



THE REPUBLIC OF CAMEROON

MINISTRY OF HIGHER EDUCATION

HND PROGRAM

Field : COMPUTER ENGINEERING

Specialty : COMPUTER ENGINEERING

OPTION : **SOFTWARE ENGINEERING**





Option:

Software Engineering

1. The objective of the training

This specialty trains senior technicians who, with the help of their capability to study the needs of the society, can analyse (MERISE, UML), design and implement computer applications in various fields.

2. Expected skills

→ General skills

- Self-employed, work together as a team;
- Analyse, synthesize a professional document (French, English);
- Oral and written business communication (French, English);
- Participate in /conduct an approach to the management of a project;
- Know and exploit professional and institutional networks in the computer sectors.

→ Specific skills

- Design and develop computer applications;
- implement and ensure the maintenance of computer programs;
- Develop software or systems based on software by following professional standards adequately;
- Put in place and customize distributed applications;
- Diagnose the main faults affecting the computer system and replace defective parts; plan, monitor and control a computer project.

3. Career opportunities

After HND, a student can further His/Her studies in any of these lucrative fields:

- Head of IT project;
- Cyber Security expert;
- Machine Learning Engineer;
- Python Developer
- Java Developer
- Cloud Developer
- Software Consultant;
- Developer of applications;
- System Administrator.

4. Organization of teachings

• FIRST SEMESTER

Field: Computer Engineering		Specialty: Computer Engineering Option: Software Engineering					
Course Code	Course titles	Number of hours					Number Of Credits
		L	T	P	SPW	Total	
Fundamental Courses 30% (2 UC) 9 credits 135 hours							
SWE111	Engineering Maths I	45	25	0	5	75	5
SWE112	Basic environment I	20	10	25	5	60	4
Professional courses 60% (4 UC) 18 credits 270 hours							
SWE113	Digital electronics	30	10	0	5	45	3
SWE114	Introduction to algorithms	40	30	0	5	75	5
SWE115	Introduction to software engineering	70	30	0	5	105	7
SWE116	Multi-media data processing	20	5	20	0	45	3
Transversal Courses 10% (1 UC) 3 credits 45 hours							
SWE117	English and general accounting	30	10	0	5	45	3
Total		225	120	45	30	450	30

• SECOND SEMESTER

Field: Computer Engineering		Specialty: Computer Engineering Option: Software Engineering					
Course Code	Course titles	Number of hours					Number Of Credits
		L	T	P	SPW	Total	
Fundamental Courses 30% (2 UC) 9 credits 135 hours							
SWE121	Engineering maths II	35	20	0	5	60	4
SWE122	Basic environment II	35	20	15	5	75	5
Professional courses 60% (4 UC) 18 credits 270 hours							
SWE123	Architecture	20	10	25	5	60	4
SWE124	Database and MERISE I	40	15	15	5	75	5
SWE125	Programming I	20	15	35	5	75	5
SWE126	Maintenance and legal regulations	25	15	15	5	60	4
Transversal Courses 10% (1 UC) 3 credits 45 hours							
SWE127	Economics and Enterprise Organisation (EEO) and French	30	10	0	5	45	3
Total		205	105	105	35	450	30

• THIRD SEMESTER

Field: Computer Engineering		Specialty: Computer Engineering Option: Software Engineering					
Course Code	Course titles	Number of hours					Number Of Credits
		L	T	P	SPW	Total	
Fundamental Courses 30% (2 UC) 9 credits 135 hours							
SWE231	Engineering Maths III	45	25	0	5	75	5
SWE232	Basic environment III	40	20	0	0	60	4
Professional courses 60% (4 UC) 18 credits 270 hours							
SWE233	OOM UML	40	10	5	5	60	4
SWE234	Data structure and SQL language	40	25	5	5	75	5
SWE235	Programming II	15	15	40	5	75	5
SWE236	Systems and Networks	40	10	5	5	60	4
Transversal Courses 10% (1 UC) 3 credits 45 hours							
SWE237	Enterprise creation and civics and moral education	30	10	0	5	45	3
Total		250	115	55	30	450	30

