Buea Institute of Technology

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Authorisation No. 122/MINEFOP/SG/DFOP/SDGSF/SACD du/of 12 Jan 2023

DEPARTMENT OF WEB AND SOFTWARE DEVELOPMENT

HND SOFTWARE ENGENEERING

COURSES OVERVIEW

FIRST YEAR: FIRST SEMESTER

1. WSD201: HTML/CSS

Credits: 6, Course State: Compulsory (C)

- **Web design:**
  - **Introduction to Web Design**
    - History of web design
    - Basic concepts
    - Criteria used in web design
    - Colour language
    - Some examples and commentaries
- **Web and multimedia I** :
- **Web design:**
  - General information on the Web Design
    - Definitions: web, web design, digital;
    - The trades of Web design;
    - The software used in the Web design;
    - The characteristics of the images for the Web;
    - Optimization of images for the Web;
    - Organization of files;
    - The nomenclature rules of files;
    - Extension of the current files;
    - Optimization of files;
    - Types of files;
    - Dimensions of a web page.
- **Initiation to the Web Programming:**
  - Adobe Golive: Images
    - Place an image in a page;
    - Inpector palette;
    - Atltext field;
    - Field HSpace;
    - VSpace field.

- Adobe Golive: images in rollover and the hypertext links
  - Actions open windows;
    Internal links;
  - External Links.
- Adobe Golive: actions, sheets of CSS styles
  - Usefulness of the CSS.
  - Creation of style sheets;
  - Style sheets inter and external.
- Adobe Golive: definition of styles (HTML)
  - Definition of styles;
  - Styles classes;
  - ID styles;
  - Styles of HTML elements;
  - Character attributes;
  - Attributes of styles;
  - Apply a class style to a selection.
- Adobe Golive: Iframes
  - Creation of an Iframe;
  - Attributes of an Iframe;
  - Compatibility of iframes.
- Adobe Photoshop: images gif with transparent background
  - The bottom of the page; - substance of the image;
  - Indexedcolor.
- Adobe Golive, and HTML: scroll bar customized
  - The scrollbarcolor.

2. WSD203: DATABASE MANAGEMENT SYSTEMS

Credits: 6, Course State: Compulsory (C)

- **Introduction to database**
  - Fundamental objectives of a database
    - Less redundancy
    - Consistency
    - ACID Properties
    - Multiuser and Concurrent Access
    - Multiple views
    - Confidentiality/integrity
  - Flashback on data models
    - Entity-Relationship Model
    - Relational Model
  - Normalization(1NF, 2NF, 3NF)
  - Relational algebra
    - Relational Algebra

- Relational Calculus

- Practicals on MS access and or Mysql

➢ **Database administration**

- Introduction
- Presentation of Mysql
- Mysql architecture
- Mysql server
- Configuration of Mysql server
  - Running and Shutting down MySQL Server
  - Setting Up a MySQL User Account
  - Administrative MySQL Command
- Mysql client
  - Presentation of client administration
  - Mysql customer program calls
  - Usage of mysql client
  - Mysql client administration
- Presentation of data types
- Metadata
- Storage engine
- Partitioning
  - Presentation and advantages of partitioning
  - Creating a partition table
  - Collecting information on partition
  - Modification and suppression of partition
- Mysql transactions
- Management of users and security
  - Security risks
  - Security measures
  - Privileges
  - Access level, particularly:1- users account, 2- database, 3- tables, 4- column, 5- routine storage
  - Management of user account
  - Client access control
  - Usage of secured connection
- Maintenance of tables
- Exporting and importing data

3. WSD205: PHP I

Credits: 6, Course State: Compulsory (C)

➢ **Advanced Web site programming**

- PHP code modification
- CSS code modification

- HTML code modification
- Practical session on PHP, CSS, HTML

4. WSD245: INTRODUCTION TO SOFTWARE ENGINEERING

Credits: 6, Course State: Compulsory(C)

- **Digital electronics**
  - Number systems and codes
    - Binary, octal and hexadecimal number systems
    - Conversion from one number system to the other
    - Binary codes: BCD, gray, excess – 3, 8:4:2:1; 2:4:2:1 etc
    - Alpha numeric code: ASCII
- **Combinational logic**
    - Logic gates
    - Boolean algebra
    - Simplification of Boolean functions
    - Applications of combinational logic
- **Sequential logic**
    - Flip flops
    - Counters
    - Registers
- **Fundamentals of algorithms**
    - Introduction to algorithms
    - Algorithm approaches: greedy, dynamic programming, divide and conquer, branch and bound, introduction to complexity analysis and measures.
    - Algorithms: sorting and searching, merging, tree and graph traversals, shortest path, minimum spanning tree, order statistics, string matching.
- **Introduction to information systems:**
  - **Specification languages of an information system.**
    - Data models(Entity relational models, relational models)
    - Processing models(petri diagram, MERISE diagram, SADT diagram)
    - Communication models
    - Objects models
  - **Analysis of the is – the system and opportunities offered**
    - Methods of studying an existing information system
    - Data representation and processing of an existing information system in terms of the models studied above.
    - Quality criteria of an information system
    - Criticizing the is – the system
    - Study of the opportunities
    - Audit

