BUSINESS STUDIES PROGRAMMES

CURRICULUM CHART FOR

ADVANCED CERTIFICATE IN COMPUTER STUDIES

CHART NO. 154B

PRODUCED BY:
CURRICULUM DEVELOPMENT AND ADVISORY SERVICES
DEVELOPMENT DIVISION
TEVETA

Table of Contents

ACKNOWLEDGEMENTS

This chart was developed by the Curriculum Development Unit under the Training Standards Division. The Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) values the work of the Information Technology and Computer Programmes Curriculum Development Team which produced the initial Curriculum comprising the following people:-,

Mr. Yusuf Dodia	Action Computers
Mrs. Elizabeth Nyambe	Massi Computing College
Mr. Milner Makuni	Real-Time Technologies & Computer Society of Zambia
Mr. Martin Kasonso	Northern Technical College
Mr. Libimba Libimba	Evelyn Hone College of Applied Arts and Commerce
Mr. Simon Lozani	Zambia Insurance Business College
Dr. James Mbale	University of Zambia
Mr. Cabina Chituta	TEVETA
Mr. Gabriel S. Konayuma	TEVETA

REVISION

This chart was reviewed through the efforts of the following people:-

Mr. Rabbison M Chongo	IT Head of Section – Evelyn Hone College
Mr. Kipher Nanjame	IT Lecturer - ZIBSIP
Mr. Twandi Mpazi	IT Lecturer – NIEC School
Mr. Gabriel S. Konayuma	Ministry of Science & Technology
Mr. Garry Mukelabai	IT Manager – Communications Authority
Mr. James Banda	Senior Examinations Specialist – ECZ
Mr. Anthony Mwange	Principal Engineer, IT - ZESCO
Mr Milner Makuni	Past President – Computer Society of Zambia
Mr. Simon H. Chiwamba	IT Officer – TEVETA
Ms. Christine Musonda	TEVETA
Mrs. Catherine Kanyensha	TEVETA
Ms. Hazel Njoloma	TEVETA

The validation team comprised the following people:-

Mr. Martin Kasonso	H.O.D, Applied Sciences and Business Studies – NORTEC
Mr. Jim Mwazembe	Lecturer – Copperbelt University

Mr Milner Makuni	Past President – Computer Society of Zambia
Mr Julius Jere	Manager, Information Systems – Bank of Zambia
Mr Fredrick Mwamba	CI-AE/AV – Zambia Air Services Training Institute
Mr James Maseka	Deputy Director, IT – Zambia Air Force
Mr Patrice Miselo	H.O.D, IT – Australian Institute of Business and Technology
Mr Rabbison M. Chongo	H.O.S, Computer Studies – Evelyn Hone College
Mr Martin Mumba	College Commander – Army Technical College
Ms. Ellen Nali	Sales & Marketing Consultant – RPC Data (Z) Limited
Mr Collins C. Chinyama	Director, ICT – University of Zambia
Ms. Patricia Munkondya	Instructor, ICT – Zambia Air Services Training Institute
Mr Jerry E Chishala	A/Principal Examinations Specialist – Examinations Council of Zambia
Mr Simon H. Chiwamba	IT Officer – TEVETA
Mrs. Catherine Kanyensha	TEVETA

TEVETA also wishes to extend acknowledgement to the secretary who typed both the Chart and the Syllabus for this curriculum, Mrs. Annette M.M. Mwamulima

1.0 RATIONALE

With the critical shortage of qualified Information Technology personnel in Zambia, a need to produce locally trained computer graduates at various levels of training was established. Previously, only Diploma graduates were trained from the TEVET sector. These had with lower qualifications, and also some people would not manage to wait for three years before obtaining any qualification. Hence, the Diploma programme was reviewed in order to develop this course at Advanced Certificate level.

The Diploma has been restructured to have three levels of qualifications to be obtained at the end of each year of training. These are Certificate, Advanced Certificate and Diploma levels. This staggered certification is to award a qualification to trainees who successfully complete the first or second years of training but are unable for one reason or other to complete the entire programme. Some trainees who get certification at lower levels may be employed, thus contributing to the development of the nation.

The approach to learning modules is a logical sequence, developing from basic computer principles to the complex computer operations. The content is structured into a competency-based format to address the issues of comparable standards worldwide and to be a precise guide for those who would ultimately develop the trainee resource materials.