• FOURTH SEMESTER

Field: Computer Engineering		Specialty: Computer Engineering Option: Software Engineering					
Course Code	Course titles	Number of hours					Number Of Credits
		L	T	P	SPW	Total	
Fundamental Courses 30% (2 UC) 9 credits 135 hours							
SWE241	mobile terminals and application security	25	10	35	5	75	5
SWE242	Project management	30	10	15	5	60	4
Professional courses 60% (4 UC) 18 credits 270 hours							
SWE243	Network and system administration	30	10	15	5	60	4
SWE244	OOP and advanced database	25	5	25	5	60	4
SWE245	Data structure and HCI	30	10	15	5	60	4
SWE246	Internship			60	30	90	6
Transversal Courses 10% (1 UC) 3 credits 45 hours							
SWE247	General economics and Law	30	10	0	5	45	3
Total		170	55	165	60	450	30

SPH: Students' personal work

5. Courses content

❖ SWE 111 : Engineering mathematics I

➤ Analysis I: 3 credits (45 hours); L, T, SPW

6. Numerical functions of a real variable:



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

7. **Several real variables functions**

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

8. **Taylor series and limits**

9. **Integration(simple and multiple)**

10. **Differential equations**

➤ **Linear algebra I: 2 credits (30 hours); L, T, SPW**

1. Vector space of finite dimension $n \leq 4$
2. Matrices

❖ **SWE 112 : Basic environment I**

➤ **Digital literacy: 2 credits (30 hours); L, T, P, SPW,**

1. **Computer fundamentals**

- Hardware
- Networks and mobile devices
- Software
- Operating system
- File management
- Security and maintenance
- Cloud computing

2. **Key applications**

- Apps and applications
- Using Microsoft word
- Using Microsoft Excel
- Database concepts
- Using Microsoft power point

3. **Living online**

- Looking at the Internet
- Managing media literacy
- Digital communication
- Understanding e – mail
- Contacts and calendaring
- Your life online

❖ **SWE 113 : Digital electronics**

➤ **Digital electronics : 3 credits(45 hours); L, T, P, SPW**

1. **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

2. Combinational logic

- Logic gates
- Boolean algebra
- Simplification of Boolean functions
- Applications of combinational logic

3. Sequential logic

- Flip flops
- Counters
- Registers

❖ SWE 114 : Introduction to algorithms

➤ Fundamentals of algorithms: 3 credits (45 hours); L, T

1. Introduction to algorithms
2. Algorithm approaches: greedy, dynamic programming, divide and conquer, branch and bound, introduction to complexity analysis and measures.
3. Algorithms: sorting and searching, merging, tree and graph traversals, shortest path, minimum spanning tree, order statistics, string matching.

❖ SWE 115 : Introduction to software engineering

➤ Introduction to information systems: 5 credits (75 hours); L, T, SPW

1. 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

2. 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

3. 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

➤ **Introduction to software engineering: 2 credits (30 hours); L, T, SPW**

1. Software development life cycle (SDLC)
2. Quality
3. Specifications
4. Ergonomics
5. Tests
6. Management of requirements
7. Control of development
8. Writing of specifications
9. Methods of estimating the cost

❖ **SWE 116 : Multimedia data processing**

➤ **Computer graphics: 3 credits (45 hours); L, T, SPW**

1. 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

2. Sound

- Definition of sound
- Characteristics of sound
- Digitalization of sound
- Mono and stereo sound
- Size of a sound file
- Sound compression

3. Video

- Definition of video
- Analogue video
- Digital video
- Compression of digital video (notion on Codec)

❖ **SWE 117 : English and General Accounting**

➤ **English: 2 credits (30 hours); L, T**

6. Vocabulary

- Technical and usual vocabulary of the specialty

7. Grammar

8. Bilingual expression

- Understanding in interaction in Technical Discussions
- Continuous oral communication: Show, explain, develop, summarize, account, comment;
- Interactions oral communication
- How to introduce oneself

9. 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.

10. Write clear, detailed texts

- Essay writing;
- Application for employment;
- C.V.;
- Letter of motivation;
- Lettre / memo writing and minutes of a meeting

➤ **General Accounting: 1 credit (15 hours); L, T**

1. Heritage
2. Influx at an enterprise and its registration
3. Balance sheet and results
4. Accounting law and accounting plan
5. Buying and selling
6. Expenses and products
7. Incidental expenses on buying and selling
8. Packing supplies
9. Transport
10. Classical accounting system
11. Balancing of accounts
12. Cash regulations
13. Terms regulation
14. Depreciations
15. Provisions