- **Design**
  - Data conceptual diagrams
    - Construction of data conceptual diagram
    - Normalization
  - Processing conceptual diagram
    - Processing architectural diagram
  - Dynamic representation
  - Conceptual diagram of a communication system
  - Representing a communication system
  - Determination of the elements of a communication system
  - Object conceptual diagram

➢ **Information Management system (MERISE)**

- From conceptual to logical level
  - Human – Computer Interface (HCI): Explain what Human computer interaction is and why it is needed
  - Ergonomic elements
  - Data organization
  - Conception of files or database
  - Coding
  - Control
  - Process organization
  - Determination of the nature of processing
- From logical to physical level
  - Programming, test
  - Documentation
  - Maintenance
- Methodology and software tools
  - General presentation of the different methodologies
  - Detail analysis of at least one of the methodologies(MERISE, SADT etc).
  - Evaluation of the cost of the detail study and development
  - Usage of software tools in conceiving and developing the software.

➢ **Introduction to software engineering**

- Software development life cycle (SDLC)
- Quality
- Specifications
- Ergonomics
- Tests
- Management of requirements
- Control of development
- Writing of specifications
- Methods of estimating the cost

5. GDP211: GRAPHIC AND MULTIMEDIA DESIGN

Credits: 6, Course State: Compulsory (C)

- **Computer graphic design**
  - Digital images
  - Bitmap images
  - Vector images
  - Characteristics of bitmap images
  - Image compression
  - Final improvements of images
  - Practicals on the creation buttons and images for the Web
  - Bitmap and vector file format
  - Document and print – out format
  - The Design Process
  - Elements & Principles of Design
  - Typography
  - Color Theory & Use
  - Creating images for print & web
- **Visual language:**
  - Graphic representations
    - Pictorial symbols;
    - Graphic symbols; - verbal symbols.
  - The basic principles of the Gestalt
    - Figure/background;
    - Opening/closing;
    - Proximity;
    - Likeness; - continuity; - color.
  - Basic elements of visual language
    - Conceptual elements;
    - Visual elements;
    - Relational elements; - items practices.
  - Basic principles of visual composition
    - Balance ;
    - Pace;
    - Harmony; - emphasis; - Unit.
  - Composition as a whole
    - Patterns of composition;
    - Lines of force;
    - Strengths;
    - Angular constructions;
    - Golden Rule;
    - The laws of the third and fourth.
- **Communication plan in graphic design:**

- Client-target;
- The objectives of the communication;
- Axis of communication; - communication strategy;
- Strategy of creation.

- **Typography and layout I :**
- **Anatomy and typographical Classification:**
  - **Anatomy of a letter**
    - Wheelbase;
    - Axis;
    - Loop;
    - Body;
    - Loosed ;
    - Connecting point; - height; - the keg.
    - **Basic vocabulary**
    - Basic Terminology; - specific terminology.
    - **Typographical Classification**
    - Vox classification;
    - Fonts Humanes;
    - Garaldes fonts;
    - Reais fonts;
    - Didones fonts;
    - Mécanes fonts;
    - Sans serif fonts;
    - Fonts Incises;
    - - Fonts scripts;
    - Manuaires fonts;
    - Fracture fonts; - Onciales fonts; - fancy fonts.
- **Implementation typographical Page:**
  - **Introduction to the typography**
    - The fonts of characters;
    - Origin of the writing and fonts (first scriptures, appearance of the alphabet, write the Roman capital, write, roman, gothic Writing, Writing Renaissance, etc.).
    - **Evolution of the typography**
    - The families of character (fonts to serif, sans serif font, fonts, script, fonts fantasies;
    - Importance of typography in the design.
  - **Typology and typographical properties**
    - The Capitals;
    - The bold and italics;
    - The condensed and the extended;
    - Size and spacing;

- Line spacing and length of line;
- Character plan and background.

- **The measurement systems**
  - The Anglo-American system;
  - The European system;
  - Page layout typographical.

