFT491	Final Year Project I	1	2	3
Total				**19**

Fourth Year, 2nd Semester

Course Code	**Course Title**	**L**	**T/P**	**Credits**
RELG451	Bible and Family Dynamics	3		3
INFT420	Human Computer Interaction	2	1	3
INFTxxx	***(Elective 1)***	2	1	3
INFTxxx	***(Elective 2)***	2	1	3
INFTxxx	***(Elective 3)***	2	1	3
INFT492	Final Year Project II	1	2	3
INFT340	Computer Vision: Concepts and Applications			
Total				**18**

INFORMATION TECHNOLOGY MINOR [FOR NON-IT STUDENTS]

Information Technology Minor (21 Credits Plus Prerequisite)

The Department of Information Technology offers a minor to students majoring in areas other than Information Technology. Candidates planning to do a minor would have to meet the admission requirements for the Information Technology Department, including WASSCE/SSSCE passes in three (3) core subjects and three (3) electives in any of the following areas Science, Business, Technical Skills, Vocational Skills and Agriculture. For Information Technology Minor, the 21 credits must be selected from the required courses listed below. Given that a number of the required courses Minor have prerequisites, it is anticipated that the total number of required credits will be in excess of 21.

Required Courses for Minor

INFT346 DotNet Programming	3	
INFT211 Computer Architecture & Organization	3	
INFT280 Management Information Systems	3	
INFT360 Web Application Development	3	
COSC230 Database Management Systems	3	
COSC355 Operating Systems	3	
COSC271 Data Communication & Computer Network I	3	

Prerequisite Courses

INFT115 Information Technology Foundation I	3	
INFT116 Information Technology Foundation II	3	
COSC113 Elements of Programming	3	
COSC124 Procedural Programming		3
COSC224 Object-Oriented Programming	3	
COSC130 Digital Electronics		3
MATH142 Algebra		3

2. **Course Description:**

ENGL 111 LANGUAGE AND WRITING SKILLS I 2 CREDITS
This course aims at developing the basic skills in the grammatical systems of English language and to use these effectively in writing for university and professional pursuits. Coverage includes a wide range of structures required for appropriate use of the English Language.

RELB163 LIFE AND TEACHINGS OF JESUS 3 CREDITS
A comprehensive study of the life and teachings of Jesus as unfolded in the four gospels with analytical attention to the gospel writers and their writings in an attempt to reveal the impact of His self-revelation in that age and ours.

FREN 111 FRENCH FOR GENERAL COMMUNICATION I 2 CREDITS
This course provides a basic foundation on which to build the skills of listening, speaking, reading and writing simple material in French. The approach is essentially communicative and accurate pronunciation is stressed.

PEAC100 PHYSICAL ACTIVITY NC
This course is designed to train the body as 'the temple of God' and to develop a positive attitude towards exercise for the improvement and maintenance of overall health and fitness. It is aimed at improving cardio-respiratory endurance and other components of physical fitness.

GNED 125 STUDY SKILLS NC
The course is about tools and techniques for success in the university and beyond. It covers skills and strategies designed to improve study behavior. Upon completion, students should be able to apply appropriate study strategies and techniques to the development of an effective study plan.

INFD142 CRITICAL THINKING AND PRACTICAL REASONING 3 CREDITS

It will blend formal and informal logic with a variety of skills and themes helpful in making wise decisions about claims, actions, and practices. The goal of this interactive, conversational course is to teach students how to utilize the tools of logic to reach the most compelling conclusions possible when faced with a variety of real-world problems.

MATH141 ALGEBRA 3 CREDITS
This course introduces students to the fundamental concepts of Algebra. The course concentrates on the application of fundamental mathematical concepts in solving real-life problems, By the end of this course, students should be able to solve problems involving linear equations using elimination and substitution methods; understand the concept of factorization, apply concepts of series and sequence in real-life situations, solve and sketch linear and quadratic curves, solve problems involving Matrices and Systems of Linear Equations; understand the concept of Mathematical Induction; Graph Polynomial Functions; determine the Zeros of Polynomial Functions; solve Probability Problems, and understand the concept of permutation and combination

Course Contents

COSC113 ELEMENTS OF PROGRAMMING 3 CREDITS
This course introduces students to the principles of problem-solving using fundamental algorithmic techniques and design, structured programming, and computer systems concepts. The course covers the techniques necessary to write well-documented, structured computer programs. The course is intended to emphasize the planning process using examples involving sequence, selection, iteration, and basics of computer arithmetic, data structures, sorting and searching. Upon successful completion of this course, the students should be able to design simple, structured, well-documented computer programs.

INFT115 INFORMATION TECHNOLOGY FOUNDATIONS 3 CREDITS

This course introduces students to the basic principles, concepts and practice of information technology. The course provides an overview of key topics in information technology, emphasizing: the underlying mathematical concepts and principles of computing, relating to hardware as well as system development components and aspects of information technology are covered. This course provides a good appreciation of the fundamentals of computer architectures and their operation. It provides understanding of how computers are employed for problem-solving. Identify and describe the functions of the various components of the Basic Computer Architecture. Understand the concept of algorithms and their development and to use the computer to manipulate such data items as numbers, characters, and strings.

ENGL 112 LANGUAGE AND WRITING SKILLS II 2 CREDITS

The prerequisite for this course is Language and Writing Skills 1 (ENGL 111). The course deals with the application of the grammatical systems studied in Language and Writing Skills I. The course is designed to enable students to acquire writing skills, skills to analyse and critique written forms and grasp information and meaning from the recommended text for personal and academic writing.

CMME 115 INTRODUCTION TO COMMUNICATION SKILLS 2 CREDITS

This course is designed to assist students to acquire oral, written skills and nonverbal communication skills in order to communicate effectively. The course is also to raise students' level of proficiency as well as prepare them to function effectively on their own.

PSYC 105 INTRODUCTION TO PSYCHOLOGY 3 CREDITS

This course introduces students to the study of behavior and mental processes. The course will focus on the evolvement of psychology into a scientific study and some psychological principles that explain human behavior and mental process. In addition, there will be an application of these principles to everyday life to help students appreciate how these psychological principles affect their daily lives and interaction with others. It is designed to introduce University students to the history, development, and present scope of psychology with additional emphasis on non-western psychological approaches.

COSC124 PROCEDURAL PROGRAMMING 3 CREDITS

The course is designed to introduce the principles and concepts of programming and teach problem-solving methods and algorithm development; high-level, structured programming using a recent procedural programming language such as C/C++ etc.

Prerequisite: COSC113

COSC 130 DIGITAL ELECTRONICS 3 CREDITS

This course is designed to introduce students to the theory and practice of digital electronics. The first part of the course deals with a comprehensive study of the principles and techniques of digital electronics. The second part of the course aims at providing students with a strong foundation in the core fundamentals of digital electronics with an emphasis on digital systems designs and troubleshooting.

MATH 172: DISCRETE AND CONTINUOUS MATHEMATICS 3 CREDITS

The course presents a study of mathematics that falls outside the realm of Calculus. Calculus is the study of continuous mathematics concepts, whereas discrete mathematics is the study of separable, countable or quantified objects. It involves mathematical reasoning along with creativity and problem solving.

AFST XXX AFRICAN STUDIES 2 CREDITS

This course is about our way of life as Africans and its implications for development. The course, therefore, aims at creating a learning space for students to critically examine the interplay between African culture and development by highlighting how these concepts shape or influence each other. It also seeks to develop a positive attitude to African cultures and ways of life. Themes for discussion focus on the cultural issues that arise in the quest for socio-political, economic, religious and technological advancement and the need to preserve certain traditional values while pursuing new ones. There are several African Studies courses out of which students are to choose two of them

RELB 251 PRINCIPLES OF CHRISTIAN FAITH 3 CREDITS
This course surveys the fundamentals of Christian teachings. It focuses on providing the biblical concepts of God as the creator of all things, the sustainer and the redeemer. It provides the understanding of the essentials of Christian living, the origin of man out purpose on earth and what happens after death.

ACCT210 INTRODUCTION TO ACCOUNTING 3 CREDITS
This course is designed to cover the fundamentals of accounting applicable to different business entities with emphasis on the accounting cycle, the preparation of financial statements, bank reconciliations, and payroll. The process of recording, summarizing and reporting financial information is covered in detail for decision making. The course focusses on the study of analysing, classifying, and recording business transactions in both manual and computerized environments.

INFT211 COMPUTER ARCHITECTURE AND ORGANIZATION 3 CREDITS
This course introduces students to the science and art of selecting and interconnecting hardware components to create a computer that meets functional, performance, and cost goals, and also provides the constituent parts of the system, how they are interconnected, and how they interoperate in order to implement the architectural specification.

COSC 230 DATABASE MANAGEMENT SYSTEM 3 CREDITS
The course is aimed at introducing students to the management of database systems. It emphasizes on the theoretical and practical issues in management, retrieval and organization of large quantities of data. The course also facilitates students understanding of database architectures, data models and database manipulations. It aids students to represent information with the relational database model, manipulating data with an interactive query language (SQL) and database programming, database development including internet applications and privacy, security and integrity issues.

COSC 271 DATA COMMUNICATION & COMPUTER NETWORK I 3 CREDITS
This course concentrates on the fundamentals of computer communications and networks, and telecommunications. It introduces students to the concept of digital, voice and video signals and transmission; protocols for data communication; capacity utilization; multiplexing and concentration; local area networks (LANs), wide area networks (WANs).

MATH282 INTRODUCTION TO STATISTICS AND PROBABILITY
This course aims to lay foundations in probability and distribution theory, data analysis and the use of a statistical methods. It then formally defines probability and studies the key properties. The concepts of random variables as outcomes of random experiments are introduced and the key properties of the commonly used standard univariate random variables are studied. Emphasis is placed on learning the theories by proving key properties of each distribution. Basic ideas of statistical inference, including techniques of point and interval estimation and hypothesis testing, are introduced and illustrated with practical examples.

HLTH200 HEALTH PRINCIPLES 3 CREDITS
This course deals with the study of basic health practices which seek to improve health and longevity. It focuses on holistic health, which includes the physical, mental, social and spiritual aspects of the human being. It also encourages students to apply these principles for achieving and maintaining good health in their various communities. It also studies physiology, including the principles governing the community and personal health and the methods of applying these principles to successful daily living. Course coverage includes Introduction to health, S. D. A. Philosophy of health and Biblical Concept of health, Understanding the levels of human Body Organization, Application of "CELEBRATIONS" to Healthy Lifestyles etc.

MGNT234 PRINCIPLES OF MANAGEMENT 3 CREDITS
A beginning course designed to study business management theory and practice, including topics such as functions of management, history of management thought, executive functions of a manager (planning, organizing, directing, coordinating, staffing and controlling). This course also introduces students to the functional areas of

business such as marketing, financial, personnel and operations. It further applies the study of the principles of management theory and practice in organizations, with emphasis placed on the challenges of management in diverse and complex environments.

INFT250 COMPUTER ETHICS & IT LEGAL ISSUES 3 CREDITS

This course examines personal and contemporary organizational ethical issues and challenges in the design, development, and use of computing technologies in a global environment. Special emphasis on philosophical basis for computer ethics, reliability and safety of computer systems, protecting software and other intellectual property, computer crime and legal issues, and professional codes of ethics. The course is designed to provide students with an ethical framework from which they may ascertain the appropriate actions to take as they work in the IT field. It is believed that without the proper perspective and understanding of ethical, legal, and societal issues it can be difficult to know the best decisions to make. This course hopes to help individuals take responsibility for their actions, act with transparency and accountability, and understand the implications of their actions towards individuals, organizations, and society.

COSC224 OBJECT-ORIENTED PROGRAMMING 3 CREDITS

This course introduces the concepts of object-oriented programming to students with a background in the procedural paradigm. The course begins with a brief review of control structures and data types with an emphasis on structured data types and array processing. It then moves on to introduce the object-oriented programming paradigm, focusing on the definition and use of classes along with the fundamentals of object-oriented design. Other topics include an overview of programming language principles, simple analysis of algorithms, basic searching and sorting techniques, event-driven programming, memory management and an introduction to software engineering issues. The course also covers a variety of other advanced topics, including developing graphical user interface (GUI) and graphics in both AWT and SWING.
Prerequisite: COSC124 [Java or Python may be preferred]

COSC 272 DATA COMMUNICATION AND COMPUTER NETWORK II 3 CREDITS

This course is designed to provide a thorough understanding & in-depth knowledge of concepts in computer networks such as Internet protocols and routing, local area networks, wireless communications and networking, performance analysis, congestion control, TCP, network address translation, multimedia over IP, switching and routing, mobile IP, multicasting, IPv6. Peer-to-peer networking, network security, and other current research topics. A focus will be placed on wireless networking, reflecting rapid advances in this area.

INFT280 MANAGEMENT INFORMATION SYSTEMS 3 CREDITS

The purpose of the course is to provide students with a solid grounding in business uses of information technology in a rapidly changing environment and to provide a discussion of critical issues surrounding the use of IT in organizations. It provides the ability to explain terminology and concepts related to hardware, software, and networks. Define various business information systems, including transaction processing systems, management information systems, decision support systems, group support systems, and enterprise resource planning systems. Define and distinguish among the Internet, Intranets, and Extranets. Increase awareness of ethical issues related to using technology in business contexts. Use information technology as a tool to do essential business tasks.

RELT385 INTRODUCTION TO BIBLICAL FOUNDATIONS OF ETHICS 3 CREDITS

This course studies the structure and content of Christian ethics: goal, motive, and norm of the Christian life, with an analysis of ethical issues of practical decision-making, authority, life, and sexuality. Ethical considerations of business decisions are examined in light of a Christian value system. This course covers the different approaches to decision making in ethical situations, development of appropriate organizational responses to ethical problems, morality and issues of right and wrong, etc.

COSC320: SYSTEMS ANALYSIS AND DESIGN 3CREDITS

This course introduces students to the concepts, principles and practice of systems analysis and design. A number of systems analysis methodologies, techniques and tools are covered with emphasis on prescriptive models, agile models, use case models, computer-aided software engineering (CASE) tools, object-oriented models and commercial off-the-counter tools. The course covers the system development life cycle (SDLC) and considers practical issues involved in the development of implementable systems for user organizations. The course

provides the students with the skills to identify business problems and opportunity statements which may be solved by technology-based solutions by determining requirements, provision solutions, and develop designs and translating designs into construction and implementation and maintenance of the systems.

INFT331 MULTIMEDIA APPLICATION SYSTEMS DEVELOPMENT I
Multimedia is the combination of the digital forms of text, images, sounds, video and animation. This course aims to introduce students to the theories and principles of multimedia and provide students with a theoretical and practical introduction to design criteria and the design process of information delivered by multimedia. The course will aid students to understand user needs analysis and designing for the user; selection of suitable technology; designing for computer-based media; and the use of the major software tools and their accompanying skills.

COSC355 OPERATING SYSTEMS 3 CREDITS
This course provides a thorough understanding of the principles and design of operating systems. The aim is to illustrate the algorithms and approaches which can be taken in developing operating system functionalities. The course compares and contrasts the approaches taken in several modern operating systems. This course leads to a deep knowledge of the problems and solutions in developing modern concurrent systems. The course compares and contrasts the approaches taken to achieve the above facilities in a number of operating systems.

INFT365 DESIGN & THEORY OF ALGORITHMS 3 CREDITS
The course aims at introducing students to writing pseudo code for computing data structures. It provides understanding in deriving the data structures in different problems and applying these structures in efficient way of solving problems.

INFT360 Web Engineering & Application Systems 3 CREDITS
This course introduces students to the discipline of web Engineering, including the methods and techniques used in web-based system development. In contrast to traditional software engineering, web engineering methods and techniques that incorporate unique aspects of the problem domain such as document-oriented delivery, fine-grained lifecycles, user-centric development, client-server legacy system integration and diverse end-user skill levels. This course draws upon previous programming and computing experience to develop practical web development and maintenance skills. This course is intended for students with knowledge of both Internet communication concepts and an introductory programming knowledge (Java & JavaScript).

INFT328 MOBILE APPLICATION AND SYSTEMS DEVELOPMENT 3 CREDITS
This project-oriented course will investigate application development for the Android mobile platform. It concentrates on techniques for building applications that adapt to the ways in which mobile apps differ from traditional desktop or web-based apps, including constrained resources, small screen sizes, varying display resolutions, intermittent network connectivity, specialized sensors, and security restrictions. We will explore best practices for making mobile applications flexible: using XML-based layouts, networking via NFC and Wi-Fi, determining device location and orientation, deploying applications, gracefully handling shutdowns and restarts to the application, embedding web components in applications, showing maps with the Google Maps plug-in, and storing local data with SQLite. Prerequisite(s): Expertise in simple SQL, Java and basic APIs, including callbacks, threads, XML, lists, and maps. Course Note(s): Students should already be very comfortable with Java.

INFT340 COMPUTER VISION: CONCEPTS AND APPLICATIONS 3 CREDITS
Computer vision is concerned with modelling and replicating human vision using computer software and hardware. Topics include camera models, multi-view geometry, reconstruction, some low-level image processing, and high-level vision tasks like image classification and object detection.

NFT346 DOT NET PROGRAMMING 3 CREDITS
This course is designed to introduce students to Visual and Object-Oriented Programming Concepts, Inheritance, Polymorphism and Encapsulation. Students are taught how to write stand-alone windows applications with Dialogue boxes. It is to aid students develop the skill in the use of Options buttons, checkboxes, menus, windows style, help Facilities and installation programs writing ActiveX controls and windows DLLs and using windows

API are covered.

INFT356 PROJECT PLANNING AND MANAGEMENT 3CREDITS

This course provides students with a comprehensive introduction to project management in an information technology/information systems context. It will highlight the key phases of the project management cycle and describe the various tools and methods used in each of those phases. Key areas such as project selection methods, work breakdown structures, network diagrams, critical path analysis, and critical chain scheduling, time and cost estimates, earned value management and motivation theory, and team building will be emphasized. The course will consider both theoretical and practical perspectives and equip students with the necessary skills to be able to better manage or participate in projects.

INFT361 INTERNET-ENABLED APPLICATION SYSTEMS 3 CREDITS

Modern information systems necessitate the implementation of web-based applications. The course provides the knowledge and skills necessary to create dynamic web applications and prepares students for relevant advanced courses in computer technologies. The purpose of the course is to enable the student to learn how to develop internet applications that users can access on various platforms via a standard client, i.e. web browser. The student will learn how to use internet programming and scripting languages. This course provides a broad overview of the principles and technologies used in Internet Applications, with practical experience of client-side and server-side programming.

INFT364 RESEARCH METHODS 3 CREDITS

This course is designed to provide the fundamentals of research methodology applicable to Information Technology and its related areas. Analysis, critical reading, evaluation, and application of research needed for the development of skills in research proposals are emphasized. The course is to provide students with the basic concepts and strategies in design science research and to enable students to develop the most appropriate design methodology for their research studies.

INFT370 MANAGEMENT SCIENCE 3 CREDITS

This course provides all rational approaches to managerial decision making based on the application of scientific methodology. Using a scientific problem-solving approach and taking into account organizational objectives and resources, attempts to formulate policies that are in the best interests of the organization. Emphasis is placed not only on how the techniques work but on how they can be interpreted and applied by the decision-maker. The course will focus on model building and computer applications and the importance of mathematical models and techniques in the decision-making process

INFT447 SOFTWARE ENGINEERING 3 CREDITS

This course introduces students to concepts applied throughout the entire software lifecycle, spanning the early phases of system specifications all the way to maintenance after system deployment using an engineering approach. Aiding students to appreciate why use an engineering approach to software, simply, because the alternative would be to use an ad-hoc or disordered approach. An understanding of engineering approach means predictability and quantifiable results through the application of theories, methodologies, frameworks, and tools. When applied efficiently, the result is high-quality software created in a cost-effective manner.

INFT439 CLOUD COMPUTING SYSTEMS 3 CREDITS

This course is aimed at introducing the main concepts in cloud computing and to examine the fundamental problems in the area, and look at the various models and solutions that have been proposed. Extensive use is made of real system case studies to aid students to develop skills in software-defined architectures, virtualization, IaaS, PaaS, SaaS, serverless architectures, cloud middleware technologies, cloud storage services and the likes.

INFT445 IT ENTREPRENEURSHIP 3 CREDITS

This course is designed to introduce students to the fundamental issues related to starting and managing technology-based new ventures. The course is designed to equip students to study how technology-based solutions can be applied to solve economic and socially oriented problems. It aids students in understanding into more

intensive entrepreneurship concepts, such as Venture Creation and Entrepreneurial Growth Strategies, which focus on testing, developing, and growing new technology businesses. The course places special emphasis on decision-making and problem-solving in society through an understanding of opportunity recognition, economic/financial models, value creation, and basic entrepreneur-related concepts.

INFT356 IT PROJECT MANAGEMENT 3 CREDITS

This unit provides students with the knowledge and skills to effectively manage networking projects. It covers professional practice in the context of networking projects. The unit employs case studies and follows projects from conception through to completion. It covers the key knowledge areas identified by the project management body of knowledge (PMBOK) developed by the Project Management Institute. The unit enhances knowledge and uses in-depth analysis of common issues/risks that project team members often face and strategies to mitigate these issues/risks. This unit helps students to learn about how project characteristics and management differ in the context of current enterprise case studies.

COSC455 ARTIFICIAL INTELLIGENCE 3 CREDITS

In this course, students will get a basic introduction to the building blocks and components of artificial intelligence, learning about concepts like algorithms. Students will also explore how AI is already being used, and evaluate problem areas of AI. The course also contains a balanced look at AI's impact on existing jobs, as well as its potential to create new and exciting career fields in the future.

COSC456 MACHINE LEARNING 3 CREDITS

This course is designed to introduce students to Machine learning. It emphasizes both practical and research knowledge areas required to design and build intelligent systems that are capable of learning using Python and scikit-learn library.

INFT452 ENTERPRISE INFORMATION SECURITY 3 CREDITS

This course covers conceptual and technological aspects of network security for voice and data networks. The course deals with the analysis, design, implementation and management issues surrounding effective network security. The intention of the course is to provide an even depth of coverage across the entire domain of the network security common body of knowledge. It is not intended to provide in-depth coverage of any particular network security topic.

RELG 451 BIBLE AND FAMILY DYNAMICS 3 CREDITS

Bible and Family Dynamics focuses on the role of the Bible in aiding family members find meaning and purpose in life. From the biblical perspective, the course highlights relevant issues that are incidental to the life of family members as they strive to function effectively in an increasingly global society. Issues for discussion include dynamics of family life, individual development, life relationships, responsible parenting, family worship, crisis management, resource management, civic responsibility, healthy living, housing decisions, career planning, and trends affecting African families.

INFT420 HUMAN-COMPUTER INTERACTION 3 CREDITS

This course covers the principles of human-computer interaction and the design and evaluation of user interfaces. It deals with an overview of human information processing subsystems (perception, memory, attention, and problem-solving); how the properties of these systems affect the design of user interfaces; the principles, guidelines, and specification languages for designing good user interfaces, with emphasis on tool kits and libraries of standard graphical user interface objects; and a variety of interface evaluation methodologies that can be used to measure the usability of the software. Other knowledge areas include World Wide Web design principles and tools, computer-supported cooperative work, multimodal and "next-generation" interfaces, speech and natural language interfaces, and virtual reality interfaces. Course work includes both the creation and implementation of original user interface designs and the evaluation of user interfaces created by others.

INFT491 FINAL YEAR PROJECT I 3 CREDITS

This is a capstone course for students to utilize knowledge they acquired from different courses to design and

develop an IT-related product or service. This is the first part of the course that spans through the final year of the student's study in which students are to provide detailed analysis of the existing systems or existing works in their research related area and their proposed system.

INFT492 FINAL YEAR PROJECT II 3 CREDITS

This is a capstone course for students to utilize knowledge they acquired from different courses to design and develop an IT-related product or service. This is the second part of the course that spans through the final year of the student's study. In this part students are able to provide detailed design and implement their design to create an IT software solution to the problems analyzed in the first part.

SOCI 115 PRINCIPLES OF SOCIOLOGY 3 CREDITS

This course is designed to assist students gain knowledge on the theoretical perspectives and subject matter of sociology. The main focus of the course is to help students develop sociological imagination in understanding, explaining and addressing every day, commonplace issues and behavior, especially within the African context. The course looks at an objective approach to the analysis and understanding of the social world. Consideration is given to the dynamic nature of African society and social institutions.

INFT361 INTERNET-ENABLED APP. SYSTEMS DEVELOPMENT 3 CREDITS

This course concentrates on the development of application systems and tools using the resources of the Internet as a development, implementation and delivery platform. Students are exposed to the emerging area of developing Web-based application systems for service delivery in the area of business, education, health, entertainment, etc. The course will introduce students to current Web-based systems development tools and programming languages. Students will be required to undertake projects involving the development of working systems using these tools and programming languages.

INFT432 MULTIMEDIA APP. SYSTEMS DEVELOPMENT II 3 CREDITS

This course provides the background needed for the design and development of computer-based business systems that combine text, still images, sound, animation, and full-motion video. The course will examine hardware characteristics necessary for the development and execution of such systems, design methodologies used in planning these systems, and authoring languages used to create such systems. Students will be required to design, create, and present at least one multimedia system for evaluation at the end of the semester.

INFT454 ADVANCE DATABASE MANAGEMENT SYSTEM 3 CREDITS

This course introduces students to the basic concepts in database management and practices, the application of database systems, SQL and commercial relational database systems (oracle). Students will explore relational database theory and be able to write relational SQL expressions for queries, sound design principles for logical design of databases including ER methods and normalization approach, as well as basic database storage structures and access techniques.

INFT466 SYSTEMS AND NETWORK ADMINISTRATION 3 CREDITS

This course introduces students to the foundational concepts and experience in networking and systems administration. The course provides the basic theory, concepts and practical experience in the design, installation and configuration of personal computers, peer-to-peer networks and client-server networks meeting user requirements.

INFT470 COMPUTER AND CYBER FORENSICS 3 CREDITS

This course introduces students to the types of crime that can occur through computers and the Internet, such as e-mail scams, identity theft, hacking, Internet harassment, and phishing. Students learn investigation techniques and discuss how cyber-crime is changing and growing. Often, the course covers ways to present evidence in a cybercrime case. The course emphasizes steps for conducting investigations and properly obtaining evidence for these types of cases. Students will learn about digital and analogue communications networks and other related cellular technologies. Students will sharpen their skills concerning analyzing data found on mobile devices.

INFT480 DATA MINING **3 CREDITS**

This course is an introductory course on data mining. It introduces the basic concepts, principles, methods, implementation techniques, and applications of data mining.

3. **Requirements for graduation:**

Provide information on the following requirements for graduation:

Course Requirements

Students are required to obtain a total of 154 credits to qualify for graduation.

a. Credits Requirements

Table 2: Credits Requirements

Major Curriculum **Major Curriculum Sub-Divisions –divisions**	**Credits Requirements**
Core courses	45
Elective Courses	09
Mandatory courses	46
Research Components	09
Competence-Based Training (CBT) component	18
Problem-Based Learning (PBL) component	24
Practical training, industrial attachment, internship, clinical experience, etc.,	03
Total	154

b. Any additional requirements for graduation e.g., attendance.

CITIZENSHIP GRADE

Each graduating student is to fulfil citizenship requirement of non-credit [though graded]. Citizenship grade is awarded to students who satisfy University requirements with respect to decent behaviour and conducts in lifestyle on-campus and off-campus and regular attendance to university gatherings. Students are expected to follow all regulations stipulated in the Valley View University Students Handbook.

LABORATORY SESSIONS AND PROJECT

Students are required to take a number of Non-Credit Courses, take Computer Laboratory sessions and do projects that form part of the Credit Courses.

FINAL YEAR RESEARCH PROJECT

Each graduating student is to carry out under the supervision of a faculty member a practical Information Technology project on a topic or subject previously approved by the Head of Department.

RESEARCH COMPONENT

Final Year Research Project is a pre-requisite for graduation. Practical training, internship experience, etc., are all required. Practicum in Computer Science is required of all students.

Aims

The aims of the programme are:

- To prepare graduates to begin a career in Information Technology.
- To enable students to develop practical skills within the information technology field to provide support in organizations and industries.
- To offer students the ability to work with real clients and businesses, enabling them to gain work experience required for initial job placement or entrance into undergraduate degree programmes of professional careers in Information Technology.
- To provide students the opportunity for a balanced development of the intellectual, spiritual, and social dimensions of life in harmony with the Christian heritage.

The Objectives

The objectives of the programme are:

- To offer in-depth training for students who are aspiring to become professionals in the field of Information Technology.
- To train Diploma graduates to apply their skills to support in solving problems in diverse fields in the industry.
- To communicate effectively as an IT professional with users, peers, and higher management.
- To work effectively on teams, whether as a participant or as a leader.
- To demonstrate ethical behavior as an IT professional and sensitivity to the impact of technology on society.
- To pursue and successfully complete an advanced degree if desired.
- To encourage students to appreciate the dignity of labour through work-study program;
- To encourage students to dedicate their lives to leadership in selfless service to God and to humanity through participation in community service.

Requirements for Graduation

To successfully graduate from the programme and qualify for the award of the Diploma in Information Technology, candidates must satisfy the following:

A. Total Credits required – 77 semester credits

B. Breakdown of total credits into major curriculum sub-divisions – See Table I below.

Table I: Diploma [Information Technology] Major Curriculum Sub-Divisions

	Major Curriculum Sub-Divisions –divisions	Credits Requirements
A.	**General Education**	**14**
B.	**Information Technology Courses**	**54**
C.	**Cognates**	**9**
	Total	**77**

Additional Requirements for Graduation

a) Have passed all required courses of the programme with a C grade in all courses
b) Have obtained Cumulative Great Point Average CGPA of 2.0 or more
c) Have attended lectures and have his/her results and performance confirmed by Academic Board.

- **Laboratory Sessions and Project**

  Students are required to take a number of Non-Credit Courses, take Computer Laboratory sessions and do projects that form part of the Credit Courses.

1) **Employment:**

The worldwide shortage of IT professionals is a well-known phenomenon. In Ghana, as in other countries, there is an acute shortage of qualified computer personnel.

The market for Information Technology graduates in Ghana and elsewhere is large and growing. Almost every sector needs IT personnel and as such the employment prospects of Information Technology graduates are great in every country including Ghana. Experience from elsewhere shows that graduates in this field are in high demand and most students on this type of programme are normally offered jobs before graduation.

We, therefore, expect a very high demand in Ghana and elsewhere for graduates of the VVU Information Technology programme. Graduates of the programme can go on to pursue professional career in information technology in basically any type of establishment in both the private and the public sector.
Graduates will typically be employed as: systems analysts, computer system administrators, network managers, programmers, software or system developers, software support staff, hardware support staff, computer systems technicians, business system analysts, among others. The field of information technology has one of the most attractive career advancement prospects in both the private and public sector.
There are also numerous opportunities for pursuing undergraduate studies in the field of information technology in leading universities world-wide. Graduates may also have the opportunity both within and outside Ghana to join any development teams involved in cutting-edge development work.

2) **Components of the programme:**
Details of the curriculum are as follows:
   a. Required(core) course(s)
   b. Elective course(s)
   c. Research component
   d. Practical training, industrial attachment, internship, clinical experience, etc.
   e. Semester-by-semester structure/schedule of course, showing the credit value of each course

List of Courses for The
Dip in Information Technology Program

COURSES	Total Credits	1st Year	2nd Year	Final Year
C. MANDATORY COURSES				
1. Language and Communications				
ENGL111 Language and Writing Skills I	2	***x***		
ENGL112 Language and Writing Skills II	2	***x***		
FREN111 French for General Communication	2	***x***		
CMME105 Intro to Communication Skills	2	***x***		
2. Religion				
RELB163 Life and Teaching of Jesus	2	***x***		
RELB251 Principles of Christian Faith	2		***x***	
3. Health and Physical Education				
PEAC100 Physical Activity	(NC)*1		***x***	
4. Behavioural and Social Science				
SOCI105 Principles of Sociology OR	2	***x***		
PSYC105 Introduction to Psychology				
5. Natural and Physical Sciences Mathematics				
Courses in Information Technology satisfy this requirement				
6. Counselling, Career Planning, Human Development				
GNED225 Study Skills	(NC)*1		***x***	
D. CORE COURSES				
MATH141 Algebra	3	***x***		
INFT142 Critical Thinking and Practical Reasoning	3	***x***		
INFT115 Information Technology Foundation	3	***x***		
INFT116 Microsoft Office Applications	3	***x***		
CSOC113 Elements of Programming	3	***x***		

COSC124 Procedural Programming	3	***x***		
COSC130 Digital Electronics	3	***x***		
CSOC224 Object Oriented Programming	3	***x***		
INFT211 Computer Architecture and Organization	3		***x***	
COSC230 Database Management Systems	3		***x***	
INFT240 Dot Net Programming	3		***x***	
COSC260 Systems Analysis & Design	3			***x***
COSC271 Data Communication and Computer Networks	3		***x***	
INFT280 Introduction to Information Systems	3		***x***	
INFT262 Web Technologies	3			***x***
INFT232 Computer Hardware and Maintenance	3		***x***	
INFT210 Information Security and Ethics	3			***x***
INFT274 Systems and Network Administration	3		***x***	
E. RESEARCH AND INDUSTRIAL ATTACHMENT				
INFT280 Project Work	3			***x***
INFT281 Industrial Attachment	NC			***x***

Semester-by-Semester Schedule of courses

First Year, 1st Semester

Course Code	Course Title	L	T/P	Credits
ENGL111	Language and Writing Skills I	2		2
RELB163	Life and Teaching of Jesus	3		3
MATH141	Algebra	3		3
GNED125	Study Skills	1		NC (*1)
PEAC100	Physical Activity	1	1	NC (*1)
FREN121	French for General Communication I	2		2
COSC113	Elements of Programming	2	1	3
INFT115	Introduction to Information Technology	3		3
Total				**16+(2)=18**

First Year, 2nd Semester

Course Code	Course Title	L	T/P	Credits
ENGL112	Language and Writing Skills II	2		2
CMME115	Introduction to Communication Skills	2		2
SOCI105 OR PSYC105	General Sociology ***OR*** Introduction to Psychology	2		2
COSD124	Procedural Programming	1	2	3
INFT116	Microsoft Office Applications	2	1	3
COSC130	Digital Electronics	2	1	3
MATH172	Discrete and Continuous Mathematics	2	1	3
INFT142	Critical Thinking and Practical Reasoning	3		3
Total				**21**

Second Year, 1st Semester

Course Code	Course Title	L	T/P	Credits
AFSTxxx	African Studies – Group A	1		1
RELB251	Principles of Christian Faith	3		3

INFT211	Computer Architecture and Organization	2	1	3
COSC224	Object-Oriented Programming	1	2	3
COSC230	Database Management Systems	1	2	3
COSC271	Data Communication & Computer Network	2	1	3
MATH282	Introduction to Statistics and Probability	2	1	3
INFT232	Computer Hardware and Maintenance	2	1	3
Total				**22**

Second Year, 2nd Semester

Course Code	Course Title	L	T/P	Credits
AFSTxxx	African Studies – Group B	1		1
HLTH200	Health Principles	3		3
INFT240	Dot Net Programming	3		3
INFT210	Information Security and Ethics	3		3
INFT262	Web Technologies	1	2	3
INFT274	Systems and Network Administration	2	1	3
INFT280	Introduction to Information Systems	2	1	3
INFT289	Project Work		3	3
Total				**22**

Summer

Course Code	Course Title	L	T/P	Credits
INFT281	Industrial Attachment		3	3

The detailed description for the program courses can be referenced from the BSc. Information Technology catalog

BACHELOR OF SCIENCE IN BUSINESS INFORMATION SYSTEMS

PHILOSOPHY

The underlying and guiding philosophy of the Department of Information Systems and the BSc (Business Information Systems) Programme is to promote scholarship, as well as the search for and the application of scientific knowledge through education, training and research.
The Department is committed to pursuing this philosophy through the provision of a world-class programme in Information System aimed at training highly skilled and globally-employable IS personnel and conducting cutting-edge research in the field of Information Technology as applied in Business.