2.0 PROGRAMME PURPOSE

The programme is designed to equip students with necessary skills to design, program, operate, support and use computer systems to satisfy industry requirements.

3.0 PROGRAMME AIMS

This course is designed to provide students with knowledge and skills in:

3.1 Communication Skills

3.2 Principles of Information Technology

3.3 Office Productivity Software

3.4 Programming

3.5 Computer Architecture

3.6 Mathematics and Statistics

3.7 Foundations of Management

4.0 PROGRAMME OBJECTIVES

On completion of the course, the student will be able to:

4.1 Develop application programs

4.2 Install, use, maintain and support

4.2.1 An operating system

4.2.2 Local Area Network (LAN)

4.2.3 Application Programs and System programs

4.2.4 Office Productivity Software

4.3 Use a designated relational database management system

4.4 Use Websites and intranets

4.5 Apply accounting and entrepreneurial skills

5.0 COURSE OUTLINE

154B-01-B	PROGRAMMING	300
154B-02-B	QUANTITATIVE ANALYSIS	180
154B-03-B	SYSTEMS ANALYSIS AND DESIGN	180
154B-04-B	OPERATING SYSTEMS	220
154B-05-B	DATABASE TECHNOLOGY	250
154B-06-B	ACCOUNTING	140
154B-07-B	ENTREPRENEURSHIP	100
	TOTAL:	**1370**

6.0 ENTRY REQUIREMENTS

6.1 Direct Entry

6.1.1 Grade 12 School Certificate or equivalent with credits in English Language, Mathematics and in three other subjects. A pass in 'O' Level Computer Studies will be considered as an added advantage.

6.1.2 Certificate in Computer Studies.

7.0 PROGRAMME EVALUATION

7.1 FORMATIVE EVALUATION

Purpose:

To determine on an on-going basis whether the programme is being implemented as planned and to advise on improvement.

7.1.1 Major areas of Evaluation

Course aims and objectives, student's entry requirements, course content, teaching/learning activities, learning resources.

7.1.2 Evaluation Instruments

Questionnaires, structured interviews, observations, checklist, examination and test records.

7.1.3 Sources of Information

Trainees, trainers, administrators, student drop out and mentors.

7.2 SUMMATIVE EVALUATION

7.2.1 Major areas of evaluation

Course aims, student's entry requirements, course content, learning resources, teaching/learning activities, trainers and graduates performance in employment.

7.2.2 Evaluation Instruments

Questionnaires, structured interviews, observations, checklist, records, committees.

7.2.3 Sources of Information

Students, trainers, administrators, student drop outs, employers, union officials and the general public.

8.0 ASSESSMENT

The course shall be assessed as follows:

Final Examination	60%
Continuous Assessment	40%
TOTAL	**100%**

9.0 MINIMUM PASS LEVEL

The minimum pass level shall be as per ECZ requirements for each subject i.e. **50%** pass level for the entire programme.

10.0 REFERRALS AND FAILURES

Students who fail in 4 modules or more at the end of the course shall be considered an outright fail and shall not be allowed to re-sit for examinations.

However, those failing in up to 3 modules will be given two chances to re-sit after which they will be excluded.

11.0 ATTENDANCE

The candidate must have an attendance of not less than 85% to be eligible for the final examination.

12.0 STAFFING

Lecturers/Trainers shall have a minimum qualification of a Degree in a relevant field from a recognized institution.

13.0 COURSE DURATION

I year with a minimum of 1370 contact hours

14.0 DELIVERY METHODS

Combination of lectures, practicals, assignments, tutorials and demonstrations/ laboratory work.

15.0 CERTIFICATION

The Examinations Council of Zambia shall award an Advanced Certificate in Computer Studies to candidates successfully completing the course.