- **Implementation typographical page**
  - Top and bottom;
  - Relationship Figure/background;
  - Static space and space assets.

➢ **Steps for the Creation:**

- **Steps for the creation: the pre production**
  - Iconographic Script: realization of the pages of trends (types of objects, materials and colors, TARGET, direct competitor and indirect).
- **Steps for the creation: the production**
  - Analysis of the sources of inspiration;
  - Graphical research (sketch);
  - Chromatic research (sketch);
  - The final models (model);
  - Production of the model and prototyping.
- **Steps for the creation: the postproduction**
  - Manufacture in workshop;
  - Commercial strategies;
  - Industrialization.

➢ **Image processing**

- **Working With Adobe Photoshop**
  - Images, colours, copies
  - Improve and transform the images
  - Filters and effects, text
  - Vector drawing in photoshop
  - Saving, exportation and printing
  - RAW camera
  - Photoshop innovations

➢ **Colours**

- Level of gray
- Colour
- True colour
- Indexed colour

➢ **Image reproduction modes**

- Matrix coding
- Vector coding
- Curve fractal

- **Compression and compaction**
- **Formats and standards**
  - Matrix image format
  - Vector image format
  - Web adapt format
- **Logo and Icons Realisation**
  - **Logotype**
    - How to create a logo;
    - Qualities of a logo.
    - Types of Logo.
- **Streaming:**
  - Introduction to streaming
  - Realizing streaming
  - Efficient and adapted methods used in importing web elements
  - Adopted tools
- **Introduction to Sound**
  - Definition of sound
  - Characteristics of sound
  - Digitalization of sound
  - Mono and stereo sound
  - Size of a sound file
  - Sound compression
- **Introduction to Video**
  - Definition of video
  - Analogue video
  - Digital video
  - Compression of digital video (notion on Codec)
- **Streaming:**
  - Introduction to streaming
  - Realizing streaming
  - Efficient and adapted methods used in importing web elements
  - Adopted tools

6. FRE101: BASIC FRENCH LANGUAGE I

Credits: 2, Course State: Required (R)

- **Etude des situations de communication**
  - Identification des facteurs de la situation de communication (émetteur, récepteur, code, canal, message, contexte) ;
  - Situation de communication et interactions verbales ;
  - Etude des éléments para verbaux (kinésique, proxémiques, mimogestuels, etc.) ;

- Identification et manipulation des figures d'expression et de pensée (métaphores, ironie, satire, parodie, etc.).

- **Typologie des textes et recherche documentaire**
  - Lecture des textes de natures diverses (littéraires/non littéraires, image fixe/image mobile, dessin de presse, caricature, etc.);
  - Analyse des textes publicitaires et des discours (scientifiques, politiques, littéraires, etc.) ;
  - Constitution et exploitation d'une documentation et montage des dossiers;
  - Lecture des textes cultivant les valeurs morales et civiques.
- **Communication orale**
  - Réalisation d'un exposé ;
  - Réalisation d'une interview ;
  - Réponse à une interview ;
  - Présentation d'un compte-rendu oral ;
  - Résumé de texte ;
  - Réalisation d'un jeu de rôles ou d'une simulation ;
  - Initiation au leadership et à la dynamique des groupes ;
  - Ecoute et lecture attentive de documents sonores et/ou graphiques ;
  - Lecture méthodique à l'oral.

7. ENG101: BASIC ENGLISH LANGUAGE I

Credits: 2, Course State: Required (R)

- **Vocabulary**
  - Technical and usual vocabulary of the specialty
- **Grammar**
- **Bilingual expression**
  - Understanding in interaction in Technical Discussions
  - Continuous oral communication: Show, explain, develop, summarize, account, comment;
  - Interactions oral communication
  - Haw to introduce oneself
- **Autonomous reading of "writings" of all levels**
  - Lead by a quick reading to understand the general sense;
  - Browse a text long enough to locate desired information;
  - Gather information from different parts of the document or of the different documents in order to accomplish a specific task.
- **Write clear, detailed texts**
  - Essay writing;
  - Application for employment;
  - C.V.
  - Letter of motivation;
  - Lettre / memo writing and minutes of a meeting

8. DIL101: DIGITAL LITERACY

Credits: 4, Course State: Required (R)