MISSION STATEMENT

The mission of the Department of Information System is to serve as an international centre of excellence in the provision of high-quality holistic education, and professional training in Business Information System; as well as serve as a leading centre for cutting- edge advanced research and development work in current and emerging subject areas of Information System. By integrating faith and learning, it is hoped that graduates will be equipped to exert positive intellectual, moral and professional influence in the practice of Information Systems.

THE RATIONALE

The Business Information Systems (BIS) programme provides a range of knowledge and skills needed to enter graduate level employment in a business and information systems environment, or to engage in postgraduate study; particular knowledge of the use of information systems and analytical methods to support the analysis and design of policy and practice in business; emphasis on information systems issues and project management; opportunities to develop more general understanding of business management and skills in business information management. BIS is widely diffused across modern organizations, and industry is demanding BIS graduates who are well versed in business concepts; in understanding the role and contribution of information systems in driving and enabling the achievement of business goals and objectives; an in managing the vital information systems resource in organizations. This degree has been designed to meet this need, and will produce graduates, who are competent and knowledgeable in the discipline, possess excellent interpersonal and communications skills, and who are able to critically analyze business problems and develop creative and innovative enterprise solutions.

NATIONAL DEMAND FOR THE PROGRAMME

In Ghana, the need for trained personnel of integrity, good work ethnics, excellent professional skills and positive human relations to contribute towards the realization of Ghana's socio-economic development cannot be over-emphasized. Specifically, there is an urgent need in Ghana to meet the short fall in Information System graduates with the requisite skills. This programme is, therefore, designed to address the major area of manpower requirements of the nation by preparing qualified youth for Information Systems careers in the public and private sectors of the economy.

EMPLOYMENT PROSPECTS OF STUDENTS (ENROLLED)

Upon successful completion of the four-year programme, graduates from Valley View University could be gainfully employed in the following fields of endeavour:

- Banking and finance
- Marketing and advertising companies
- Business analysts: Business architect, enterprise-wide information specialist,
- Managerial positions
- Software development: application programmer, software architect, system

programmer/engineer.

- Systems analyst: Product specialist, systems engineer, solutions specialist, technical designer.
- Accounting Technical sales: Sales manager, account manager, sales executive.
- Technical support: Helpdesk support, operations analyst, problem manager.
- Network engineering: Hardware troubleshooting and repairs, network designing.
- Technical consultant: IT consultant, application specialist, enterprise-wide information specialist.
- Web developer: Web designer, web producer, multimedia architect, internet engineer.
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BACHELOR OF SCIENCE (BSC) IN BUSINESS INFORMATION SYSTEMS

The Business Information Systems (BIS) programme provides a range of knowledge and skills needed to enter graduate level employment in a business and information systems environment, or to engage in postgraduate study; particular knowledge of the use of information systems and analytical methods to support the analysis and design of policy and practice in business; emphasis on information systems issues and project management; opportunities to develop more general understanding of business management and skills in business information management. BIS is widely diffused across modern organizations, and industry is demanding BIS graduates who are well versed in business concepts; in understanding the role and contribution of information systems in driving and enabling the achievement of business goals and objectives; in managing the vital information systems resource in organizations. This degree has been designed to meet this need, and will produce graduates, who are competent and knowledgeable in the discipline, possess excellent interpersonal and communications skills, and who are able to critically analyze business problems and develop creative and innovative enterprise solutions.

THE OBJECTIVES

The course has the following objectives:

- To enable graduates, understand the applications of IS in organizations.
- To introduce students to business cases, so they learn to solve business problems with information technology.
- To introduce students to strategic applications of technology.
- Enable graduates to fulfil key roles in the Information Systems (IS) and related industries, and to liaise between IS personnel and other professional and industrial personnel.
- Provide graduates with a solid foundation in Information Systems skills, knowledge and values at a practical and theoretical level.
- Develop self-confidence through a learning experience aimed at an understanding of the subject areas and including the development of life-long learning skills
- Provide graduates with a strong systems focus, in their ability to conceive of new designs, address business needs and solve problems.
- Provide graduates with a good understanding of the roles of IS in society and for individuals, and an awareness that information systems is a powerful factor for change in the global environment.
- Provide an understanding of the value of research, critical thinking and effective communication in the management of information systems.
- Develop professional skills in such areas as inter-personal communication, working in teams, and technical report writing.
- Provide a graduate with an educationally sound route to become competent IS practitioners and academics.

REQUIREMENT FOR GRADUATION

a) Total Credits required – A minimum of 142 semester credits

b) Breakdown of total credits into major curriculum sub-divisions – See below.
c) Breakdown of the grading system – See Table II below

6. **Components of the programme:**

(a) Core course (s): IS (73)

Level 100		
Course Code	**Course Title**	**Credits**
COSC113	Elements of Programming	3
COSC122	Programming with C++	3
BBIS110	Introduction to Business Information Systems	3
BBIS213	IT for Business (MOS)	3
Level 200		
BBIS203	IT Professional Ethics and Practice	3
COSC260	Structured Systems Analysis and Design	3
BBIS270	Computers and Networks	3
BBIS260	Web and Social Media Management Tools	3
BBIS245	Entrepreneurship and Small Business Management	1
BBIS226	Business Process Modeling	3
BBIS202	Database Management	3
Level 300		
BBIS309	E-Business	3
BBIS331	Multimedia Application Systems Development	3
BBIS304	Business Intelligence and Data Warehousing	3
BBIS338	Enterprise Systems	3
BBIS350	Project Management	3
INFT410	Internet-Enabled Application Systems	3
Level 400		
INFT425	Mobile Application Development	3
BBIS435	IT Governance and Strategy for Business	3
INFT452	Enterprise Information Security	3
COSC351	Expert Systems and Artificial Intelligence	3
INFT420	Human-Computer Interaction	3
BBIS488	Decision Support Systems	3
BBIS432	IS Consultancy Practices Solution Development	3
BBIS430	Seminar (Current Trends in IS)	3
(b) **Business Courses (27)**		
Level 200		
ACCT211	Introduction to Accounting	3
MGNT231	Principles of Management	3
ACCT222	Principles of Accounting	3
Level 300		
MKGT351	Principles of Marketing	3
MGNT363	Organizational Behavior	3
BSAD341	Business Law I	3
BKFN310	Business Finance	3
BSAD342	Business Law II	3
Level 400		
BSAD480	Strategic Management	3

(c) Mandatory course(s) 43

Level 100

ENGL121	Language and Writing Skills I	3
ENGL122	Language and Writing Skills II	3
CMME115	Introduction to Communication Skills	2
RELB163	Life and Teachings of Jesus	3
FREN111	French for General Communication	3
SOCI115/ PSYC 105	Principles of Sociology OR Introduction to Psychology	3
PEAC100	Physical Activity	NC (**1)
GNED125	Study Skills	NC (**1)
MATH181	Business Mathematics	3
Level 200		
RELB251	Principles of Christian Faith	3
AFST253	African Studies-Group A	1
AFST254	African Studies-Group B	1
GNED230/ GNED430	Career Planning and Development OR Job Search Strategies and Techniques (Optional)	NC (**1)
HLTH200/ BIOL140	Health Principles OR Human Body in Health & Disease	3
STAT272	Statistics for Business	3
Level 300		
RELT385	Introduction to Biblical Foundations to Ethics	3
BSAD331	Quantitative Methods	3
Level 400		
RELG451	Bible and Family Dynamics	3

(d) Research component: **09**

BBIS364	Research Methods	3
BBIS491	Final Year Project I	3
BBIS492	Final Year Project II	3

(e) Industrial attachment **03**

BBIS348	Industrial Experience (SUMMER)	3

NOTE: NC ***1 means the course is 1 hour per week but no credit assigned to it. It does not therefore add up to the total credit requirement for graduation but mandatory.

(f) Structure of the programme (Semester-by-semester schedule/structure, of course, showing the credit value of each course).

Table 1: Semester-by-semester schedule/structure of course

FIRST YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
ENGL121 Language and Writing Skills I	3	**ENGL122** Language and Writing Skills II	3
RELB163 Life and Teachings of Jesus	3	**CMME115** Introduction to Communication Skills	2
FREN111 French for General Communication	3	**STAT272** Statistics for Business	3
MATH181 Business Mathematics	3	**COSC122** Programming with C++	3
COSC113 Elements of Programming	3	**BBIS110** Introduction to Business Information Systems	3
SOCI115 Principles of Sociology ***OR*** **PSYC 105** Introduction to Psychology		**BBIS213** IT for Business (MOS)	3
		PEAC100 Physical Activity	NC(**1)
		GNED125 Study Skills	NC(**1)
Total Credits	**18**	**Total Credits**	**17+2 =19**

SECOND YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
AFST253 African Studies – Group A	1	**GNED230** Career Planning and Development	NC(**1)
RELB251 Principles of Christian Faith	3	**AFST254** African Studies – Group B	1
BSAD331 Quantitative Methods	3	**HLTH200** Health Principles	3
BBIS203 IT Professional Ethics and Practice	3	**BBIS270** Computers and Networks	3
ACCT211 Introduction to Accounting	3	**BBIS260** Web and Social Media Mgt Tools	3
MGNT231 Principles of Management		**BBIS226** Business Process Modeling	3
COSC260 Structured Systems Analysis and Design	1	**BBIS202** Database Management	3
BBIS245 Entrepreneurship and Small Business Management		**ACCT222** Principles of Accounting	3
Total Credits	**20**	**Total Credits**	**19+1=20**
THIRD YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
RELT385 Intro to Biblical Foundation to Ethics	3	**BBIS304** Business Intelligence and Data Warehousing	3
MKGT351 Principles of Marketing	3	**BKFN310** Business Finance	3
BBIS309 E-Business	3	**BBIS338** Enterprise Systems	3
BBIS331 Multimedia Application System Development	3	**BBIS350** Project Management	3
		BBIS364 Research Methods	3
MGNT363 Organizational Behavior	3	**BBIS310** Internet-Enabled Application Systems	3
BSAD341 Business Law I	3	**BSAD342** Business Law II	3
Total Credits	**18**	**Total Credits**	**21**
BBIS348 Industrial Experience (SUMMER)			**3**
FOURTH YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
INFT425 Mobile Application Development	3	**INFT420** Human-Computer Interaction	3
INFT452 Enterprise Information Security	3	**BBIS488** Decision Support Systems	3
BBIS491 Final Year Project I	3	**BBIS492** Final Year Project II	3
COSC351 Expert Systems and Artificial Intelligence	3	**RELG451** Bible and Family Dynamics	3
BSAD480 Strategic Management		**BBIS435** IT Governance and Strategy for Business	3
BBIS430 Seminar (Current trends in BIS)		**BBIS432** IS Consultancy Practices Solution Development	3
Total Credits	**18**	**Total Credits**	**18**

7. **Course Description:**

GENERAL COURSES

ENGL 121: Language and Writing Skills I **3 Credits**

This course aims at developing the basic skills in the grammatical systems of English language and to use these effectively in writing for university and professional pursuits. Coverage includes a wide range of structures required for appropriate use of the English Language.

RELB 163: Life and Teachings of Jesus **3 Credits**

A study of the similarities and differences in the synoptic gospels and the various theories to solve the synoptic problem. A study of theological motifs of the gospel of John. A comprehensive study of the life and the teachings of Jesus Christ as unfold in the prophecies. It further surveys the harmony of the four gospels with analytical attention to the gospel writers and their writings in relation to the life of Jesus.

FREN 111: French for General Communication **3 Credits**

This course provides a basic foundation on which to build the skills of listening, speaking, reading and writing simple material in French. The approach is essentially communicative and accurate pronunciation is stressed.

BBIS213 IT for Business (MOS) **3 Credits**

This course is an introduction to business application tools and basic computing concepts. The business application software packages used in the unit are Microsoft Excel and Microsoft Access.

MATH 181 Business Mathematics **3 Credits**

This course is design to introduce students to mathematical concepts applied in business and information systems.

COSC 113 Elements of Programming **3 Credits**

This course introduces students to the principles of problem-solving using fundamental algorithmic techniques and design, structured programming, and computer systems concepts. The course covers the techniques necessary to write well-documented, structured computer programs. The course is intended to emphasize the planning process using examples involving sequence, selection, iteration, and basics of computer arithmetic, data structures, sorting and searching. Upon successful completion of this course, the students should be able to design simple, structured, well-documented computer programs.

ENGL 122: Language and Writing Skills II **3 Credits**

The prerequisite for this course is Language and Writing Skills 1 (ENGL 111). The course deals with the application of the grammatical systems studied in Language and Writing Skills I. The course is designed to enable students to acquire writing skills, skills to analyse and critique written forms and grasp information and meaning from the recommended text for personal and academic writing.

CMME 115: Introduction to Communication Skills **2 Credits**

This course is to assist students to acquire oral, written and nonverbal communication skills to communicate effectively. The course is also to raise students' level of proficiency as well as prepare them to function effectively on their own. At the end of the course, students will be able to: name the various elements/components of communication and explain what makes communication effective; explain the role of communication in human existence and use language effectively in different contexts.

SOCI 115 Principles of Sociology **3 Credits**

This course will expose the students to basic sociological concepts and explore influences of social and cultural factors upon the behavior of individuals, families, groups and communities and their influence on health and disease.

PSYC 105 Introduction to Psychology **3 Credits**

This course covers the basic principles and concepts in psychology, including the principles of motivation, learning, and perception. It is designed to introduce University students to history, development, and present scope of psychology with additional emphasis on non-Western psychological approaches.

COSC122 Programming with C++ **3 Credits**

The course is designed to introduce the principles and concepts of programming and teach problem-solving methods and algorithm development; high-level, structured programming using C++. Development of process of design, coding, debugging, documentation; focus upon techniques of good programming style and sound program construction.

BBIS 110 Introduction to Business Information Systems **3 Credits**

This course is to provide the students with an overall knowledge of business organizations and their structure. The unit will cover all the steps from business strategy to operational planning and financial systems. The internal processes of a business organization will be described with an emphasis on how they work together to achieve the financial and physical goals of the business.

PEAC 100: Physical Activity **NC**

This course is to train the body as 'the temple of God' and to develop a positive attitude towards exercise for the improvement and maintenance of overall health and fitness. Objectives of the course include improving cardio-respiratory endurance and other components of physical fitness.

MKTG 351 Principles of Marketing **3 Credits**

This course gives an overview of the marketing process as it applies to marketing products and/or services in public, private and not-for-profit organizations. At the end of the course, the students should understand the four P's of marketing, Price, Place, Promotion and Product; and the interrelationships between marketing and overall business practices. It is an introductory course; hence it touches on most aspect of the marketing discipline. It again touches on contemporary issues and the changing role of marketing in the current global dispensations.

AFST253 African Studies [A] NC /1 Credit

The group A of the African studies introduces students to the origin of some African cultures and traditions with the impact on development.

AFST254 African Studies [B] NC /1 Credit

The group B of the African studies introduces students to the origin of some African view on gender and development, chieftaincy and development.

RELB251 Principles of Christian Faith **3 Credits**

This course surveys the fundamentals of Christian teachings: Revelation, Inspiration, the Godhead, Angels, the Devil and the Origin of sin, Creation, man's original condition and fall, his condition in death, Incarnation, Ministry, Death, Resurrection and Ascension of Christ. The Holy Spirit, The Plan of Redemption. The Covenant, The Sanctuary. Essentials of Christian Living, Baptism, and Christian Growth. The Sabbath. God's Church in the world, The Coming Crisis. Christ Second Coming, the Millennium, Heaven.

BSAD 331 Quantitative Methods **3 Credits**

The objective of this course is to give students an introduction to statistical and quantitative methods within a business-related framework and to provide students with a sound foundation for more advanced statistical and quantitative studies. The unit will provide opportunities for the student to gain skills in the presentation of business and economic data.

BBIS 203 IT Professional Ethics and Practice 3 Credits

The objective of this course is to provide a practical and theoretical introduction to what it means to be an IT professional today. Students will encounter a range of issues relevant to professional practice in the workplace, as well as an understanding of the wider responsibilities that professionals are called upon to uphold in society.

ACCT 211 Introduction to Accounting 3 Credits

The objective of this course is to cover the fundamentals of accounting applicable to different business entities with emphasis on the accounting cycle and the preparation of financial statements.

ACCT 222: Principles of Accounting 3 Credits

This course is a continuation of ACCT 221 Principles of Accounting I. It provides students with further principles and concepts of financial accounting. It focuses on the preparation of control accounts, accounting for property, plant and equipment including depreciation and preparation of financial statements from incomplete records. It also introduces students to the accounts of manufacturing concerns, non-profit organizations, partnerships and companies.

MGNT231 Principles of Management 3 Credits

The objective of this course is to study business management theory and practice including. This course also introduces students to the functional areas of business such as marketing, financial, personnel and operations.

BBIS 202 Database Management 3 Credits

The objective of this course is to provide an introduction to the concepts of database design and usage and the related issues of data management. Students will develop skills in planning, designing, and implementing a data model using an enterprise-scale relational database system (Oracle). Methods and techniques will also be presented to populate, retrieve, update and implement integrity features on data in the implemented database system.

Manipulation of a database necessarily raises issues of data collection/creation and management, data rights (ownership, copyright, access, privacy etc) and data curation, which this unit will also address.

GNED 230 Career Planning and Development 1 Credit

This course deals with career planning and management. The four stages of Career Planning are dealt with- Career Awareness, Career Exploration, Career Preparation and Work Experience. These help students make career decisions and choices. It also helps them plan their pathway for life after graduation.

HLTH 200: Health Principles 3 Credits

The objective of this study is to study the basic health practices which seek to improve health and longevity. It focuses on holistic health which includes the physical, mental, social and spiritual aspect of the human being. It also encourages students to apply these principles for achieving and maintaining good health in their various communities. It also studies physiology, including the principles governing community and personal health and the methods of applying these principles to successful daily living.

COSC260 Structured Systems Analysis and Design 3 Credits

The objective of this course is to provide students with an introduction to systems development using an agile development approach. The unit will focus on the application of UML models to the analysis and design of a system. The unit will introduce students to the nature of systems analysis and design as a problem-solving activity, describe the key elements of analysis and design, and explain the place of the analysis and design phases within an agile development life cycle. The unit will introduce students to the nature of modelling as an analytical and a communicative process.

BBIS 271 Computers and Networks **3 Credits**

The objective of this course is on the following: the fundamentals of computer communications and networks and telecommunications; digital, voice and video signals and transmission; protocols for error and flow control; capacity utilization; multiplexing and concentration; local area networks (LANs), wide area networks (WANs).

BBIS 260 Web and Social Management Tools **3 Credits**

The objective of this course is to introduce students to the design, creation, and maintenance of web pages and websites. Students learn how to critically evaluate website quality, management social media tools, learn how to create and maintain quality web pages, learn about web design standards and why they're important, and learn to create and manipulate images. The course progresses from introductory work on web design to a culminating project in which student's design and develop websites for local community organization.

BBIS 245 Entrepreneurship and Small Business Management **1 Credit**

The objective of this course is to study the theory and practice of initiating a business venture and organizing the necessary resources. This course provides students with an understanding of the business planning techniques, economic analysis, financial analysis, market analysis and human resource analysis which are utilized in conceiving and launching a new business. The course also provides an understanding of the risks and rewards associated with entrepreneurship. The fundamentals of Human Resource functional capabilities used to select, develop, and motivate workers. The context and challenges of HRM and its role as a strategic function and set of practices within organizations.

BBIS 226 Business Process Modeling **3 Credits**

The objective of this course is to introduce students to the issues in increased globalization, companies are facing stiffer competition and successful companies cannot afford to harbour inefficiencies if they are to be competitive. Furthermore, customers are becoming more demanding. Business processes must be designed to ensure that they are effective and meet customer requirements. A well-designed process will improve efficiency and deliver greater productivity. This unit will survey the analytical tools that can be used to model, analyze, understand and design business processes. Students will also gain hands-on experience in using simulation software as a tool for analyzing business processes. Upon completion of this unit students should have acquired: an understanding of business organizations, their functional structure and the advantage of considering the process oriented view of organizations; a thorough knowledge of business processes, their structure and how processes fit in to the overall organization objectives; knowledge of the analytical tools that can be used to model, analyze, understand, and design business processes; and skills to use simulation software as a tool for analyzing business processes.

RELT 385: Introduction to Biblical Foundation Ethics **3 Credits**

The Objective of this course is to understand the structure and content of Christian ethics: goal, motive, and norm of the Christian life; with an analysis of ethical issues of practical decision-making, authority, life, and sexuality. Ethical considerations of business decisions are examined in light of a Christian value system.

BBIS 309 E-Business **3 Credits**

The objective of this course is to understand organizational, inter-organizational and foundational technological issues in e-Business systems. Students are introduced to the fundamentals of trading systems so they can be better placed within an e-Business context. Various types of e-business models are discussed. Contents and processes involved in e-business planning and strategy development are reviewed. Ways to manage changes caused by e-business initiatives are discussed. Electronic auctions and their relationships with business procurement processes are discussed. Security mechanisms safeguarding e-business transactions are reviewed.

BBIS 331 Multimedia Application & Systems Development **3 Credits**

Multimedia is the combination of the digital forms of text, images, sounds, video and animation. This course aims to introduce students to the theories and principles of multimedia and provide students with a theoretical and practical introduction to design criteria and the design process of information delivered by multimedia. The course will cover user needs analysis and designing for the user; selection of suitable technology; designing for computer-based media; and the use of the major software tools and their accompanying skills. Pre-requisite: COSC122

BBIS304 Business Intelligence and Data Warehousing **3 Credits**

Automation and the use of technological tools have resulted in the accumulation of vast volumes of data by modern business organizations. Data warehouses have been set up as repositories to store this data and improved techniques now result in the speedy collection and integration of such data. OLAP technology has resulted in the faster generation of reports and more flexible analysis based on the data repositories. Business intelligence (BI) can be considered as the art of exploring and analysing this data, extracting relevant information and identifying patterns, and turning such information and patterns into knowledge upon which actions can be taken. This unit will explore the concepts of BI, including the emergence of BI and factors influencing BI, technology requirements for BI and will provide hands on experience on designing and building business intelligence systems.

BBIS338 Enterprise Systems **3 Credits**

The objective of this course is to provide both a theoretical and practical overview of enterprise systems and real time enterprise systems. Real time enterprise systems are configurable information systems packages, implemented on-line that integrate people, technology and information processing. The three integrated processes within and across functional areas are seamlessly interconnected and almost time-lag free in an organization. The theoretical component will be augmented by detailed case studies which focus on problems faced by real-life companies. For the practical component, laboratory exercises using a well-known enterprise system will be used to deepen student understanding.

BBIS350 Project Management **3 Credits**

The objective of this course is to provide both a theoretical and practical overview of processes involved in successfully managing medium to large scale projects undertaken by organizations operating within various industry sectors. Even though, this unit makes references to projects common to the information technology industry, the principles are equally applied to non-IT related projects. Examples and mini-cases illustrating project management issues experienced by various sectors (e.g. construction, business, defense) are cited.

STAT 272: Statistics for Business **3 credits**

This course introduces the student to the basic methods of empirical inquiry in business. The emphasis of the course is on testing the hypotheses, empirically fitting models, produce predictions, or estimate impacts based upon some form of quantitative or statistical analysis. The course will provide a foundation in statistical inference, enabling the student to become competent in statistical research. Throughout the course, a weekly computer laboratory practical assignment using SPSS software will provide a hands-on research experience to the students; this will enable them to become skillful practitioners in data entry and analysis.

BBIS364 Research Methods **3 Credits**

This course is designed to provide the fundamentals of research methodology applicable to Information Systems and its related areas. Analysis, critical reading, evaluation, and application of research needed for the development of skills in research proposals are emphasized.

MGNT 363: Organizational Behavior **3 Credits**

A management capstone course for the development of thinking about organizations. The theory of organizations is studied in detail. Patterns, models, structures and architecture of organizations characterizing the behaviour of the organization is dealt with. Missions, goals, strategies, and effectiveness are blended into learning about organizational design as it is influenced by external realities. Students learn organizational behaviour and design alternatives to create a fit between the strengths of the organization and its external environment to achieve a sustainable competitive advantage.

BSAD 341: Business Law I [Commercial Law] **3 Credits**

This an introduction to general principles of law and its interpretation including limited coverage of business torts and crimes, source of law, conflict resolution, environmental law, consumer protection, substantial coverage of contract and sale law, real and personal property law. Full coverage of commercial paper (negotiable instruments,

notes, bills, drafts and cheques) law, with substantial review of agency and employment law, creditors and debtors' rights, insurance, secured transactions, property and its use as security, succession partnership law, and will and trusts laws will be made.

BSAD 342: Business Law II [Company Law] **3 Credits**

An introduction to the corporate law including topics such as types of companies, features of different types of companies, the company's regulations, formation of companies, memorandum of association, articles of association, The capital of a company, shares, types of shares: ordinary shares, preference shares, treasury shares. Issuing of shares, allotment of shares, call on shares, forfeiture of shares, debentures, types of debentures, surplus and income surplus, the financial statements of a company, extraordinary and exceptional items, reserves, share deal account, general reserve, corporation tax, dividends, company meetings, statutory meetings, AGM, minutes, company directors and secretaries, are all dealt with.

BKFN 310: Business Finance **3 Credits**

A managerial approach to financial analysis, planning and control. Emphasis is on instruments of finance, policies of capitalization problems pertaining to working capital, and corporate expansion and reorganization.

BBIS338 Enterprise Systems **3 Credits**

This unit provides both a theoretical and practical overview of real time enterprise systems. Enterprise systems are configurable information systems packages, implemented on-line that integrate people, technology and information processing. The three integrated processes within and across functional areas are seamlessly interconnected and almost time-lag free in an organization. The theoretical component will be augmented by detailed case studies which focus on problems faced by real-life companies. For the practical component, laboratory exercises using a well-known enterprise system will be used to deepen student understanding.

BBIS435 IT Governance and Strategy for Business **3 Credits**

This objective of this course is to provide students with an understanding of how to manage and govern the IT function in business organizations. It builds on themes relating to managing IT as an organizational resource and discusses IT function from strategy and governance perspectives. The unit also emphasizes the relationship between theoretical knowledge and its practical application using cases and real examples.

BBIS488 Decision Support Systems **3 Credits**

The objective of this course is to give the students an opportunity to solve some concrete decision-making problems, such as resource allocation and investment planning, using different ways of modelling and solving decision support problems of different size and complexity; strategic, tactical and operational problems; problems involving discrete alternatives and problems involving continuous variables; problems whose constraints and goals are precise and problems which need to be further pinned down. The students will be introduced to a high-level problem modelling and solving platform which is supported by a variety of solvers. They will use the platform to model and solve some quite complex decision support problems and experiment with different solvers, and search methods.

COSC425 Mobile Applications Development **3 Credits**

This course aims to teach students how to develop mobile applications for mobile devices. The course focuses on the frameworks/platforms, development tools, communication and connection capabilities, human-computer interaction, development life-cycle (requirements gathering & analysis, design, construction, and testing) database integration and management, transaction management of mobile applications. Also, issues related to mobile commerce, the current trends and future expectations regarding mobile application are considered.

INFT452 Enterprise Information Security **3 Credits**

This course covers conceptual and technological aspects of network security for voice and data networks. The course deals with the analysis, design, implementation and management issues surrounding effective network security. The intention of the course is to provide an even depth of coverage across the entire domain of the

network security common body of knowledge. It is not intended to provide in-depth coverage of any particular network security topic.

BBIS491 Final Year Project I **6 Credits**

This is a capstone course for students to utilize knowledge they acquired from different courses to design and develop an IT-related business product or service. This is the first part of the course that spans through the final year of the student's study in which students are to provide detailed analysis of the existing systems or existing works in their research related area and their proposed system.

BBIS492 Final Year Project II **3 Credits**

This is a capstone course for students to utilize knowledge they acquired from different courses to design and develop an IT-related product or service. This is the second part of the course that spans through the final year of the student's study. In this part students are able to provide detailed design and implement their design to create an IT framework or software solution to the problems analyzed in the first part.

RELG451 Bible and Family Dynamics **3 Credits**

Bible and Family Dynamics focuses on the role of the Bible in aiding family members find meaning and purpose in life. From the biblical perspective, the course highlights relevant issues that are incidental to the life of family members as they strive to function effectively in an increasingly global society. Issues for discussion include dynamics of family life, individual development, life relationships, responsible parenting, family worship, crisis management, resource management, civic responsibility, healthy living, housing decisions, career planning, and trends affecting African families.

BBIS430 Seminar [Current Trends in IS] **3 Credits**

To promote continuous interaction between industry players and the department, this course has been introduced. Students will have regular seminars both in and out of campus. Different personnel will be invited to present current trends on IS issues with students. There may be times when students will visit industry for such presentations.

BBIS 348 Industrial Experience **3 Credits**

In their third year of study, students are given the opportunity to go to any company of their choice to obtain industrial experience and which they will apply the knowledge and skills they have gained in the development of an information system for a real world client. Students work in groups and will: design, develop and deliver an information system for a client, manage the project through all its development stages, communicate effectively with all project stakeholders, develop project documentation to a professional standard, present their project work to academics and other groups, attend unit seminars, and contribute in a professional and committed manner to the work of the group.

COSC351 Expert Systems and Artificial Intelligence **3 Credits**

This course introduces students to the concepts, principles and the practice of Expert Systems. It also examines the processes by which machines simulate intelligence; heuristic and algorithmic processes in problem solving and programming machines to play simple games; models of cognitive process; applications and limitations of machine intelligence. The course introduces students to symbolic programming (Common Lisp and Prolog) in the context of some of the main ideas and breakthroughs in the area of Artificial Intelligence (AI), etc.

INFT 410: Internet-Enabled Application System **3 Credits**

This course provides an overview of internet based application systems to support business, government, and education delivery in the web/online environment. The broad systems that will be considered but not limited to e-commerce, e-education, e-government. The course will consider issues relating to the development of prototypes of these systems.

INFT 420: Human-Computer Interaction 3 Credits

This module aims to provide a theoretical and scientific framework within which the student will be able to understand the impact of computers on humans. The student will develop skills and knowledge that will enable efficient and effective human computer systems to be specified. They will develop an understanding of human factors and ergonomics that will enable high levels of system usability to be achieved. The module will introduce students to the available user interface technologies and to techniques for evaluation the relative merits of different types of interfaces.

BSAD480: Strategic Management 3 Credits

A capstone course that integrates the functional business areas of accounting, marketing, finance, production and human resource. This course is therefore, necessarily integrative and interdisciplinary. It is designed to give the student experience in strategic analysis and decision-making using the case method. Students learn to identify, analyze, propose alternative solutions, and make decisions about business strategy. Attention is given to matching organizational resources to the external environment to achieve a strategic competitive advantage. Cases are used to enhance problem identification, problem analysis and problem-solving skills. Cases on contemporary issues are also built by collecting problem related data from the business environment.

BBIS432 IS Consultancy Practices Solution Development 3 Credits

This course is designed to initially overview the consulting profession with a subsequent emphasis on Information Systems (IS) consulting issues. Effort will be placed on developing proficiencies in a range of skills required to IS practice consulting. The course is relevant to those (1) who are specifically interested in IS consulting careers and / or (2) whose current or future jobs involve staff consulting or line management using consultants. The primary objective of this course is to provide students with an opportunity to become familiar with the typical phases in an IS consulting project. These phases include: selling a project, entering the client firm, gathering data, diagnosing issues, implementing solutions and leaving. In addition to discussing these phases in class, students will discuss how similarly, and how differently, consultants work with their clients. Broadly, students will also study the functional specialty areas in which most consultants practice. Students conclude the course with discussions of ethical issues, career concerns and expert witnessing of consultants.

8. **Requirements for graduation:**

Provide information on the following requirements for graduation:

d. Course Requirements

Students are required to obtain a total of 149 credits to qualify for graduation.

e. Credits Requirements

Table 2: Credits Requirements

	Major Curriculum /Sub-Divisions –divisions	**Credits Requirements**
H.	**Core courses**	
I.	Information Systems	70
J.	Business	27
K.	Mandatory courses	40
L.	Research Components	09
M.	**Practical training, industrial attachment, internship, clinical experience, etc.,**	03
	Total	**149**

f. Any additional requirements for graduation e.g. attendance.

CITIZENSHIP GRADE

Each graduating student is to fulfil citizenship requirement of non-credit [though graded]. Citizenship grade is awarded to a student who satisfies University requirements with respect to decent dressing and conduct in lifestyle on-campus and off-campus and regular attendance to University gatherings. Students are expected to follow all regulations stipulated in the Valley View University Students Handbook.

LABORATORY SESSIONS AND PROJECT

Students are required to take a number of Non-Credit Courses, take Computer Laboratory sessions and do projects that form part of the Credit Courses.

FINAL YEAR RESEARCH PROJECT
Each graduating student is to carry out under supervision of a faculty member a practical Business Information Systems project on a topic or subject previously approved by the Head of Department.

RESEARCH COMPONENT
Final Year Research Project is a pre-requisite for graduation. Practical training, internship, clinical experience, etc. are all required. Practicum in Business Information Systems is required of all students.

9. **Assessment Regulations:**

Details of Assessment Regulations

d. **Students' performance and achievement**:

Students shall earn degrees by completing the prescribed number of credit hours. The student shall earn credits only if all the course requirements have been fulfilled and the student succeeding by obtaining an acceptable grade for the course. A student shall not be able to receive credits for a course in which he/she obtained an unacceptable grade [C-, D and F in Major courses].