❖ SWE 121 : Engineering mathematics II

➤ **Analysis I : 2 credits (30 hours); L, T, SPW**

1. Numerical functions of a real variable:

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

2. Several real variables functions

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



- Vector operators
- 3. Taylor series and limits**
- 4. Integration (simple and multiple)**
- 5. Differential equations**

➤ **Probability : 2 credits (30 hours); L, T, SPW**

Combinatory analysis

1. Calculation of probabilities

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

2. 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

3. Probability laws

❖ **SWE 122 : Basic environment II**

➤ **Operating system I: 2 credits (30 hours); L, T, P, SPW**

1. Background

- 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

2. 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

3. Inter-process Communication & Clock Synchronization

- Mutual exclusion and critical section
- Race Conditions
- Semaphores
- IPC Problems



➤ **Web programming I: 3 credits(45 hours); L, T, P, SPW**

1. Internet and its services
2. Operation of the Web
3. Addressing of Web documents
4. HTML
5. CSS
6. Java script

❖ **SWE 123 : Architecture**

➤ **Computer architecture: 3 credits (45 hours); L, T, SPW**

1. 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
- etc

2. Computer Memory

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

3. Assembly language

- Assembler
- Editors
- Instruction sets
- Addressing modes
- Control structures
- Sub routines
- Interrupts

4. Interfacing techniques

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

5. Technology of peripherals

6. New technologies

❖ **SWE 124 : Database and MERISE I**

➤ **Introduction to database: 3 credits (45 hours); L, T, P, SPW**

1. Fundamental objectives of a database

- Less redundancy
- Consistency
- ACID Properties
- Multiuser and Concurrent Access
- Multiple views
- Confidentiality/integrity

2. Flashback on data models

- Entity-Relationship Model
- Relational Model

3. Normalization(1NF, 2NF, 3NF)

4. Relational algebra

- Relational Algebra
- Relational Calculus

5. Practicals on MS access and or Mysql

➤ **Information system II(MERISE): 3 credits (45 hours); L, T, SPW**

1. 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

2. From logical to physical level

- Programming, test
- Documentation
- Maintenance

3. 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.

❖ **SWE 125 : Programming I**

➤ **Structured programming: 2 credits (30 hours); L, T, P, SPW,**

1. Introduction

2. Data types, Variables, Constants, C operators, types conversions in expression, input and output and expression statements.



3. Branching and looping, arrays and string, functions, pointers, structures, unions, linked list and file management

➤ **Factual programming: 2 credits (30 hours); L, T, P, SPW**

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

❖ **SWE 126 : Maintenance and legal regulations**

➤ **Installation and maintenance of hardware and software: 2 credits (30hours); L, T, P, SPW**

1. 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

2. Computer maintenance

- Hardware maintenance
- Software maintenance
- Computer assembly

➤ **Legal regulations: 2 credits (30 hours); L, T, P, SPW**

1. The intervenors

- General regulations:
 - Copyright and related laws
- Types of intervenors
 - The supplier
 - The client
 - Adviser
 - Jurist

2. 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

❖ **SWE 127 : Economics and Enterprise Organization(EEO) and French**

➤ **Economics and Enterprise Organization(EEO): 2 credits (30 hours); L, T, P**

1. 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

2. 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

3. 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.



4. 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

Page **76** of **246**

- The actual form of a work organization
- Robotization, enrichment,

5. Know how to undertake

- Steps of the creator
- Steps of the decision maker
- Steps of the manager

6. 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
- Decentralization of decision making

➤ **French: 1 credit (15 hour); L, T**

1. 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.).

2. Typologie des textes et recherche documentaire

- Lecture des textes de natures diverses (littéraires/non littéraires, image fixe/image mobile, dessin de presse, caricature, etc.) ;

Page **77** of **246**

- 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.

3. 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.

❖ **SWE 231 :
Engineering
Mathematics III**

➤ **Statistics: 2 credits (30 hours); L, T, SPW**

1. Graphical representation;
2. Central tendency, dispersion, (mean, mode, median, variance, and standard deviation, deciles, interquartile range);
3. Covariance;
4. Correlation coefficients and regression;
5. Least square methods;
6. Estimation of mean and standard deviation;
7. Test of hypothesis
8. Descriptive statistics;

➤ **Analysis III: 2 credits (30 hours); L, T, SPW**

1. Whole series and Fourier series



2. Fourier transform, Laplace transform and Z transform

Page 78 of 246

❖ **SWE 232 : Basic environment III**

➤ **Operating system II: 2 credits (30 hours); L, T, P, SPW**

1. 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

2. Input / Output Management and Disk Scheduling

- I/O devices
- Organization of I/O function
- I/O buffering
- Disk scheduling, RAID

3. 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

4. Deadlocks

- Conditions for deadlocks
- Deadlock avoidance
- Deadlock prevention
- Research on deadlocks

5. Multi processor systems

- Multicomputers
- Virtualization
- Distributed systems

6. Operating system security

- Cryptography
- Authentication
- Malware etc.