- **Computer fundamentals**
  - Hardware
  - Networks and mobile devices
  - Software
  - Operating system
  - File management
  - Security and maintenance
  - Cloud computing
- **Memory Management**
  - Partitioning, paging and segmentation
  - Virtual memory
  - Page Faults
  - Address translation and page fault handling
  - Memory management hardware: page table and Translation
  - Memory management algorithms: fetch policy, replacement policy
- **Input / Output Management and Disk Scheduling**
  - I/O devices
  - Organization of I/O function
  - I/O buffering
  - Disk scheduling, RAID
- **File Management**
  - File systems
    - File systems interface
    - File system structures
  - Organization: files and directories
  - Secondary storage management, file systems: FAT and NTFS
  - File protection & Security
- **Deadlocks**
  - Conditions for deadlocks
  - Deadlock avoidance
  - Deadlock prevention
  - Research on deadlocks
- **Multi processor systems**
  - Multicomputers
  - Virtualization
  - Distributed systems
- **Operating system security**
  - Cryptography
  - Authentication

- Malware etc.

- **Key applications**
  - Apps and applications
  - Using Microsoft word
  - Using Microsoft Excel
  - Database concepts
  - Using Microsoft power point
- **Living online**
  - Looking at the Internet
  - Managing media literacy
  - Digital communication
  - Understanding e – mail
  - Contacts and calendaring
  - Your life online
- **Internet Services**
  - Internet and its services
  - Operation of the Web
  - Addressing of Web documents

FIRST YEAR: SECOND SEMESTER

1. WSD202: JAVASCRIPT

Credits: 6, Course State: Compulsory (C)

2. WSD232: PROGRAMMING I - C

Credits: 6, Course State: Compulsory (C)

- **Factual programming and Human Computer Interface**
  - Concepts on object oriented programming(OOP)
  - Practice of OOP
  - Windows applications, Web application
  - To distribute the application(setup)
  - Introduction to database programming with ADO.NET
- **C Programming**

3. WSD236: PROGRAMMING II - JAVA

Credits: 6, Course State: Compulsory (C)

- **Object oriented programming with Java**
  - Introduction to object oriented programming
  - Objects and class
  - Encapsulation and masking of information
  - Aggregation and decomposition
  - Generalization and specialization
  - Inheritance

- Polymorphism and dynamic links
- Examples of OOP: C++, Java

➢ **Java Programming**

4. WSD240: ENGINEERING MATHEMATICS I

Credits: 6, Course State: Compulsory (C)

➢ **Basic Mathematics**

- Mathematics:
- Functions of a real variable
  - Focus on the aesthetic aspect of the curves;
  - Tangent at a point where the vector derivative is not null;
  - The study of singular points and branches endless is not payable.
- Vector calculation
- Geometric modeling

➢ **Physical:**

- Mechanical
  - Mechanical action;
  - Balance of a solid;
  - Fluid mechanics.
- **Materials**
  - The polymers; and other.
- Behavior of Materials
  - Resistance of Materials;
  - Maintenance of tissues.

➢ **Numerical functions of a real variable:**

- Logarithmic and exponential functions
- Reciprocal circular functions
- Hyperbolic functions and their reciprocals.

➢ **Several real variables functions**

- 1st and 2nd order partial derivative
- Schwarz theorem
- Differential applications
- Composite functions
- Differential forms
- Vector operators

➢ **Analysis I**

- Numerical functions of a real variable:
  - Logarithmic and exponential functions
  - Reciprocal circular functions
  - Hyperbolic functions and their reciprocals.
- Several real variables functions
  - 1st and 2nd order partial derivative

- Schwarz theorem
- Differential applications
- Composite functions
- Differential forms
- Vector operators

- **Taylor series and limits**
- **Integration(simple and multiple)**
- **Differential equations**
  - Linear algebra I:
- **Vector space of finite dimension n ≤ 4**
- **Matrices**

5. WSD242: MAINTENANCE AND OPERATING SYSTEMS

Credits: 6, Course State: Compulsory (C)

- **Operating system I**
  - Overview of computer system and operating system
  - History of operating systems
  - Operating system structure
  - Processes, files, system call, the shell
  - The Kernel
  - Monolithic Kernels
  - Micro-kernels
- Operating system Design Case Studies
  - Linux
  - Windows 7
  - Symbian OS
  - Windows 10
  - Windows 11
  - MAC OS
- **Process Management**
  - Process description and control
  - Process Interrupts
  - Context Swapping
  - Process scheduling:
  - First Come First Served
  - Round Robin Scheduling
  - Shortest Process Next
  - Shortest Remaining Time
  - Threads, Symmetric Multiprocessing
- **Inter-process Communication & Clock Synchronization**
  - Mutual exclusion and critical section
  - Race Conditions