Students Assessment Regulations*: Students are assessed using the following criteria:*

iv. **Continuous Assessment:** Students are required to participate in class tests, quizzes, mid-semester examinations, term papers, oral presentations and discussions in class.

v. **Final Examinations:** A comprehensive examination covering materials presented during the entire semester is administered to students and graded as shown in Table 3.

vi. **Grading System:** Final Semester Grades are based on the grading system that provided a Grade Point Average (GPA) for the Semester. Table 1 provide details of the letter grading system. The evaluation and grading of the final grade of each course will be determined as given in Table 1 and Table 3:

Table 3: Grading System **********

Scores	Grades	Grade Point	Description
80 – 100	A	4.00	Superior
75 – 79	A -	3.67	
70 – 74	B +	3.33	
65 – 69	B	3.00	Above Average
61 – 64	B -	2.67	
56 – 60	C +	2.33	
50 – 55	C	2.00	Average
45 – 49	C -	1.67	
40 – 44	D	1.00	Below Average
00 – 39	F	0.00	Fail
00 – 39	FA	0.00	Failure Due to Inadequate Attendance
Additional Grades			
50 – 100	P	0.00	Pass
	AU	0.00	Audit
	I	0.00	Incomplete
	W	0.00	Withdraw

Table 4: Class Evaluation

Category	Grading
Assignment Class Test, Labs, Projects, Quizzes, etc., Mid-semester Examination End-of-Semester Examination	10% 10% 20% 60%
Total	**100%**

Classes Awarded

Students are also awarded the following classes shown in Table 5:

Table 5: Class Evaluation

First Class	3.60—4.00
Second Class [Upper]	3.25—3.59
Second Class [Lower]	2.50—3.24
Third Class	2.00—2.49

e. **Mode of certification:** Regular

f. **The certificate awarding institution:** Valley View University

DEPARTMENT OF MATHEMATICAL SCIENCES

PHILOSOPHY

The philosophy of the Department of Mathematical Sciences is to promote interdisciplinary scholarship, as well as the search for and the application of scientific knowledge through mathematical education, training and research. The Department is committed to pursuing this philosophy by providing a programme in Mathematics with Economics aimed at training highly skilled and globally employable graduates that can conduct interdisciplinary research in the field of mathematics and economics.

MISSION STATEMENT

The mission of the Department of Mathematical Sciences is to serve as a centre of excellence in the provision of high quality holistic and professional education in mathematics and economics, as well as serve as a leading centre for interdisciplinary research and development work in current and emerging areas of Mathematical Economics. By integrating faith and learning, it is hoped that graduates will be equipped to demonstrate positive intellectual, moral and professional influence in their field of expertise.

PROGRAMMES

The department of Mathematical Sciences offer the following programs;

1. Bachelor of Sciences in Mathematics with Economics
2. Bachelor of Sciences in Mathematics with Statistics

ENTRY REQUIREMENTS

Applicants must have one of the following academic requirements in order to be admitted to the degree programme.

1. *Senior Secondary School Certificate Examination (SSSCE)*: *Compulsory Subjects* - Grade D or better in three (3) core subjects (Mathematics, Integrated Science and English) and *Elective Subjects* –Grade D or better in three (3) elective subjects. The three electives should include elective Mathematics).
2. *West Africa Senior School Certificate Examination (WASSCE)*: Compulsory Subjects - Grade C6 or better in three (3) core subjects (Mathematics, Integrated Science and English) and Elective Subjects – Grade C6 or better in three (3) elective subjects. The three elective subjects should include Elective Mathematics.
3. *General Certificate of Education (GCE) Advanced Level*: Passes in two (2) subjects including Mathematics (at least, one of the passes should be Grade D or better). Also, the applicant must have had credit passes (Grade 6) in five GCE Ordinary Level subjects including English, Mathematics and a Science subject (for non-science students) and an Arts subject for Science students.
4. HND holders from recognized institutions with at least second-class lower division may be considered for admission into level 200 or 300 in their area of specialization depending on the subjects passed. The applicant must have acquired a two-year post HND qualification working experience.
5. Diploma or other certificates from recognized institutions assessed to be equivalent to (1), (2) or (3) may be considered for admission into level 200 or 300 where applicable.
6. International Students having equivalent qualifications as stated in (1), (2) or (3) may apply for admission. Foreign Certificates must receive authentication and equivalencies from the Ghana National Accreditation Board. Foreign students must have their high school certificates/diplomas translated into English if they are not written in English.
7. *Mature Students*: The applicant must:
    a. Be at least 25 years old.
    b. Show proof of age with birth certificate or any legitimate documentary proof of

birth date which is at least 5 years old at the time of application.

8. Pass Mature Students' Entrance Examinations conducted by Valley View University with three subjects (English Language, Mathematics and General Paper). In lieu of entrance examination, the applicant should show proof of credit passes in English and Mathematics in WASSCE, SSCE, GCE or any other nationally recognized standard High School level examinations. The mature applicant is also required to attend an interview to determine his/her eligibility for the programme.

PROGRAMME OBJECTIVES

The objectives of the Mathematical Science Department are:

- To prepare graduates for a career in mathematics and economics.
- To teach students the different applications of mathematics and economics in solving economic and industry problems.
- To encourage graduates of the programme to go into self-employment by creating their own consultancy businesses in their areas of mathematics and economics.
- To develop in students the ability to think critically and to develop the highest levels of human values,
- To encourage students to appreciate the dignity of labour through work-study programme,
- To encourage students to dedicate their lives to leadership in selfless service to God and to humanity through participation in community service.
- To expose students to a wide range of mathematical and economics skills to prepare them for the job market as professionals in mathematics and economics.
- To provide students with a high-quality programme that confers skills required to enter into graduate degree programmes in mathematics and economics.
- To provide students the opportunity for a balanced development of the intellectual, spiritual, and social dimensions of life in harmony with the Christian heritage.
- To enhance the relationship between the University and the business community in order to continue to provide opportunities for faculty research and service

REQUIREMENTS FOR GRADUATION

- Total Credits required – 140 semester credits
- Breakdown of total credits into major curriculum sub-divisions: See Table below. The required distribution of credits is as follows:

	Major Curriculum Major Curriculum Sub-Divisions –divisions	Credits Requirements
A	General Education	29
B	Mathematics Courses	57
C	Statistics Courses	12
D	Economics Courses	36
E	Research Methods	03
F	Final Year Project	03
	Total	**140**

A. GENERAL EDUCATION **24**

CLUSTER 1. Language and Communications **10**

ENGL121 Language and Writing Skills I 2
ENGL122 Language and Writing Skills II 2
FREN111 French for General Communication I 2
FREN112 French for General Communication II 2
CMME105 Intro to Communication Skills 2

CLUSTER 2. Religion, Theology and Philosophy **11**

RELB163 Life and Teaching of Jesus 3
RELB251 Principles of Christian Faith 3
RELB385 Introduction to Biblical Foundation Ethics 3
RELG451 Bible and Family Dynamics 3

CLUSTER 3. Health and Physical Education **3**

PEAC100 Physical Activity NC
BIOL 140 Human Body in Health & Disease 3
OR
HLTH 200 Health Principles 3

CLUSTER 4. Behavioural and Social Science **3**

SOCI105 Principles of Sociology 3
OR
PSYC105 Introduction to Psychology 3

CLUSTER 5. Natural and Physical Sciences Mathematics
Courses in Mathematical Sciences satisfy this requirement

CLUSTER 6. Counselling, Career Planning, Human Development NC
GNED230 Career Exploration and Planning NC
OR
GNED468 Job Search Strategies and Techniques (optional)
GNED125 Study Skills NC

CLUSTER 7. African Studies course **2**

AFSTxxx African Studies course 2

B. MATHEMATICS COURSES

MATH101 Algebra and Trigonometry 3

MATH 113 Vectors and Geometry 3
MATH 112 Calculus I 3
MATH 114 Algebra 3
MATH 213 Introduction to Abstract Algebra 3

MATH 215 Calculus II	3
MATH 216 Calculus of Several Variables	3
MATH212 Vectors and Mechanics	3
MATH 331 Discrete Mathematics I	3
MATH 333 Introductory Analysis	3
MATH 313 Abstract Algebra	3
MATH 336 Linear Algebra	3
MATH 332 Discrete Mathematics II	3
MATH 334 Analysis	3
MATH 338 Numerical Analysis	3
MATH 457 Complex Analysis	3
MATH 455 Ordinary Differential Equations	3
MATH 456 Partial Differential Equations	3
MATH 468 Operations Research	3

C. STATISTICS COURSES

STAT 101 Introduction to Statistics	3
STAT 112 Introduction to Probability	3
STAT 203 Statistical Methods	3
STAT 204 Regression Analysis	3

D. ECONOMIC COURSES

ECON 101 Principles of Microeconomics	3
ECON 102 Principles of Macroeconomics	3
ECON 201 Intermediate Microeconomics	3
ECON 214 Mathematical Economics	3
ECON 202 Intermediate Macroeconomics	3
ECON 301 Microeconomic Theory	3
ECON 329 Growth and Development	3
ECON 302 Macroeconomic Theory	3
ECON 403 Econometrics I	3
ECON 463 International Trade	3
ECON 462 Econometrics II	3
ECON 464 International Finance	3

E. RESEARCH METHODS

RESH 330 Research Methods	3

F. FINAL YEAR RESEARCH PROJECT

MATH 470 Senior research project	3

ADDITIONAL REQUIREMENTS FOR GRADUATION

a. Research Component
b. Competence-Based Training (CBT) component
c. Problem-Based Learning (PBL) component
d. Practical training, Industrial attachment, Internship, Clinical experience, etc.,
e. Structure of the programme (Semester-by- semester schedule/structure of course, showing the credit value of each course

Prerequisite Courses

COSC115 Introduction to Computer Science I	NC
ENGL121 Language and Writing Skill I	2
FREN111 French for General Communication I	2
MATH113 Vectors and Geometry	3
ECON101 Principles of Microeconomics	3
MATH114 Algebra	3
MATH331 Discrete Mathematics I	3
MATH 333 Introduction to Analysis	3
ECON 403 Econometrics I	3

SEQUENCE OF COURSES

FIRST YEAR

FIRST SEMESTER		**SECOND SEMESTER**	
COURSE	***CREDITS***	***COURSE***	***CREDITS***
STAT101 Introduction to Statistics	3	STAT112 Introduction to Probability	3
MATH101 Algebra & Trigonometry	3	MATH112 Calculus I	3
MATH113 Vectors & Geometry	3	MATH114 Algebra	3
ECON101 Prin. of Microeconomics	3	ECON102 Prin. Of Macroeconomics	
COSC115 Intro to Computer Science I	NC	COSC116 Intro to Computer Science II	NC
RELB163 Life and Teachings of Jesus	3	CMME115 Communication Skills	2
PEAC100 Physical Activity	NC		
FIRST SEMESTER TOTAL CREDITS	**19**	**SECOND SEMESTER TOTAL CREDITS**	**18**

SECOND YEAR

FIRST SEMESTER		**SECOND SEMESTER**	
COURSE	***CREDITS***	***COURSE***	***CREDITS***
STAT203 Statistical Methods	**3**	STAT204 Regression Analysis	**3**
MATH213 Introduction to Abstract Algebra	**3**	MATH216 Calculus of Several Variables	**3**
MATH215 Calculus II	**3**	MATH212 Vectors & Mechanics	**3**
ECON201 Intermediate Microeconomics	**3**	ECON214 Mathematical Economics	**3**
RELB251 Principles of Christian Faith	**3**	ECON202 Intermediate Macroeconomics	**3**
HLTH200 Health Principles	**3**		
FIRST SEMESTER TOTAL CREDITS	**18**	**SECOND SEMESTER TOTAL CREDITS**	**15**

THIRD YEAR

FIRST SEMESTER		**SECOND SEMESTER**	
COURSE	***CREDITS***	***COURSE***	***CREDITS***
ECON301 Microeconomics Theory	**3**	RESH330 Research Method	**3**
ECON329 Growth & Development	**3**	ECON302 Macroeconomics Theory	**3**
MATH331 Discrete Mathematics I	**3**	MATH332 Discrete Mathematics II	**3**
MATH333 Introductory Analysis	**3**	MATH334 Analysis	**3**
MATH313 Abstract Algebra	**3**	MATH336 Linear Algebra	**3**
RELT385 Introduction to Biblical Foundation of Ethics	**3**		
FIRST SEMESTER TOTAL CREDITS	**18**	**SECOND SEMESTER TOTAL CREDITS**	**15**

FOURTH YEAR

FIRST SEMESTER		**SECOND SEMESTER**	
COURSE	***CREDITS***	***COURSE***	***CREDITS***
ECON403 Econometrics I	**3**	ECON462 Econometrics II	**3**
ECON463 International Trade	**3**	ECON464 International Finance	**3**
MATH457 Complex Analysis	**3**	MATH456 Partial Differential Equation	**3**
MATH455 Ordinary Differential Equations	**3**	MATH468 Operations Research	**3**
MATH459 Numerical Analysis	**3**	MATH470 Senior Research Project	**3**
RELG451 Bible and Family Dynamics	**3**		
FIRST SEMESTER TOTAL CREDITS	**18**	**SECOND SEMESTER TOTAL CREDITS**	**15**

STAT 101: INTRODUCTION TO STATISTICS 3 CREDITS

Introduction to Statistics, Types of data (qualitative, quantitative, continuous, discrete, etc.); scales of measurement (nominal, ordinal, interval, ratio, etc.); Descriptive Analysis of Data: Graphical (histogram, bar chart, pie chart, percentiles, quartiles, Box plot) and Tabular Representation of data, outliers. Measures of Central Tendency (mean, trimmed mean, median, mode) and Dispersion, Skewness and Kurtosis, Correlation Analysis & Coefficient of Determination. The primary analysis tools for this course are Microsoft Excel, SPSS, Minitab or Statistica

MATH 101: ALGEBRA AND TRIGONOMETRY 3 CREDITS

The course concentrates on functions and trigonometric functions. It aims at introducing students to various types of functions, which will enable them to do Calculus, Statistics and other related Math courses at higher levels. Topics include exponential functions, Logarithmic functions and radicals, polynomial functions and equations. Rational functions and Partial fractions. Inequalities in one and two variables. Permutations and combinations, series and sequences, use of recurring orders. Binomial theorem for a positive integral index, principles of induction. Trigonometric functions and identities.

MATH 113: VECTORS AND GEOMETRY 3 CREDITS

This course concentrates on the concepts of Vectors and Analytic Geometry. It aims at preparing students for further studies in Calculus of Single and Several Variables, Differential Geometry and Linear Algebra. Topics include: Vectors and Vector Algebra, the Scalar Product and the Vector product. Applications to Geometry, lines and plane; position vector of a point in a plane and in space, direction and normal vectors of a line. Equation of a line, equation of a circle, intersection of a line and a circle. Loci, parametric representation of a curve. The conic sections in a rectangular Cartesian form, parabola, ellipse and hyperbola. Vector equations of lines and planes.

ECON 101 PRINCIPLES OF MICROECONOMICS 3 CREDITS

This course will provide students with an introduction to a core area of economics known as microeconomics. It considers the operation of a market economy and the problem of how best to allocate society's scarce resources. The course considers the way in which various decisions making units in the economy (individual and firms) make their consumption and production decisions and how these decisions are coordinated. It considers the laws of supply and demand, elasticities and introduces the theory of the firm and its components, production, cost theories and revenue and model of market structure (perfect competition and monopoly).

ENGL 111 LANGUAGE AND WRITING SKILLS 2 CREDITS

This course aims at developing the student's basic skills in the grammatical systems of English language and to use these effectively in writing for academic and professional pursuits. Coverage includes introduction to parts to speech, vocabulary development, vocabulary usage, nouns: identification, types, functions, plural formation; pronouns: types/case, functions; adjectives: types, functions/position, sequencing, comparison; determiners/interjections; verbs: identification, types, tenses: types, sequencing; concord: types of Concord; adverbs and prepositions: formation, types, functions; conjunction/ transitional devices; sentences: types, parts, sentence errors: fragments, run-on and punctuation.

FREN 101 FRENCH FOR GENERAL COMMUNICATION I 2 CREDITS

This course provides a foundation on which to build the skills of listening, speaking, reading and writing simple material in French. The approach is essentially communicative and accurate pronunciation is stressed. The following topics will be studied: greetings; alphabets and phonetics; accents; introduction; articles; countries and nationalities; numbers (1 – 100); days of the week; months of the year; time; demonstrative adjectives; possessive adjectives; prepositions (à, de, en, au, aux, à la, à l', du, des, etc.); expressing the past; expressing the future; giving general information about a person (name, age, origin, residence, marital status, occupation, etc.); describing a person (general outlook, first impressions, height and structure,

hairs, eyes, clothing); talking about one's health and physical status.

CMME 105 COMMUNICATION SKILLS 2 CREDITS

This course is designed to assist students to acquire verbal and non-verbal communication skills in order to communicate effectively. The course is also to raise students' level of proficiency as well as prepare them to function effectively on their own.

STAT 203 STATISTICAL METHODS 3 CREDITS

The course covers both parametric and non-parametric tests. It aims at preparing students for research. Topics include: Joint Probability Distributions: Properties, Marginal and Conditional distributions. Conditional Mean and Variance. Statistical Inference: Basic Concepts of Statistical Inference, Sampling distributions. Introduction to sampling methods, Sampling distributions of sample means, proportions and variances. Estimation: Point and Interval. Estimation of Parameters (mean, proportion and variance). Hypothesis Testing: Type I and II Errors and Power Function, Neyman-Pearson Lemma and Likelihood Ratio Test for Most Powerful Critical Region. Parametric Tests for parameters (mean, proportion and variance), Analysis of Variance Test for several means. Non-Parametric Tests: Chi- Square Tests Chi-Square Tests, Tests for Independent and Paired Samples, Mann- Whitney U-Test, Wilcox Signed Rank Test, Kruskal-Wallis and Friedman's tests and Sign Test. The primary analysis tools for this course are MATLAB, Mathematica, or Octave.

MATH 213 INTRODUCTION TO ABSTRACT ALGEBRA 3 CREDITS

This course provides the basic foundations of Sets, Number Theories and Mathematical Logic. It serves as a foundation for further studies in Abstract Algebra. Topics for the course are: Mathematical logic and proof, Elements of set theory, Cartesian products, binary relations and equivalence relation. Elementary number theory, algebraic structures, introduction to groups. Rings, fields and integral domains, vectors spaces and subspace, basis.

MATH 215 CALCULUS II 3 CREDITS

The course concentrates on the continuation of Calculus of Single Variables. It aims at preparing students to apply Calculus to Statistics and Economics. Topics for this course include: the first and second derivatives and their applications. Integration as a sum; definite and indefinite integrals, in particular reduction formulas. Logarithmic and exponential functions, hyperbolic functions and their inverse, inverse circular functions, integrating by parts and by substitution, applications to plane curves, arc length area of surface of revolution and volume of rotation. Ordinary differential equations, first order linear equation; integrating factors, second order linear differential equations with constant coefficients.

ECON 201 INTERMEDIATE MICROECONOMICS 3 CREDITS

This course builds on the microeconomics principles studied in Level 100 and provides an analysis of the way in which the market system functions as a mechanism for coordinating the independent choices of individual economic agents. It develops basis for evaluating the efficiency and equity implications of competition and other market structures and perspective on the appropriate role of government. Included are the study of consumer theory, production and cost, market structures and market failure. This course will put more emphasis of mastery of theoretical concepts and analytical tools already discussed.

RELB 163 LIFE AND TEACHINGS OF JESUS 3 CREDITS

The course deals with a comprehensive study of the life and teachings of Jesus Christ as unfolded in the four Gospels with analytical attention to the gospel writers and their writings in an attempt to reveal the impact of His self-revelation in that age and ours. The objective of the course is to link the student spiritually with the lord Jesus Christ. Topics covered include: Inter-Testamental Period, Jewish Religious Groups, Synoptic Gospels, Harmony of the Four Gospels, Nature of Jesus Christ, Jesus Christ-His Birth to Manhood, Preparation for Ministry, Ministry in Galilee, Retirement from Public Ministry, Ministry in Samaria, The Passion Week, and Resurrection to Ascension. Mode of Delivery: Lectures, Discussions and Group Presentations.

HLTH 200 HEALTH PRINCIPLES 3 CREDITS

This course deals with the study of basic health practices which seek to improve health and

longevity. It focuses on holistic health, which includes the physical, mental, social and spiritual aspect of the human being. It also encourages students to apply these principles for achieving and maintaining good health in their various communities. It also studies physiology, including the principles governing community and personal health and the methods of applying these principles to successful daily living. Course coverage includes: introduction to health, S. D. A. philosophy of health and Biblical concept of health, understanding the levels of human body organization, application of "CELEBRATIONS" to healthy lifestyles etc.

STAT 204 REGRESSION ANALYSIS 3 CREDITS

This course concentrates on the relationships between two variables and among three or more variables. It aims at preparing students for research in Statistics and Economics. Basic Concepts of Regression and Correlation Analysis. Simple Regression Model: Estimation of regression coefficients by least squares method and Error variance. Interpretation of regression coefficients, Coefficient of Determination, forecasting. Multiple Regression Model: Some Basic Concepts and results of Matrices and Vectors. Expectation and Covariance Matrix for linear combination(s) of random variables, Estimation of the Multiple Regression Model by the Least Squares Method, Interpretation of regression coefficients using Analysis of Variance, Concepts of Multi-Collinearity and the use of Dummy or Qualitative Variables. Residual Analysis: Testing Regression Model Assumptions. Use of Statistical Packages

MATH 216 CALCULUS OF SEVERAL VARIABLES 3 CREDITS

This course concentrates on derivatives of functions of several variables, Multiple Integrals, and their applications to Business, Economics, and Statistics. Higher derivatives and their applications, Taylor's and Maclaurin's series of standard functions – vector functions, functions of several variables and partial derivatives, Euler's theorem of homogeneous functions, Grachets, maxima and minima the method of Lagrange Multipliers and constraints optimization. The gradient operator,curves, surfaces, tangent planes and normals, The divergence and curl operators, Introduction to multiple integrals.

MATH 212 VECTORS AND MECHANICS 3 CREDITS

Prerequisite: MATH113

It examines the concept of vectors and its application to Mechanics. It aims at letting students appreciate the motion of objects in space and the forces that acts on them. It also serves as a foundation to Linear Algebra and further studies in Mechanics. Topics include Vector functions of a single variable, differentiation and integration, velocity and acceleration. Relation motion, Newton's laws of motion. Forces: composition and resolution of forces, work, energy and power, Momentum and impulse, energy conservation and momentum conservation. Rectilinear motion resisted motion and simple harmonic motion.

ECON 214 MATHEMATICAL 3 CREDITS

This course presents a fairly rigorous and detailed application of various mathematical techniques in economics. Topics to be covered in this course include derivatives of exponential and logarithmic functions, optimization without constraints and optimization with inequality constraints (non-linear programming and Kuhn-Tucker conditions), the envelope theorem (reciprocity conditions and duality; profit and utility maximization; derivation of Slutsky equation), integral calculus, differential equations, difference equations (first and second order; cobweb model) and optimal control theory (Pontragin's maximum principle; Hamiltonian; transversality conditions and application to growth models).

COSC115 INTRODUCTION TO COMPUTER SCIENCE I NC

This course introduces students to the basic principles, concepts and practice of computer science. The course provides an overview of key topics in computer science emphasizing on the underlying mathematical concepts and principles of computer science, topics relating to hardware as well as system development components and aspects of computer science.

COSC116 INTRODUCTION TO COMPUTER SCIENCE NC

Prerequisite: COSC115

This course provides a good appreciation of the fundamentals of computer architectures and their operation. It covers the following topics: number systems; basic computer components;

the fetch-decode-execute cycle; branch instructions and flow control; addressing modes; stacks and subroutines; input output; interrupts; exceptions.

RELB 251 PRINCIPLES OF CHRISTIAN FAITH 3 CREDITS

The course deals with the detailed study of the fundamental doctrines of the Christian Faith. The aim of the course is to enable students have a working knowledge of the different doctrines of the Christian Faith and be able to practically apply these doctrines to the challenges of living as Christians in today's society. Course topics include: The Nature and Scope of Theology, The Doctrine of Revelation and Inspiration, The Gift of Prophecy, The Doctrine of God and the Natural Beings, God's Special Agents, The Devil and the Origin of Sin, The Doctrine of Creation, The Doctrine of Man, The Doctrine of Sin, The Doctrine of Christ, and Death (The Ultimate End of Life on Earth). Mode of Delivery: Lectures, Discussions and Group Presentations.

ECON 202 INTERMEDIATE 3 CREDITS

The first year course provided a broad overview of the subject area. In this course, the aim is to delve a little deeper into the subject. In particular, it addresses the big issues which affect us on a day to day basis. We would be interested in finding out why some countries grow more quickly than others, why some experience high inflation while others have stable prices and why all countries experience recession and booms. Furthermore, we want to know if government policy can have an impact on these factors. Specific topics to be covered include but not limited to: Absolute Income, Life Cycle, Permanent income and Relative Income Hypothesis; Theory of Investment. Equilibrium in product and money markets: IS and LM functions; open economy; aggregate supply and the short-run trade-off between inflation and unemployment; stabilization policy; government and budget deficits.

ECON 329 GROWTH AND DEVELOPMENT 3 CREDITS

This course is intended to familiarize students with some major growth models (exogenous and endogenous growth models), poverty and inequality. The course is also designed to uncover issues such as the relationship between Aid, debt and growth and trade and growth. Specifically, topic may include: theories of economic growth and development, poverty and inequality, population growth and development, education and health in economic development, environment and development and international trade and development.

RELT 385 INTRODUCTION TO BIBLICAL FOUNDATION ETHICS 3 CREDITS

This course studies the structure and content of Christian ethics: goal, motive, and norm of the Christian life; with an analysis of ethical issues of practical decision- making, authority, life, and sexuality. Ethical considerations of business decisions are examined in light of a Christian value system. This course covers topics such as different approaches to decision making in ethical situations, development of appropriate organizational responses to ethical problems, morality and issues of right and wrong, etc.

MATH 331 DISCRETE MATHEMATICS I 3 CREDITS

The course concentrates on set theories, Logic and their Applications. It aims at enabling students to develop critical thinking for Computer Programming. Topics include: Foundations: Logic, Sets, and Functions: Logic, Propositional Equivalences, Predicates and Quantifiers, Sets, Set Operations, Functions, Sequences and Summations, Growth Functions. Algorithms, the Integers, and Matrices: Algorithms, Complexity of Algorithms, Integers and Division, Integers and Algorithms, Applications of Number Theory, Matrices. Mathematical Reasoning:Methods of Proof, Mathematical Induction, Recursive Definitions, Recursive Algorithms, Program Correctness. Counting: Basics of Counting, Pigeonhole Principle, Permutations and Combinations, Discrete Probability, Probability Theory, Generalized Permutations and Combinations, Generating Permutations and Combinations. Advanced Counting Techniques: Recurrence Relations, Solving Recurrence Relations, Divide-and-Conquer Relations, Generating Functions, Inclusion-Exclusion, and Applications of Inclusion-Exclusion.

MATH 333 INTRODUCTORY ANALYSIS I 3 CREDITS

The course concentrates on the real number system, and sequences of real numbers. It aims at

making students gain insight into the behavior of real numbers. Topics Include: Construction of Real Numbers. Least Upper Bound, and the Greatest Lower Bound of a Set (of real numbers). Convergence of sequences, upper and lower Limits. The Bolzano-Wierstrass Theorem and the Cauchy criteria for convergence. The concept of a function of a real variable. Limit, continuity and derivative of a function (treatment).

MATH 313 ABSTRACT ALGEBRA 3 CREDITS

Prerequisite: Math114

It concentrates on Algebraic Structures aiming at providing insight into the fundamentals of properties of Groups, Rings and Fields. Topics under this course are: Groups Rings and Fields; Definitions, Examples and Properties. Polynomial Rings. Euclidean Algorithms. Ideals and Quotient Rings. The Homomorphism Theorems. The field of Quotients of an Integral Domain.. Principal Ideal Domains. Factorisation in Principal Ideal Domain. Groups. Examples of Groups such as Cyclic Groups, Groups of Permutations, and Dihedral Groups. Subgroups, Cossets and Lagrange's Theorem. groups. Normal Subgroups and Factor Groups. The Homomorphism Theorems for Groups

ECON 302 MACROECONOMIC THEORY 3 CREDITS

This course presents a detailed discussion of the structure of the macroeconomic system. It discusses the major theoretical questions and controversies of the structure of macroeconomics. The course would employ a general equilibrium view of the macro economy wherein we analyse equilibrating conditions of supply and demand in the goods, money and labour markets and the effect of policy (fiscal and monetary) on these markets. Using literary, graphic and algebraic approaches, we would show that the function of the macro economy is based on the optimizing decisions of microeconomic agents in utility and profit maximization. Specific topics covered include: advanced equilibrium analysis in the goods, money and labour markets; effectiveness of fiscal, monetary and income policies; theories of money demand (regressive expectation model, Tobin's model of liquidity preference, inventory approach to Tobin's model of liquidity preference, inventory approach to transactions demand and Friedman quantity theory of money model).

MATH 336 LINEAR ALGEBRA 3 CREDITS

Prerequisite: Math113

The course is a continuation of Vectors and Geometry. It also concentrates on Matrixes and Vector Spaces. It is an important tool for Business, Statistics and Economics. Topics include: Vector spaces and subspace, spanning sets, bases, linear maps and their matrices. Range space rank and kernel. Eigen values and eigenvectors. Diagonalization of a linear operator, diagonalizing a matrix; bases of Eigen vectors, symmetric maps, matrices and quadratic forms

MATH 332 DISCRETE MATHEMATICS II 3 CREDITS

This course is the continuation of Discrete Mathematics I. It aims at helping students to gain insight into Mathematical relations and Graphs. Topics Include: Relations: Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings. Graphs: Introduction to Graphs, Graph Terminology, Representing Graphs and Graph, Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest Path Problems, Planar Graphs, Graph Colouring. Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Trees and Sorting, Spanning Trees, Minimum Spanning Trees. Boolean Algebra: Demoivre's Theorem, Boolean Functions, Representing Boolean Functions, Logic Gates, Minimization of Circuits. Modelling Computation: Languages and Grammars, Finite-State Machines with Output, Finite- State Machines with No Output, Language Recognition, Turing Machines.

MATH 334 ANALYSIS 3 CREDITS

Prerequisite: Math333

This course concentrates on derivatives of functions of real variables, sequences and series and the fundamental theorem of Calculus. It aims at preparing students for Mathematical Analysis and Functional Analysis at higher levels and for research. Topics include: Derivative of a

function, its properties and applications. Mean value theorem, Rolle 's Theorem, maximum value theorem, and the intermediate value theorem. Series as the sequence of n'th partial sums. Existence of limits, increasing (decreasing) sequences bounded above (below). Series with positive terms. Convergence tests. Absolute convergence and conditional convergence. Sequences of functions point wise and uniform convergence. Power series. Definition of integral and continuity as criterion for integrability, fundamental theorem of calculus. The Riemann integral.

RESH 330 RESEARCH METHODS 3 CREDITS

This course is designed to provide the fundamentals of research methodology applicable to mathematical sciences and its related areas. Analysis, critical reading, evaluation, and application of research needed for the development of skills in research proposals are emphasized. Topics covered include types of research, population sampling, research design, developing instruments of data collection, statistical treatment of data, testing of hypothesis. Presentation of oral and written reports.

ECON 403 ECONOMETRICS I 3 CREDITS

This course introduces students to the primary tools of quantitative data analysis employed in the study of economic and social relationships. It equips students for independent econometric research and for critical reading of empirical research papers. A survey of economics devoted to the statistical testing of propositions derived from economic theory, with primary emphasis on business and economic applications. It deals with applications of statistical methods to the testing and estimation of economic relationships. The main topics covered include structure of economic data, the linear regression model, extensions of the basic linear regression model, the problems of omitted variables, two-stage least squares and weighted least squares regression methods, and problems that arise when analyzing cross section and time series data by means of regression models.

ECON 463 INTERNATIONAL TRADE 3 CREDITS

This is a preparatory course in international economics. It is intended to introduce students to international trade theory and provide a foundation for understanding trade policies. The course covers major theories of trade (Ricardian, Hecksher- Ohlin and modern trade theories) as well as the relationship between trade and economic growth, with a particular focus on the role of trade policy.

MATH 457 COMPLEX ANALYSIS 3 CREDITS

This course concentrates on the behaviours of complex numbers and complex functions. It serves as a foundation for students who wish to study complex analysis at higher levels. It also aims at helping students to gain more experience in complex numbers and calculus of complex numbers. Topics include: Graphical Representation of complex Numbers, Demoivre's Theorem, Roots of complex Numbers, Vector Representation of Complex Numbers, Limits, Continuity, Complex Functions, Analytic Functions, Cauchy-Riemann Equations Conjugate Functions, Harmonic Functions, Conformal Mappings Taylor and Laurent's Series ,Complex Integration and Cauchy's Theorem.

MATH455 ORDINARY DIFFERENTIAL EQUATIONS 3 CREDITS

This course serves as bases of Mathematical Modelling. It aims at enabling student model real life situations in Business, Economics and Statistics using Differential Equations. Topics for the course include: Differential forms in R2 and R3, exactness conditions and inerrability condition, existence and uniqueness of solution. Ordinary differential equations with constant and variable coefficients, reduction of orders. Variation of parameters, series solution. Ordinary and regular points, fubini's theorem. Introduction to Legendre equations and Bessel equations, Laplace transformation; application to initial-value problems.

MATH 459 NUMERICAL ANALYSIS 3 CREDITS

The course concentrates on numerical analyses of real numbers. It aims at enabling students to solve complex algebraic, transcendental and differential equations. Sources and type of errors; round-off errors, truncation error, Basic Error Analysis.Evaluation of functions. Numerical solution of non-linear algebraic equation; one- point methods; simple iteration, bisection,

secant, false position and Newton- Raphson Methods. Bisection and false-position methods. Numerical solution of sets of linear algebraic equations; Solution of Tridiagonal Systems, Iterative Method, Gaussian Elimination Method, Gauss Seidel and Gauss Jordan Method, matrix inversion. LU Decomposition. Finite Differences, Lagrange's interpolation, Inverse Interpolations, Least square, fitting a straight line, nonlinear curve fitting, Data fitting with cubic splines. Numerical differentiation using interpolation method, numerical integration, Trapezoidal rule, Simpson's 1/8 rule, Simpson 3/8 rule. Euler method, Runge-Kutta method, Predictor corrector method. Use of Visual C# programming language.

MATH 468 OPERATIONS RESEARCH 3 CREDITS

This course aims at helping students to develop models to determine the optimum use and allocation of resources in industries and at their workplaces. Topics to be covered include: Linear Programming, Sensitivity Analysis, Transportation Model, Assignment Model, Integer Programming, Non-Linear Programming, Queuing Models, Sequencing Problems, and Game Theory, Dynamic Programming, Goal Programming, Deterministic Inventory models, Probabilistic Inventory models, Simulation model, CPM / PERT, Markov Analysis, Decision Theory. Lab sessions will use Excel Solver and Quantitative Management software.

MATH 456 PARTIAL DIFFERENTIAL EQUATIONS 3 CREDITS

Prerequisite: Math216

This course is the continuation of calculus of several variable. It deals with unknown functions of several variables and their derivatives. It aims at helping students to model real life situations in Business, Economics, and Statistics. Topics for the course include: First and second order partial deferential equations with constant coefficients: classification of 2nd P.D.E., elliptic, parabolic and hyperbolic types. Initial and boundary value problem. Separation of variables, heat equation, vibrating strings, one dimensional move equation.