7. Operating system designs

- Case studies
 - Linux
 - Windows Vista
 - Symbian OS

➤ **Web programming II: 2 credits(30 hours); L, T, P, SPW,**

1. Define Web
2. Installation and configuration of a Web server(wamp server/Easy PHP)
3. Notions on intranet, Internet and extranet



4. Presentation of web development tools
5. Apache projects
6. Basic concepts on Mysql
7. PHP language

❖ **SWE 233 : OOM UML**

- **Introduction to object modeling: 4 credits (60 hours); L, T, P, SPW**
1. Basic techniques of modeling computer systems
 2. Overview of Prominent Object-oriented Methodologies
 3. Introduction to UML (Unified Modeling Language)
 4. Overview of the development process
 5. Study of the various UML diagrams (structural and behavioral diagrams)
 6. Class Diagram (attributes, association, aggregation, composition, generalization, parameterized classes)
 7. Use Case diagram.
 8. Interaction diagrams (sequence diagram, collaboration diagram).
 9. State Diagram and Activity Diagram.
 10. Introduction to object-oriented design (inheritance, encapsulation, polymorphism, abstract interfaces, parameterized types).
 11. Design patterns in object-oriented design modeling of the source code. Modeling executable versions.
 12. Workshop on object oriented software engineering

❖ **SWE 233 : Data structure and SQL language**

- **Database and SQL: 2 credits (30 hours); L, T, P, SPW**
- 1. Relational database conception principles**
 - Functional dependence
 - Algorithms and normalization
 - Normal forms
 - Integrity constraints (static, dynamic, etc)
 - 2. SQL language**
 - 3. 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: 3 credits (45 hours); L, T, P, SPW**
1. Function and procedures
 2. Notion on recursiveness
 3. Search techniques(sequential, sequential with guard, dichotomy)
 4. Sorting techniques(insertion, selection, bubbles)
 5. Practical on one of the programming languages(C, C++)



❖ **SWE 234 : Programming II**

➤ **Factual programming and Human Computer Interface : 3 credits (45 hours); L, T, P, SPW**

1. Concepts on object oriented programming(OOP)
2. Practice of OOP
3. Windows applications, Web application
4. To distribute the application(setup)
5. Introduction to database programming with ADO.NET

❖ **SWE 236 : Systems and Networks**

➤ **Computer networks I: 5 credits (75 hours); L, T, P, SPW**

1. Transmission problems encountered in a network

2. 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

❖ SWE 237 : Enterprise creation and Civics & Moral Education**➤ Enterprise creation: 2 credits(30 hours); L, T, SPW**

1. Characteristics of the entrepreneur
2. Opportunity recognition
3. Starting a business
4. Business operation

➤ Civics and Moral education: 1 credit(15 hours); L, T, SPW

1. The citizen
2. The nation
3. The state
4. Public goods – collective goods
5. Freedoms
6. Public services
7. Ethical problems
8. Ethics, rights and privileges
9. Management and ethics of the responsibility
10. Ethics and management

❖ SWE 241: Mobile terminals and application security**➤ Programming of mobile terminals: 2 credits (30 hours); L, T, P, SPW**

1. Generalities
2. Android operating system
3. Some elements on the embarked programming
4. Generalities on the development environment of iOS applications
5. Identify the different types of mobile terminals
6. Web applications for mobile platforms
7. Java scripts
8. Cordova
9. AngularJS

➤ Application security: 2 credits (30 hours); L, T, P, SPW

1. Security requirement
2. Security architecture
3. Secure coding practices
4. Vulnerability assessment
5. Security patch up date

❖ SWE 242: Project management**➤ Management of computer projects: 4 credits (60 hours); L, T, SPW**

1. Project Management Overview
2. Projects in the business environment
3. Projects Definition
4. Estimates
5. Project Planning
6. Project Execution
7. Project Monitoring & Control
8. Project Quality