- Semaphores
- IPC Problems

- **Installation and maintenance of hardware and software**
  - Electronic circuits
    - Circuit laws and theorems
    - Introduction to semiconductors
    - Technology of electronic components:
    - Resistors
    - Capacitors
    - Inductors
    - Transformer
    - Diodes
    - Transistors
    - Linear regulated power supply
    - Transformer regulated power supply
    - Transformerless regulated power supply
    - Switch mode power supply
    - Amplifiers
    - Transistor amplifiers
    - Operational amplifiers
- **Computer maintenance**
    - Hardware maintenance
    - Software maintenance
    - Computer assembly
- **Legal regulations**
  - The intervenors
    - General regulations:
    - Copyright and related laws
    - Types of intervenors
    - The supplier
    - The client
    - Adviser
    - Jurist
- **Market research**
    - Market demand
    - Mastery of the market
    - Market trends
    - Market offer
    - Study of the needs
    - Customer prospection techniques
    - Copyright laws on software
- **Standard software**

- **Specific software**
- **Protecting programs and database**

6. CVE102: CIVICS, ETHICS AND LAW

Credits: 4, Course State: Required (R)

- **Civics and Moral education**
  - The citizen
  - The nation
  - The state
  - Public goods – collective goods
  - Freedoms
  - Public services
  - Ethical problems
  - Ethics, rights and privileges
  - Management and ethics of the responsibility
  - Ethics and management
  - Civics
  - Deontology
  - Moral consciousness
  - The universal declaration of Human Rights
  - Good governance in public services
  - The importance of civics to the life of the nation
  - Functions of the state and its citizens
  - Deontology, Professional ethics and professionalism
  - Relationship between morality, law and ethics
  - Codes of ethics
- **Business Law**
- **Civil Law:**
  - Definition, characteristics, branches and sources of law
  - Scope of application of the law
  - Dimensions of law (objective law, Subjective law)
  - Legal organisation
  - The right of a legal personality
  - Marital status, name and address
  - Disabilities
  - Legal acts
  - Legal facts
- **Labour law:**
  - Definition of labour law, birth and evolution of labour law and sources
  - The employment contract (conclusion, implementation and breach)
  - Labour disputes (individual and collective)
  - The staff delegate, Trade Unions

- Labour accidents and occupational diseases
- Health and safety at work

7. IPL102: INTERGRATION TO PROFESSIONAL LIFE

Credits: 4, Course State: Required (R)

- **Enterprise creation**
  - Characteristics of the entrepreneur
  - Opportunity recognition
  - Starting a business
  - Business operation
- **Economics and Enterprise Organization(EEO)**
  - Enterprise and typology of enterprises
    - Definition of an enterprise
    - Analysis mode
    - Enterprise as a production unit
    - Enterprise as a distribution unit
    - Enterprise as a social center
    - Classification of enterprise based on the following economics criteria
      - According to economic activities
      - According to dimension
      - According to judicial criteria
  - Organizational structure of an enterprise
    - Distribution of tasks and power hierarchy
      - Distribution of tasks
      - Organizational structure
      - Departmental structure
      - Site location
      - Practical structure
    - Power hierarchy
      - Functional hierarchy
      - Staff and line hierarchy
    - Coordination and relationships in the enterprise
      - Coordination of tasks in the enterprise
      - Relationships in the enterprise
  - Insertion of the enterprise into the economic web
  - Basic notions on the enterprise environment
  - Inter – enterprise relationship
    - Competing relationship
    - Complementary relationship
  - Relationship between the enterprise and other aspects of the environment.
- **Income earning activities**
  - Commercial policies (the 4p)

- Policy of the products
- Price policy
- Distribution policy
- Communication policy

➢ **Production and processing policies**

- Production policy:
  - Production on command
  - Production in series
  - Continuous production
- Processing policy
  - Studies and research office
  - Methods office
  - Office of scheduling and launching
- Various production methods (influence of technology on production)
  - Mechanization, automation and computer assisted production (CAP)
  - Quality policies (Production control)
    - At the level of production factors
    - At the level of work advancement
    - At the level of quality
  - Work organization and evolution
    - Taylorization
    - Fordism
    - The actual form of a work organization
    - Robotization, enrichment,
- Know how to undertake
  - Steps of the creator
  - Steps of the decision maker
  - Steps of the manager
- Information system and decision system
  - Importance of information and communication to an enterprise
  - Organization of an information system:
- Data bank
- Database
- Communication networks
  - contribution of information as regards information system
  - Decision processing
  - Types of decision
  - Tools that helps in decision-making
- Decision in unquestionable future
- Decision in questionable future
- Capacities and participation in the company
  - Delegation of authority