MODULE 154-01-B PROGRAMMING

Module Description/Purpose:

To equip students with programming skills using advanced data structures

Objectives: At the end of the module, the trainee will be able to:

1. Write code in any of the following programming languages C/C++ or Visual Basic
2. Write code to represent data structures
3. Represent linked lists using constructs in that language
4. Write code to represent recursive procedures using constructs in that language
5. Apply search technologies
6. Sort files
7. Apply file retrieval techniques
8. Assess Algorithm efficiency

Unit 1.1 Writing code in Programming Language C/C++ or VB

- 1.1.1 Specific language such as C/C++, Java or Visual Basic
- 1.1.2 Program structure
- 1.1.3 Control structures
- 1.1.4 Basic data structures
- 1.1.5 Input/output
- 1.1.6 Files

Unit 1.2 Writing code to represent Data Structures

- 1.2.1 Static and dynamic structures
- 1.2.2 Stacks
- 1.2.3 Queues
- 1.2.4 Implementation

Unit 1.3 Representing Linked Lists

- 1.3.1 Dynamic memory allocation and pointers
- 1.3.2 Linked stacks and queues
- 1.3.3 Declarations and processing a linked stack (pop and push operations)
- 1.3.4 Implementation

Unit 1.4 Writing code to represent Recursion

- 1.4.1 Recursive definition and processes
- 1.4.2 Efficiency of recursion
- 1.4.3 Implementation

Unit 1.5 Applying Search technologies

- 1.5.1 Background and definitions
- 1.5.2 Basic search techniques
- 1.5.3 Implementation

Unit 1.6 Sorting

- 1.6.1 Bubble sort
- 1.6.2 Selection sorting
- 1.6.3 Insertion sort

MODULE 154-02-B QUANTITATIVE ANALYSIS

Module Description/Purpose: To equip trainees with skills knowledge and attitudes in applying the basic methods of numerical analysis used in the business environment, and quantitative analysis in the decision making process in an organisation.

Objectives: At the end of the module, the trainee will be able to:

1. Carry out numerical analysis
2. Apply principles of integration within the context of management information systems, in a modern organisation.
3. Differentiate probability models and deterministic models
4. Apply elements of model construction
5. Carry out inventory control
6. Apply the principles of queuing models
7. Carry out operational research
8. Perform linear programming
9. Perform a network analysis
10. Apply the basics of discrete mathematics.
11. Solve transport and assignment problems

Unit 2.1 Numerical Analysis

2.1.1 Recurrence relationship

Unit 2.2 Integration

2.2.1 Integral calculus
2.2.2 Approximation techniques

Unit 2.3 Probabilistic Models versus Deterministic Models

2.3.1 The scientific method

Unit 2.4 Elements of model construction

2.4.1 Model construction

Unit 2.5 Inventory Control

2.5.1 Inventory control
2.5.2 Inventory production

Unit 2.6 Queuing Models

2.6.1 Queuing models
2.6.2 Queuing model components

Unit 2.7 Operational Research

2.7.1 Essential features
2.7.2 Stages in a study

Unit 2.8 Linear Programming

2.8.1 Linear programming
2.8.2 Simplex method

Unit 2.9 Network Analysis

2.9.1 PERT, PERT/cost

Unit 2.10 Discrete Mathematics

2.10.1 Fundamentals of logic
2.10.2 Set theory
2.10.3 Relations and function
2.10.4 Recurrence relations

Unit 2.11 Transport and Assignment Problems

2.11.1 The transportation problem
2.11.2 The assignment problem

MODULE 154-03-B SYSTEMS ANALYSIS AND DESIGN

Module Description/Purpose: To equip students with knowledge, skills and attitudes in carrying out systems analysis and design development.

Objectives: At the end of the module, the trainee will be able to:

1. Explain system development and the system development life cycle
2 Outline the process of project initiation
3 Determine the requirements of a new system
4 Apply appropriate analytical techniques.
5 Analyse systems proposals
6 Use standards, controls and documentation

Unit 3.1 Explaining Information Systems Development

3.1.1 Business systems theory
3.1.2 Nature and development of business information systems
3.1.3 Role of the systems analyst
3.1.4 The systems development life cycle

Unit 3.2 Process of Project Initiation

3.2.1 Project definition
3.2.2 Sources of project request
3.2.3 Key players in projects management
3.2.4 Initial project investigation