ECON 464 INTERNATIONAL FINANCE 3 CREDITS

Prerequisite: ECON 463

This course is complementary to Econ 463 and aims to teach tools for understanding international financial flows for a complete understanding of the workings of the external sector of the economy. The main areas covered include balance of payments, exchange rate determination and policy making in an open economy. Topical issues in the international monetary system, aid, debt and foreign direct investment are also discussed.

ECON 406 ECONOMETRICS II 3 CREDITS

Prerequisite: ECON 403

It is a continuation of Econ403. This course delves into the estimation problems in OLS estimation (Concept and consequences) Heteroscedasticity: when the errorvariance is nonconstant. Autocorrelation: when the error terms are correlated. Multicollinearity: when the regressors are correlated. Time Series Data Analysis. Other Advanced topic include: the method of maximum likelihood estimation (MLE), simultaneous equations, Panel Data Analysis (pooled model, fixed effect model, random effect model, testing for heteroscedasticity in panel and remedies, dynamic panel data, non-stationary panel data), binary choice models (linear probability models, Probit and Logit models). Laboratory work shall be done to give students hands on experience in data handling using STATA and E-views.

MATH 470 SENIOR RESEARCH PROJECT 3 CREDITS

The Senior Research Project is to be taken by every final year student. This must be done as a partial fulfilment of the requirements for the award of bachelor's degree at VVU. The students should register for this course at least a semester before they hope to graduate. The student should then choose the topic in the relevant field and submit it to the Head of Department. The Department, after deliberation, will suggest a supervisor. The research project should be type-written and double- spaced. The completed research work should not be less than 4000 words. The student has to defend the research work in the presence of examiners.

PROGRAMME OBJECTIVES

The objectives of the Mathematics with Statistics Department are:

- To prepare graduates for a career in Mathematics with Statistics.
- To teach students the different applications of mathematics and statistics in solving industry problems.
- To equip students with knowledge and skills needed to perform professional duties and to work more effectively with other specialists in other fields of study.
- To encourage graduates of the programme to go into self-employment by creating their own consultancy businesses in Mathematical Statistics.
- To develop the students' ability to think critically and to develop the highest levels of human values,
- To encourage students to appreciate the dignity of labour through work-study programme,
- To train the students to dedicate their lives to leadership in selfless service to God and to humanity through participation in community service.
- To expose students to a wide range of mathematical science skills to prepare them for the job market as professionals and practising mathematical science in their areas of specialization.
- To provide students with a high-quality programme that provide skills required for job placement or entrance into graduate degree programmes in Mathematical Statistics.
- To provide students the opportunity for a balanced development of the intellectual, spiritual, and social dimensions of life in harmony with the Christian heritage.

ENTRY REQUIREMENTS

Applicants must have one of the following academic requirements in order to be admitted to the degree programme.

1. *Senior Secondary School Certificate Examination (SSSCE)*: *Compulsory Subjects* - Grade D or better in three (3) core subjects (Mathematics, Integrated Science and English) and *Elective Subjects* –Grade D or better in three (3) elective subjects. The three electives should include elective Mathematics).

2. *West Africa Senior School Certificate Examination (WASSCE)*: Compulsory Subjects - Grade C6 or better in three (3) core subjects (Mathematics, Integrated Science and English) and Elective Subjects – Grade C6 or better in three (3) elective subjects. The three elective subjects should include Elective Mathematics.
3. *General Certificate of Education (GCE) Advanced Level*: Passes in two (2) subjects including Mathematics (at least, one of the passes should be Grade D or better). Also, the applicant must have had credit passes (Grade 6) in five GCE Ordinary Level subjects including English, Mathematics and a Science subject (for non-science students) and an Arts subject for Science students.
4. HND holders from recognized institutions with at least second-class lower division may be considered for admission into level 200 or 300 in their area of specialization depending on the subjects passed. The applicant must have acquired a two-year post HND qualification working experience.
5. Diploma or other certificates from recognized institutions assessed to be equivalent to (1), (2) or (3) may be considered for admission into level 200 or 300 where applicable.
6. International Students having equivalent qualifications as stated in (1), (2) or (3) may apply for admission. Foreign Certificates must receive authentication and equivalencies from the Ghana National Accreditation Board. Foreign students must have their high school certificates/diplomas translated into English if they are not written in English.
7. *Mature Students*: The applicant must:
    a. Be at least 25 years old.
    b. Show proof of age with birth certificate or any legitimate documentary proof of birth date which is at least 5 years old at the time of application.
    c. Pass Mature Students' Entrance Examinations conducted by Valley View University with three subjects (English Language, Mathematics and General Paper). In lieu of entrance examination, the applicant should show proof of credit passes in English and Mathematics in WASSCE, SSCE, GCE or any other nationally recognized standard High School level examinations. The mature applicant is also required to attend an interview to determine his/her eligibility for the programme.

REQUIREMENTS FOR GRADUATION

a) Total Credits required – 140 semester credits
b) Breakdown of total credits into major curriculum sub-divisions: See Table below. The required distribution of credits is as follows:

BSc. [Mathematics With Statistics] Major Curriculum Sub-Divisions

	Major Curriculum Major Curriculum Sub-Divisions – divisions	**Credits Requirements**
A	General Education	29
B	Mathematics Courses	57
C	Statistics Courses	33
D	Economics Courses	15
E	Research Methods	03
F	Final Year Project	03
	Total	**140**

A. GENERAL EDUCATION **29**

CLUSTER 1. Language and Communications **10**

ENGL121 Language and Writing Skills I	2
ENGL122 Language and Writing Skills II	2
FREN111 French for General Communication I	2
FREN112 French for General Communication II	2
CMME105 Intro to Communication Skills	2
CLUSTER 2. Religion, Theology and Philosophy	**12**
RELB163 Life and Teaching of Jesus	3
RELB251 Principles of Christian Faith	3
RELB385 Introduction to Biblical Foundation Ethics	3
RELG451 Bible and Family Dynamics	3
CLUSTER 3. Health and Physical Education	**3**
PEAC100 Physical Activity	NC
BIOL 140 Human Body in Health & Disease	3
OR	
HLTH 200 Health Principles	3
CLUSTER 4. Behavioural and Social Science	**5**
SOCI105 Principles of Sociology	3
OR	
PSYC105 Introduction to Psychology	3
CLUSTER 5. Natural and Physical Sciences Mathematics	
Courses in Computer Science satisfy this requirement	
CLUSTER 6. Counselling, Career Planning, Human Development	**NC** GNED230
Career Exploration and Planning	NC OR
GNED468 Job Search Strategies and Techniques (optional)	NC GNED125
Study Skills	NC
CLUSTER 7. African Studies course	2
AFSTxxx African Studies course	2
B. MATHEMATICS COURSES	
MATH101 Algebra and Trigonometry	3
MATH 113 Vectors and Geometry	3
MATH 112 Calculus I	3
MATH 114 Algebra	3
MATH 213 Introduction to Abstract Algebra	3
MATH 215 Calculus II	3
MATH 216 Calculus of Several Variables	3
MATH212 Vectors and Mechanics	3
MATH 331 Discrete Mathematics I	3
MATH 333 Introductory Analysis	3
MATH 313 Abstract Algebra	3
MATH 336 Linear Algebra	3
MATH 332 Discrete Mathematics II	3
MATH 334 Analysis	3
MATH 338 Numerical Analysis	3
MATH 457 Complex Analysis	3
MATH 455 Ordinary Differential Equations	3
MATH 456 Partial Differential Equations	3
MATH 468 Operations Research	3
C. STATISTICS COURSES	
STAT 101 Introduction to Statistics	3
STAT 112 Introduction to Probability	3
STAT 203 Statistical Methods	3
STAT 204 Regression Analysis	3
STAT 325 Design and Analysis of Experiment	3
STAT 327 Time Series Analysis	3
STAT 312 Sampling Techniques and Survey Methods	3

STAT 326 Data Analysis	3
STAT 461 Statistical Inference	3
STAT 452 Multivariate Analysis	3
STAT 112 Statistical Quality Control	3

D. ECONOMIC COURSES

ECON 101 Principles of Microeconomics	3
ECON 102 Principles of Macroeconomics	3
ECON 201 Intermediate Microeconomics	3
ECON 214 Mathematical Economics	3
ECON 202 Intermediate Macroeconomics	3

G. RESEARCH METHODS

RESH 330 Research Methods	3

H. FINAL YEAR RESEARCH PROJECT

MATH 470 Senior research project	3

ADDITIONAL REQUIREMENTS FOR GRADUATION

a. Research Component
b. Competence-Based Training (CBT) component
c. Problem-Based Learning (PBL) component
d. Practical training, Industrial attachment, Internship, Clinical experience, etc.,
e. Structure of the programme (Semester-by- semester schedule/structure of course, showing the credit value of each course

Prerequisite Courses

COSC115 Introduction to Computer Science I	NC
ENGL121 Language and Writing Skill I	2
FREN111 French for General Communication I	2
MATH113 Vectors and Geometry	3
ECON101 Principles of Microeconomics	3
MATH114 Algebra	3
MATH331 Discrete Mathematics I	3
MATH 333 Introduction to Analysis	3
ECON 403 Econometrics I	3

SEQUENCE OF COURSES

FIRST YEAR

FIRST SEMESTER		**SECOND SEMESTER**	
COURSE	***CREDITS***	***COURSE***	***CREDITS***
STAT101 Introduction to Statistics	3	STAT112 Introduction to Probability	3
MATH101 Algebra & Trigonometry	3	MATH112 Calculus I	3
MATH113 Vectors & Geometry	3	MATH114 Algebra	3
ECON101 Prin. Of Microeconomics	3	ECON102 Prin. Of Macroeconomics	
COSC115 Intro to Computer Science I	NC	COSC116 Intro to Computer Science II	NC
RELB163 Life and Teachings of Jesus	3	CMME105 Communication Skills	2
PEAC100 Physical Activity	NC		
FIRST SEMESTER TOTAL CREDITS	**19**	**SECOND SEMESTER TOTAL CREDITS**	**18**

SECOND YEAR

FIRST SEMESTER		**SECOND SEMESTER**	
COURSE	***CREDITS***	***COURSE***	***CREDITS***
STAT203 Statistical Methods	**3**	STAT204 Regression Analysis	**3**
MATH213 Introduction to Abstract Algebra	**3**	MATH216 Calculus of Several Variables	**3**
MATH215 Calculus II	**3**	MATH212 Vectors & Mechanics	**3**
ECON201 Intermediate Microeconomics	**3**	ECON214 Mathematical Economics	**3**
RELB251 Principles of Christian Faith	**3**	ECON202 Intermediate Macroeconomics	**3**
HLTH200 Health Principles	**3**		
FIRST SEMESTER TOTAL CREDITS	**18**	**SECOND SEMESTER TOTAL CREDITS**	**15**

THIRD YEAR

FIRST SEMESTER		**SECOND SEMESTER**	
COURSE	***CREDITS***	***COURSE***	***CREDITS***
STAT325 Design and Analysis of Experiments	**3**	STAT326 Data Analysis	**3**
STAT327 Time Series Analysis	**3**	STAT312 Sampling Techniques and Survey Methods	**3**
RELT385 Introduction to Biblical Foundation of Ethics	**3**	MATH336 Linear Algebra	**3**

MATH331 Discrete Mathematics I	**3**	MATH331 Discrete Mathematics II	**3**
MATH333 Introductory Analysis	**3**	MATH 334 Analysis	**3**
MATH 313 Abstract Algebra	**3**	RESH330 Research Methods	**3**
FIRST SEMESTER TOTAL CREDITS	**18**	**SECOND SEMESTER TOTAL CREDITS**	**18**

FOURTH YEAR

FIRST SEMESTER		**SECOND SEMESTER**	
COURSE	***CREDITS***	***COURSE***	***CREDITS***
STAT461 Statistical Inference	**3**	STAT452 Multivariate Analysis	**3**
STAT457 Complex Analysis	**3**	STAT462 Statistical Quality Control	**3**
GNED468 Job Search Strategies and Techniques	**3**	MATH468 Operation Research	**3**
MATH455 Ordinary Differential Equation	**3**	MATH456 Partial Differential Equation	**3**
MATH459 Numerical Analysis	**3**	MATH470 Senior Research Project	**3**
RELG451 Bible and Family Dynamics	**3**		
FIRST SEMESTER TOTAL CREDITS	**18**	**SECOND SEMESTER TOTAL CREDITS**	**15**

COURSE DESCRIPTIONS

STAT 101: INTRODUCTION TO STATISTICS 3 CREDITS

This course introduces students into various types and analysis of data. By the end of this course, students should be able to collect and analyse quantitative and qualitative data and determine the strength of relationship between two variables. **Topics include:** Introduction to Statistics, Types of data (qualitative, quantitative, continuous, discrete, etc.); scales of measurement (nominal, ordinal, interval, ratio, etc.); Descriptive Analysis of Data: Graphical (histogram, bar chart, pie chart, percentiles, quartiles, Box plot) and Tabular Representation of data, outliers. Measures of Central Tendency (mean, trimmed mean, median, mode) and Dispersion, Skewness and Kurtosis, Correlation Analysis & Coefficient of Determination. The primary analysis tools for this course are Microsoft Excel, SPSS, Minitab or Statistical.

MATH 101: ALGEBRA AND TRIGONOMETRY 3 CREDITS

The course concentrates on functions and trigonometric functions. It aims at introducing students to various types of functions, which will enable them to do Calculus, Statistics and other related Math courses at higher levels. **Topics include** exponential functions, Logarithmic functions and radicals, polynomial functions and equations. Rational functions and Partial fractions. Inequalities in one and two variables. Permutations and combinations, series and sequences, use of recurring orders. Binomial theorem for a positive integral index, principles of induction. Trigonometric functions and identities.

MATH 113: VECTORS AND GEOMETRY 3 CREDITS

This course concentrates on the concepts of Vectors and Analytic Geometry. It aims at preparing students for further studies in Calculus of Single and Several Variables, Differential Geometry and Linear Algebra. Topics include: Vectors and Vector Algebra, the Scalar Product and the Vector product. Applications to Geometry, lines and plane; position vector of a point in a plane and in space, direction and normal vectors of a line. Equation of a line, equation of a circle, intersection of a line and a circle. Loci, parametric representation of a curve. The conic sections in a rectangular Cartesian form, parabola, ellipse and hyperbola. Vector equations of lines and planes.

ECON 101 PRINCIPLES OF MICROECONOMICS 3 CREDITS

This course will provide students with an introduction to a core area of economics known as microeconomics. It considers the operation of a market economy and the problem of how best to allocate society's scarce resources. The course considers the way in which various decisions making units in the economy (individual and firms) make their consumption and production decisions and how these decisions are coordinated. It considers the laws of supply and demand, elasticities and introduces the theory of firm and its components, production, cost theories and revenue and model of market structure (perfect competition and monopoly).

ENGL 111 LANGUAGE AND WRITING SKILLS 2 CREDITS

This course aims at developing the student's basic skills in the grammatical systems of English language and to use these effectively in writing for academic and professional pursuits. Coverage includes introduction to parts to speech, vocabulary development, vocabulary usage, nouns: identification, types, functions, plural formation; pronouns: types/case, functions; adjectives: types, functions/position, sequencing, comparison; determiners/interjections; verbs: identification, types, tenses: types, sequencing; concord: types of Concord; adverbs and prepositions: formation, types, functions; conjunction/ transitional devices; sentences: types, parts, sentence errors: fragments, run-on and punctuation.

FREN 101 FRENCH FOR GENERAL COMMUNICATION I 2 CREDITS

This course provides a foundation on which to build the skills of listening, speaking, reading and writing simple material in French. The approach is essentially communicative and accurate pronunciation is stressed. The following topics will be studied: greetings; alphabets and phonetics; accents; introduction; articles; countries and nationalities; numbers (1 – 100); days of the week; months of the year; time;

demonstrative adjectives; possessive adjectives; prepositions (à, de, en, au, aux, à la, à l', du, des, etc.); expressing the past; expressing the future; giving general information about a person (name, age, origin, residence, marital status, occupation, etc.); describing a person (general outlook, first impressions, height and structure, hairs, eyes, clothing); talking about one's health and physical status.

EDST 202 PHILOSOPHY OF CHRISTIAN EDUCATION 2 CREDITS

The course examines the Seventh-day Adventist philosophy of education within the context of their basic beliefs. It includes the distinctive characteristics of Adventist education—derived from Bible and the writings of Ellen G. White which points to the redemptive aim of true education: to restore human beings into the image of their Maker. This course seeks to prepare students for a useful and joy-filled life, fostering friendship with God, whole-person development, Bible-based values, and selfless service.

STAT 112 INTRODUCTION TO PROBABILITY 3 CREDITS

This course introduces the concepts of probability. It aims at preparing students for further studies in Probability and Statistics. **Topics include**: Basic terms, definition of probability of events, set theory, random experiments and outcomes, measure of probability of events, theorems of probability; conditional probability and independent events, laws of probability, Bayes' theorem and applications. Random variables and probability distributions: expectations, variance and properties of random variables, probability mass function, probability density function, cumulative distribution functions, moments and moment generating functions. *Discrete probability distributions*: Bernoulli, Binomial, Poisson, Uniform, Geometric, Negative Binomial, and Multinomial distributions with applications; *Continuous Distributions*: Normal, Uniform, Exponential, Beta and Gamma distributions

MATH 112 CALCULUS I 3 CREDITS

The course introduces the concepts of single variable functions and their limits, derivatives of single variable functions, antiderivatives of single variable functions and some applications of derivatives and antiderivatives. **Topics for this course include:** Limits and continuity of functions, differentiation, Derivatives of polynomial, rational functions, exponential and logarithmic functions, trigonometric functions, maxima and minima, tangents and normals, implicit differentiation (rules of differentiation), integration as inverse of differentiation. Area under a curve, substitution and integration by parts, integration by partial fractions. Introduction to the first order separable differential equations.

MATH 114 ALGEBRA 3 CREDITS

This course provides the basic foundations of complex numbers and matrices. It serves as a foundation for further studies in Abstract Algebra and Linear Algebra. **Topics for the course are:** Algebra of complex numbers, modulus and argument form of a complex number. Geometry of complex numbers, the complex plane, de Moivres theorem, roots of unity and roots of a general complex number. Loci in the complex plane, elementary transformation from the complex z-plane to the complex w-plane. Algebra of matrices and determinants (up to 3 × 3 matrices), applications to solving linear equations. Linear transformations and matrix representation of linear transformations.

ECON 102 PRINCIPLES OF MACROECONOMICS 3 CREDITS

This course introduces some of the basic concepts and issues of macroeconomics – the study of the economy as a whole, to explain how economic events affect households, firms and governments simultaneously. It will cover topics such as money and banking, the supply of money, monetary policy (mechanisms, problems
and issues) as well as fiscal policy. Other areas to be treated include inflation and unemployment, aggregate demand and aggregate supply, inflation and unemployment, the gains from trade, international exchange, trade policy (mechanics, problems and issues), economic development and poverty.

ENGL 122 LANGUAGE AND WRITING SKILLS II 2 CREDITS

Prerequisite: ENGL 121

This course is a study of writing processes and good writing skills. It is designed to help students advance their skills in writing variety of compositions. The course content covers areas such as: sentence construction (avoiding fragments and run- on sentences), sources of information and documentation,

paragraph development, the writing process, note taking paraphrasing, quoting, outlining, summary writing, etc. Other topics include: the reading process, types of reading and types of composition.

FREN 112 FRENCH FOR GENERAL COMMUNICATION II 2 CREDITS
Prerequisite: FREN 111
Vocabulary is widened and the grammar becomes more demanding. Careful attention is given to the oral as well as the written aspect of the language. French for General Communication II Course will address communication difficulties detected during the teaching of French for General Communication I. It will therefore be based on reading and oral expression. Learners will be called upon to undertake repetitive reading and simulation drills in class. The course will try to address phonetic difficulties through basic lessons on the French alphabets and phonetics.

CMME 105 COMMUNICATION SKILLS 2 CREDITS
This course is designed to assist students to acquire verbal and non-verbal communication skills in order to communicate effectively. The course is also to raise students' level of proficiency as well as prepare them to function effectively on their own.

STAT 203 STATISTICAL METHODS 3 CREDITS
The course covers both parametric and non-parametric tests. It aims at preparing students for research. **Topics include**: Joint Probability Distributions: Properties, Marginal and Conditional distributions. Conditional Mean and Variance. Statistical Inference: Basic Concepts of Statistical Inference, Sampling distributions. Introduction to sampling methods, Sampling distributions of sample means, proportions and variances. Estimation: Point and Interval. Estimation of Parameters (mean, proportion and variance). Hypothesis Testing: Type I and II Errors and Power Function, Neyman-Pearson Lemma and Likelihood Ratio Test for Most Powerful Critical Region. Parametric Tests for parameters (mean, proportion and variance), Analysis of Variance Test for several means. Non-Parametric Tests: Chi- Square Tests Chi-Square Tests, Tests for Independent and Paired Samples, Mann- Whitney U-Test, Wilcox Signed Rank Test, Kruskal-Wallis and Friedman's tests and Sign Test. The primary analysis tools for this course are MATLAB, Mathematica, or Octave.

MATH 213 INTRODUCTION TO ABSTRACT ALGEBRA 3 CREDITS
This course provides the basic foundations of Sets, Number Theories and Mathematical Logic. It serves as a foundation for further studies in Abstract Algebra. Topics for the course are: Mathematical logic and proof, Elements of set theory, Cartesian products, binary relations and equivalence relation. Elementary number theory, algebraic structures, introduction to groups. Rings, fields and integral domains, vectors spaces and subspace, basis**.**

MATH 215 CALCULUS II 3 CREDITS
The course concentrates on the continuation of Calculus of Single Variables. It aims at preparing students to apply Calculus to Statistics and Economics. Topics for this course include: the first and second derivatives and their applications. Integration as a sum; definite and indefinite integrals, in particular reduction formulas. Logarithmic and exponential functions, hyperbolic functions and their inverse, inverse circular functions, integrating by parts and by substitution, applications to plane curves; arc length area of surface of revolution and volume of rotation. Ordinary differential equations, first order linear equation; integrating factors, second order linear differential equations with constant coefficients.

ECON 201 INTERMEDIATE MICROECONOMICS 3 CREDITS
This course builds on the microeconomics principles studied in Level 100 and provides an analysis of the way in which the market system functions as a mechanism for coordinating the independent choices of individual economic agents. It develops basis for evaluating the efficiency and equity implications of competition and other market structures and perspective on the appropriate role of government. Included are the study of consumer theory, production and cost, market structures and market failure. This course will put more emphasis of mastery of theoretical concepts and analytical tools already discussed.

RELB 163 LIFE AND TEACHINGS OF JESUS 3 CREDITS

The course deals with a comprehensive study of the life and teachings of Jesus Christ as unfolded in the four Gospels with analytical attention to the gospel writers and their writings in an attempt to reveal the impact of His self-revelation in that age and ours. The objective of the course is to link the student spiritually with the lord Jesus Christ. Topics covered include: Inter-Testamental Period, Jewish Religious Groups, Synoptic Gospels, Harmony of the Four Gospels, Nature of Jesus Christ, Jesus Christ-His Birth to Manhood, Preparation for Ministry, Ministry in Galilee, Retirement from Public Ministry, Ministry in Samaria, The Passion Week, and Resurrection to Ascension. Mode of Delivery: Lectures, Discussions and Group Presentations.

HLTH 200 HEALTH PRINCIPLES 3 CREDITS

This course deals with the study of basic health practices which seek to improve health and longevity. It focuses on holistic health, which includes the physical, mental, social and spiritual aspect of the human being. It also encourages students to apply these principles for achieving and maintaining good health in their various communities. It also studies physiology, including the principles governing community and personal health and the methods of applying these principles to successful daily living. Course coverage includes: introduction to health, S. D. A. philosophy of health and Biblical concept of health, understanding the levels of human body organization, application of "CELEBRATIONS" to healthy lifestyles etc.

STAT 204 REGRESSION ANALYSIS 3 CREDITS

This course concentrates on the relationships between two variables and among three or more variables. It aims at preparing students for research in Statistics and Economics. Basic Concepts of Regression and Correlation Analysis. Simple Regression Model: Estimation of regression coefficients by least squares method and Error variance. Interpretation of regression coefficients, Coefficient of Determination, forecasting. *Multiple Regression Model*: Some Basic Concepts and results of Matrices and Vectors. Expectation and Covariance Matrix for linear combination(s) of random variables, Estimation of the Multiple Regression Model by the Least Squares Method, Interpretation of regression coefficients using Analysis of Variance, Concepts of Multi-Colinearity and the use of Dummy or Qualitative Variables. Residual Analysis: Testing Regression Model Assumptions. Use of Statistical Packages

MATH 216 CALCULUS OF SEVERAL VARIABLES 3 CREDITS

This course concentrates on derivatives of functions of several variables, Multiple Integrals, and their applications to Business, Economics, and Statistics. Higher derivatives and their applications, Taylor's and Maclaurin's series of standard functions – vector functions, functions of several variables and partial derivatives, Euler's theorem of homogeneous functions, Grachets, maxima and minima the method of Lagrange Multipliers and constraints optimization. The gradient operator, curves, surfaces, tangent planes and normals, The divergence and curl operators, Introduction to multiple integrals.

MATH 212 VECTORS AND MECHANICS 3 CREDITS

Prerequisite: MATH113

It examines the concept of vectors and its application to Mechanics. It aims at letting students appreciate the motion of objects in space and the forces that acts on them. It also serves as a foundation to Linear Algebra and further studies in Mechanics. Topics include: Vector functions of a single variable, differentiation and integration, velocity and acceleration. Relation motion, Newton's laws of motion. Forces: composition and resolution of forces, work, energy and power, Momentum and impulse, energy conservation and momentum conservation. Rectilinear motion resisted motion and simple harmonic motion.

ECON 214 MATHEMATICAL ECONOMICS 3 CREDITS

This course presents a fairly rigorous and detailed application of various mathematical techniques in economics. Topics to be covered in this course include derivatives of exponential and logarithmic functions, optimization without constraints and optimization with inequality constraints (non-linear programming

and Kuhn-Tucker conditions), the envelope theorem (reciprocity conditions and duality; profit and utility maximization; derivation of Slutsky equation), integral calculus, differential equations, difference equations (first and second order; cobweb model) and optimal control theory (Pontragin's maximum principle; Hamiltonian; transversality conditions and application to growth models).

COSC115 INTRODUCTION TO COMPUTER SCIENCE I NC

This course introduces students to the basic principles, concepts and practice of computer science. The course provides an overview of key topics in computer science emphasizing on the underlying mathematical concepts and principles of computer science, topics relating to hardware as well as system development components and aspects of computer science.

COSC116 INTRODUCTION TO COMPUTER SCIENCE NC

Prerequisite: COSC115

This course provides a good appreciation of the fundamentals of computer architectures and their operation. It covers the following topics: number systems; basic computer components; the fetch-decode-execute cycle; branch instructions and flow control; addressing modes; stacks and subroutines; input output; interrupts; exceptions.

RELB 251 PRINCIPLES OF CHRISTIAN FAITH 3 CREDITS

The course deals with the detailed study of the fundamental doctrines of the Christian Faith. The aim of the course is to enable students have a working knowledge of the different doctrines of the Christian Faith and be able to practically apply these doctrines to the challenges of living as Christians in today's society. Course topics include: The Nature and Scope of Theology, The Doctrine of Revelation and Inspiration, The Gift of Prophecy, The Doctrine of God and the Natural Beings, God's Special Agents, The Devil and the Origin of Sin, The Doctrine of Creation, The Doctrine of Man, The Doctrine of Sin, The Doctrine of Christ, and Death (The Ultimate End of Life on Earth). Mode of Delivery: Lectures, Discussions and Group Presentations.

ECON 202 INTERMEDIATE MACROECONOMICS 3 CREDITS

The first-year course provided a broad overview of the subject area. In this course, the aim is to delve a little deeper into the subject. In particular, it addresses the big issues which affect us on a day to day basis. We would be interested in finding out why some countries grow more quickly than others, why some experience high inflation while others have stable prices and why all countries experience recession and booms. Furthermore, we want to know if government policy can have an impact on these factors. Specific topics to be covered include but not limited to: Absolute Income, Life Cycle, Permanent income and Relative Income Hypothesis; Theory of Investment. Equilibrium in product and money markets: IS and LM functions; open economy; aggregate supply and the short-run trade-off between inflation and unemployment; stabilization policy; government and budget deficits.

STAT 325 DESIGN AND ANALYSIS OF EXPERIMENTS 3 CREDITS

Introduction: Basic Principles of Design, Randomization, Replication and blocking, Guidelines for planning experiments. Statistical Analysis Methods: ANOVA: One Way and Two – Way Classification, mean squares and expected mean squares, standard errors for specific comparisons, Multiple comparisons, Model assumptions, empirical detection of the failure of assumptions. Principles of design, replication and randomization, Completely Randomised Design, Randomized Block Design, Meaning of the error mean square, handling missing observations, Latin Square Design/multiple Latin Square Design. Sequential experiments with many factors: Collecting and interpreting data from a factorial experiment, Main effects and interactions, 2^2 factorial experiments, 2^3 factorial experiments, 2^k factorial experiments, Cross-over designs, split -plot designs, Split-split plot designs, Incomplete block designs, Covariance, Analysis of covariance, Error variance estimates. Use of Statistical packages for analysis of experiments

STAT 327 TIME SERIES ANALYSIS 3 CREDITS

The objective of this course is to make students learn and apply statistical methods for the analysis of data

that have been observed over a period of time. Topics covered in this course include: components of time series, methods for modelling univariate time series data with Autoregressive and Moving Average Models (denoted as ARIMA models, sometimes called Box Jenkins models); Tools for Model Identification; Model Estimation and Assessment of the Suitability of the Model; using a Model for Forecasting and Determine Prediction Intervals; Smoothing methods and Trend/Seasonal Decomposition Methods (smoothing methods include Moving Averages, exponential smoothing and Lowes smoothers); Relationship between Time Series Variables, Cross correlation, lagged regression models; Intervention Analysis; Longitudinal Analysis and Repeated Measures Model for comparing Treatments when the Response is a Time Series. The statistical software program to analyze time series data is R.

MATH 313 ABSTRACT ALGEBRA 3 CREDITS
Prerequisite: Math114
It concentrates on Algebraic Structures aiming at providing insight into the fundamentals of properties of Groups, Rings and Fields. **Topics under this course are:** Groups Rings and Fields; Definitions, Examples and Properties. Polynomial Rings. Euclidean Algorithms. Ideals and Quotient Rings. The Homomorphism Theorems. The field of Quotients of an Integral Domain. Principal Ideal Domains. Factorization in Principal Ideal Domain. Groups. Examples of Groups such as Cyclic Groups, Groups of Permutations, and Dihedral Groups. Subgroups, Cossets and Lagrange's Theorem. groups. Normal Subgroups and Factor Groups. The Homomorphism Theorems for Groups

RELT 385 INTRODUCTION TO BIBLICAL FOUNDATION ETHICS 3 CREDITS
This course studies the structure and content of Christian ethics: goal, motive, and norm of the Christian life; with an analysis of ethical issues of practical decision-
making, authority, life, and sexuality. Ethical considerations of business decisions are examined in light of a Christian value system. This course covers topics such as different approaches to decision making in ethical situations, development of appropriate organizational responses to ethical problems, morality and issues of right and wrong, etc.

MATH 331 DISCRETE MATHEMATICS I 3 CREDITS
The course concentrates on set theories, Logic and their Applications. It aims at enabling students to develop critical thinking for Computer Programming. **Topics include:** *Foundations: Logic, Sets, and Functions:* Logic, Propositional Equivalences, Predicates and Quantifiers, Sets, Set Operations, Functions, Sequences and Summations, Growth Functions. *Algorithms, the Integers, and Matrices:* Algorithms, Complexity of Algorithms, Integers and Division, Integers and Algorithms, Applications of Number Theory, Matrices. *Mathematical Reasoning:* Methods of Proof, Mathematical Induction, Recursive Definitions, Recursive Algorithms, Program Correctness. *Counting:* Basics of Counting, Pigeonhole Principle, Permutations and Combinations, Discrete Probability, Probability Theory, Generalized Permutations and Combinations, Generating Permutations and Combinations. *Advanced Counting Techniques*: Recurrence Relations, Solving Recurrence Relations, Divide-and-Conquer Relations, Generating Functions, Inclusion-Exclusion, and Applications of Inclusion-Exclusion.

MATH 333 INTRODUCTORY ANALYSIS I 3 CREDITS
The course concentrates on the real number system, and sequences of real numbers. It aims at making students gain insight into the behaviour of real numbers. Topics Include: Construction of Real Numbers. Least Upper Bound, and the Greatest Lower Bound of a Set (of real numbers). Convergence of sequences, upper and lower Limits. The Bolzano-Wierstrass Theorem and the Cauchy criteria
for convergence. The concept of a function of a real variable. Limit, continuity and derivative of a function (□ □ □ treatment).

STAT312 SAMPLING TECHNIQUES AND SURVEY METHODS 3 CREDITS
This course aims at helping students to use various sampling techniques to collect and analyze data. Topics covered include: Fundamentals of Probability Sampling and Estimation; Sampling Techniques and Mathematical Properties of the Estimates. Simple Random Sampling: Theory involved in Estimation Procedures, Estimating Population Mean, Variance, Total and Proportion. Estimating a Ratio and its

Variance, Estimation Using Ratio and Regression methods and Properties. Sample Size Determination. Stratified Sampling: Proportional and Optimal Cost Allocation to Strata, Estimation of Population Mean, Variance, Total and Proportion. Post Stratification: quota sampling; Cluster Sampling: Sampling with equal and unequal clusters. Two-Stage Cluster Sampling: sampling with equal and unequal probabilities with or without replacement, Selection of cluster of clusters with probabilities proportional to size. Design of Questionnaire and Data Collection
Methods; Complex Surveys. Field practicum will be conducted for students to apply what they have learned.

STAT326 DATA ANALYSIS 3 CREDITS
This course aims at using Statistical Software packages such as R, SAS, Minitab and MATLAB to analyse data. It will help students to be conversant with these Statistical software packages for further research or analysis. Topics covered will include: types of data, Descriptive Statistics and Graphical Presentation of data. Correlation and Regression: simple and multiple linear regressions, nonlinear regression, logistic regression. Inferential Statistics: Hypothesis testing (Z, t, F, Chi- Square tests); some nonparametric tests; ANOVA. Analysis of Time Series Data. In a nutshell, real practical situation will be used for students to be able to understand the concept well.

MATH 336 LINEAR ALGEBRA 3 CREDITS
Prerequisite: Math113
The course is a continuation of Vectors and Geometry. It also concentrates on Matrixes and Vector Spaces. It is an important tool for Business, Statistics and Economics. **Topics include:** Vector spaces and subspace, spanning sets, bases, linear maps and their matrices. Range space rank and kernel. Eigen values and eigenvectors. Diagonalization of a linear operator, diagonalizing a matrix; bases of Eigen vectors, symmetric maps, matrices and quadratic forms

MATH 332 DISCRETE MATHEMATICS II 3 CREDITS
This course is the continuation of Discrete Mathematics I. It aims at helping students to gain insight into Mathematical relations and Graphs. **Topics Include:** Relations*:* Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings. *Graphs:* Introduction to Graphs, Graph Terminology, Representing Graphs and Graph, Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest Path Problems, Planar Graphs, Graph Colouring. *Trees:* Introduction to Trees, Applications of Trees, Tree Traversal, Trees and Sorting, Spanning Trees, Minimum Spanning Trees. *Boolean Algebra:* Demoivre's Theorem, Boolean Functions, Representing Boolean Functions, Logic Gates, Minimization of Circuits. *Modelling Computation:* Languages and Grammars, Finite-State Machines with Output, Finite- State Machines with No Output, Language Recognition, Turing Machines.