- **General Economics**
  - Introduction
    - Classification of economic actors
    - Economic operators
    - Relationship between economic agents: economic circuits ;
    - Basic notions on national accounting: aggregates and their circuit; products, revenue, expenses.
  - Consumption
    - Demographic elements
    - The needs, the level of life, way of life.
    - Individual consumption and collective consumption
    - The demands
  - Production
    - Production units, the sectors and branch activities
    - Production factors and their combinations, offers concentration
  - Growth and development
    - Growth
      - Definition and measures
      - Growth factors
      - Growth and notions on neighbors
    - Development
      - Definition
      - Development criteria
- **The payment of the international exchanges**
  - The exchange
  - Formation of exchange rate
  - Tests of international monetary organization and its difficulties.
- **Decentralization of decision making**
- **General Accounting**
  - Heritage
  - Influx at an enterprise and its registration
  - Balance sheet and results
  - law and accounting plan
  - Buying and selling
  - Expenses and products
  - Incidental expenses on buying and selling
  - Packing supplies
  - Transport
  - Classical accounting system
  - Balancing of accounts
  - Cash regulations
  - Terms regulation

- Depreciations
- Provisions

➢ **Projects Management**

- Project Management Overview
- Projects in the business environment
- Projects Definition
- Estimates
- Project Planning
- Project Execution
- Project Monitoring & Control
- Project Quality
- Leadership in Projects
- Projects' success & failure
- Project Closure & Audit
- Conclusions & Presentations

SECOND YEAR: FIRST SEMESTER

1. WSD339: PROGRAMMING III – VB.Net

Credits: 6, Course State: Compulsory (C)

➢ **Structured programming**

- Introduction
- Data types, Variables, Constants, C operators, types conversions in expression, input and output and expression statements.
- Branching and looping, arrays and string, functions, pointers, structures, unions, linked list and file management

➢ **Factual programming**

- Introduction to visual basic and .NET
- Visual studio development environment
- Syntax of VB.NET
  - Form and control elements
  - Control structures
  - Procedures
  - Identification and elimination of errors

2. WSD341: ENGINEERING MATHS II

Credits: 6, Course State: Compulsory (C)

➢ **Probability**

➢ **Combinatory analysis**

- Calculation of probabilities
  - Kolmogorov axioms
  - Conditional and independent probabilities
  - BAYES theorem and axiom on total probability

- **Random variables**
  - Definition
  - Moment of a random variable
  - Joint law and marginal laws of a pair
  - Bienaymé-Tchebychev Inequality
  - Basic laws on large numbers
  - TCL
- **Probability laws**
- **Statistics:**
  - Graphical representation;
  - Central tendency, dispersion,(mean, mode, median, variance, and standard deviation, deciles, interquatile range);
  - Covariance;
  - Correlation coefficients and regression;
  - Least square methods;
  - Estimation of mean and standard deviation;
  - Test of hypothesis
  - Descriptive statistics;
- **Analysis III**
  - Whole series and Fourier series
  - Fourier transform, Laplace transform and Z transform

3. WSD343: DATA STRUCTURES

Credits: 6, Course State: Compulsory (C)

- **Database and SQL**
  - Relational database conception principles
    - Functional dependence
    - Algorithms and normalization
    - Normal forms
    - Integrity constraints (static, dynamic, etc)
  - SQL language
  - Database administration
    - Physical implementation of the data
    - Structure of the file and index
    - Control of concurrent access
    - Breakdown resistance
    - Security and protection of data
    - Parameter setting, start, stop, save, restoration
    - Distributed database, distributed processing
    - Auditing, optimization
- **Advanced data structure I**
  - Function and procedures

- Notion on recursiveness
- Search techniques(sequential, sequential with guard, dichotomy)
- Sorting techniques(insertion, selection, bubbles)
- Practical on one of the programming languages(C, C++)

➢ **Advanced data structure II**

- Files
- Single and double linked list
- Stacks
- Tables
- Practical using one of the programming languages(C, C++)

➢ **Database and human Computer Interface(HCI)**

- Principles on how to create Human Computer Interface
- Factual programming
- Data access methodology(ADO, ODBC, OLE DB, ….)
- Practicals on Visual basic, .NET, ou developer.