Unit 3.3 Systems requirements determination

3.3.1 Outline the requirements of a new system
3.3.2 Method of determining requirements

Unit 3.4 Requirement Analysis techniques

3.4.1 Data Flow Diagrams
3.4.2 Data dictionary
3.4.3 Decision tables
3.4.4 Decision trees
3.4.5 Structured English

Unit 3.5 Analysing Systems Proposals

3.5.1 Analysing systems data input
3.5.2 Analysing processing requirements
3.5.3 Analysing outputs
3.5.4 Analysing costs and benefits
3.5.5 Writing the systems proposal

Unit 3.6 Standards, Controls and Documentation

3.6.1 Need for standards
3.6.2 Need for controls
3.6.3 Importance of documentation
3.6.4 Types of documents

MODULE 154-04-B OPERATING SYSTEMS

Module Description/Purpose:
To equip students with knowledge, skills and attitudes to enable them install, use, administer and maintain operating systems

Objectives: At the end of the module, the trainee will be able to:

1. Outline the fundamental concepts, the structure and operation of different operating systems
2. Describe the concurrent process
3. Apply scheduling skills
4. Carry out memory management
5. Apply the principles of protection
6. Identify operating systems
7. Carry out systems administration

Unit 4.1 Operating System Fundamental Concepts
- 4.1.1 Evolution of operating systems
- 4.1.2 Definition of an operating system
- 4.1.3 Types of operating systems
- 4.1.4 Operating system characteristics

Unit 4.2 Concurrent Process
- 4.2.1 Processes
- 4.2.2 Inter process communication concepts

Unit 4.3 Scheduling
- 4.3.1 Scheduling Algorithms
- 4.3.2 Deadlocks

Unit 4.4 Memory Management
- 4.4.1 Memory
- 4.4.2 Virtual memory

Unit 4.5 Protection
- 4.5.1 Protection concept
- 4.5.2 Dynamic protection structures

Unit 4.6 Identifying Operating Systems
- 4.6.1 Disk operating system (DOS)
- 4.6.2 Unix/Linux
- 4.6.3 Window operating system
- 4.6.4 Comparisons of various operating systems

Unit 4.7 System Administration
- 4.7.1 Operating System Installation
- 4.7.2 Operating System Configuration
- 4.7.3 Maintain the operating system

MODULE 154-05-B DATABASE TECHNOLOGY

Module Description/Purpose:
To equip trainees with knowledge, skills and attitudes to enable them plan, design, implement and install databases.

Objective: At the end of this module, the trainee will be able to:

1. Design databases
2. Use a relational data language
3. Use system implementation techniques
4. Describe current trends in Database systems

Unit 5.1 Database Design Techniques

5.1.1 Data models
5.1.2 Entity relationship modelling
5.1.3 Data normalisation and decomposition

Unit 5.2 Relational Data Language

5.2.1 The relational data model and relational algebra
5.2.2 SQL-a relational database language
5.2.3 The relational calculus-a formal query language
5.2.4 Query optimisation

Unit 5.3 System Implementation Techniques

5.3.1 The system catalogue
5.3.2 Transactions, recovery and concurrency control
5.3.3 Security and integrity constraints

Unit 5.4 Current Trends in Database System

5.4.1 Distributed database
5.4.2 Emerging database technologies and applications

MODULE 154-06-B ACCOUNTING

Module Description/Purpose: To enable students apply the fundamental accounting concepts.

Objectives: At the end of the module, the trainee will be able to:

1. Appy fundamental concepts of bookkeeping
2. Maintain all books of prime entry
3. Apply cash and bank accounting concepts
4. Apply the principles of management accounting
5. Cost and manage materials, labour and overheads
7 Apply budgeting techniques
8 Carryout marginal costing, standard costing and variance analysis

Unit 6.1 Book Keeping Fundamental Concepts

6.1.1 Nature and purpose of accounting
6.1.2 Accounting equation
6.1.3 Double entry system
6.1.4 Posting transactions
6.1.5 Accruals, prepayments and adjustments
6.1.6 Balancing of accounts
6.1.7 Trial balance
6.1.8 Trading, profit and loss account
6.1.9 Balance sheet

Unit 6.2 Books of Prime Entry

6.2.1 Sales day book
6.2.2 Purchase day book
6.2.3 Returns day book
6.2.4 The cash book
6.2.5 The journal
6.2.6 The Ledger
6.2.7 Columnar day books