MATH 334 ANALYSIS 3 CREDITS
Prerequisite: Math333
This course concentrates on derivatives of functions of real variables, sequences and series and the fundamental theorem of Calculus. It aims at preparing students for Mathematical Analysis and Functional Analysis at higher levels and for research. **Topics include:** Derivative of a function, its properties and applications. Mean value theorem, Rolle 's Theorem, maximum value theorem, and the intermediate value theorem. Series as the sequence of n'th partial sums. Existence of limits,
increasing (decreasing) sequences bounded above (below). Series with positive terms. Convergence tests. Absolute convergence and conditional convergence. Sequences of functions point wise and uniform convergence. Power series. Definition of integral and continuity as criterion for integrability, fundamental theorem of calculus. The Riemann integral.

RESH 330 RESEARCH METHODS 3 CREDITS
This course is designed to provide the fundamentals of research methodology applicable to mathematical sciences and its related areas. Analysis, critical reading, evaluation, and application of research needed for

the development of skills in research proposals are emphasized. Topics covered include types of research, population sampling, research design, developing instruments of data collection, statistical treatment of data, testing of hypothesis. Presentation of oral and written reports

MATH455 ORDINARY DIFFERENTIAL EQUATIONS 3 CREDITS

This course serves as bases of Mathematical Modelling. It aims at enabling student model real life situations in Business, Economics and Statistics using Differential Equations. **Topics for the course include:** Differential forms in R^2 and R^3, exactness conditions and inerrability condition, existence and uniqueness of solution. Ordinary differential equations with constant and variable coefficients, reduction of orders. Variation of parameters, series solution. Ordinary and regular points, Fubini's theorem. Introduction to Legendre equations and Bessel equations, Laplace transformation; application to initial-value problems.

STAT461 STATISTICAL INFERENCE 3 CREDITS

This course introduces the student to the basic theory behind the development and assessment of statistical analysis techniques in areas of point and interval estimation and hypothesis testing. Topics covered will include: Point Estimation, including method of moments and maximum likelihood; Bias and Variance; Mean Square Error and the Cramer-Rao Inequality; Sufficiency, Completeness and Exponential Families; Uniformly Minimum Variance Unbiased Estimators; Bayesian Estimation Methods; Resampling estimation methods, including the jackknife and bootstrap; Confidence Interval Construction Methods, including likelihood-based intervals, inversion methods, interval based on pivots and simple resampling-based percentile intervals; Highest Posterior Density and Bayesian Credibility Region; Likelihood Ratio Test and the Neymann-Pearson Lemma. Hypothesis testing. R and MATLAB will be used in the practical.

MATH 457 COMPLEX ANALYSIS 3 CREDITS

This course concentrates on the behaviours of complex numbers and complex functions. It serves as a foundation for students who wish to study complex analysis at higher levels. It also aims at helping students to gain more experience in complex numbers and calculus of complex numbers. **Topics include:** Graphical Representation of complex Numbers, Demoivre's Theorem, Roots of complex Numbers, Vector Representation of Complex Numbers, Limits, Continuity, Complex Functions, Analytic Functions, Cauchy-Riemann Equations Conjugate Functions, Harmonic Functions, Conformal Mappings Taylor and Laurent's Series, Complex Integration and Cauchy's Theorem.

MATH 459 NUMERICAL ANALYSIS 3 CREDITS

The course concentrates on numerical analyses of real numbers. It aims at enabling students to solve complex algebraic, transcendental and differential equations. Sources and type of errors; round-off errors, truncation error, Basic Error Analysis. Evaluation of functions. Numerical solution of non-linear algebraic equation; one- point methods; simple iteration, bisection, secant, false position and Newton- Raphson Methods. Bisection and false-position methods. Numerical solution of sets of linear algebraic equations; Solution of Tridiagonal Systems, Iterative Method, Gaussian Elimination Method, Gauss Seidel and Gauss Jordan Method, matrix inversion. LU Decomposition. Finite Differences, Lagrange's interpolation, Inverse Interpolations, Least square, fitting a straight line, nonlinear curve fitting, Data fitting with cubic splines. Numerical differentiation using interpolation method, numerical integration, Trapezoidal rule, Simpson's 1/8 rule, Simpson 3/8 rule. Euler method, Runge-Kutta method, Predictor corrector method. Use of Visual C# programming language.

MATH 456 PARTIAL DIFFERENTIAL EQUATIONS 3 CREDITS

Prerequisite: Math216

This course is the continuation of calculus of several variable. It deals with unknown functions of several variables and their derivatives. It aims at helping students to model real life situations in Business, Economics, and Statistics. **Topics for the course include:** First and second order partial deferential equations with constant coefficients: classification of 2nd P.D.E., elliptic, parabolic and hyperbolic types. Initial and boundary value problem. Separation of variables, heat equation, vibrating strings, one

dimensional move equation.

STAT462 STATISTICAL QUALITY CONTROL 3 CREDITS

The course aims at helping students to develop Statistical Techniques to ensure that industrial products conforms to the set standard and to carefully select the characteristics of a product (or service) whose quality is to be maintained. **Topics include:** Deming Philosophy and Taguchi Approach in Quality Control, Statistical Data Characterize action, Shewhart's Concept of Statistical Process Control, Basis for and construction of Shewhart Control Chart for Variable Data, Application of Xbar and R control Charts, Rational Sampling and Analysis of out-of-control Patterns, Process Capabilities, Tolerance Assessment, Taguchi's Loss Function, Tolerance Engineering, Statistical Thinking, X, Rm Control Charts, Exponentially Weighted Moving Average Control Charts, Cusum Control Charts and Cusum Plots, Bivariate Control Charts.

STAT452 MULTIVARIATE ANALYSIS 3 CREDITS

The course concentrates on analysis of multiple variables and their relationships. It aims at helping students to develop statistical models which consist of several variables. Topics include: Multivariate Normal Distribution: definition, marginal and conditional distributions, distribution of linear combination of normally distributed variables. Estimation of Mean Vector and Covariance Matrix and their Independence. Distribution of Sample Correlation Coefficient (Single and Multiple) under Null Hypothesis. Testing Hypothesis of Significance of these Correlation Coefficient. Hotelling's T Square Distribution: distribution under null case, its uses, Mahalanobis square statistics, Behren-Fisher's problem. Principal Component Analysis; Cluster Analysis and Discriminant Analysis. The statistical software program is SAS, MATLAB or R.

MATH 468 OPERATIONS RESEARCH 3 CREDITS

This course aims at helping students to develop models to determine the optimum use and allocation of resources in industries and at their work places. Topics to be covered include: Linear Programming, Sensitivity Analysis, Transportation Model, Assignment Model, Integer Programming, Non-Linear Programming, Queuing Models, Sequencing Problems, and Game Theory, Dynamic Programming, Goal Programming, Deterministic Inventory models, Probabilistic Inventory models, Simulation model, CPM / PERT, Markov Analysis, Decision Theory. Lab sessions will use Excel Solver and Quantitative Management software.

MATH 470 SENIOR RESEARCH PROJECT 3 CREDITS

The Senior Research Project is to be taken by every final year student. This must be done as a partial fulfilment of the requirements for the award of bachelor's degree at VVU. The students should register for this course at least a semester before they hope to graduate. The student should then choose the topic in the relevant field and submit it to the Head of Department. The Department, after deliberation, will suggest a supervisor. The research project should be type-written and double- spaced. The completed research work should not be less than 4000 words. The student has to defend the research work in the presence of examiners.

INTRODUCTION

Medical equipment is extensively used in all aspects of health services, ranging from prevention, screening, diagnosis, monitoring and treatment to rehabilitation. It is virtually impossible to provide health services without it.

Unlike other types of health technologies, medical equipment requires maintenance (scheduled and unscheduled) during its useful life. Cost-effective management of medical equipment within a healthcare organization is critical to the delivery of quality, effective and safe healthcare. Proper planning, acquisition and deployment of medical technology will maximize clinical outcomes and financial returns, and lower cost (investment and recurring). The appropriate deployment of medical technology contributes to the improvement in the quality of healthcare, the containment of cost, and to increased access to health services. Improper planning and acquisition will lead to acquisition of inappropriate equipment, which does not produce effective and efficient patient care.

MISSION STATEMENT

To produce biomedical engineers and biomedical equipment technologists equipped with the requisite theoretical knowledge and practical skill, within a Christian environment, necessary for pursuing professional careers in the healthcare industry and for graduate studies through curricula that integrate mathematics, engineering and life sciences in a global context.

PHILOSOPHY

Medical equipment is one of the essential elements for effective delivery of health care services. In spite of its obvious importance, medical equipment in developing countries has not received the requisite attention in terms of planning, acquisition, utilization, and maintenance. Significant proportion of all health equipment in developing countries cannot be used for one reason or the other. This situation seriously undermines efforts to deliver health services to people of developing countries. A major cause of equipment idleness in developing countries is improper or lack of equipment management. There

is therefore a growing need for engineers and engineering technicians who can support the rapidly expanding use of technology in patient care.

The philosophy of the Department is to produce biomedical engineers and biomedical equipment technicians through a curriculum that incorporates the spiritual, physical, mental and social development of qualified students.

VISION STATEMENT

To be a national leader in biomedical engineering and biomedical equipment technology education. To this end, the Department aspires to be the department of choice for students who wish to pursue careers in the biomedical engineering and biomedical equipment technology fields.

OBJECTIVES

- Offer students a strong and rigorous foundation in the life sciences, physical sciences, mathematics, and engineering.
- Offer students problem-solving skills, the ability to think independently, and to assess ideas and situations with an open mind.
- Offer students the ability to exhibit professional responsibility and sensitivity to a broad range of societal concerns including ethical, environmental, political, and regulatory issues in making decisions.
- Provide students with the ability to integrate the life sciences, physical sciences, mathematics, and engineering for understanding, analysing and solving problems at the interface between medicine and engineering.
- Provide students the basics of oral and written communication, and the values and skills necessary for working effectively in teams.

- Prepare students to assume management, entrepreneurial and leadership roles in the medical technology industry.
- Provide students with the ability to engage in professional development through life-long learning.

PROGRAMMES OFFERED

The department offers a Diploma in Biomedical Equipment Technology and a Degree in Biomedical Engineering respectively.

PROGRAMME OBJECTIVES

The education objectives for graduates of gradates of the Diploma programme in Biomedical Equipment Technology are to:

- Apply knowledge of mathematics, physical and life sciences, and engineering to solve problems at the interface between engineering and medicine.
- Function on multi-disciplinary teams.
- Communicate effectively both orally and written.
- Recognize the need for and engage in life-long learning.
- Identify, formulate and solve engineering problems.
- Understand professional and ethical responsibility.
- Use the techniques, skills and modern engineering tools necessary for engineering practice.
- Understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- Solve biomedical equipment technology problems within realistic constraints such as economic, environmental, social, political, ethical, health, safety, regulation and sustainability.
- Understand the use, application and operation of a wide range of biomedical equipment and instrumentation systems.
- Perform preventive maintenance (PM), safety and performance inspections (SPI), and performance assurance (or verification) on a wide range of biomedical equipment and instrumentation systems.
- Apply knowledge of mathematics, science, and engineering to solve problems with medical instrumentation systems.
- Understand the use and application of electronic test and measurement equipment, biomedical test equipment, simulators and tools required to perform inspection and preventive maintenance (IPM), calibration, troubleshooting, and repair of biomedical equipment and instrumentation systems.
- Perform installation and acceptance testing (or initial inspection) of medical equipment.
- Properly document all maintenance activities.

- Know and understand the application of applicable national and international codes, standards, and regulations regarding medical equipment management.
- Participate in medical equipment planning and acquisition.
- Understand and apply basic networking principles to medical instrumentation.

PROGRAMME OUTCOMES

Upon completing Diploma programme in Biomedical Equipment Technology, students will possess:

- an ability to apply knowledge of mathematics, science, and engineering.
- an ability to function effectively on multi-disciplinary teams.
- an ability to recognize the need for and engage in life-long learning.
- an ability to communicate effectively.
- an ability to identify, analyse, formulate, and solve engineering and technical problems.
- an understanding of professional and ethical responsibility.
- an ability of using techniques, skills, and modern engineering tools necessary for engineering practice.
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- an ability to solve biomedical engineering technology problems within realistic constraints such as economic, environmental, social, political, ethical, safety, regulation and sustainability.
- an understanding of the design, development and construction, theory of operation, application, installation, maintenance, and management of biomedical equipment and instrumentation systems.
- an ability to perform preventive maintenance (PM), safety and performance inspections (SPI), performance assurance (or verification), installation, and acceptance testing of biomedical equipment and instrumentation systems.
- an ability to use electronic test and measurement equipment, biomedical test equipment and simulators to perform inspection and preventive maintenance (IPM), calibration, troubleshooting, and repair of biomedical equipment and instrumentation systems.
- knowledge and understanding of the applicable national and international codes, standards, and regulations regarding management of medical equipment.
- knowledge and understanding of medical equipment management including: equipment planning, evaluation, selection and acquisition, installation and acceptance testing, maintenance, equipment replacement and disposal.

NATIONAL DEMAND FOR PROGRAMME

The quest of every society, including Ghana, is to continuously improve the quality of its member's lives through promoting of health, prevention of disease, and access to an efficient health care delivery system. The delivery of efficient and quality health care system largely depends upon technology especially medical technology. As medical technology continues to evolve, so does its impact on patient outcomes, hospital operations, and financial resources. The ability to manage this continual evolution has become a major challenge in all health care organizations. The effective and efficient management of medical technology has become a matter of financial survival for health care facilities, and therefore medical technology management is one of the most important segments of the health care system.

Medical technology management requires both technical and managerial expertise. The Biomedical Equipment Technician is trained to ensure cost-effective, efficacious and safe management of medical technology to meet the demands of quality patient care. Currently, there is no institution in Ghana that offers a programme in Biomedical Equipment Technology. It is therefore not surprising that a visit to some of our hospitals, including the major ones, reveals the deplorable state of the medical technology in those hospitals.

It is to address this prevailing national need that Valley View University has decided to start a two-year Diploma programme in Biomedical Equipment Technology.

ENTRY OR ADMISSION REQUIREMENTS

Admission to the Diploma programme in Biomedical Equipment Technology at Valley View University is available to any student who meets the academic and character requirements of the University, and who expresses willingness to cooperate with its policies.

Applicants must have one of the following academic requirements in order to be admitted to the Diploma programme in Biomedical Equipment Technology.

a. SSSCE Applicants

Six passes (A-D) in six (6) subjects comprising three core subjects; Social Studies, English Language, Integrated Science and Mathematics, plus three (3) electives; Elective Mathematics, Physics, Chemistry, Applied Electricity and Biology.

b. WASSCE Applicants

Six passes (A1-D7) in six (6) subjects comprising three core subjects; Social Studies, English Language, Integrated Science and Mathematics, plus three (3) electives; Elective Mathematics, Physics, Chemistry, Applied Electricity and Biology. Three of the passes must be C6 or better.

c. Mature Applicants

The applicant must:

a. Be at least 25 years old.
b. Show proof of age with birth certificate or any legitimate documentary proof of birth date which is at least 5 years old at the time of application;
c. Pass Mature Students' Entrance Examinations conducted by Valley View University with three subjects (English Language, Mathematics and General Paper). In lieu of entrance examination, the applicant should show proof of passes in English and Mathematics in WASSCE, SSCE, GCE or any other nationally recognized standard High School level examinations.

d. Technical Certificates Candidates

Intermediate, Part I, Part II, or Part III in Electrical Engineering Technician, TV, Radio, and Electronics, Electrical Installation, and Mechanical Engineering Technician

GRADUATION REQUIREMENTS:

a. Course Requirements:
   i. General Education (Mandatory) Courses: 8 (12 Credits)
   ii. Core Courses: 26 (75 Credits)
b. Credits Requirements: 87 Credits
c. Any Additional Requirements:
   i. Submission of a project report. The project must be submitted before a student can receive his / her certificate.
   ii. Overall Cumulative Grade Point Average (CGPA) of 2.00 or above.

EMPLOYMENT PROSPECTS

Sectors of the economy that could employ graduates of the programme:

- Healthcare: Hospitals, Clinics, Medical Laboratories
- Private: Independent Service Organizations, Medical Equipment vendors
- Public: Regulatory Institutions / Agencies, Research Institutions.

SEQUENCE OF COURSES:

First Year				
First Semester				
Course Code	**Course Title**	**T**	**P**	**C**
MATH 131	Mathematics I	3	0	3
BMET 121	Electrical Circuit Analysis I	2	3	3
BMET 131	Electronic Devices and Circuits I	2	3	3
BMET 141	Digital Fundamentals I	2	3	3
RELB 163	Life and Teaching of Jesus	3	0	3

ENGL 111	Language and Writing Skills I	2	0	2
COSC 117	Fundamentals of Computing Skills	3	0	3
GNED 125	Study Skills	1	0	NC
	Total			**20**
Second Semester				
Course Code	**Course Title**	**T**	**P**	**C**
MATH 132	Mathematics II	3	0	3
BMET 128	Technical Communication	2	0	2
BMET 132	Electronic Devices and Circuits II	2	3	3
BMET 142	Digital Fundamentals II	2	3	3
BMET 156	Database Management	3	0	3
BMET 164	Biomedical Electronics	2	3	3
BMET 178	Physics for Biomedical Equipment Technology	2	0	2
BMET 122	Electrical Circuit Analysis II	2	3	3
PEAC 100	Physical Activity			NC
	Total			**22**
Second Year				
First Semester				
Course Code	**Course Title**	**T**	**P**	**C**
BIOL 211	Basic Human Anatomy and Physiology	3	0	3
BMET 227	Medical Imaging Systems I	2	3	3
BMET 235	Networking and Data Communication	2	3	3
BMET 247	Basic Medical Imaging and Radiotherapy Physics	3	0	3
BMET 255	Computers and Microprocessors	3	0	3
BMET 261	Biomedical Measurement and Instrumentation I	2	3	3
RELB 251	Principles of Christian Faith	3	0	3
AFST XXX	African Studies	1	0	1
	Total			**22**
Second Semester				
Course Code	**Course Title**	**T**	**P**	**C**
BSAD 216	Bess Essentials	3	0	3
BMET 228	Medical Imaging Systems II	2	3	3
BMET 236	Biomedical Equipment Management	3	0	3
BMET 248	Medical Device Standards	3	0	3
BMET 258	Biomedical Equipment Technology Practicum	NC	9	3
BMET 262	Biomedical Measurement and Instrumentation II	2	0	3
BMET 214	Medical Laboratory Instrumentation	2	3	3
BMET 267	Biomedical Equipment Technology Project	NC	NC	3
GNED 230	Career Exploration and Planning	1	0	NC
	Total			**24**

T = Teaching Hours, P = Practical Hours, and **C** = Credit Hours

COURSES DESCRIPTIONS

MATH 131 MATHEMATICS I 3 CREDITS

The objective of this course is to help students acquire a solid foundation in algebra and trigonometry for further coursework such as calculus, show students how algebra and trigonometry can model and solve authentic real-world problems, and to enable students to develop problem-solving skills, while fostering critical thinking. Topics covered include: Introduction to Functions, Linear Functions, Quadratic Functions, Polynomial and Rational Functions, Exponential and Logarithmic Functions, Partial Fractions, Series and Sequences, and Matrices and Determinants.

BMET 121 ELECTRICAL CIRCUIT ANALYSIS I 3 CREDITS

This course deals with the study of DC circuits. The objective of this course is to provide students with a comprehensive practical coverage of electric circuit with emphasis on application and troubleshooting. Topics covered include: Voltage, Current and Resistance, Ohm's Law, Power and Energy, Series Circuits, Parallel Circuits, Series-Parallel Circuits, Circuit Theorems and Conversion.

BMET 131 ELECTRONIC DEVICES AND CIRCUITS 3 CREDITS

The first part of a two-semester course in electronic devices and circuits. The objective of the course is to help students acquire a solid foundation in analog electronics (discrete electronic devices and linear integrated circuits) with strong emphasis on real-world applications and troubleshooting. Topics covered include: Introduction to Semiconductors, Diode Applications, Special Purpose Diodes, Bipolar Junction Transistor (BJT), Transistor Bias Circuits, BJT Amplifiers, and Power Amplifiers.

BMET 141 DIGITAL FUNDAMENTALS I 3 CREDITS

The first part of a two-semester course in digital electronics. The course aims at providing students with a strong foundation in the core fundamentals of digital electronics with emphasis on application and troubleshooting. Topics covered include: Introductory Concepts, Number Systems, Operations and Codes, Logic Gates, Boolean Algebra and Simplification, and Combinatorial Logic Analysis.

MATH 132 MATHEMATICS II 3 CREDITS

An introduction to differential and integral calculus, and differential equations. The goal of this course is to provide students with a solid foundation in differential and integral calculus with particular emphasis on their applications. Topics covered include: Limits and Continuity, Differentiation, Applications of Differentiation, Integration, Applications of Integration, and Introduction to Differential Equations.

BMET 122 ELECTRICAL CIRCUIT ANALYSIS II 3 CREDITS

This course deals with the study of AC circuits. The objective of this course is to provide students with a comprehensive practical coverage of electric circuit with emphasis on application and troubleshooting. Topics covered include: Voltage, Magnetism and Electricity, Introduction to Alternating Current and Voltage, Capacitors, Inductors, RC Circuits, RL Circuits, RLC Circuits and Resonance, Passive Filters, and Transformers.

BMET 128 TECHNICAL COMMUNICATION 2 CREDITS

A study of writing, reading, listening, and speaking skills. The objective of this course is to help students understand the concept of communication, plan and prepare material for communication of technical information, and be able to present technical information orally. Course topics include: The Concept of Communication, Technical Communication, Effective Communication, Writing, Reading, Listening, and Speaking.

BMET 132 ELECTRONIC DEVICES AND CIRCUITS II 3 CREDITS

The second part of a two-semester course in electronic devices and circuits. The aim of the course is to provide students with a solid foundation in discrete electronic devices and linear integrated circuits, with emphasis on real-world applications and troubleshooting. Topics covered include: Amplifier Frequency Response, The Operational Amplifier, Basic Op-amp Circuits, Special-Purpose Op-amp Circuits, Active Filters, Oscillators, Voltage Regulators, and Communication Circuits.

BMET 142 DIGITAL FUNDAMENTALS II 3 CREDITS

The second part of a two-semester course in digital electronics. The objective of the course is to provide students with a strong foundation in the core fundamentals of digital electronics with emphasis on application and troubleshooting. Topics covered include: Functions of Combinational Logic, Latches, Flip-Flops and Timers, Counters, Registers, Memory and Storage.

BMET 156 DATABASE MANAGEMENT 3 CREDITS

A study of the fundamentals of database architecture, database management systems, and database systems. The aim of the course is to provide students with a general understanding of modelling of data analysis, analysis of data relationships, programming of database management systems, and analysis of database concurrency protocols and algorithms. Topics covered include: Databases and Database Users, Data Models, Schemes and Instances, Database Design and Implementation, Data Modelling, The Relational Data Model and Relational Database Constraints, The Relational Algebra and Relational Calculus, Structure Query Language, Normalization, Practical Database Design Methodology, Concepts of Object Databases, and Distributed Database Concepts.

BMET 164 BIOMEDICAL ELECTRONICS 3 CREDITS

A study of basic theories of measurement, bioelectric signals, biomedical transducers and sensors, instrumentation amplifiers, isolation amplifiers, biopotential amplifiers, signal processing circuits, electrical safety, and biomedical troubleshooting techniques. The course is designed to assist students understand the characteristics of physiological signals and the methods to collect, process, display and record such signals. Course topics include: Basic Theories of measurement, Fundamentals of Biomedical Transducers, Pressure Transducers, Temperature Transducers, Flow Transducers, Electrochemical Transducers, Biopotential Electrodes, Biopotential Amplifiers, and Signal Conditioning Circuits.

BMET 178 PHYSICS FOR BIOMEDICAL EQUIPMENT TECHNOLOGY 2 CREDITS

A study of general physics with emphasis on the applications of basic physics principles to biomedical equipment technology. The aim of the course is to enable students acquire a solid foundation in the fundamental principles of physics and how to apply them. Topics covered include: Mechanics, Sound and Waves, Heat and Thermodynamics, Electromagnetism, Optics, and Modern Physics.

BIOL 211 BASIC HUMAN ANATOMY AND PHYSIOLOGY 3 CREDITS

A systems approach to the study of the fundamental structure and function of the human body. The course is designed to provide students with a strong foundation in the principles of anatomy and physiology for understanding both health and disease with emphasis on the integration of structure and function. Topics covered include: Cellular Level of Organization, Tissue Level of Organization, Integumentary System, The Skeletal System, The Nervous System, The Cardiovascular System, The Respiratory System, The Digestive System, and The Urinary System.

BMET 227 MEDICAL IMAGING SYSTEMS I 3 CREDITS

The first part of a two-semester course in the study of the operation and hardware of imaging devices used in medicine. The goal of the course is to enable students acquire knowledge and understanding of theory of operation, design and construction, fundamental building blocks, circuit analysis, general inspection and

preventive maintenance, troubleshooting, and repair of imaging devices. Course topics include: Overview of Radiographic Equipment, Conventional X-Ray Machine, Mobile Radiographic Equipment, Fluoroscopic Equipment, and Mammographic Equipment.

BMET 235 NETWORKING AND DATA COMMUNICATION 3 CREDITS

A study of the principles of data communication and network fundamentals with applications in biomedical equipment technology. The aim of the course is to provide students with a comprehensive knowledge of the basic concepts, principles, technologies, systems, solutions and applications relating to data communications and computer networks. Topics covered include: Introduction to Computer System

Configurations, Data Communication and Network Concepts, The OSI Model, Data Communications Channels / Media, Systems and Solutions, and Local Area Networks.

BMET 247 BASIC IMAGING AND RADIOTHERAPY PHYSICS 3 CREDITS
A study of the physical principles of medical imaging devices. The goal of the course is to enable students gain an understanding of the physics concepts underlying each medical imaging device. Topics include: Radiation Concepts, Production of X- Rays, Interaction of X-Rays with Matter, Radiation Units and Radiation Protection, Radiation Biology, Physical Principles of Diagnostic Ultrasound, Physical Principles of Magnetic Resonance Imaging, and Basic Nuclear Medicine Physics.

BMET 255 COMPUTERS AND MICROPROCESSORS 3 CREDITS
A study of typical PC architecture and organization, and microprocessor architecture. The objective of the course is to provide students with an understanding of PC hardware organization and the interaction between operating system and application software, and a comprehensive overview of microprocessor internal architecture. Course topics include: Hardware Organization and Configuration, Hardware Maintenance and Troubleshooting, Software Installation, Software Maintenance and Troubleshooting, Microprocessor Fundamentals, Addressing Modes, Interfacing the Microprocessor, Programming Models, and Interrupt Structures and Handling.

BMET 261 BIOMEDICAL MEASUREMENT AND INSTRUMENTATION I 3 CREDITS
The first part of a two-semester course in the study of the operation and hardware of selected medical equipment. The course is designed to enable students gain an understanding of the relevant physiology, principles of operation, design and construction, functional building blocks, circuit analysis, general inspection and preventive maintenance procedures, and common problems / troubleshooting of common medical equipment. Course topics include: Introductory Concepts, Electrocardiograph, ECG Monitor, ECG Telemetry Systems, Electroencephalograph, NIBP Monitor, IBP Monitor, Physiological Monitor, Cardiotocograph, and Pulse Oximeterz

BSAD 216 BUSINESS ESSENTIALS 3 CREDITS
This course looks at the basic principles of entrepreneurship and management. The course is designed to introduce students to the many exciting and challenging facets of business. Topics covered include: Fundamentals of Entrepreneurship, Basics of Human Resource Management, Costing and Pricing, Financial Performance Measurement, and Basics of Project Management.

BMET 228 MEDICAL IMAGING SYSTEMS II 3 CREDITS
The second part of a two-semester course in the study of the operation and hardware of imaging devices used in medicine. The goal of the course is to enable students gain an understanding of the theory of operation, design and construction, fundamental building blocks, circuit analysis, general inspection and preventive maintenance procedures, common problems / troubleshooting of selected medical imaging devices. Course topics include: Computed Tomography (CT) Scanner, Magnetic Resonance Imaging (MRI) Scanner, Diagnostic Ultrasound Machine, and Nuclear Medicine Instrumentation

BMET 236 BIOMEDICAL EQUIPMENT MANAGEMENT 3 CREDITS
This course discusses the management of medical technology from user's perspective, starting from technology acquisition to disposal. The purpose of the course is to enable students acquire practical understanding in the management of medical equipment in clinical settings. Topics covered include: Introduction to Medical Technology Management, Medical Technology Life Cycle, Technology Maintenance (Planning, Implementation and Management), Organization of Support Services, Technology Acceptance and Documentation, Introduction to Needs Assessment and Acquisition, Budgeting (Technology Deployment Cost), Hospital-Level Technology Acquisition, and Technology Replacement.

BMET 248 MEDICAL DEVICE STANDARDS 3 CREDITS
This course discusses the standards and regulations that guide the medical device industry and the management of medical equipment. The aim of the course is to introduce students to the relevant laws,

regulations, and requirements in major medical device markets worldwide. Course topics include: NFPA 99, IEC 60601 and JCAHO Standards, The Medical Device Directives (MDD), The Active Implantable Medical Device Directives (AIMDD), The In Vitro Diagnostic Device Directive (IVDD), and the Federal Food, Drug and Cosmetic Act.

BMET 258 BIOMEDICAL EQUIPMENT TECHNOLOGY PRACTICUM 3 CREDITS

Practical experience within or related to a hospital environment on a variety of medical equipment and instrumentation systems. Students work under supervision in a hospital or technical and support organization (independent service organization). The aim is to enable students put into practice knowledge acquired in the classroom, reinforce their knowledge, and gain valuable work experience

BMET 262 BIOMEDICAL MEASUREMENT AND INSTRUMENTATION II 3 CREDITS

The second part of a two-semester course in the study of the operation and hardware of selected medical equipment. The aim of the course is to enable students gain an understanding of the relevant physiology, principles of operation, design and construction, functional building blocks, circuit analysis, general inspection and preventive maintenance procedures, common problems / troubleshooting of common medical equipment. Topics covered include but not limited to Electrosurgical Unit, Cardiac Defibrillator, Infusion Device, Dialysis Machine, Mechanical Ventilator, Anaesthesia Machine, Baby Incubator, Radiant Warmer, Phototherapy Unit, Shortwave Diathermy Unit, Microwave Diathermy Unit, and Ultrasound Diathermy Unit.

BMET 214 MEDICAL LABORATORY INSTRUMENTATION 3 CREDITS

This course deals with the comprehensive treatment of the engineering principles, theory of operation and hardware of selected clinical laboratory instruments. The objective of the course is to enable students gain an understanding of the relevant physiology, function, clinical application / use, design and construction, functional building blocks (or system diagram) circuit analysis, theory of operation, installation / acceptance testing, general inspection and preventive maintenance (IPM) procedures, and common problems / troubleshooting of selected clinical laboratory instruments. Topics covered include: Basic Laboratory Technology, Overview of Clinical Laboratory Department, Spectrophotometry, Spectrophotometer, Filter Photometer, Automation in Clinical Laboratory, Automated Chemistry Analyzer, Electrolyte Analyzer, Blood Gas Analyzer, and Haematology Analyzer

PROGRAMME OBJECTIVES

To produce graduates who, during the first few years of professional practice, will be able to:

- Apply knowledge of mathematics, physical and life sciences, and engineering to solve problems at the interface between engineering and medicine.
- Function effectively on multi-disciplinary teams.
- Communicate effectively both orally and written.
- Recognize the need for and engage in life-long learning.
- Identify, analyse, formulate and solve engineering and technical problems.
- Understand professional and ethical responsibility.
- Use the techniques, skills and modern engineering tools necessary for engineering practice.
- Understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- Solve biomedical engineering technology problems within realistic constraints such as economic, environmental, social, political, ethical, health, safety, regulation and sustainability.
- Understand the design and construction, use, application and operation of biomedical equipment and instrumentation systems.
- Perform preventive maintenance (PM), safety and performance inspections (SPI), and performance assurance (or verification) of biomedical equipment and instrumentation systems (e.g. electrocardiographs, physiological monitors, cardiac defibrillators, pulse oximeters, infusion pumps, electrosurgical units).
- Apply knowledge of mathematics, science, and engineering to solve problems in medical instrumentation systems.
- Understand the use and application of electronic test and measurement equipment, biomedical test equipment, simulators and tools required to perform inspection and preventive maintenance (IPM), calibration, troubleshooting, and repair of biomedical equipment and instrumentation systems.
- Properly document all maintenance activities.
- Know and understand the application of applicable national and international codes, standards, and regulations regarding medical equipment management.
- Participate in medical equipment incorporation, installation and acceptance testing (or initial inspection) of medical equipment
- Understand and apply basic networking principles to medical instrumentation

PROGRAMME OUTCOMES

Upon completing the undergraduate Biomedical Engineering degree, students will possess:

- an ability to apply knowledge of mathematics, science, and engineering.
- an ability to function effectively on multi-disciplinary teams.
- an ability to recognize the need for and engage in life-long learning.
- an ability to communicate effectively.
- an ability to identify, analyze, formulate, and solve engineering and technical problems.
- an understanding of professional and ethical responsibility.
- an ability of using techniques, skills, and modern engineering tools necessary for engineering practice.
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- an ability to solve biomedical engineering technology problems within realistic constraints such as economic, environmental, social, political, ethical, safety, regulation and sustainability.
- an understanding of the design, development and construction, theory of operation, application, installation, maintenance, and management of biomedical equipment and instrumentation systems.
- an ability to perform preventive maintenance (PM), safety and performance inspections (SPI), performance assurance (or verification), installation, and acceptance testing of biomedical equipment and instrumentation systems.
- an ability to use electronic test and measurement equipment, biomedical test equipment and simulators to perform inspection and preventive maintenance (IPM), calibration, troubleshooting, and repair of biomedical equipment and instrumentation systems.
- knowledge and understanding of the applicable national and international codes, standards, and regulations regarding management of medical equipment.
- knowledge and understanding of medical equipment management including equipment planning, evaluation, selection and acquisition, installation and acceptance testing, maintenance, equipment replacement and disposal.