4. WSD345: COMPUTER ARCHITECTURE

Credits: 6, Course State: Compulsory (C)

➢ **Internal architecture and operation of a microprocessor**

- Program counter
- Registers
- Instruction registers
- Instruction decode
- Arithmetic and logic unit
- Accumulator
- Flag register
- Bus
- Opcode
- Operand
- Machine cycle
- Polling
- Interrupts

➢ **Computer Memory**

- Types and technological structure
- Memory hierarchy
- Installing memory
- Organizational structure and uses

➢ **Assembly language**

- Assembler
- Editors
- Instruction sets
- Addressing modes

- Control structures
- Sub routines
- Interrupts

➢ **Interfacing techniques**

- Notion on communication
- Conversion of signals (ADC and DAC)
- Parallel interface
- Serial interface

➢ **Technology of peripherals**

- New technologies

5. WSD347: SYSTEMS AND NETWORKS

Credits: 6, Course State: Compulsory (C)

➢ **Computer networks I**

- Transmission problems encountered in a network
- Computer networking basics: hardware and software
  - Transmission of information
    - Media
    - Topology
    - Coding
    - Access techniques
    - subnetting
    - Hardware: MODEMs repeaters, communication controllers
  - Management of communication in a network
    - Synchronization
    - Errors control
    - Flow control
    - Routing
    - Addressing
    - Switching
  - Architecture:
    - Concept of layers
    - Concept of service
    - Protocols
    - OSI model
    - Other standards
    - Services intended for inter operation of the systems
    - Data representation
    - Calls of remote procedures
  - Criteria used to choose a network(characteristics, organization, services offered etc)
    - LAN: Ethernet, Token ring

- Public networks (PSTN etc)
- High data rate networks

6. WSD349: OBJECT ORIENTED MODELLING

Credits: 6, Course State: Compulsory (C)

- **Introduction to object modeling**
  - Basic techniques of modeling computer systems
  - Overview of Prominent Object-oriented Methodologies
  - Introduction to UML (Unified Modeling Language)
  - Overview of the development process
  - Study of the various UML diagrams (structural and behavioral diagrams)
  - Class Diagram (attributes, association, aggregation, composition,
  - generalization, parameterized classes)
  - Use Case diagram.
  - Interaction diagrams (sequence diagram, collaboration diagram).
  - State Diagram and Activity Diagram.
  - Introduction to object-oriented design (inheritance, encapsulation, polymorphism, abstract interfaces, parameterized types).
  - Design patterns in object-oriented design modeling of the source code.
  - Modeling executable versions.
  - Workshop on object oriented software engineering

SECOND YEAR: SECOND SEMESTER

1. WSD340: ENGINEERING MATHEMATICS III

Credits: 6, Course State: Compulsory (C)

- **General Revision in Engineering Mathematics**
  - **Numerical functions of a real variable:**
    - Logarithmic and exponential functions
    - Reciprocal circular functions
    - Hyperbolic functions and their reciprocals.
  - **Several real variables functions**
    - 1st and 2nd order partial derivative
    - Schwarz theorem
    - Differential applications
    - Composite functions
    - Differential forms
    - Vector operators
  - **Analysis I**
    - Numerical functions of a real variable:
      - Logarithmic and exponential functions
      - Reciprocal circular functions
      - Hyperbolic functions and their reciprocals.

- Several real variables functions
  - 1st and 2nd order partial derivative
  - Schwarz theorem
  - Differential applications
  - Composite functions
  - Differential forms
  - Vector operators

- **Taylor series and limits**
- **Integration(simple and multiple)**
- **Differential equations**
  - Linear algebra I
- **Vector space of finite dimension n ≤ 4**
- **Matrices**
- **Probability**
- **Combinatory analysis**
  - Calculation of probabilities
    - Kolmogorov axioms
    - Conditional and independent probabilities
    - BAYES theorem and axiom on total probability
- **Random variables**
    - Definition
    - Moment of a random variable
    - Joint law and marginal laws of a pair
    - Bienaymé-Tchebychev Inequality
    - Basic laws on large numbers
    - TCL
- **Probability laws**
- **Statistics:**
    - Graphical representation;
    - Central tendency, dispersion,(mean, mode, median, variance, and standard deviation, deciles, interquatile range);
    - Covariance;
    - Correlation coefficients and regression;
    - Least square methods;
    - Estimation of mean and standard deviation;
    - Test of hypothesis
    - Descriptive statistics;
- **Analysis III**
    - Whole series and Fourier series
    - Fourier transform, Laplace transform and Z transform

2. WSD342: MOBILE TERMINAL AND APPLICATIONS SECURITY

Credits: 6, Course State: Compulsory (C)

- **Programming of mobile terminals**
  - Generalities
  - Android operating system
  - Some elements on the embarked programming
  - Generalities on the development environment of iOS applications
  - Identify the different types of mobile terminals
  - Web applications for mobile platforms
  - Java scripts
  - Cordova
  - AngularJS
- **Application security**
  - Security requirement
  - Security architecture
  - Secure coding practices
  - Vulnerability assessment
  - Security patch up date

