GCE ORDINARY LEVEL · COMPUTER SCIENCE (0595)

O-Level Computer Science Syllabus

A unified, non-overlapping 5-module curriculum arranged chronologically from foundational concepts to exam-level mastery, structured into Modules, Chapters, and Lessons.

SOURCE: MINESEC NATIONAL HARMONISED PROGRESSION SHEETS (FORMS 3, 4 & 5) · ORIGIN TAGS SHOW CHRONOLOGICAL PROGRESSION (F3 → F4 → F5)

258

5
SELF-CONTAINED MODULES

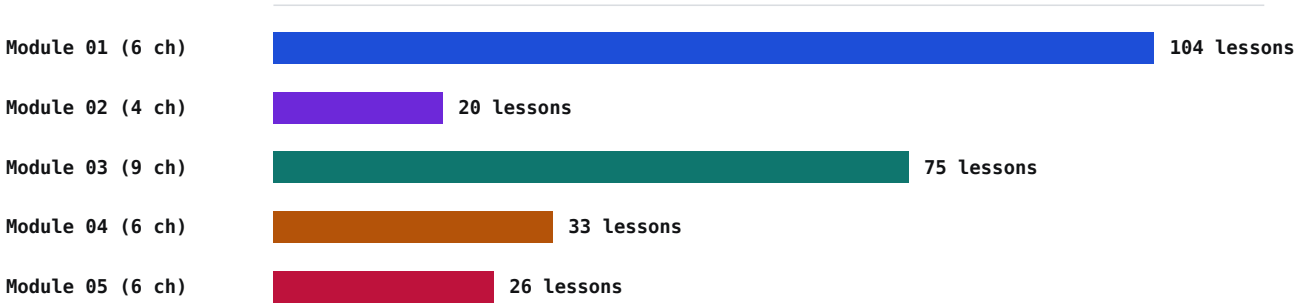
31
CHAPTERS

0
CROSS-MODULE SPLITS

Every topic lives inside a single self-contained module with zero duplication or splitting across class levels, while lessons inside each chapter progress chronologically from Form 3 through Form 5.

CURRICULUM BREAKDOWN

Lessons by Thematic Module



Module 01 — Hardware, Software & Digital Content Systems (6 Chapters · 104 Lessons)

Module 02 — Data Manipulation & Digital Logic (4 Chapters · 20 Lessons)

Module 03 — Problem Solving, Algorithms, Programming & Information Systems (9 Chapters · 75 Lessons)

Module 04 — Network Systems, Internet & Cybersecurity (6 Chapters · 33 Lessons)

MODULE 01 · 6 CHAPTERS · 104 LESSONS

Hardware, Software & Digital Content Systems

All hardware architecture, peripherals, storage, IoT/cloud, AI & emerging technologies, software acquisition, productivity suites, multimedia authoring, maintenance, ergonomics, and assistive technology—consolidated into one complete module in chronological progression.

CHAPTER 1.1 · 15 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Artificial Intelligence, Robotics, VR/AR & Prompting

Competency: Describe AI, robotics, control systems, VR/AR, and write effective prompts.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.1.1 F3 · L1	**Introduction to Artificial Intelligence**	Define AI; explain its history and evolution; identify and categorise types of AI in the real world.
1.1.2 F3 · L2	**Applications of Artificial Intelligence in Society**	Identify everyday AI uses (medicine, business, agriculture); state advantages of integrating AI.
1.1.3 F3 · L3	**Societal Impact and Challenges of Applied AI**	Describe how AI processes real-world inputs; compare AI-driven vs. human-led processes; explain ethical challenges (privacy, bias, job displacement).
1.1.4 F3 · L4	**Using Appropriate Prompts to Generate AI Responses**	Examine and discuss prompt results; write appropriate prompts to solve problems within a given context.
1.1.5 F3 · L5	**Robots and Their Applications**	Explain robot and robotics; identify physical characteristics and roles of a robot; describe applications in manufacturing, agriculture, and medicine.
1.1.6 F3 · L6	**Control Systems, Virtual Reality & Augmented Reality**	Distinguish monitoring systems, control systems, VR, and AR; describe applications in education, aviation, and medicine.
1.1.7 F3 · L7	**Integration Activities (Emerging Tech & AI)**	Consolidate concepts on AI, robotics, control systems, VR, and AR through applied exercises.
1.1.8 F4 · L1	**Introduction to Artificial Intelligence (Intermediate)**	Define AI; explain its history and evolution; identify and categorise types of AI.
1.1.9 F4 · L2	**Applications and Ethics of Artificial Intelligence**	Identify common AI applications across fields; state ethical issues related to AI.
1.1.10 F4 · L3	**Using Appropriate Prompts to Generate AI Responses**	Examine and discuss prompt results; write appropriate prompts to solve contextual problems.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.1.11 F4 · L4	**Integration Activities (AI Prompting)**	AI prompting workshop.
1.1.12 F5 · L4	**Introduction to Artificial Intelligence (Advanced)**	Define AI; explain its history and evolution; identify and categorise AI types.
1.1.13 F5 · L5	**Applications and Ethics of Artificial Intelligence**	Identify common applications and field uses of AI; state ethical issues.
1.1.14 F5 · L6	**Using Appropriate Prompts to Generate AI Responses**	Examine and discuss prompt results; write prompts to solve contextual problems.
1.1.15 F5 · L7	**Integration Activities (AI Applications)**	Applied AI prompt engineering.