ENTRY OR ADMISSION REQUIREMENTS

Applicants must have one of the following requirements*:*

a. SSSCE Candidates: Passes (A-D) in six (6) subjects comprising three core subjects, including English Language and Mathematics, Integrated Science or Social Studies plus three (3) electives; Elective Mathematics, Physics, Chemistry, Biology, Agricultural Science or Applied Electricity.

b. WASSCE Candidates: Credit Passes (A1-C6) in six (6) subjects comprising three core subjects, including English Language and Mathematics, Integrated Science or Social Studies plus three (3) electives; Elective Mathematics, Physics, Chemistry, Biology, Agricultural Science or Applied Electricity.

c. A two-year University Diploma in Biomedical Equipment Technology, and other equivalent certificates. These students will be admitted at level 200.

d. HND Electrical / Electronic Engineering and HND Mechanical Engineering, and other HND engineering degrees. Applicants must have graduated with a good HND certificate (i.e. at least 2nd Class Lower Division). In addition, the applicant must have acquired a 2-year post-HND working experience. HND Applicants will be admitted at level 200 (i.e. Second Year).

8. Mature Applicants: The applicant must:
    a. Be at least 25 years old.
    b. Show proof of age with birth certificate or any legitimate documentary proof of birth date which is at least 5 years old at the time of application.
    c. Pass Mature Students' Entrance Examinations conducted by Valley View University with three subjects (English Language, Mathematics and General

Paper). In lieu of entrance examination, the applicant should show proof of passes in English and Mathematics in WASSCE, SSCE, GCE or any other nationally recognized standard High School level examinations.

GRADUATION REQUIREMENTS

a. Total Credits required: 150
b. Overall Cumulative Grade Point Average (CGPA) of 2.00 or above.
c. Clear any financial obligation to the University The total credits for graduation is 83.

EMPLOYMENT PROSPECTS

Areas in which students are likely to be employed are:

- Hospitals
- Independent Service Organizations (for medical equipment)
- Original Medical Equipment Manufacturers
- Regulatory Authorities / Institutions
- Medical Equipment Vendors (or Distributors)
- Free-standing Diagnostic Imaging Centres

SEQUENCE OF COURSES:

First Year				
First Semester				
Course Code	**Course Title**	**T**	**P**	**C**
BMET 151	Language and Communication Skills, I	2	0	2
FREN 121	French For General Communication I	2	0	2
COSC 117	Fundamentals of Computing Skills	3	0	3
RELB 163	Life and Teachings of Jesus Christ	3	0	3
PSYC 105	Introduction to Psychology	3	0	3
COSC 113	Elements of Programming	3	0	3
MATH 111	College Algebra and Trigonometry	3	0	3
GNED 125	Study Skills	1	0	NC
	Total			**19**
Second Semester				
Course Code	**Course Title**	**T**	**P**	**C**
BMET 152	Language and Communication Skills II	3	0	3
FREN 122	French for General Communication II	2	0	2
PHYS 124	Physics for Biomedical Engineering	2	3	3
COSC 114	Programming with C	3	0	3
MATH 112	Calculus I	3	0	3
BMET 114	Principles of Electric Circuits	2	3	3
PEAC 100	Physical Activity			NC
	Total			**17**
Second Year				
First Semester				
Course Code	**Course Title**	**T**	**P**	**C**
MATH 211	Calculus II	3	0	3
BMET 213	Thermodynamics for Biomedical Engineering	2	0	2
BMET 231	Electronic Circuits I	2	3	3
BMET 241	Digital Electronics I	2	3	3
COSC 221	Programming with C++	3	0	3
RELB 251	Principles of Christian Faith	3	0	3

AFST XXX	African Studies	1	0	1
GNED 230	Career Exploration and Planning	1	0	NC
	Total			**18**

Second Semester				
Course Code	**Course Title**	**T**	**P**	**C**
MATH 214	Multivariable Calculus	3	0	3
CHEM 224	Chemistry for Biomedical Engineering	2	3	3
BMET 232	Electronic Circuits II	2	3	3
BMET 242	Digital Electronics II	2	3	3
BMET 254	Computers and Microprocessors	3	0	3
COSC 230	Database System Design	3	0	3
BMET 278	Biomedical Transducers and Sensors	2	0	2
AFST XXX	African Studies	1	0	1
BMET 264	Biomedical Engineering Internship I	NC	NC	NC
	Total			**21**
Third Year				
First Semester				
Course Code	**Course Title**	**T**	**P**	**C**
BIOL 321	Human Anatomy and Physiology I	3	0	3
BMET 325	Biomaterials	2	0	2
MATH 311	Probability and Statistics	3	0	3
BMET 331	Biomedical Instrumentation I	2	3	3
BMET 347	Medical Physics	3	0	3
BMET 315	Computer Networks and Data Communication	3	0	3
RELT 385	Introduction to Biblical Foundation of Ethics	3	0	3
	Total			**20**
Second Semester				
Course Code	**Course Title**	**T**	**P**	**C**
BSAD 316	Essentials of Business	3	0	3
BIOL 322	Human Anatomy and Physiology II	3	0	3
BMET 336	Quantitative Human Physiology	2	0	2
BMET 374	Research Methods	3	0	3
BMET 346	Transport Phenomena in Biomedical Engineering	2	0	2
BMET 332	Biomedical Instrumentation II	2	3	3
BMET 354	Biomedical Engineering Internship II	N/A	N/A	NC
COSC 360	Software Engineering	3	0	3
	Total			**19**

Fourth Year				
First Semester				
Course Code	**Course Title**	**T**	**P**	**C**
BMET 411	Medical Imaging I	2	3	3
BMET 413	Biomechanics	2	0	2
BMET 435	Introduction to Clinical Engineering	3	0	3
BMET 447	Design of Biomedical Devices and Systems	3	0	3
BMET 453	Codes, Standards, and Ethics in Medical Devices	2	0	2
BMET 465	Biomedical Engineering Project I	N/A	N/A	3
Elective I		3	0	3
	Total			**19**
Electives				
BMET 415	***Information Systems in Healthcare***			
BMET 417	***Biomedical Telemetry***			
BMET 427	***Advanced Biomedical Instrumentation***			
Second Semester				
Course Code	**Course Title**	**T**	**P**	**C**
BMET 412	Medical Imaging II	2	3	3
BMET 424	Digital Radiography	2	0	2
BMET 436	PACS and Medical Imaging Informatics	2	0	2
BMET 446	Biofluid Mechanics	2	0	2
BMET 466	Biomedical Engineering Project II	N/A	N/A	3
Elective II		3	0	3
RELG451 Bible and Family Dynamics		3	0	0
Total				**18**
Electives				
BMET 454	***Biomedical Signal and Image Processing***			
BMET 414	***Biomedical Optics***			
BMET 426	***Advanced Medical Imaging***			

T = Teaching Hours, **P** = Practical Hours, and **C** = Credit Hours

COURSE DESCRIPTIONS

BMET 151 LANGUAGE AND COMMUNICATION SKILLS I 2 CREDITS

This course covers the study of the grammatical systems of the English Language. The course aims at helping students to develop the basic skills in the grammatical systems of the English Language and to use these effectively in writing good sentences, paragraphs and essays for both academic and professional pursuits. Topics covered include: Introduction to Parts of Speech and Vocabulary Usage,
Grammatical Elements, Nouns, Pronouns, Adjectives, Verbs, Concord, Adverbs and Propositions, Conjunction / Transitional Devices, Sentences, and Sentence Errors.

PHYS 124 PHYSICS FOR BIOMEDICAL ENGINEERING 3 CREDITS

The course discusses the concepts of general physics and their applications. The aim of the course is to enable students acquire a solid foundation in the fundamental principles of physics, and to apply the understanding of these principles to applications in biomedical engineering technology. Course topics include: Mechanics, Sound and Waves, Optics, Electromagnetism, and Modern Physics.

COSC 113 ELEMENTS OF PROGRAMMING 3 CREDITS

The course addresses the techniques necessary to write well-documented and structured computer programs. The course is intended to emphasize the planning process using examples involving sequence, selection, and iteration. The objective of the course is to promote good programming practices for further study of programming languages. Topics will include: Program Design, Pseudo-Code, Flowcharts, and other Graphical Representations, Developing an Algorithm, Selection Control Structures, Algorithms using Sequence, Selection and Repetition, Modularization, Communication between Modules, Cohesion and Coupling, and Primitive Data Structures.

MATH 111 COLLEGE ALGEBRA AND TRIGONOMETRY 3 CREDITS

The course provides a detailed treatment of college algebra and trigonometry. The objectives of the course are to assist students acquire a solid foundation in algebra and trigonometry for further coursework such as calculus, show students how algebra and trigonometry can model and solve real-world problems, and to enable students develop problem-solving skills and critical thinking ability. Topics covered include: Functions, Linear Functions, Quadratic Functions, Polynomial and Rational Functions, Exponential and Logarithmic Functions, Partial Fractions, Series and Sequences, Matrices and Determinants.

BMET 152 LANGUAGE AND COMMUNICATION SKILLS II 3 CREDITS

The course deals with the application of the grammatical systems studied in Communication skills I. The course is designed to enable students acquire writing skills, skills to analyse and critique written forms and to grasp information and meaning from reading materials for personal and academic writing. The course also aims at assisting students to acquire verbal and non-verbal communication skills. Topics covered include: Punctuations, The Writing Process, Paragraph Development, Types of Communications, Elements of Communication, Models of Communication, Levels of Communication, Paraphrasing, Quoting, Writing in Response to Reading, Sources of Information / Information Search.

COSC 114 PROGRAMMING WITH C 3 CREDITS

This course covers the comprehensive study of the C programming language. It focuses on the principles of problem-solving using C and structured programming
techniques for computer systems, and addresses the fundamentals of program design, analysis and implementation. The objective of the course is to give students the fundamentals for understanding and using other programming languages. Topics covered include: Functions and Operators, Control Flow Constructs, The C Preprocessor, Simple I / O and File I / O, Bit Manipulation, Strings, Higher Dimensional Arrays, Separate Compilation, Pointers, Structures, and Structured Related Items.

CHEM 224 CHEMISTRY FOR BIOMEDICAL ENGINEERING 3 CREDITS

The course discusses the fundamentals of general, organic, and biological chemistry. The course is

primarily designed to provide students with the appropriate background in chemistry, and to develop students' understanding in the fundamental concepts of chemistry and their application to biological systems. Topics covered include: Energy and Matter, Structure of Matter, Chemical Bonding, Chemical Formulas and Reactions, Oxidation-Reduction Reactions, Gases, Liquids and Solids, Solutions, Acid, Bases and Salts, Saturated Hydrocarbons (Alkanes), Unsaturated Hydrocarbons (Alkenes, Alkynes), Alcohols, Amines, Carbohydrates and Proteins.

MATH 112 CALCULUS I **3 CREDITS**

The course provides a detailed treatment of differential and integral calculus. The objective of the course is to provide students with a solid foundation in differential and integral calculus with particular emphasis on their applications. Topics covered include: Limits, The Derivative, Applications of the Derivative: Integration, Techniques of Integration, Applications of Integration, Indeterminate Forms and Improper Integrals.

BMET 114 PRINCIPLES OF ELECTRIC CIRCUITS 3 CREDITS

This course covers the study of DC and AC circuits. The objective of this course is to provide students with a comprehensive practical coverage of electric circuits (DC and AC) with emphasis on application and troubleshooting. Topics covered include: Voltage, Current and Resistance, Ohm's Law, Power and Energy, Series Circuits, Parallel Circuits, Series and Parallel Circuits, Circuit Theorems, Magnetism and Electromagnetism, Introduction to Alternating Current and Voltage, Capacitors, Inductors, and Transformers.

MATH 211 CALCULUS II **3 CREDITS**

The course provides a detailed treatment of differential equations. The course is designed to give students a strong foundation in differential equations with special emphasis on their applications. Topics covered include: First-Oder Differential Equations, Second-Oder Differential Equations. Laplace Transforms, Fourier series, Fourier Integrals and the Fourier Transform, and Partial Differential Equations.

BMET 213 THERMODYNAMICS FOR BIOMEDICAL ENGINEERING 2 CREDITS

The course deals with the study of energy transformations involving heat, mechanical work, and other aspects of energy and how these transformations relate to the properties of matter. The course is designed to enable students appreciate the concepts of thermodynamics and their applications. Topics covered include: Temperature and Heat, Thermal properties of Matter, First Law of Thermodynamics, Second Law of Thermodynamics, Third Law of Thermodynamics, and Thermodynamic Potentials.

BIOL 321 HUMAN ANATOMY AND PHYSIOLOGY I 3 CREDITS

This course is the first part of a two-semester course in human anatomy and physiology. The course provides a systems approach to the study of the structure and function of the human body. The objective of the course is to provide students with a strong foundation in the principles of anatomy and physiology for understanding both health and disease with emphasis on integration of structure and function. Topics covered include: Cellular Level of Organization, Tissue Level of Organization, The Integumentary System, The Skeletal System, The Muscular System, and The Nervous System.

BMET 231 ELECTRONIC CIRCUITS I 3 CREDITS

This course is the first part of a two-semester comprehensive practical coverage of electronic devices and circuits. The objective of the course is to enable students acquire a solid foundation in discrete devices and circuits with strong emphasis on real-world applications and troubleshooting. Topics covered include: Introduction to Semiconductors, Diode Applications, Special Purpose Diodes, Bipolar Junction Transistors, Transistor Bias Circuits, BJT Amplifiers, and Power Amplifiers.

BMET 241 DIGITAL ELECTRONICS I 3 CREDITS

This course is the first part of a two-semester comprehensive study of the principles and techniques of digital electronics. The course aims at providing students with strong foundation in the core fundamentals

of digital electronics with emphasis on application and troubleshooting. Course topics include: Introductory Concepts, Number Systems, Operations and Codes, Logic Gates, Boolean Algebra and Logic Simplification, and Combinatorial Logic Analysis.

COSC 221 PROGRAMMING WITH C++ 3 CREDITS

This introductory course addresses the development process of analysis, design, coding, debugging and documentation, and focus on techniques of good programming style and sound program construction which are fundamental to computer programming. The course is designed to introduce students to the principles and concepts of programming, teach problem-solving methods, algorithm development and coding using the C++ language. Topics covered include: Fundamentals of Computer Programming, Control Statements, Functions, Arrays, Pointers, Strings, and Classes.

MATH 214 MULTIVARIABLE CALCULUS 3 CREDITS

This course provides a comprehensive study of multivariable calculus. The course is designed to give students a strong foundation in the principles and techniques of multivariable calculus and their applications. Topics covered include: Vectors, Vector-Valued Functions, Functions of Several Variables, Multiple Integration, and Vector Calculus and Analysis.

BIOL 322 HUMAN ANATOMY AND PHYSIOLOGY II 3 CREDITS

This course is the second part of a two-semester course in human anatomy and physiology. The course provides a systems approach to the study of the structure and function of the human body. The objective of the course is to provide students with a strong foundation in the principles of anatomy and physiology for understanding both health and disease with emphasis on integration of structure and function. Topics covered include: The Cardiovascular System, The Respiratory System, The Urinary System, The Digestive System, and The Reproductive System.

BMET 232 ELECTRONIC CIRCUITS II 3 CREDITS

This course is the second part of a two-semester comprehensive practical treatment of electronic devices and circuits. The objective of the course is to enable students acquire a strong foundation in electronic devices and circuits, and integrated circuits with strong emphasis on real-real applications and troubleshooting. Topics covered include: Amplifier Frequency Response, The Operational Amplifier, Basic Op-amp Circuits, Special-Purpose Op-amp Circuits, Active Filters, Oscillators, Voltage Regulators and Communication Circuits.

BMET 242 DIGITAL ELECTRONICS II 3 CREDITS

This course is the second part of a two-semester comprehensive study of the principles and techniques of digital electronics. The course aims at providing students with a strong foundation in the core fundamentals of digital electronics with emphasis on application and troubleshooting. Topics covered include: Functions of Combinational Logic, Latches, Flip-Flops and Timers, Counters, Shift Registers, Memory and Storage, and Integrated Circuit Technologies.

BMET 254 COMPUTERS AND MICROPROCESSORS 3 CREDITS

This course covers the study of typical PC architecture and organization, and microprocessor architecture. The objective of the course is to provide students with an understanding of PC hardware organization and the interaction between operating system and application software, and a comprehensive overview of microprocessor internal architecture. Course topics include: Hardware Organization and Configuration, Hardware Maintenance and Troubleshooting, Software Installation, Software Maintenance and Troubleshooting, Microprocessor Fundamentals, Addressing Modes, Interfacing the Microprocessor, Programming Models, and Interrupt Structures and Handling.

COSC 230 DATABASE SYSTEM DESIGN 3 CREDITS

This course covers the study of the fundamentals of database architecture, database management systems, and database systems. The aim of the course is to provide students with a general understanding of

modelling of data analysis, analysis of data relationships, programming of database management systems, and analysis of database concurrency protocols and algorithms. Topics covered include: Databases and Database Users, Data Models, Schemes and Instances, Database Design and Implementation, Data Modelling, The Relational Data Model and Relational Database Constraints, The Relational Algebra and Relational Calculus, Structure Query Language, Normalization, Practical Database Design Methodology, Concepts of Object Databases, and Distributed Database Concepts.

BMET 278 BIOMEDICAL TRANSDUCERS AND SENSORS 2 CREDITS

The course covers the basic theories of measurement, bioelectric signals, biomedical transducers and sensors for acquiring physiological signals and their associated signal conditioning circuits, and electrical safety. The course is designed to assist students to understand the characteristics of physiological signals (such as ECG, EEG, EMG) and the methods to collect, process, display and record such signals. Topics covered include: Basic Theories of Measurement, Fundamentals of Biomedical Transducers and Sensors, Pressure Transducers, Temperature Transducers, Flow Transducers, Electrochemical Transducers, Biopotential Electrodes, Biopotential Amplifiers, and Electrical Safety.

BMET 413 BIOMECHANICS 2 CREDITS

This introductory course deals with the application of mechanical principles to the study of the musculoskeletal system. The objective of the course is to acquaint students with the force-motion relationship within the musculoskeletal system and the various techniques used to understand these relationships. Topics covered include: Introduction to Biomechanics (Basic Terminology and Concepts), Biomechanics of Soft Tissues, Biomechanics of Hard Tissues, Biomechanics of Joints, and Applied Biomechanics.

BMET 325 BIOMATERIALS 2 CREDITS

This introductory course covers natural and synthetic materials and their biomedical applications such as the design of implantable and extracorporeal devices. The course is designed to assist students understand the structure, properties and processing of biomaterials. Topics covered include: Introductory Concepts, Metals, Ceramics, Polymers, Composite Materials, Biocompatibility of Biomaterials, and Sterilization Techniques.

MATH 311 PROBABILITY AND STATISTICS 3 CREDITS

The course provides a comprehensive study of the probability models and statistical methods for analyzing data. The course aims at providing students with an understanding of probability models and statistical methods, and how they may be applied in the solution of engineering problems. Topics covered include: Descriptive
Statistics, Probability Discrete Random Variables and Probability Distributions, Continuous Random Variables and Probability Distributions, Joint Probability Distributions and Random Samples, Point Estimation, Statistical Intervals Based on s Single Sample, Test of Hypotheses Based on s Single Sample, Inferences Based on Two Samples, The Analysis of Variance, and Regression and Correlation.

BMET 331 BIOMEDICAL INSTRUMENTATION I 3 CREDITS

This course is the first part of a two-semester comprehensive treatment of the theory of operation and hardware of selected medical equipment. The objective of the course is to enable students gain an understanding of the relevant physiology, design and construction, functional building blocks (or system diagram) circuit analysis, theory of operation, general inspection and preventive maintenance (IPM) procedures, and common problems / troubleshooting of selected medical equipment. Topics covered include: Overview of Biomedical Instrumentation, Electrocardiograph, Electroencephalograph, Cardiac or ECG Monitor, NIBP Monitor, IBP Monitor, Physiological Monitoring System, Cardiotocograph, and Pulse Oximeter.

BMET 347 MEDICAL PHYSICS 3 CREDITS

This course discusses the application of physics to medicine, in particular diagnosis and treatment of

diseases. The objective of the course is to enable students gain an understanding of the physics concepts and their application to medicine. Topics covered include: Structure of the Atom, Radiation Concepts, Production of X-rays, Interaction of X-rays with Matter, Biological effects of Radiation, Radiation Units, and Radiation Protection, Fundamentals of Dosimetry, Physics of Nuclear Medicine, Physics of MRI, Physics of Ultrasound, Radiobiology, and Radiotherapy.

BMET 315 COMPUTER NETWORKS AND DATA COMMUNICATION 3 CREDITS

This course covers the principles of data communication and network fundamentals with applications in biomedical engineering technology. The aim of the course is to provide students with a comprehensive knowledge of the basic concepts, principles, technologies, systems, solutions and applications relating to data communications and computer networks. Topics covered include: Introduction to Computer System Configurations, Data Communication and Network Concepts, The OSI Model, Data Communication Channels / Media, Systems and Solutions, and Local Area Networks.

BSAD 316 ESSENTIALS OF BUSINESS 3 CREDITS

The course looks at the basic principles of entrepreneurship and management. The course is designed to introduce students to the many exciting and challenging facets of business. Topics covered include: Fundamentals of Entrepreneurship, Basics of Human Resource Management, Costing and Pricing, Financial Performance Measurement, and Basics of Project Management.

BMET 336 QUANTITATIVE HUMAN PHYSIOLOGY 2 CREDITS

The course deals with quantitative study of human physiology using the quantitative methods of engineering and physical science with emphasis on the operation of major organ systems. The objective of the course is to provide students with a rigorous integration of mathematical and applications of engineering principles in human physiology. Topics covered include: Physical and Chemical Foundations of Physiology, Membranes, Transport, and Metabolism, Physiology of Excitable Cells, The Nervous System, The Cardiovascular System, Respiratory Physiology, and Renal Physiology.

BMET 446 BIOFLUID MECHANICS 2 CREDITS

This introductory course covers biofluid mechanics with emphasis on microcirculation, microcirculation, and other biological flows in the human body. The objective of the course is to enable students understand fluid mechanics principles and their applications to systems of the human body. Topics covered include: Fundamentals of Fluid Mechanics, Conservation Laws, The Heart, Blood Rheology, Blood Flow in Arteries and Veins, Microvascular Beds, Flow in the Lungs, and Flow through the Kidneys.

BMET 374 RESEARCH METHODS 3 CREDITS

This course covers the fundamentals of research methodology. The objective of the course is to provide students with the basic concepts and strategies in research, and to enable students develop the most appropriate methodology for their research studies. Course content include: Introduction (Meaning of Research, Objectives of Research, Types of Research, Tools of Research, Research Process etc), The Research Problem, Literature Review, Writing the Research Proposal, Research Design, Sampling Design, Methods of Data Collection, Research Ethics, and Preparing the Research Report.

BMET 346 TRANSPORT PHENOMENA IN BIOMEDICAL ENGINEERING 3 CREDITS

This introductory course addresses the issues of transport phenomena in physiological systems. The objective of the course is to provide students with the fundamentals of mass, heat, and momentum transfer in physiological systems and their applications in solving problems. Course content include: Introductory Concepts, Mass Transport, Transport of Gases between Blood and Tissues, Transport in the Kidneys, and Energy Transport.

BMET 332 BIOMEDICAL INSTRUMENTATION II 3 CREDITS

This course is the second part of a two-semester comprehensive treatment of the theory of operation and hardware of selected medical equipment. The objective of the course is to enable students gain an

understanding of the relevant physiology, design and construction, functional building blocks (or system diagram) circuit analysis, theory of operation, general inspection and preventive maintenance (IPM) procedures, and common problems / troubleshooting of selected medical equipment. Course content include Electrosurgical Unit, Cardiac Defibrillator,
Infusion Devices, Infant Incubators, Warmers and Phototherapy Units, Mechanical Ventilators and Respiration Monitors, Anaesthesia Delivery System, Dialysis Machine, Oxygen Concentrators.

BMET 354 BIOMEDICAL ENGINEERING INTERNSHIP II NC

Practical experience within or related to a hospital environment on a variety of medical equipment and instrumentation systems. Students work under supervision in a hospital or technical and support organization (independent service organization). The aim is to enable students put into practice knowledge acquired in the classroom, reinforce their knowledge, and gain valuable practical work experience.

COSC 360 SOFTWARE ENGINEERING 3 CREDITS

The course presents the concepts and methodologies for constructing robust software systems and for managing software projects. The objective of the course is to introduce students to the techniques necessary to develop complex, high quality software systems. Topics covered include: Project Management, Requirements Engineering Process, Design, User Interface Design, Verification and Validation, Managing People, Security Engineering, and Service Oriented Software Engineering.

BMET 411 MEDICAL IMAGING I 3 CREDITS

This course is the first part of a two-semester comprehensive discussion of the theory of operation and hardware of medical imaging devices. The objective of the course is to enable students acquire knowledge and understanding of the design and construction, functional building blocks, circuit analysis, theory of operation, general inspection and preventive maintenance (IPM) procedures, installation, and troubleshooting / repair of medical imaging devices. Course content include: Overview of Radiographic Equipment, Conventional X-Ray machine, Mobile Radiographic Equipment, Fluoroscopic Equipment, and Mammographic Equipment.

BMET 435 INTRODUCTION TO CLINICAL ENGINEERING 3 CREDITS

The course discusses the management of medical technology from user's perspective, starting from technology acquisition to disposal. The purpose of the course is to enable students acquire practical understanding in the management of medical equipment in clinical settings. Topics covered include: Introduction to Medical Technology Management, Medical Technology Life Cycle, Technology Maintenance (Planning, Implementation and Management), Organization of Support Services, Technology Acceptance and Documentation, Introduction to Needs Assessment and Acquisition, Budgeting (Technology Deployment Cost), Hospital-Level Technology Acquisition, and Technology Replacement.

BMET 447 DESIGN OF BIOMEDICAL DEVICES AND SYSTEMS 3 CREDITS

The course provides a comprehensive coverage of all major design principles. The course addresses all aspects of the design process including project selection,
specification development, concept design, analysis, construction, evaluation and documentation. The objective of the course is to enable students understand design principles. Course content include: Design Process, Acquiring and Presenting the Idea, Minimal Criteria for Design, Product Checklist for the Team, Writing the Design Specification, Concept Design, Design Evaluation, Detailed Technical Design, Device or Process Development, Pilot Production, and Volume Production.

BMET 453 CODES, STANDARDS, AND ETHICS IN MEDICAL DEVICES 2 CREDITS

This course discusses the codes and standards that guide the medical device industry and the management of medical equipment, ethical guidelines and codes of ethics. The aim of the course is to introduce students to the relevant laws, regulations and requirements in major medical device markets worldwide,

and to give students an in-depth knowledge of ethical considerations. Course content include: Standards, Medical Device Regulations, The European Medical Device Directives, The Medical Device Directive, The Active Implantable Medical Device Directive, The In Vitro Diagnostic Device Directive, The Federal Food, Drug and Cosmetic Act, Introduction to Ethics, and Experiments with Human Subjects or Animals.

BMET 465 BIOMEDICAL ENGINEERING PROJECT I 3 CREDITS
Independent research and writing on an approved topic under the supervision of a faculty member. The course provides students the opportunity to individually identify a problem or issue within their field of study and apply their education to conduct scientific research, and propose solutions to the problem so identified for the benefit of society. The objective of the course is to introduce students to the process of carrying out independent research.

BMET 412 MEDICAL IMAGING II 3 CREDITS
This course is the second part of a two-semester comprehensive discussion of the theory of operation and hardware of medical imaging devices. The objective of the course is to enable students acquire knowledge and understanding of the design and construction, functional building blocks, circuit analysis, theory of operation, general inspection and preventive maintenance (IPM) procedures, installation, and troubleshooting / repair of medical imaging devices. Course content include: Computed Tomography (CT) Scanner, Magnetic Resonance Imaging (MRI) Scanner, Diagnostic Ultrasound Machine, and Nuclear Medicine Instrumentation.

BMET 424 DIGITAL RADIOGRAPHY 2 CREDITS
The course presents the physical principles and technical description of digital radiography imaging systems and associated technologies. The objective of the course is to give students in-depth knowledge, Digital Mammography, and Quality Control in Digital Radiography.

BMET 436 PACS AND MEDICAL IMAGING INFORMATICS 2 CREDITS
The course discusses PACS basic concepts, terminology, technology development and implementation, as well as PACS-based applications to clinical practice and PACS-based imaging informatics. The objective of the course is to give students in- depth knowledge and understanding of PACS architecture and operation, and the principles of imaging informatics. Topics covered include: PACS Components and Workflow, PACS Network Design, Industrial Standards (HL7 and DICOM), PACS Server and Archive, Display Workstation, Integration of HIS, RIS, PACS and EPR, PACS Data Management and Web-Based Image Distribution, PACS Clinical Implementation, Acceptance and Evaluation, and PACS and DICOM-based Imaging Informatics.

BMET 454 BIOMEDICAL SIGNAL AND IMAGE PROCESSING 3 CREDITS
This course discusses the application of signal processing tools / techniques such as Laplace transforms, Fourier transforms, and time-frequency analysis to biomedical signals and systems. The objective of the course is to enable students understand the mathematical principles of continuous and digital signal processing, and apply these principles to biomedical signal processing. Course content include: Basic Concepts, Spectral Analysis (Classical Methods), Digital Filters, Spectral Analysis (Modern Techniques), Time-Frequency Analysis, Wavelet Analysis, Advanced Signal Processing Techniques, Fundamentals of Image Processing, Image Processing (Filters, Transformation and Registration), Image Segmentation and Image Reconstruction.

BMET 466 BIOMEDICAL ENGINEERING PROJECT II 3 CREDITS
Students continue with BMET 465 and produce a full report that documents the research

BMET 264 BIOMEDICAL ENGINEERING INTERNSHIP I NC
Practical experience within or related to a hospital environment on a variety of medical equipment and instrumentation systems. Students work under supervision in a hospital or technical and support organization (independent service organization). The aim is to enable students put into practice

knowledge acquired in the classroom, reinforce their knowledge, and gain valuable practical work experience.

BMET 414 BIOMEDICAL OPTICS 3 CREDITS

This course deals with the study of interaction of light with biological media. The purpose of the course is to enable students understand general biomedical optics theory, and diagnostic and therapeutic applications of light. Topics covered include: Review of Optical Principles, Optical Interaction Properties, Light-Tissue Interaction Variables, Light-Tissue Interaction Theory, Light-Tissue Interaction Mechanisms and Applications, Therapeutic Applications of Light, and Diagnostic Applications of Light.

BMET 417 BIOMEDICAL TELEMETRY 3 CREDITS

This course discusses the design of biomedical telemetry devices, and propagation and communication concepts in biomedical telemetry. The objective of the course is to enable students gain an understanding of the principles of biomedical telemetry and their applications. Course content include: Introduction to Biomedical Telemetry, Design of Biomedical Telemetry Devices, Sensing Principles of Biomedical Telemetry, Sensing Technologies for Biomedical Telemetry, Power Issues in Biomedical Telemetry, Antennas and RF Communication, Optical Biotelemetry, and Safety Issues in Biomedical Telemetry.

BMET 417 INFORMATION SYSTEMS IN HEALTHCARE 3 CREDITS

The course discusses the various information systems used in healthcare. The purpose of the course is to enable students understand the concepts of information systems, and the information systems used in healthcare. Topics covered include: Review of Information Systems, Hospital Information System (HIS), Radiology Information System (RIS), Electronic Medical Record (EMR), Laboratory Information System (LIS), Public Health Information System, and Pharmacy Information System

The internship programme affords participating students' opportunity to put into practice theory and concepts learnt in the classroom and thereby gain valuable work experience before graduation. The programme will also enable students: to increase the awareness of career demands, to identify skill strength and weakness, and to accumulate valuable work experience before seeking permanent employment.

The internship will not only equip participating students with the tools essential to a smooth transition from school to work but will also offer employers a partnership in the training of prospective employees. The mastering of certain field specific competencies will make students greater assets to employers and to the community as a whole.

DEPARTMENT OF AGRIBUSINESS

BACHELOR OF SCIENCE (BSC) IN AGRIBUSINESS

Ghana is basically an agricultural country but lacks manpower to create and manage strategic agro-based businesses which offer well paid jobs for large number of unemployed people. Farmers still use crude implements and poor technology to produce food A large quantity of the food produced in Ghana is lost through poor post- harvest handling. The program seeks to train and produce graduates to create and manage strategic agri-businesses through in-depth knowledge and application of Agricultural Science and Business principles.

MISSION STATEMENT

To serve as an international centre of excellence in the provision of high-quality holistic education, and professional

EMPLOYMENT PROSPECTS OF STUDENTS

Graduate of this programme can be employed in sectors such as the Agric sector, Trade and Industry and the Banking Industry

Graduate of this programme can also establish Agro processing companies, small and medium scale enterprises, or other self-employment companies

THE OBJECTIVES

The objectives of the Agribusiness programme are:

1. To provide a four-year instruction, practical training and demonstration leading to the attainment of a degree of Bachelor of Science (Agric Business) which will prepare graduands to undertake, manage, research and create sustainable, viable and environmentally friendly Agribusiness.
2. To address the production, storage and marketing constraints in agriculture in Ghana through teaching, research, training and extension.

i. Senior Secondary School Certificate Examination (SSSCE)

Compulsory subjects – Grade D or better in three (3) core subjects, including English and Mathematics (core)

And Elective subjects – Grade D or better in three (3) elective subjects.

ii. West Africa Senior School Certificate Examination (WASSCE)

Compulsory subjects- Grade C6 or better in three (3) core subjects including English and Mathematics (core)

And Elective subjects –Grade C6 or better in three (3) elective subjects.

iii. General Certificate of Education (GCE) Advanced Level

Passes in three (3) subjects (at least, one of the passes should be Grade D or better). Also, the applicant must have had credit passes (Grade 6) in five GCE Ordinary Level subjects including English, Mathematics and a Science (for non-science students) and an Arts subject (for science students).

iv. Advanced Business Certificate Examination (ABCE)

Passes in three (3) subjects (at least, one of the passes should be Grade D or better). Also, the applicant must have had credit passes in five (5) subjects including English Language, Mathematics, Integrated Science or Social Studies in the General Business Certificate Examination.

1. Mature Students' Entry

Mature students' entry avenues to tertiary education provide opportunities for people who could not do so earlier in their lives to further their education at the tertiary level after some years in the workplace (preferably, the formal workplace). Such applicants should normally not exceed 5% (for Public Tertiary Educational Institutions) and 20% (for Private Tertiary Educational Institutions) of the total admissions of an institution in a given academic year. The applicant must:

a. Be at least 25 years old.

b. Show proof of age with birth certificate or any legitimate documentary proof of birth date which is at least 5 years old at the time of application.

c. Provide introductory letter from employer or show any other proof of employment.

d. (for admission into chartered institutions) pass Mature Students' Entrance Examinations conducted by the institution itself (English Language, Mathematics and an Aptitude Test). In the case of non-chartered institutions, the examinations should be moderated and the marked scripts, vetted by their Mentor Institution. In lieu of such examinations, the applicant should show proof of credit passes in English and

Mathematics in WASSCE or any other nationally recognized standard High School level examinations (for qualifications from countries outside WAEC's aegis)

2. Foreign Qualifications

All foreign qualifications should be referred to the National Accreditation Board (NAB) for determination of equivalences and eligibility for admission to tertiary institutions in Ghana (National Accreditation Board Act, 2007[Act 744(2(2b)]). Note should be taken however that the American SAT, TOEFL etc. cannot in themselves be acceptable as entry qualifications into Ghanaian tertiary educational institutions.