Unit 6.3 Cash and Bank Accounting

6.3.1 Bank reconciliation statement
6.3.2 Petty cash
6.3.3 Bills of exchange/letter of credit

Unit 6.4 Audit and Mechanised Systems

6.4.1 Application of audit principles and practices to EDP systems
6.4.2 Special audit techniques applied to computer audits

Unit 6.5 Management Accounting

6.5.1 Purpose and general principles
6.5.2 Units and elements of cost
6.5.3 Key classifications, concepts and terminology
6.5.4 Distinction between management and financial accounting

Unit 6.6 Materials

6.6.1 Purchasing and stock control systems
6.6.2 Pricing of stores issues
6.6.3 Stock valuation methods

Unit 6.7 Labour

6.7.1 Remuneration
6.7.2 Time wages
6.7.3 Incentive schemes and piece work
6.7.4 Premium bonus plans
6.7.5 Double entry system for payroll accounting

Unit 6.8 Overheads

6.8.1 Cost centre and cost units
6.8.2 Allocation, apportionment and absorption
6.8.3 Overhead absorption rates
6.8.4 Cost ascertainment of factory services, administration, selling and distribution expense

Unit 6.9 Fundamentals of Costing Methods

6.9.1 Job/batch/contract costing
6.9.2 Process costing
6.9.3 Work-in-progress evaluation
6.9.4 Joint costs/by-products/process/uses

Unit 6.10 Budget Setting and Budgetary Control

6.10.1 Management processing process
6.10.2 The budget
6.10.3 Budget system
6.10.4 Budget committee
6.10.5 Budget process
6.10.6 Budget variances

Unit 6.11 Marginal Costing

6.11.1 Cost behaviour –fixed and variable costs
6.11.2 Marginal costing principles
6.11.3 Contribution and P/V ratio
6.11.4 Cost-volume-profit analysis
6.11.5 Comparison with absorption costing
6.11.6 Relevant costs for decision making

Unit 6.12 Standard Costing and Variance Analysis

6.12.1 Basic principles
6.12.2 Preparation of standard costs
6.12.3 Calculation of materials, labour and variances and causes of variances

MODULE 154B-07-B ENTREPRENEURSHIP

Nominal Duration: 100 HOURS 10 CREDITS

Module Description/Purpose: The aim of the module is to create awareness of the importance of entrepreneurship and its relevance to career growth by building entrepreneurial competences, attitudinal change that will lead to self motivation and generation of business ideas.

OBJECTIVES: At the end of the Module, trainees will be able to:

1. Apply entrepreneurial concepts in computer and information technology work
2. Develop Entrepreneurial Competences and Attitudes
3. Apply enterprise management skills
4. Identify information technology business opportunities
5. Establish a computer and information technology business entity
6. Sustain a computer and information technology enterprise

UNIT A7.1 Applying entrepreneurial concepts

7.1.1 Concepts of Entrepreneurship

7.1.2 Economic trends in the computer and information technology industry in Zambia

7.1.3 Government policy on computer and information technology enterprise development

UNIT A7.2 Developing Entrepreneurial Competences and Attitudes

7.2.1 Developing self-motivation

7.2.2 Developing business opportunities

7.2.3 Networking for enterprise development

7.2.4 Effective business communication

7.2.5 Customer service

UNITA7.3 Applying enterprise management skills

7.3.1 Managerial and leadership skills in an enterprise

7.3.2 Marketing

7.3.3 Cost and price per product / service

7.3.4 Management of finances

7.3.5 Business records

7.3.6 Enterprise and technology

7.3.7 Business ethics and values in managing an enterprise

UNIT 7.4 Identifying Information Technology Business Opportunities

7.4.1 Scanning a local Business environment

7.4.2 Business centre

7.4.3 Network building and support

7.4.4 Vending in Computer spares and consumables

7.4.5 Outsourcing Information Technology services and products

7.4.6 Managing information systems

UNIT A7.5 Establishing a computer and information technology enterprise

7.5.1 Types of businesses

7.5.2 Business Plan / project

7.5.3 Procurement management

7.5.4 Law and taxation

7.5.5 Procedures for formalising an enterprise

7.5.6 Contracting (quotations and tendering)

UNIT A7.6 Sustaining an enterprise

7.6.1 Appraise one's enterprise

7.6.2 Manage survival and growth

7.6.3 Project