3. WSD344: NETWORK AND SYSTEM ADMINISTRATION

Credits: 6, Course State: Compulsory (C)

- **Computer networks II**
  - Interconnection of networks
  - Specifications of a network
  - Installation and configuration of a network
  - Splitting of a network
  - Networks in industries and enterprises
  - Usage of network applications: messaging, transfer of files etc
  - Services of network administration
  - Surveillance and security of a network
- **Windows server administration fundamentals**
  - Installation of a Window server
  - Identify application servers
  - Understand web services
  - Understand remote access
  - Understand file and print services
  - Understand server virtualization
  - Management of groups infrastructure and policy
  - Storage technologies and scenarios
  - Troubleshooting methods
- **Linux network administration**
  - Linux system
    - History

- Main characteristics
- System architecture
- Tree structure
- Users and group of users
- Connection/disconnection
- Data protection
- Syntax
- Main commands used
- Text editor
- Communication tool

- **System administration commands**

4. WSD380: INTERNSHIP

Credits: 6, Course State: Compulsory (C)

- 8 Weeks Internship
- **Methodology for drafting the report of internship:**
  - The collection of information
  - How to make a report
  - The plan of the probationary report and the Executive Summary
  - The Table of Contents
  - The introduction of the report of internship
  - The conclusion of the Internship report
  - The Acknowledgments
  - How to build the annexs
  - When to start his internship report
  - How to find a subject of Internship report
  - The cover page
  - How to write effectively
  - Form and presentation (coverage, MSDS, summary, bibliography, glossary, index of figures, tables and illustrations)
  - Instructions and typographical rules of presentation (police, spacing, titles, highlighted, punctuation, graphic charter)
  - How to prepare the defense

5. WSD390: ACADEMIC PROJECT

Credits: 12, Course State: Compulsory (C)

- Personal Practical Project (70%)
- Written Project (Project Report) (30%)

HND SOFTWARE ENGINEERING

MAJOR COURSES

FIRST YEAR: FIRST SEMESTER

SN	COURSE CODE	STATE	CREDIT VALUE	COURSE TITLE
01	WSD201	C	6	HTML/CSS
02	WSD203	C	6	Database Management Systems
03	WSD205	C	6	PHP I
04	WSD245	C	6	Introduction to Software Engineering
05	GDP211	C	6	Graphic and Multimedia Design
06	FRE101	R	2	Basic French Language I
07	ENG101	R	2	Basic English Language I
08	DIL101	R	4	Digital Literacy
Total Credits:36				

FIRST YEAR: SECOND SEMESTER

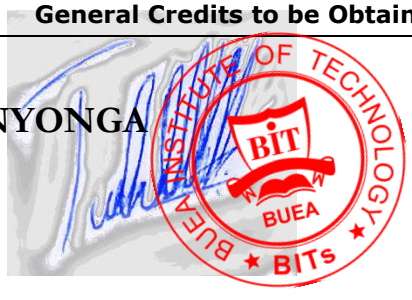
SN	COURSE CODE	STATE	CREDIT VALUE	COURSE TITLE
01	WSD202	C	6	JavaScript
02	WSD232	C	6	Programming I - C
03	WSD236	C	6	Programming II - Java
04	WSD240	C	6	Engineering Mathematics I
05	WSD242	C	6	Maintenance and Operating Systems
06	CVE102	R	4	Civics, Ethics and Law
07	IPL102	R	4	Integration to Professional Life
Total Credits: 38				

SECOND YEAR: FIRST SEMESTER

SN	COURSE CODE	STATE	CREDIT VALUE	COURSE TITLE
01	WSD339	C	6	Programming III - VB.Net
02	WSD341	C	6	Engineering Mathematics II
03	WSD343	C	6	Database Structure
04	WSD345	C	6	Computer Architecture
05	WSD347	C	6	Systems and Networks
06	WSD349	C	6	Object Oriented Modelling
Total Credits: 36				

SECOND YEAR: SECOND SEMESTER

SN	COURSE CODE	STATE	C. VALUE	COURSE TITLE
01	WSD340	C	6	Engineering Mathematics III
02	WSD342	C	6	Mobile Terminals and Applications Security
03	WSD344	C	6	Network and System Administration
04	WSD380	C	6	Internship
05	WSD390	C	12	Academic Project II
Total Credits: 36				
General Credits to be Obtained: 146				



Date: Monday, July 17th 2023

TEGHEN Clovis MONYONGA
Dean of Studies