3. Higher National Diploma (HND) Qualifications

For institutions willing to admit HND holders to undergraduate programmes, the applicant must have graduated with a good HND certificate (i.e. at least 2nd Class Lower Division). In addition, the applicant must have acquired a 2-year post-HND qualification working experience. Institutions under mentorship should follow their Mentor Institutions' practice with regard to entry levels for HND applicants.

Other Diploma qualifications from elsewhere assessed to be equivalent to HND may be similarly considered.

4. Professional and Other Entry Qualifications.

All professional certificates and any other qualifications beyond the ones specified above must be referred to the National Accreditation Board for the establishment of their equivalences, to

determine their eligibility for admission to tertiary education institutions-universities, university colleges, polytechnics, etc.

Notes that the Diploma in Business Studies (DBS) qualification cannot, in itself, be used for admission into tertiary education Institutions and programmes.

REQUIREMENT FOR GRADUATION

A) Total Credits required – 146 semester credits
B) Breakdown of total credits into major curriculum sub-divisions – See Table 1 below.

BSc. [Agribusiness] Major Curriculum Sub-Divisions

	Major Curriculum Major Curriculum Sub-Divisions –divisions	**Credits Requirements**
A	General Education	16
B	Agribusiness Required Core Courses	94
C	Agribusiness Cognate Course Requirements	21
D	Agribusiness Practicum & Student Research Project	15
	Total	**146**

SEQUENCE OF COURSES

FIRST YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
AGRB 103 Introduction to Agricultural Botany	2	AGRB 122 Biology of Farm animals	2
AGRB 105 Introduction to Soil Science	2	AGRB 124 Introduction to Agric Engineering	2
AGRB 107 Introduction to Agric Economics	2	AGRB 114 Principles of Crop Production	2
AGRB 109 Principles of Agribusiness Management	2	BSAD 126 Business Communication	2
COSC 117 Fundamentals of Computers	3	STAT 128 Statistics for Agriculture	2
ENGL 113 Language and Writing Skills	2	SOCI 132 Rural Sociology	2
AGRB 115 Business Mathematics	2	RELB 163 The Life & Teachings of Jesus	3
ACCT 117 Principles of Accounting	2	AGRB 192 Practicum I	3
RELB 254 Principles of Christian Faith	3		
Total Credits	**20**	**Total Credits**	**18**
SECOND YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
AGRB 215 Insect Biology and Plant microbes	2	AGRB 232 Animal Production and Health	3
AGRB 213 Crop Protection		AGRB 234 Soil Physical and Chemical Fertility	2
AGRB 217 Business and Land Use Laws	2	AGRB 222 Introduction to Food Science II	2
RELB 247 Christian Ethics for Business	3	AGRB 236 Soil and Water Engineering	2
AGRB 219 Introductory	2		

Genetics		ACCT 238 Auditing	2
AGRB 221 Introduction to Food Science I	2	BSAD 246 Company and Partnership Law	2

AGRB 223 Economics for Agribusiness	2	BSAD 248 Entrepreneurship I	2
BSAD 225 Business Finance	3	FREN 111 French for General Communication I	2
AGRB 227 Emerging Non-traditional Agribusinesses	2	AGRB 292 Practicum II	3
	2		
Total Credits	**20**	**Total Credits**	**20**
THIRD YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
AGRB 315 Plant Breeding and Seed Science	3	AGRB 324 Poultry Production	3
AGRB 317 Management of Soil Environment	2	AGRB 326 Introduction to Animal Breeding	2
AGRB 319 Field crops: Cereals and legumes	3	AGRB 328 Agricultural Marketing	2
AGRB 323 Fruits and Vegetables	2	AGRB 334 Managerial and Business Economics	2
BSAD 327 Entrepreneurship II	2	AGRB 336 Introduction to Post Harvest Technology	2
BSAD 325 Supply Chain Management	3	AGRB 338 Quantitative Methods and Operation Research	2
AGRB 329 Research Methods for Agribusiness	3	AGRB 340 Agricultural Price Analysis	2
FREN 112 French for General Communication II	2	AGRB 392 Practicum III	3
		RELT385 Biblical Foundation of Ethics	3
Total Credits	**20**	**Total Credits**	**21**
FOURTH YEAR			
1st Semester	**Credits**	**2nd Semester**	**Credits**
AGRB 491 Research Project	3	AGRB 492 Research Project	3
AGRB 413 Plantation and Industrial Crops	2	AGRB 422 Ruminant Production	2
AGRB 415 Root and Tuber Crops	2	AGRB 424 Grassland Management	2
AGRB 417 Project Planning and Management	3	AGRB 426 Current Issues in Agribusiness	2
AGRB 423 Financial Management	2	AGRB 428 Agribusiness Strategic Management	2

ACCT 425 Management Accounting	2	AGRB 430 Agri-food Business and Agro Processing	2
BSAD 427 International Trade	2	AGRB 434 Industrial Psychology	2
AGRB 431 Seminar I	1	BSAD 436 Fundamentals of Business Planning and Policy	2
RELG451 Bible and Family Dynamics	3	AGRB 432 Seminar II	1
Total Credits	**20**	**Total Credits**	**18**

COURSES DESCRIPTION

AGRB 103 INTRODUCTION TO AGRICULTURAL BOTANY 2 CREDITS

The objective of the course is to provide the basic botanical foundation necessary for students to understand the principles of crop production. Some topics in this course include: Plant cell, tissues and organs. Fine cell structures and their functions. Mitosis, meiosis, molecular basis of inheritance, protein synthesis. Root: medication of roots, arrangement of tissues in monocotyledonous (monocot) and dicotyledonous (dicot) roots. Stem: medication of stems, arrangement of tissues in monocot and dicot stems. Lead: simple, compound, venation, shapes, arrangement and modification of leaves: arrangement of tissues in monocot and dicot leaves. Flower: parts, types, floral arrangements (inflorescence), and floral diagrams. Fruit and seed: structure, types germination and dormancy. Principles of classification including concepts of species, genus, family, order, division and kingdom, binomial system of nomenclature.

AGRB 105 INTRODUCTION TO SOIL SCIENCE 2 CREDITS

The objective of the course is to provide the basic foundation for students to know and understand the soil environment in which crops grow. Some topics in this course include: Pedology: Concepts of soil: composition of the earth-crust and its environment, pedogenic factors and their interactions, major components of soil; introduction to inorganic components of soil (origin and nature of rocks): Soil Physics :Soil as a 3-phase dispersed system, definition of physical quantities, the solid phase, soil texture, classification systems, Stoke's law and particle size analysis; specific surface, bulk density, particle density: Soil Chemistry: Soil acidity: definition, calculations, effect on the soil environment, liming and liming materials. Agricultural chemicals and the soil: fertilizers, pesticides, etc. Soil Microbiology and Biochemistry Major groups of microorganisms, requirements for microbial/bacterial growth classification of bacteria-morphological and/or physiological characteristics, soil carbohydrates with examples of monomers, dimmers, polymers etc., soil organic N compounds especially proteins, amides, amino acids, peptides. Enzymes and their roles in the soil.

AGRB 107 INTRODUCTION TO AGRICULTURAL ECONOMICS 2 CREDITS

The objective of the course is to introduce students to the nature and concepts of Economics and their application in the field of agriculture and agribusiness management. Some topics in this course include: Nature of Economics, the scientific method and tools of economic analysis, economic variables, production and economic systems, demand, supply and equilibrium price: use and application of elasticity concept, theory of the firm, special topics of contemporary interest (inflation, unemployment, national income and its distribution).

AGRB 109 PRINCIPLES OF AGRIBUSINESS MANAGEMENT 2 CREDITS

The objective of the course is to introduce students to management theory in the context of agribusiness. Some topics in this course include: Management theory in the context of Agribusiness, the Decision making process; The Agribusiness Manager and his responsibilities, The role of marketing and market planning in agribusiness management, Business organizations (types, merits, demerits and organizational structure), Budgeting and forecasting, Records and Accounting information (Profit and Loss Account, Cash flow Statement and Balance sheet).

COSC 117 FUNDAMENTALS OF COMPUTERS 3 CREDITS

The objective of this course is to introduce students to Personal Computers and their application in agribusiness management. Some topics in this course include: Overview of the historical development of micro computers, Application and use of operating systems, word processing, spreadsheets, data base managers, graphics, desktop publishing, and presentation of managers for agribusiness, Introduction to information technology and the use of the internet.

ENGL 111 LANGUAGE AND WRITING SKILLS 2 CREDITS

The objective of the course is to sharpen the grammatical skills of students to enhance their

communication and report writing abilities. Some topics in this course include: The first semester section of this full semester course focuses on English grammar and is a required course for all first-year students. They will be assisted to review some common problem areas of their writing, such as verb/tense system, concord, as well as other problem areas to be identified by the lecturers in charge. There shall also be a study of basic grammatical structures that shall involve teaching students to write formally correct sentences, avoiding sentence errors, and using punctuation effectively.

AGRB 115 BUSINESS MATHEMATICS 2 CREDITS

To improve on students' understanding of basic mathematical theories as they apply to the field of business. Some topics in this course include: The study of the notations of equation and linear equation, Cartesian coordinates, functions, graphs, laws of exponent, linear function (applications to agribusiness). Quadratic functions (applications to agribusiness), polynomial function, rational functions, exponential and logarithmic functions. Matrices (application to agribusiness. Sequences and
Series, Binomial expansions, Mathematics of Money and interest (Deferential Annuities, Interest on loans, Bank Discount, Amortization, Singing funds, etc.)

ACCT 117 PRINCIPLES OF ACCOUNTING 2 CREDITS

To introduce students to accounting concepts and principles for agribusiness management. Some topics in this course include: Nature, role and principles of accounting, Types of business entity; The global accounting regulatory system; Recording, classifying, presenting and analysis of financial data. Accounting for fixed assets (tangibles and intangibles). Adjustments; financial statements (excluding notes and disclosures); Partnership accounts. Introduction to final accounts of limited liability companies.

RELB 254 PRINCIPLES OF CHRISTIAN FAITH 3 CREDITS

The object of this course is to expose students to the fundamental teachings in the Bible that relate to Christian faith. Some topics in this course include: This course surveys the fundamentals of Christian teachings: Revelation, Inspiration, the Godhead, Angels, the Devil and the Origin of sin, Creation, Man's original condition and fall, his condition in death, Incarnation, Ministry, Death, Resurrection and Ascension of Christ. The Holy Spirit, the plan of Redemption, the Covenant, the Sanctuary, Essentials of Christian living, Baptism and Christian growth. The Sabbath, God's church in the world, the coming crisis, Christ and second coming, the Millennium, Heaven.

AGRB 122: BIOLOGY OF FARM ANIMALS 2 CREDITS

To expose students to the anatomy and physiology of farm animals to enhance their understanding of the behaviour of farm animals. Some topics in this course include: Blood and circulation – composition of blood, functions of blood, heart and blood vessels, the respiratory system – structure of the respiratory system of mammalian and avian species, gaseous exchange in the lungs and tissues, transport of oxygen and carbon dioxide. The excretory system – structure of the kidneys, the functional unit of the kidneys and formation of urine; the reproductive system – reproductive organs of livestock and avian species, spermatogenesis and oogenesis, endocrine functions of the testes and ovaries; skeletal system of livestock and avian species; the digestive system – structure and functions of the different sections of the digestive systems of livestock and avian species.

AGRB 124: INTRODUCTION TO AGRICULTURAL ENGINEERING 2 CREDITS

This course is an introduction to the basic concepts in Agricultural Engineering
Some topics in this course include:

1. Concepts of work, Power, Horsepower, and Torque. Types of Farm Power, Internal Combustion Engines and Power Applications.
2 Farm equipment and implements: Calibration, performance, hitching and stability.
3 Cost of using Farm Equipment.
4 Measuring distances, angles, areas and volumes. Different and profile levelling, topographic maps.
5 Weather and water run-off. Water measurement. Introductory Hydraulics, Farm

Water Systems. Irrigation Water Use.

6 Selection of structural members for farm structures. Ventilation and heat balance for buildings, the Psychometric Chart. Principal views of an object.

7 Basic Electricity: - Series and parallel circuits, voltage drop, wiring. Single phase motors, etc.

AGRB 114: Principles of Crop Production — 2 Credits

This course will provide students with the basic principles and cultural practices in crop production. Some topics in this course include: The physical environment and crop production. Adapting crops and management practices to the environment. Soil and water conservation. Farming, cropping and agro forestry systems. Plant propagation, crop establishment and management. Weed control strategies. Pest and disease control. Integrated crop nutrient management.

BSAD 126 Business Communications — 2 Credits

The objective of this course is to provide students with the necessary skills to build effective human relation and to communicate effectively in the workplace and in dealing with business partners. Some topics in this course include: Principles and methods of communication, basics of communication, written, oral and visual communication, electronic communication systems, IT and information presentation. In this course, students will organize and compose acceptable business documents in accordance with current business communication procedures and principles.

STAT 128 Statistics for Agribusiness — 2 Credits

The objective of this course is to introduce students to various statistical methods and techniques to enable them organize, analyze and interpret field and survey data. Some topics in this course include: Graphical Presentation of data, Measures of central location and dispersion, probability and probability distributions, estimation, test of hypothesis, and simple linear regression.

SOCI 132 Rural Sociology — 2 Credits

This course will introduce students to the behaviour of rural people in the rural setting and give insight into perception and reality that will inform the formulation of plans and strategies to improve the rural economy. Some topics in this course include: Fundamental concepts in Rural Sociology, rural society, rural organization, rural people and culture, elements in the structure of culture, origin and nature of institutions, with particular reference to the rural agricultural system and the sociological implications in extension work.

RELB 163 THE LIFE & TEACHINGS OF JESUS AND THE GOSPEL 3 CREDITS

To expose students to the Biblical teachings on Jesus Christ and His role in the plan of salvation. Some topics in this course include: A comprehensive study of the life and teachings of Jesus as unfolded in the four gospels with analytical attention to the Gospel writers and their writings in an attempt to reveal the impact of His self- revelation in that age and ours.

AGRB 192 PRACTICUM I 3 CREDITS

During the summer break, students will understudy nursery techniques including budding, grafting, rapid field multiplication of food crops and compost preparation. In addition, students will undertake visits to established agribusiness firms for at least 6 weeks and a report on all activities carried out during the period of training shall be submitted by each candidate during the following semester. Lecturers of the Department shall visit all students on vacation training to monitor and assess their progress.

AGRB 215: INSECT BIOLOGY AND PLANT MICROBES 2 CREDITS

To introduce students to the different pests and diseases of crops, their control measures and some microbes, characteristics and their uses. Some topics in this course include: History of plant pathology: including spontaneous generation and germ theories of diseases. Characteristics of plant microbes (fungi, bacteria, viruses, viroids, mollicutes, nematodes, algae and protozoa): morphology structure and function-growth, reproduction, dispersal and classification of the microbes. Importance of plant microbes in agriculture: including soil fertility involving rhizobia, mycorrhiza and algae. Concept of pests. Classification of pests. Economic importance of pests. Effects of pest presence. Methods of insect pest control. Merits and demerits of different methods, with emphasis on pesticides. Current trends in pest control.

AGRB 213: CROP PROTECTION 2 CREDITS

To introduce students to the different pests and diseases of crops and their control measures. Some topics in this course include: Concept of pests. Classification of pests. Economic importance of pests. Effects of pest presence. Methods of insect pest control. Merits and demerits of different methods, with emphasis on pesticides. Current trends in pest control. Meaning, scope and history of plant pathology; concept of diseases in plants; importance, classification causes, symptoms and general control of plant diseases. Practicals will involve the recognition of some important plant diseases in Ghana. Characteristics of weeds; classification of weeds; competitive ability of autotrophic and practical weeds (Persistence and survival mechanisms; factors affecting weed persistence). Specific losses caused by weeds in relation to agric weed control strategies with emphasis on efficient herbicide usage.

AGRB 217 BUSINESS AND LAND USE LAWS 2 CREDITS

This course aims to introduce students to the evolution and concepts in Ghanaian business and land use laws and their implications in agribusiness management. Some topics in this course include: Introduction: Historical evolution of law; Sources of Ghanaian land law; Terminology – (ownership, possession, titles, rights, liability, land, etc.) Customary land law; Concept of ownership of land: Nature of title to land; Control and management of community land-individual rights and extent of community land today; Creation of family land-nature and extent of members right in family land, control of family land alienation, alienation of family land, recovery of family land, development by a member of the family, termination of family land; An outline of succession to rights in land. . Identify essential elements of Ghana's legal system including the main sources of business law and explain its operation. Laws relating to employment relationships with particular regards to dismissal, redundancy and discrimination.

RELB 247 CHRISTIAN ETHICS FOR BUSINESS 3 CREDITS

This course will expose students to basic ethical issues in business and everyday life from the viewpoint of Christianity. Some topics in this course include: This course critically examines the major themes-nature, content and rationality of the norms which guide actions – which organize ethics as a field of study. It provides the self/individual (a human being or a corporate body or institution in society) with moral directive to resolve dilemmas in real life situations – economic, medical, legal, intellectual,

sociological, as well as religious. Finally, itss projects Christianity (the ethics of Christ) as the model or standard of judging morals in our contemporary permissive world.

AGRB 219 INTRODUCTORY GENETICS 2 CREDITS

This course will expose students to the basic concepts and principles in Genetics as they relate to crops and farm animals. Some topics in this course include: Basic principles of genetics including mitosis, meiosis, laws of segregation gene interactions, sex and inheritance, chemical basis of heredity, mutations and fingerprinting.

AGRB 221 INTRODUCTION TO FOOD SCIENCE I 2 CREDITS

This course provides students with basic understanding of the various food nutrients and their functions in the diet of farm animals and humans. Some topics in this course include: Major nutrients in foods and their values: Carbohydrates, Proteins, Lipids, Vitamins and minerals.

AGRB 223 ECONOMICS FOR AGRIBUSINESS 2 CREDITS

The course will expose students to the principles of microeconomic and macroeconomic theories and their application to the workings of the economy of Ghana. Some topics in this course include: Areas to be covered under microeconomics include: Demand and supply – The price mechanism in a market economy, the Theory of consumer behaviour, the Theory of the Firm and Market Structures. Under macroeconomics, the following areas shall be covered: Concept of an Economy, Macroeconomic Theory, Inflation and Unemployment, National Income Accounting, Money Demand and Supply; Aggregate Demand and Supply Functions, Fundamentals of Exchange Rate Determination and their Applications to the Economy of Ghana; especially the Agricultural and Agribusiness sectors.

BSAD 225 BUSINESS FINANCE 2 CREDITS

This course introduces students to various methods of sourcing funding and managing business funds for profitability and long-term survival. Some topics in this course include: Introduction to business finance; Sources of funding (merits and demerits). Raising capital, controlling it and evaluating expenditure are activities that are common to all business enterprises and are explored in this course from a small business and medium scale enterprise perspective. Other topics include working capital management and capital budgeting and risks associated with various sources of capital for businesses.

AGRB 227 EMERGING NON-TRADITIONAL AGRIBUSINESSES 2 CREDITS

The objective of this course is to introduce students to emerging non-traditional agricultural enterprises such as aquaculture, apiculture (Bee keeping), Mushroom culture, etc. to arouse interest and develop student capacity for successful agribusiness operations in future. Some topics in this course include: Aquaculture planning, species selection for aquaculture; pond culture; running water; pen culture; stocking open waters; sanitation and health; fish feeds and nutrition. Simple record keeping of aquaculture inputs; costs activities. Simple profit and loss analysis for decision making. Best practices in Aquaculture. Apiculture Industry. Features of tropical apiculture, Hive Management and equipment, feeding hives, Colony behaviour, Pollination, Types of hives, Pest and Diseases of bees, Harvesting honey: Removing and Extracting Honey. Processing, Preservation and Packaging, Safety standards and Marketing of honey. Mushroom cultivation techniques: media, growth and environmental conditions for spore production. Processing and Marketing of these non-traditional products.

AGRB 232: ANIMAL PRODUCTION AND HEALTH 2 CREDITS

This course provides students with the fundamental principles underlying farm animal production with emphasis on nutrition and health. Some topics in this course include: Animal production and its importance in the Ghanaian economy; introduction to animal nutrition; feed composition and common methods of analysis for nutrients and feedstuffs; the gastrointestinal tract and nutrition; measurements of feed and nutrition utilization and requirements by farm animals. Factors affecting the health of farm animals; Deficiency diseases of farm animals (mineral and vitamin deficiencies in cattle, sheep, goats and poultry). Selected major diseases of farm animals in Ghana: incidence, aetiology, transmission, epizootiology,

pathogenesis, clinical symptoms, pathology, diagnosis, treatment and control of bacterial, viral, protozoan and parasitic diseases of ruminants, pigs and poultry. Notifiable and
zoonotic diseases, responsibilities of stockowners and others in relation to requirements of the Veterinary Services Department of Ghana.

AGRB 234 SOIL PHYSICAL AND CHEMICAL FERTILITY 2 CREDITS
This course provides students with the understanding of the physical and chemical properties of the soil as they relate to fertility. Some topics in this course include: Inorganic components of soils: rocks and minerals, primary minerals, secondary minerals, clay minerals (1:1 and 2:1); weathering of rocks and minerals: types of weathering, types of parent materials; soil formation and profile development: processes and factors of profile development; nomenclature and identification of soil horizons: master and sub-horizons and layers, transitional and combination horizons, suffix symbols, soil catena concept. The liquid phase of soil: soil water content, methods of determination; gravimetric, electrical resistance, soil water storage, concept of equivalent depth, soil water potentials, potential diagrams, soil moisture characteristic and use, available water capacity, saturated water flow in soils, Darcy Law. Clay minerals: origin, composition and chemical nature of clay minerals, soil colloids and ion exchange phenomenon, soil reaction, soil as a buffer, nutrient elements: forms and their availability in soils, functions in plants, deficiency symptoms,., soil organic carbon/organic matter, total soil nitrogen, fertilizers and calculations involving rates of application

AGRB 222 INTRODUCTION TO FOOD SCIENCE II 2 CREDITS
This course exposes students to digestion of the main food nutrients in the GIT of animals. It also introduces students to the principles underlying nitrogen fixation, nucleic acid replication, protein synthesis, DNA and photosynthesis. Some topics in this course include: Digestion of carbohydrates, proteins and lipids., Nitrogen fixation, Nucleic acid replication and protein synthesis., DNA replication transcription and translation, Photosynthesis.

AGRB 236 SOIL AND WATER ENGINEERING 2 CREDITS
The objective of the course is to provide students with the understanding of the fundamental principles underlying key processes in the soil and water environment. Some topics in this course include: Definition of soil and water engineering, its component parts and position in agricultural engineering. Fundamentals of hydrology, Precipitation, infiltration, Evapotranspiration, and runoff. Factors affecting runoff, Erosion (Types, causes, effects and control), Contour farming, Construction of contour guidelines, etc.

ACCT 238 AUDITING 2 CREDITS
This course aims at developing fundamental knowledge necessary for auditing. Some topics in this course include: The course provides basic coverage of audits and related attests, assurance and other services provided by certified Accountants and Auditors. The emphasis is on audits of financial statements including auditing standards and procedures. Engagement planning, assessment of risk and internal control, evidence accumulation and evaluation, and the selection and composition of the appropriate audit report are among the topics covered.

BSAD 246 COMPANY AND PARTNERSHIP LAW 2 CREDITS
This course introduces students to formation of businesses and the laws governing companies and partnerships in Ghana. Some topics in this course include: Company formation, shareholders, officers of the company, methods of raising capital, disclosure of corporate information, capital reorganization and liquidation, partnership law and legislation relating to fraud.

BSAD 248 ENTREPRENEURSHIP I (SAME AS BSAD 121 AT VVU MAIN CAMPUS) **2 CREDITS**
The main objective of this course is to provide the student with an understanding of the problems and challenges facing an entrepreneur in the process of creating a business. Some topics in this course include: Introduction to entrepreneurship (Meaning, scope, concepts), Characteristics of entrepreneurs, Rewards for the entrepreneur, Identification of Businesses and development of business ideas, Creation of business

and how to manage the business created. An important part of the course will be the identification of business and managerial leadership skills as they relate to the functions of planning, organizing, staffing, directing, and controlling a business.

FREN 111 FRENCH FOR GENERAL COMMUNICATION I 2 CREDITS

The objective of the course is to enable students to develop basic communication skills in French. This course provides a foundation on which to build the skills of listening, speaking, reading and writing. The approach is essentially communicative or interactive.

AGRB 292 PRACTICUM II 2 CREDITS

In the summer break, students will select a cereal or vegetable crop of their choice and grow to full maturity and prepare partial farm budget for it. In addition, students will undertake visits to established agribusiness firms for at least 6 weeks and a report on all activities carried out during the period of training shall be submitted by each candidate during the following semester. Lecturers of the Department shall visit all students on vacation training to monitor and assess their progress.

AGRB 315: PLANT BREEDING AND SEED SCIENCE 2 CREDITS

This course will introduce students to fundamental principles in plant breeding and seed production as a business. Some topics in this course include: Plant genetic resources. Reproductive systems in crop plants. The genetic basis and methods for breeding self- and cross-pollinated crops. Mutation breeding. Polyploidy. Inter- and intra-specific hybridization. Introduction to techniques of biotechnology utilized or with potential to be utilized in crop improvement. Biology of seeds – ontogeny, structure, storage, germination and storage behaviour. Principles and practices involved in the production, harvesting, processing, conditioning, storage, testing,
quality management and use of agricultural seeds. Seed improvement, national seed laws, international seed institutions and regulations, seed industry policy and germplasm policy for Ghana. Developments in the international seed arena including patenting. Establishment and management of seed production as a business.

AGRB 317: MANAGEMENT OF SOIL ENVIRONMENT 2 CREDITS

This course aims at providing students with the skills to examine the soil environment and determine the nutrient requirements as well as understand various soil conservation measures. Some topics in this course include: Soil Chemistry: Kinds of fertilizers, manufacture of nitrogen, phosphorus and potash fertilizers, manufacture of secondary, micronutrient and mixed fertilizers. Fertilizer usage: fertilizer and economic development cost/benefit of fertilizer use, effect of fertilizer use on the soil environment. Fertilizer application methods: broadcast and band application, side-dressing, top dressing, foliar application, fertilization, instrumentation, principle of soil, plant and water analysis, soil and water salinity.
Biochemistry/Microbiology: Crop residue and organic matter decomposition and management (cellulose, hemicellulose, lignin, C/N ratio), biochemistry of composting, microbiology of composting, green manuring, nitrogen, phosphorus and sulphur cycles, microbial respiration and its importance to ecosystem processes (glycolysis, Krebb cycle, respiratory chain, oxidative phosphorylation, proteins in soil. Practical: Soil fertility assessment, pot experiments with N.P.K. and analysis of plant tissue, micro-nutrient analysis for iron determinations, pH changes due to nitrogen fertilizers (demonstration in solution culture) heavy metals, soil salinity assessment: electrical conductivity, determination of inorganic carbon, soil carbonate content.

AGRB 319: FIELD CROPS: CEREALS AND LEGUMES 2 CREDITS

This course will enable students to understand the principles and management practices in cereals and legumes production. Some topics in this course include: Origin, botany, distribution, adaptation, propagation, cultural practices, harvesting, utilization and post-harvest handling of tropical food crops including cereals and legumes. Other crops include beverage, oil, spice and fibre crops. Constraints to production and research needs.

AGRB 323: FRUITS AND VEGETABLES 2 CREDITS

This course will enable students to understand the principles and management practices in Fruits and Vegetable production. Some topics in this course include: The fruit industry. Classification of fruit crops. Factors affecting fruit production. Establishment of an orchard: propagation and nursery practices and fruit crop management; fruit quality and marketing. Detailed knowledge of the botany, physiology and production practices for citrus, banana, mango, avocado pear, cashew and pineapple. Minor fruit crops of Ghana. Importance of vegetable enterprises. Classification of vegetables. Factors affecting vegetables production in Ghana. The vegetable production process: site selection and handling.

BSAD 327 ENTREPRENEURSHIP II 3 CREDITS

This course introduces students to initiating a business venture and organizing the necessary resources for efficient management. Some topics in this course include: Business planning techniques, economic analysis, financial analysis, market analysis and human resource analysis are utilized in conceiving and launching a new business. The course also provides an understanding of the risks and rewards associated with entrepreneurship. Problems associated with operating a small business, procuring physical facilities, financing, organizing, marketing and managing small and medium scale enterprises. Students will also work in teams to prepare business plans with the aim of attracting venture capital.

BSAD 325 SUPPLY CHAIN MANAGEMENT 3 CREDITS

This course will provide students with the skills to manage the primary and support activities in various agricultural value chains. Some topics in this course include: The concept of supply chain management and its relevance to the agribusiness industry will be introduced; The concept of Value Chain and the components of the value chains of selected agricultural commodities. The roles of Wholesalers and Retailers in an agricultural value chain, Warehousing/storage, inventory management and insurance. The course includes both practical aspects of the delivery process and theoretical foundations in the context of developing economies.

AGRB 329 RESEARCH METHODS FOR AGRIBUSINESS 2 CREDITS

The objective of this course is to expose students to various research methods used in the social sciences with particular focus on agribusiness. Some topics in this course include: The Scientific Method in economics and Agribusiness research, Research proposal writing, Literature search, Data/information gathering. Sampling methods, Data types (Qualitative data, Quantitative data, Primary data, secondary data, cross sectional data, time series data, panel data, etc.); Methods of collecting Quantitative/qualitative and data; Farming systems research; Economic analysis of Agronomic data. Tools for and methods of data analysis (Descriptive and Inferential analysis of data), the use of statistical programmes/packages for data analysis (e.g. SPSS, eVIEWs); Presentation and interpretation of research results.

FREN 112: FRENCH FOR GENERAL COMMUNICATION II 2 CREDITS

This course aims at further enhancing the written and spoken communication skills in French. Some topics in this course include: This course builds on the foundation laid in French for General Communication I. Vocabulary is widened and the grammar becomes more demanding. Careful attention is given to the oral as well as the written aspect.

AGRB 324: POULTRY PRODUCTION 2 CREDITS

This course will introduce students to the various management practices in Poultry production. Some topics in this course include: Avian biology and its importance in management; different poultry management systems; Egg production, Broiler production, nutrition, poultry feed formulation, Farm hygiene, Disease and pest management in poultry production, hatchery set up and management; processing and marketing of poultry; Records keeping in poultry production.

AGRB 326: INTRODUCTION TO ANIMAL BREEDING 2 CREDITS

The objective of this course is to introduce students to the principles in Animal Breeding. Some topics in this course include: Genes and gene action – the nature and control of gene function and the phenotypic expression of genes; definitions, types and consequences of mutations and chromosome aberrations; detrimental and lethal genes in farm animals; concept of gene frequencies; variations in economic traits of farm animals – genetic, Environmental and phenotypic variance, heritability and repeatability; definitions and measurements of inbreeding and relationships; introduction to the principles of selection – theory and practice. Principles of selection; improvement of livestock through selection – factors affecting rate of genetic improvement, basis for selection, types of selection, mating systems; system of breeding and selection of livestock; special problems of implementing genetic improvement of livestock programmes in the tropics (with particular reference to Ghana).

AGRB 328: AGRICULTURAL MARKETING 2 CREDITS

The purpose of this course is to enable students to have a better understanding of the functioning of the agricultural marketing system and equip them with tools for analyzing the functioning and performance of agricultural marketing systems. Some topics in this course include: **Overview of Agricultural Marketing:** Definition and Scope; the marketing system and institutions; Problems in agricultural marketing. **Markets and Competition:** Concept of market and market structure: the static theory of perfect competition; the static theory of monopoly. **Group behaviour and pricing:** non-collusive oligopoly models; collusive oligopoly concepts; cartels; price leadership; price discrimination and price flexibility. **Non-price competition:** Theory of product differentiation. **Welfare issues in marketing:** Social choice mechanisms; Market failure and government intervention; Pricing public goods; Estimation of Marketing Costs, Marketing Margins and Market Efficiency; marketing Research. **Field case studies.**

AGRB 334: MANAGERIAL AND BUSINESS ECONOMICS 2 CREDITS

The purpose of this course is to introduce students to the economic environment in which business operates and provide an understanding of how economic principles are applied in management and business. Some topics in this course include: The scope and Nature of Management and Business Economics; The firm and its environment; Alternative business objectives; Demand Estimation; Forecasting;

Production economics, cost Analysis and application of Cost Theory; Price and Output determination in different Market Structures; Linear programming and production Analysis. Decision Making under uncertainty; Capital budgeting; The economics of human resource management; Business information; Forms of business organizations; The role of government in the Market economy.

AGRB 336: INTRODUCTION TO POST HARVEST TECHNOLOGY 2 CREDITS

The objective of this course is to provide students with basic knowledge and skills in post-harvest handling and management of agricultural commodities. Some topics in this course include: History and importance of post-harvest technology in Ghana and the World. Population growth, global food situation and post-harvest technology issues. Types of food produce (perishable and durable products); Household and National food security issues; Post harvest losses (origin, nature and extent); Agents of losses (biological, microbial, physical, genetic); Detection and assessment of losses. Methods of reducing post-harvest losses; Components of the system e.g. harvesting an agric produce; Environmental factors (temperature, humidity, gases, light); Pests and diseases management in storage; Processing and preservation, conveying/transportation; Packing; Labeling.

AGRB 338 QUANTITATIVE METHODS AND OPERATIONS RESEARCH 2 CREDITS

The objective of the course is to provide basic tools to enable the student to perform quantitative analysis of agribusiness enterprise. Some topics in this course include: Probability and decision making; Index numbers; Time series analysis; Forecasting; Network analysis and Scheduling; Inventory control; Simulation analysis; Correlation and regression analysis; Waiting lines Analysis; Linear programming – Simplex and Advanced Methods; Transportation and Assignment Problem.

AGRB 340: AGRICULTURAL PRICE ANALYSIS 2 CREDITS

Course focuses on the determination of Agricultural Prices and to equip students with the tools and techniques to analyse the behaviour of Agricultural prices. Some topics in this course include: Introduction: The role of prices in Demand and Supply Analysis (Theory); Analysis of price relationships: Recursive models, spatial price analysis, inter-temporal price analysis, price indices, farm-on-farm price relationships. Futures: Functions of futures, futures contracts, types of traders and trading, market positions. Agricultural Pricing Policies in Ghana: Government price intervention (historical evidence, methods of reducing price instability).

AGRB 392: PRACTICUM III 3 CREDITS

In the summer break, students will go on attachment at commercial farms. This training will last for at least 6 weeks and a report on all activities carried out during the period of training shall be submitted by each candidate during the following semester. Lecturers of the Department shall visit all students on vacation training to monitor and assess their progress. After the visits, students will begin their project work on feasibility studies and business plans for agric enterprises of their choice.