9. Leadership in Projects
10. Projects' success & failure
11. Project Closure & Audit
12. Conclusions & Presentations

❖ **SWE 243: Network and system administration**

➤ **Computer networks II: 3 credits (45 hours); L, T, P, SPW**

1. Interconnection of networks
2. Specifications of a network
3. Installation and configuration of a network
4. Splitting of a network
5. Networks in industries and enterprises
6. Usage of network applications: messaging, transfer of files etc
7. Services of network administration
8. Surveillance and security of a network

➤ **Windows server administration fundamentals:**

1. Installation of a Window server
2. Identify application servers
3. Understand web services
4. Understand remote access
5. Understand file and print services
6. Understand server virtualization
7. Management of groups infrastructure and policy
8. Storage technologies and scenarios
9. Troubleshooting methods

➤ **Linux network administration: 1 credit (15 hours); L, T, P, SPW**

3. 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

4. System administration commands

❖ **SWE 244: OOP and Advanced database**

➤ **Object oriented programming: 2 credits (30 hours); L, T, P, SPW**

1. Introduction to object oriented programming
2. Objects and class
3. Encapsulation and masking of information
4. Aggregation and decomposition



5. Generalization and specialization
6. Inheritance
7. Polymorphism and dynamic links
8. Examples of OOP: C++, Java

➤ **Database administration: 2 credits (30 hours); L, T, P, SPW**

1. Introduction

2. Presentation of Mysql

Page 85 of 246

3. Mysql architecture

4. Mysql server

5. Configuration of Mysql server

- Running and Shutting down MySQL Server
- Setting Up a MySQL User Account
- Administrative MySQL Command

6. Mysql client

- Presentation of client administration
- Mysql customer program calls
- Usage of mysql client
- Mysql client administration

7. Presentation of data types

8. Metadata

9. Storage engine

10. Partitioning

- Presentation and advantages of partitioning
- Creating a partition table
- Collecting information on partition
- Modification and suppression of partition

11. Mysql transactions

12. 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

13. Maintenance of tables

14. Exporting and importing data

❖ **SWE 245: Data structure and Human Computer Interface(HCI)**

➤ **Advanced data structure II: 2 credits (30 hours); L, T, P, SPW**

1. Files
2. Single and double linked list
3. Stacks
4. Tables
5. Practical using one of the programming languages(C, C++)



➤ **Database and human Computer Interface(HCI): 2 credits (30 hours); L, T, P,SPW**

1. Principles on how to create Human Computer Interface
2. Factual programming
3. Data access methodology(ADO, ODBC, OLE DB,)
4. Practicals on Visual basic, .NET.

❖ **SWE 246: Internship**

➤ **Internship : 6 credits (90 hours) ; L, T, P**

Objective:

A comprehensive internship program in which the student spends full four to six weeks in approved engineering establishments (private and public) and industries. The exposure also provide opportunity for students to sharpen their technical writing skills through field reports, keeping log-book and preparation of technical documents under close supervision of professionals and lecturers. During this period the student uses tools and procedures put in place by the enterprise to carry out activities or solve a problem individually or as part of a team. The student is expected to write an academic report of scientific nature. The report should reflect the technological applications in the enterprise, the professional skills acquired and suggestions/proposals for improvement of the activities of the company.

Course Content :

- How to write an industrial attachment report
- How must it be presented?
 - Presentation of enterprise and its functioning
 - Structure of industrial achievement report (industrial training activities, technological applications in the enterprise, professional skills acquired during industrial attachment, identification of technological problems affecting the productivity of the enterprise, proposed solutions, suggestions if any, references, appendices)
 - Report writing format (page setup, character format etc)
 - Defense

❖ **SWE 247 : General Economics and Law**

➤ **General Economics: 3 credits (45 hours); L, T, SPW**

1. 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.

2. **Consumption**

- Demographic elements
- The needs, the level of life, way of life.
- Individual consumption and collective consumption
- The demands

3. **Production**

- Production units, the sectors and branch activities
- Production factors and their combinations, offers
- concentration

4. **Growth and development**

- Growth
 - Definition and measures
 - Growth factors
 - Growth and notions on neighbors
- Development
 - Definition
 - Development criteria

5. **The payment of the international exchanges**

- The exchange
- Formation of exchange rate
- Tests of international monetary organization and its difficulties.

➤ **LAW : 1 credit (15 hours)**

Business Law

Labour Law