AGRB 491: RESEARCH PROJECT 3 CREDITS

To help students carry out scientific research and present report on it. Some topics in this course include: This course will expose students to actual practical field research. Information collected based on literature search and a field survey will be analyzed and used to prepare a dissertation and a business plan.

AGRB 413 PLANTATION AND INDUSTRIAL CROPS 2 CREDITS

To provide students with an understanding of plantation and industrial crops and the various management practices used in their production. Some topics in this course include: The origin, spread, uses, botany, ecology, agronomy, major pests and diseases, improvement, utilization and trade of major industrial and plantation crops in Ghana. Emphasis will be on cocoa, oil palm, rubber, shea, coconut, cotton, and sugarcane.

AGRB 415 ROOT AND TUBER CROPS 2 CREDITS

To provide students with an understanding of Root and Tuber Crops and the various management practices used in their production. Some topics in this course include: The botany, ecology, agronomy, major pests and diseases, storage, utilization and trade of major root and tuber crops and plantain and bananas in Ghana.

AGRB 417 PROJECT PLANNING AND MANAGEMENT 2 CREDITS

To equip students with the knowledge and skills in the analysis and planning of agricultural projects as well as writing of business plans for implementation. Some topics in this course include: The Concept of Project; Project cycle (Project identification, preparation, appraisal, implementation, evaluation). Process and participatory approaches to project planning and implementation; Measures of project worth: benefit-cost analysis, payback period, simple rate of return, discounting methods (net present value, internal rate of return). World Bank, DFID, and related tools for monitoring and evaluation of agricultural projects, Business Plan Preparation and implementation.

AGRB 423 FINANCIAL MANAGEMENT 2 CREDITS

The general objective of the course is to foster an in-depth understanding of the application of financial management principles in the operation of an agribusiness firm. Some topics in this course include: This includes the use of financial statements, capital budgeting and risk management techniques and analysis of the impact of risk and time on business decisions. The regulatory framework and the financial institutions serving the farm and agribusiness sector will be discussed.

ACCT 425: MANAGEMENT ACCOUNTING 2 CREDITS

The aim of this course is to acquaint students with the fundamental of managerial accounting to enable them use accounting information in managing an organization. Some topics in this course include: Management accounting techniques, Cost management process and planning, control and decision making. Cost Description by classification and purpose. Principles of costing and budgeting. Application of principles in product and work in progress costing. Cost elements and breakeven analysis.

BSAD 427: INTERNATIONAL TRADE 2 CREDITS

The course is designed to provide the fundamental analytical framework, hypotheses and theorems required for an understanding of international economic relations, trade problems and policies options open to nations. Some topics in this course include: Introduction; the Theory of International Trade (Supply); the Theory of International Trade (Demand); the Dynamic Basis of Trade; the Balance of Payments; the Foreign Exchange Market; Elements in the Adjustment Process; the Price Mechanism in International Trade; Income and International Trade; Tariffs and International Trade; Economic Integration and International Trade.

AGRB 431 SEMINAR I **1 CREDIT**

To help students streamline their final projects and develop skills for scientific presentation.
Content:
Students present the introduction, literature review and methodology of their projects after which they interact with Lecturers and colleague students for feedback.

AGRB 492: RESEARCH PROJECT 3 CREDITS

To help students carry out scientific research and present report on it. Information collected based on the field survey is analyzed and presented in the form of a dissertation. Also, a complete business plan will be presented.

AGRB 422: RUMINANT PRODUCTION 2 CREDITS

This course will provide students with the knowledge in ruminant production. Some topics in this course include: Limitations to the small ruminant industry in Ghana and Government interventions to enhance the industry; reproductive wastage and factors that affect reproductive rates in small ruminants – litter size, young mortality and lambing/kidding interval; management practices – flushing, mating, creep feeding, weaning, castration, dehorning, spraying and drenching. Year-round programming for a small ruminant enterprise; status of the dairy industry in Ghana; constraints to cattle milk and meat production in West Africa; factors affecting profitability of a diary enterprise. Variations in normal lactation; factors affecting yield and composition of milk; diary management; production systems in the tropics – extensive, semi-intensive and intensive.

AGRB 424 GRASSLAND MANAGEMENT 2 CREDITS

This course introduces students to various grassland management techniques. Some topics in this course include: Ecology (review)- definition, ecosystem concept and function, succession, range conditions, Vegetational zones of West Africa; the value of vegetation to livestock, factors affecting herbage intake; vegetation measurement- weight, cover, density, frequency and quality; Stocking rate, carrying and grazing capacity, management and improvements of grasslands; re-seeding, fertilization, control of invading vegetation. Grazing management systems; Continuous, rotational, zero and creep grazing.

Forage conservation; silage, hay.

AGRB 426 CURRENT ISSUES IN INTERNATIONAL AGRIBUSINESS 2 CREDITS

The objective of this course is to expose students to current trends in the field of agribusiness in international circles. Some topics in this course include: The origin and principal features of the World Trade Organization (WTO), its role and mandated ISO. The need for an ISO content variation and applicability to developed and developing countries, international trade and international commodity organizations. Alternatives and consequences of public policy in the agri-food system. Analysis of economic implications for food and agribusiness firms, farmers, consumers and society.

AGRB 428 AGRIBUSINESS STRATEGIC MANAGEMENT 2 CREDITS

This course aims at providing the student with strategic management techniques needed to manage agribusinesses. Some topics in this course include: Analysis of strategic management issues for agribusiness. Formulation of business strategy and solutions to strategic problems. Integration of operations, marketing, finance and human resource management.

AGRB 430 AGRIFOOD BUSINESS AND AGROPROCESSING 2 CREDITS

The purpose of the course is to introduce students to modern dynamics and trends in agrifood business. The course focuses on case studies to introduce students to methods and concepts in agrifood business and agro processing. Some topics in this course include: A Systems approach to agro industrial analysis: production chain linkages, micro policy linkages, institutional linkages, international linkages, Organization of Agrifood Business: vertical integration/differentiation, horizontal integration/differentiation, cooperative systems, outgrower systems. Case Studies: - Management strategies, Marketing strategies, Financing strategies: Egg Production Business, Chicken meat processing business, Palm Oil Processing, Pineapple Processing business, Grain processing business.

AGRB 434 INDUSTRIAL PSYCHOLOGY 2 CREDITS

This course provides the students with the fundamentals in Psychology to guide them in the management of agribusinesses after completion. Some topics in this course include: The course is about getting the best out of people to work in the changing world Human resource management principles for farms, agribusiness and food firms: Planning recruiting, training, scheduling, motivating, Supervising and evaluating. Labour regulations, compensation and records; other organizational topics covered include working in teams, managing change and human resource policy development.

BSAD 436 FUNDAMENTALS OF BUSINESS PLANNING AND POLICY 2 CREDITS

The course is designed to equip the students to think strategically, plan, strategize and implement business policies in the agribusiness sector. Some topics in this course include: The nature and importance of Business Policy and Planning: Policy and levels of planning: Strategic planning: Choosing the strategy, implementing the strategy. Evaluating the strategy: Annual plans: information system for planning; Contingency planning; the route to market entry; and Business plan; Term paper on Business Plan Preparation.

AGRB 432 SEMINAR II 1 CREDIT

To help students' present updates on their research projects (results and discussions) for feedback. Students present the results, discussion and conclusions of their project work.

Biomedical Engineering Core Courses

Course Code	Course Title	T	P	C
BMET 115	Principles of Electric Circuits	2	3	3
BMET 213	Thermodynamics for Biomedical Engineering	2	0	2
BMET 231	Electronic Circuits I	2	3	3
BMET 232	Electronic Circuits II	2	3	3
BMET 241	Digital Electronics I	2	3	3
BMET 242	Digital Electronics II	2	3	3
BMET 272	Introduction to Engineering Softwares	3	0	3
BMET 278	Biomedical Transducers and Sensors	2	0	2
BMET 413	Biomechanics	2	0	2
BMET 325	Biomaterials	2	0	2
BMET 331	Biomedical Instrumentation I	2	3	3
BMET 332	Biomedical Instrumentation II	2	3	3
BMET 347	Medical Physics	3	0	3
BMET 315	Computer Networks and Data Communication	3	0	3
BMET 336	Quantitative Human Physiology	2	0	2
BMET 446	Biofluid Mechanics	2	0	2
BMET 374	Research Methods	3	0	3
BMET 346	Transport Phenomena In Biomedical Engineering	2	0	2
BMET 276	Biomedical Engineering Internship I	NC	NC	1
BMET 376	Biomedical Engineering Internship II	N/A	N/A	1
BMET 411	Medical Imaging I	2	3	3
BMET 412	Medical Imaging II	2	3	3
BMET 435	Introduction to Clinical Engineering	3	0	3
BMET 447	Design of Biomedical Devices and Systems	3	0	3
BMET 453	Codes, Standards, and Ethics in Medical Devices	2	0	2
BMET 465	Biomedical Engineering Project I	N/A	N/A	3
BMET 466	Biomedical Engineering Project II	N/A	N/A	3
BMET 424	Digital Radiography	2	0	2
BMET 436	PACS and Medical Imaging Informatics	2	0	2
Total				**73**

Cognate Courses

Course Code	Course Title	T	P	C
MATH 111	College Algebra and Trigonometry	3	0	3
MATH 112	Calculus I	3	0	3
MATH 211	Calculus II	3	0	3
MATH 214	Multivariable Calculus	3	0	3
MATH 311	Probability and Statistics	3	0	3
COSC 113	Elements of Programming	3	0	3
COSC 124	Procedural Programming	3	0	3
COSC 230	Database System Design	3	0	3
COSC 257	Computer Architecture and Microprocessor System	3	0	3
BSAD 314	Entrepreneurship	2	0	2
PHYS 124	Physics for Biomedical Engineering	2	3	3
CHEM 224	Chemistry for Biomedical Engineering	2	3	3
BIOL 321	Human Anatomy and Physiology I	3	0	3
BIOL 322	Human Anatomy and Physiology II	3	0	3
Total				**41**

Biomedical Engineering Elective Courses

Course Code	Course Title	T	P	C
BMET 454	Biomedical Signal and Image Processing	3	0	3
BMET 416	Artificial Intelligence in Biomedical Engineering	3	0	3
BMET 415	Information Systems in Healthcare	3	0	3
BMET 437	Biomedical Data Science and Analytics	3	0	3
BMET 427	Advanced Biomedical Instrumentation	2	3	3
BMET 426	Advanced Medical Imaging	3	0	3

General Education (Mandatory) Courses

Course Codes	Course Title	T	P	C
BMET 151	Language and Communication Skills I	2	0	2
BMET 152	Language and Communication Skills II	3	0	3
FREN 121	French for General Communication I	2	0	2
FREN 122	French for General Communication II	2	0	2
PSYC 105	Introduction to Psychology	3	0	3
RELB 163	Life and Teachings of Jesus Christ	3	0	3
RELG 451	Bible and Family Dynamics	3	0	3
RELB 250	Principles of Christian Faith	3	0	3
RELT 385	Introduction to Biblical Foundation of Ethics	3	0	3
AFST 205	Introduction to African Music	1	0	1
AFST 243	Chieftaincy and Development	1	0	1
GNED 125	Study Skills	1	0	NC
PEAC 100	Physical Activity			NC
GNED 230	Career Exploration and Planning	1	0	NC
Total				26

Semester by Semester Structure

First Year				
First Semester				
Course Code	Course Title	T	P	C
BMET 151	Language and Communication Skills I	2	0	2
FREN 121	French For General Communication I	2	0	2
BMET 115	Principles of Electric Circuits	3	0	3
RELB 163	Life and Teachings of Jesus Christ	3	0	3
COSC 113	Elements of Programming	3	0	3
MATH 111	College Algebra and Trigonometry	3	0	3
GNED 125	Study Skills	1	0	NC
Total				16
Second Semester				
Course Code	Course Title	T	P	C
BMET 152	Language and Communication Skills II	3	0	3
FREN 122	French for General Communication II	2	0	2
PHYS 124	Physics for Biomedical Engineering	2	3	3
COSC 124	Procedural Programming	3	0	3
MATH 112	Calculus I	3	0	3
PSYC 105	Introduction to Psychology	2	3	3
PEAC 100	Physical Activity			NC
Total				17

Second Year

First Semester				
Course Code	Course Title	T	P	C
MATH 211	Calculus II	3	0	3
BMET 213	Thermodynamics for Biomedical Engineering	2	0	2
BMET 231	Electronic Circuits I	2	3	3
BMET 241	Digital Electronics I	2	3	3
RELB 250	Principles of Christian Faith	3	0	3
COSC 257	Computer Architecture and Microprocessor System	3	0	3
AFST 205	Introduction to African Music	1	0	1
GNED 230	Career Exploration and Planning	1	0	NC
Total				21
Second Semester				
Course Code	Course Title	T	P	C
MATH 214	Multivariable Calculus	3	0	3
CHEM 224	Chemistry for Biomedical Engineering	2	3	3

BMET 232	Electronic Circuits II	2	3	3
BMET 242	Digital Electronics II	2	3	3
BMET 272	Introduction to Engineering Softwares	3	0	3
COSC 230	Database System Design	3	0	3
BMET 278	Biomedical Transducers and Sensors	2	0	2
AFST XXX	Chieftaincy and Development	1	0	1
BMET 276	Biomedical Engineering Internship I	NC	NC	1
Total				22

Third Year

First Semester				
Course Code	Course Title	T	P	C
BIOL 321	Human Anatomy and Physiology I	3	0	3
BMET 325	Biomaterials	2	0	2
MATH 311	Probability and Statistics	3	0	3
BMET 331	Biomedical Instrumentation I	2	3	3
BMET 347	Medical Physics	3	0	3
BMET 315	Computer Networks and Data Communication	3	0	3
RELT 385	Introduction to Biblical Foundation of Ethics	3	0	3
Total				20
Second Semester				
Course Code	Course Title	T	P	C
BSAD 314	Entrepreneurship	2	0	2
BIOL 322	Human Anatomy and Physiology II	3	0	3
BMET 336	Quantitative Human Physiology	2	0	2
BMET 374	Research Methods	3	0	3
BMET 346	Transport Phenomena in Biomedical Engineering	2	0	2
BMET 332	Biomedical Instrumentation II	2	3	3
BMET 376	Biomedical Engineering Internship II	N/A	N/A	1
Total				16

Fourth Year

First Semester				
Course Code	Course Title	T	P	C
BMET 411	Medical Imaging I	2	3	3
BMET 413	Biomechanics	2	0	2
BMET 435	Introduction to Clinical Engineering	3	0	3
BMET 447	Design of Biomedical Devices and Systems	3	0	3
BMET 453	Codes, Standards, and Ethics in Medical Devices	2	0	2
BMET 465	Biomedical Engineering Project I	N/A	N/A	3
Elective I		3	0	3
Total				19

Electives				
BMET 415	Information Systems in Healthcare			
BMET 437	Biomedical Data Science and Analytics			
BMET 427	Advanced Biomedical Instrumentation			
Second Semester				
Course Code	Course Title	T	P	C
BMET 412	Medical Imaging II	2	3	3
BMET 424	Digital Radiography	2	0	2
BMET 436	PACS and Medical Imaging Informatics	2	0	2
BMET 446	Biofluid Mechanics	2	0	2
RELG 451	Bible and Family Dynamics	3	0	3
BMET 466	Biomedical Engineering Project II	N/A	N/A	3
Elective II		3	0	3
Total				18
Electives				
BMET 454	Biomedical Signal and Image Processing			
BMET 416	Artificial Intelligence in Biomedical Engineering			
BMET 426	Advanced Medical Imaging			

COURSE DESCRIPTIONS

BMET 151 LANGUAGE AND COMMUNICATION SKILLS I (2 CREDITS)
This course covers the study of the grammatical systems of the English Language. The course aims at helping students to develop the basic skills in the grammatical systems of the English Language and to use these effectively in writing good sentences, paragraphs and essays for both academic and professional pursuits.

FREN 121 FRENCH FOR GENERAL COMMUNICATION I (2 CREDITS)
The course provides a basic foundation on which to build the skills of listening, speaking, reading, and writing simple terms in French. The objective of the course is to introduce students to the key expressions used in various real-life situations of communication in French, develop the four language skills (listening, speaking, reading and writing) in students, and create the awareness and interest in students for further studies of the French language.

RELB 163 LIFE AND TEACHINGS OF JESUS (3 CREDITS)
The course deals with a comprehensive study of the life and teachings of Jesus Christ as unfolded in the four Gospels with analytical attention to the gospel writers and their writings in an attempt to reveal the impact of His self-revelation in that age and ours. The objective of the course is to link the student spiritually with the lord Jesus Christ.

PSYC 105 INTRODUCTION TO PSYCHOLOGY (3 CREDITS)
This course is an introduction to the scientific study of basic processes underlying human behaviour, sensation and perception, learning and thinking, motivation and emotion, and other topics as it relates to the individual and society. It also deals with the application of these processes to everyday life to help students how these psychological processes affect their lives. The objective of the course is to introduce is to introduce students to the study of

PHYS 124 PHYSICS FOR BIOMEDICAL ENGINEERING (3 CREDITS)
The course discusses the concepts of general physics and their applications. The aim of the course is to enable students acquire a solid foundation in the fundamental principles of physics, and to apply the understanding of these principles to applications in biomedical engineering.

COSC 113 ELEMENTS OF PROGRAMMING (3 CREDITS)
The course addresses the techniques necessary to write well-documented and structured computer programs. The course is intended to emphasize the planning process using examples involving sequence, selection, and iteration. The objective of the course is to promote good programming practices for further study of programming languages.

MATH 111 COLLEGE ALGEBRA AND TRIGONOMETRY (3 CREDITS)
The course provides a detailed treatment of college algebra and trigonometry. The objectives of the course are to assist students acquire a solid foundation in algebra and trigonometry for further coursework such as calculus, show students how algebra and trigonometry can model and solve real-world problems, and to enable students develop problem-solving skills and critical thinking ability.

GNED 125 STUDY SKILLS (NC)
This course covers the study of the tools and techniques for success in the university and beyond. The course covers the skills and strategies designed to improve study behaviour, and for planning personal success. The aim of the course is to enable students apply appropriate study strategies and techniques to the development of an effective study plan.

BMET 152 LANGUAGE AND COMMUNICATION SKILLS II (3 CREDITS)
The course deals with the application of the grammatical systems studied in Communication skills I. The course is designed to enable students acquire writing skills, skills to analyze and critique written forms and to grasp information and meaning from reading materials for personal and academic writing. The course also aims at assisting students to acquire verbal and non-verbal communication skills.

FREN 122 FRENCH FOR GENERAL COMMUNICATION II (2 CREDITS)
This course addresses the communication difficulties detected during the teaching of French for General Communication I. The course is designed to address phonetic difficulties through basic lessons on the French

alphabets and phonetics. The objective of the course is to enable students enhance their oral communication skills in the French language, enhance their confidence level in their efforts to communicate in the French language, and effectively use the past, present and future tenses to meet their daily communication needs.

COSC 124 PROCEDURAL PROGRAMMING (3 CREDITS)

The course is designed to introduce the principles and concepts of programming and teach problem-solving methods and algorithm development; high-level, structured programming using a recent procedural programming language such as C/C++. Data types, variable declarations, arithmetic expressions, conditional statements, macros, function prototypes, standard libraries, file processing, pointers, structures, unions and dynamic memory management are discussed.

CHEM 224 CHEMISTRY FOR BIOMEDICAL ENGINEERING (3 CREDITS)

The course discusses the fundamentals of general, organic, and biological chemistry. The course is primarily designed to provide students with the appropriate background in chemistry, and to develop students' understanding in the fundamental concepts of chemistry and their application to biological systems.

MATH 112 CALCULUS I (3 CREDITS)

The course provides a detailed treatment of differential and integral calculus. The objective of the course is to provide students with a solid foundation in differential and integral calculus with particular emphasis on their applications.

BMET 115 PRINCIPLES OF ELECTRIC CIRCUITS (3 CREDITS)

This course covers the study of DC and AC circuits. The objective of this course is to provide students with a comprehensive practical coverage of electric circuits (DC and AC) with emphasis on application and troubleshooting.

PEAC 100 PHYSICAL ACTIVITY (NC)

This course is designed to train the body as 'the temple of God' and to develop a positive attitude towards exercise for the improvement and maintenance of overall health and fitness. The objective of the course is to improve cardio-respiratory endurance and other components of physical fitness.

MATH 211 CALCULUS II (3 CREDITS)

The course provides a detailed treatment of differential equations. The course is designed to give students a strong foundation in differential equations with special emphasis on their applications.

BMET 213 THERMODYNAMICS FOR BIOMEDICAL ENGINEERING (2 CREDITS)

The course deals with the study of energy transformations involving heat, mechanical work, and other aspects of energy and how these transformations relate to the properties of matter. The course is designed to enable students appreciate the concepts of thermodynamics and their applications.

BIOL 321 HUMAN ANATOMY AND PHYSIOLOGY I (3 CREDITS)

This course is the first part of a two-semester course in human anatomy and physiology. The course provides a systems approach to the study of the structure and function of the human body. The objective of the course is to provide students with a strong foundation in the principles of anatomy and physiology for understanding both health and disease with emphasis on integration of structure and function.

BMET 231 ELECTRONIC CIRCUITS I (3 CREDITS)

This course is the first part of a two-semester comprehensive practical coverage of electronic devices and circuits. The objective of the course is to enable students acquire a solid foundation in discrete devices and circuits with strong emphasis on design and analysis of real-world applications, and troubleshooting.

BMET 241 DIGITAL ELECTRONICS I (3 CREDITS)

This course is the first part of a two-semester comprehensive study of the principles and techniques of digital electronics. The course aims at providing students with strong foundation in the core fundamentals of digital electronics with emphasis on design and analysis of real-world applications, and troubleshooting.

RELB 250 PRINCIPLES OF CHRISTIAN FAITH (3 CREDITS)

The course deals with the detailed study of the fundamental doctrines of the Christian Faith. The aim of the course

is to enable students have a working knowledge of the different doctrines of the Christian Faith, and be able to practically apply these doctrines to the challenges of living as Christians in today's society.

GNED 230 CAREER EXPLORATION AND PLANNING (NC)
This course discusses the theories of career development and the processes that guide the choice of a career plan and its development. The goal of the course is to enable students understand the need for careful planning for success in any career, the role of the self in career exploration and planning, and to enhance students' ability to explore and plan their career.

MATH 214 MULTIVARIABLE CALCULUS (3 CREDITS)
This course provides a comprehensive study of multivariable calculus. The course is designed to give students a strong foundation in the principles and techniques of multivariable calculus and their applications.

BIOL 322 HUMAN ANATOMY AND PHYSIOLOGY II (3 CREDITS)
This course is the second part of a two-semester course in human anatomy and physiology. The course provides a systems approach to the study of the structure and function of the human body. The objective of the course is to provide students with a strong foundation in the principles of anatomy and physiology for understanding both health and disease with emphasis on integration of structure and function.

BMET 232 ELECTRONIC CIRCUITS II (3 CREDITS)
This course is the second part of a two-semester comprehensive practical treatment of electronic devices and circuits. The objective of the course is to enable students acquire a strong foundation in electronic devices and circuits, and integrated circuits with strong emphasis on design and analysis of real-world applications, and troubleshooting.

BMET 242 DIGITAL ELECTRONICS II (3 CREDITS)
This course is the second part of a two-semester comprehensive study of the principles and techniques of digital electronics. The course aims at providing students with a strong foundation in the core fundamentals of digital electronics with emphasis on design and analysis of real-world applications, and troubleshooting.

COSC 257 COMPUTER ARCHITECTURE AND MICROPROCESSORS (3 Credits)
This course covers the study of typical PC architecture and organization, and microprocessor architecture. The objective of the course is to provide students with an understanding of PC hardware organization and the interaction between operating system and application software, and a comprehensive overview of microprocessor internal architecture.

COSC 230 DATABASE SYSTEM DESIGN (3 CREDITS)
This course covers the study of the fundamentals of database architecture, database management systems, and database systems. The aim of the course is to provide students with a general understanding of modeling of data analysis, analysis of data relationships, programming of database management systems, and analysis of database concurrency protocols and algorithms.

BMET 278 BIOMEDICAL TRANSDUCERS AND SENSORS (2 CREDITS)
The course covers the basic theories of measurement, bioelectric signals, biomedical transducers and sensors for acquiring physiological signals and their associated signal conditioning circuits, and electrical safety. The course is designed to assist students to understand the characteristics of physiological signals (such as ECG, EEG, EMG) and the methods to collect, process, display and record such signals.

BMET 413 BIOMECHANICS (2 CREDITS)
This course offers a comprehensive examination of the application of mechanical principles to the study of function and structure of the human musculoskeletal system. The primary objective is to enable students to critically analyze and evaluate the human musculoskeletal system using the fundamental principles of mechanics, and to apply advanced methodologies and techniques for investigating the mechanics of these systems.

BMET 325 BIOMATERIALS (2 CREDITS)
This course provides an in-depth examination of natural and synthetic materials and their applications in biomedical contexts, including the design and development of implantable and extracorporeal devices. The course

aims to enable students to critically analyze and evaluate the structure, properties, and processing of various biomaterials.

MATH 311 PROBABILITY AND STATISTICS (3 CREDITS)
The course provides a comprehensive study of the probability models and statistical methods for analyzing data. The course aims at providing students with an understanding of probability models and statistical methods, and how they may be applied in the solution of engineering problems.

BMET 331 BIOMEDICAL INSTRUMENTATION I (3 CREDITS)
This course represents the first segment of a two-semester, in-depth examination of the theoretical principles and hardware associated with selected medical equipment. The course aims to build the ability of students to critically evaluate and synthesize knowledge of relevant physiological processes, the design and construction of medical devices, their functional building blocks (or system diagrams), circuit analysis, and operational principles.

BMET 347 MEDICAL PHYSICS (3 CREDITS)
This course offers a comprehensive examination of the application of physics principles to medical practice, with a particular focus on medical imaging for diagnosis and treatment of diseases. The course is designed to enable students to critically analyze and apply fundamental and advanced physics concepts in medical contexts.

BMET 315 COMPUTER NETWORKS AND DATA COMMUNICATION (3 CREDITS)
This course provides an in-depth examination of the principles of data communication and network fundamentals with a particular focus on their applications in biomedical engineering. The aim of the course is to enable students critically evaluate and synthesize knowledge of the basic concepts, principles, technologies, systems, solutions and applications relating to data communications and computer networks.

RELT 385 INTRODUCTION TO BIBLICAL FOUNDATIONS OF ETHICS (3 CREDITS)
The course examines the major themes, which organize ethics as a field of study. The aim of the course is to enable students gain an understanding of the theory and practice of ethics, and the ability to apply ethics to a variety of issues that occurs in everyday living.

BSAD 314 ENTREPRENEURSHIP (3 CREDITS)
The course looks at the basic principles of entrepreneurship and management. The course is designed to introduce students to the many exciting and challenging facets of business.

BMET 336 QUANTITATIVE HUMAN PHYSIOLOGY (2 CREDITS)
This course offers a quantitative analysis of human physiology through the application of engineering and physical science methodologies, with a focus on the function of major organ systems of the human body. The objective is to enable students to critically integrate mathematical modeling and engineering principles to deepen their understanding of physiological processes.

BMET 446 BIOFLUID MECHANICS (2 CREDITS)
This course provides an in-depth examination of biofluid mechanics, with a focus on macrocirculation and microcirculation of the cardiovascular system, and other biological flows within the human body. The objective is to the ability of students to critically analyze and apply fluid mechanics principles to understand and model the behaviour of fluid systems in physiological contexts.

BMET 374 RESEARCH METHODS (3 CREDITS)
This course covers the fundamentals of research methodology. The objective of the course is to provide students with the basic concepts and strategies in research, and to enable students develop the most appropriate methodology for their research studies.

BMET 346 TRANSPORT PHENOMENA IN BIOMEDICAL ENGINEERING (2 CREDITS)
This course provides a foundational examination of transport phenomena within physiological systems, emphasizing the principles governing mass, heat, and momentum transfer, and their applications in biomedical contexts. The objective is to enable students to critically analyze and apply the principles of transport phenomena to solve problems in physiological systems.

BMET 332 BIOMEDICAL INSTRUMENTATION II (3 CREDITS)

This course represents the segment of a two-semester, in-depth examination of the theoretical principles and hardware associated with selected medical equipment. The course aims to build the ability of students to critically evaluate and synthesize knowledge of relevant physiological processes, the design and construction of medical devices, their functional building blocks (or system diagrams), circuit analysis, and operational principles.

BMET 376 BIOMEDICAL ENGINEERING INTERNSHIP II (1 CREDIT)

This course provides a practical experience in hospital-related settings, focusing on a wide range of medical equipment and instrumentation systems. Students will engage in supervised work within hospitals or technical support organizations, such as independent service organizations. The objective is to enable students to synthesize and apply classroom knowledge in real-world contexts, deepen their understanding of biomedical engineering principles, and gain substantial hands-on experience with medical technologies and practices.

BMET 411 MEDICAL IMAGING I (3 CREDITS)

This course represents the first segment of a two-semester, thorough examination of the theory and hardware underlying medical imaging devices. The objective is to enable students to critically evaluate and synthesize knowledge concerning the design and construction, functional components, circuit analysis, operational principles, general inspection, preventive maintenance (IPM) procedures, installation, and troubleshooting of medical imaging systems.

BMET 435 INTRODUCTION TO CLINICAL ENGINEERING (3 CREDITS)

This course examines the management of medical technology from the user's perspective, encompassing the entire lifecycle of the technology from acquisition through disposal. The objective is to equip students with a thorough understanding of the strategic and operational aspects of managing medical equipment within clinical environments.

BMET 447 DESIGN OF BIOMEDICAL DEVICES AND SYSTEMS (3 CREDITS)

This course offers an in-depth discussion of key engineering design principles applicable to biomedical devices and systems. It thoroughly addresses the design process, including project selection, specification development, conceptual design, analysis, construction, evaluation, and documentation. The objective is to enable students to critically understand and apply advanced design principles in the creation of biomedical technologies.

BMET 453 CODES, STANDARDS, AND ETHICS IN MEDICAL DEVICES (2 CREDITS)

This course provides a thorough examination of the codes, standards, and ethical guidelines governing the medical device industry and the management of medical equipment. The objective is to equip students with a critical understanding of relevant laws, regulations, and requirements across major global medical device markets, as well as to deepen their knowledge of ethical considerations in biomedical engineering.

BMET 465 BIOMEDICAL ENGINEERING PROJECT I (3 CREDITS)

This course involves independent research and writing on a faculty-approved topic, providing students with the opportunity to identify and address a significant problem or issue within their field of study. Under the guidance of a faculty member, students will apply their academic knowledge to conduct scientific research and develop solutions to the identified problem, with the aim of benefiting society. The objective is to empower students to critically engage in the research process, from problem identification and investigation to proposing solutions, thereby gaining practical experience in independent research and contributing to advancements in the field of biomedical engineering.

BMET 412 MEDICAL IMAGING II (3 CREDITS)

This course represents the first segment of a two-semester, thorough examination of the theory and hardware underlying medical imaging devices. The objective is to enable students to critically evaluate and synthesize knowledge concerning the design and construction, functional components, circuit analysis, operational principles, general inspection, preventive maintenance (IPM) procedures, installation, and troubleshooting of medical imaging systems.

BMET 424 DIGITAL RADIOGRAPHY (2 CREDITS)

This course provides a comprehensive examination of the physical principles and technical aspects of digital radiography imaging systems and their associated technologies. The objective is to provide students with an advanced understanding of the architecture and operational mechanisms of digital radiography systems.

BMET 436 PACS AND MEDICAL IMAGING INFORMATICS (2 CREDITS)

This course provides an in-depth examination of the fundamental concepts, terminology, technological advancements, and implementation strategies associated with Picture Archiving and Communication Systems

(PACS) and medical imaging informatics. The objective is to enable students to gain a detailed knowledge and understanding of PACS architecture and operations, as well as the principles underpinning imaging informatics.

BMET 454 BIOMEDICAL SIGNAL AND IMAGE PROCESSING (3 CREDITS)
This course provides a comprehensive examination of signal processing methodologies, including the Laplace transform, Fourier transform, and time frequency analysis, as applied to biomedical signals and systems. The objective is to enable students to critically analyze and synthesize the mathematical foundations of continuous and digital signal processing, and apply these advanced concepts to the processing and interpretation of biomedical signals.

BMET 466 BIOMEDICAL ENGINEERING PROJECT II (3 CREDITS)
Students continue with BMET 465 Biomedical Engineering Project I

BMET 276 BIOMEDICAL ENGINEERING INTERNSHIP I (1 CREDIT)
This course provides a practical experience in hospital-related settings, focusing on a wide range of medical equipment and instrumentation systems. Students will engage in supervised work within hospitals or technical support organizations, such as independent service organizations. The objective is to enable students to synthesize and apply classroom knowledge in real-world contexts, deepen their understanding of biomedical engineering principles, and gain substantial hands-on experience with medical technologies and practices.
BMET 416 ARTIFICIAL INTELLIGENCE IN BIOMEDICAL ENGINEERING (3 CREDITS)

This course examines the application of artificial intelligence (AI) techniques and methodologies in the field of biomedical engineering. The objective is to equip students with the ability to critically evaluate, design, and implement AI-based solutions to complex biomedical problems, fostering innovation in diagnostics, therapy, and healthcare management.

BMET 437 BIOMEDICAL DATA SCIENCE AND ANALYTICS (3 CREDITS)

This course provides a detailed examination of data science and analytics techniques as applied to biomedical engineering. It focuses on the extraction, manipulation, and analysis of complex biomedical data to derive meaningful insights and develop predictive models. The course aims to enable students to critically analyze and interpret large datasets, apply advanced statistical and machine learning techniques, and develop innovative data-driven solutions to biomedical problems.

BMET 427 ADVANCED BIOMEDICAL INSTRUMENTATION (3 CREDITS)

This course provides an in-depth examination of the principles, design, and functionality of selected medical devices. The objective is to enable students to critically evaluate and analyze the underlying physiology, design architecture, circuit analysis, and operational principles of advanced biomedical equipment. Emphasis is placed on integrating and synthesizing knowledge from biomedical engineering and applying it to the development, operation, and maintenance of sophisticated medical devices.

BMET 415 INFORMATION SYSTEMS IN HEALTHCARE (3 CREDITS)

This course provides a detailed examination of the various information systems integral to healthcare management and delivery. The objective is to enable students to critically analyze and synthesize the principles, design, and functionality of healthcare information systems, and to evaluate their application in improving patient care and operational efficiency.

BMET 426 ADVANCED MEDICAL IMAGING (3 CREDITS)

This course offers a comprehensive examination of the principles and techniques of advanced medical imaging, focusing on both theoretical foundations and practical applications. The objective is to enable students to critically evaluate and apply advanced imaging modalities and algorithms to enhance diagnostic accuracy and image quality in clinical settings.

RELB 451 BIBLE AND FAMILY DYNAMICS (3 CREDITS)

This course focuses on the role of the Bible in aiding family members find meaning and purpose in life. The objective of the course is to highlight from a biblical perspective relevant issue that are incidental to the life of family members as they strive to function effectively in an increasingly global society.