CHAPTER 1.2 · 21 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Internal Computer Architecture, Storage & Peripherals

Competency: Select and justify internal components, storage units, data capture tools, and I/O peripherals.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.2.1 F3 · L8	**The Processor**	Explain CPU, GPU, processor core, multicore, and clock speed; identify speed units; compare mobile and PC processors.
1.2.2 F3 · L9	**The Processor Cycle**	Describe components of the CPU; explain the machine instruction cycle.
1.2.3 F3 · L10	**Primary Storage**	Explain primary, volatile, and non-volatile storage; identify storage units; state functions of cache, RAM, and registers.
1.2.4 F3 · L11	**Secondary Storage**	Explain secondary storage; describe common types; compare HDDs and SSDs.
1.2.5 F3 · L12	**Other Internal Components**	State functions of motherboard, power supply, battery, and fans; describe types of buses.
1.2.6 F3 · L13	**Computer Ports**	Describe main ports on the motherboard of a computer and mobile device.
1.2.7 F3 · L14	**Integration Activities (Internal Hardware)**	Applied hardware selection and internal architecture review.
1.2.8 F3 · L15	**Data Capture Technologies 1**	Explain data capture; outline advantages and disadvantages; describe initial data capture technologies.
1.2.9 F3 · L16	**Data Capture Technologies 2**	Describe additional data capture technologies; compare and contrast them.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.2.10 F3 · L17	**Integration Activities (Data Capture)**	Case-study exercises selecting data capture methods.
1.2.11 F4 · L49	**Units of Storage and Conversion**	Explain read/write operations; state storage units and relationships; convert between units.
1.2.12 F4 · L50	**Conversion Between Units of Storage**	Explain and perform multi-step conversions between storage units.
1.2.13 F4 · L51	**Integration Activities (Storage Calculations)**	Storage calculation exercises.
1.2.14 F4 · L82	**Input Peripherals**	State purpose, describe characteristics, and choose appropriate input peripherals.
1.2.15 F4 · L83	**Output Peripherals**	State purpose, describe characteristics, and choose appropriate output peripherals.
1.2.16 F4 · L84	**Integration Activities (Peripherals)**	Peripheral selection lab.
1.2.17 F5 · L48	**Input and Output Peripherals (Advanced)**	Describe RFID, QR, OMR, OCR, contactless card readers, plotters, 3D printers, and actuators; choose by context.
1.2.18 F5 · L49	**Integration Activities (Advanced Peripherals)**	Peripheral selection scenarios.
1.2.19 F5 · L78	**Storage and Processing Devices**	Describe processing and storage devices and the machine instruction cycle.
1.2.20 F5 · L79	**Other Internal Components (Motherboard, Buses, CMOS)**	State main motherboard ports, describe types of buses, and state the role of CMOS and battery.
1.2.21 F5 · L80	**Integration Activities (Internal Systems)**	Internal architecture review.

CHAPTER 1.3 · 4 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Embedded Systems, IoT & Cloud Computing

Competency: Identify sensors, embedded systems, IoT scenarios, and cloud service models.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.3.1 F4 · L74	**Types of Sensors**	Explain sensors and actuators; state sensor types, roles, and real-life uses.
1.3.2 F4 · L75	**Embedded Systems and IoT**	Differentiate embedded systems, IoT, and cloud computing; describe IoT scenarios.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.3.3 F4 · L76	**Cloud Computing**	Explain cloud computing; outline the 3 main cloud service models with examples; relate to IoT.
1.3.4 F4 · L77	**Integration Activities (IoT & Cloud)**	IoT and cloud architecture exercises.

CHAPTER 1.4 · 12 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Application Software, Acquisition & Installation

Competency: Choose appropriate application software and recommend software acquisition and installation methods.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.4.1 F3 · L24	**Common Application Software 1**	Explain software, system software, and application software; state purposes, features, and examples.
1.4.2 F3 · L25	**Common Application Software 2**	State purpose, key features, and examples of additional application software categories.
1.4.3 F3 · L26	**Common Application Software 3**	State purpose, key features, and examples of specialized application software.
1.4.4 F3 · L27	**Integration Activities (Application Software)**	Software selection scenarios.
1.4.5 F3 · L32	**Off-the-Shelf and Bespoke Software**	Describe generic, special-purpose, and tailor-made software with examples.
1.4.6 F3 · L33	**Common Ways of Distributing Software**	Describe open-source, closed-source, shareware, freeware, and SaaS with examples.
1.4.7 F3 · L34	**Software Installation**	Differentiate installing and updating; perform installation and updates on smartphones and desktops.
1.4.8 F3 · L35	**Integration Activities (Software Acquisition)**	Software acquisition and installation practice.
1.4.9 F5 · L85	**Types of Application Software**	Describe and choose application software for productivity, personal interest, media, and collaboration.
1.4.10 F5 · L86	**Integration Activities (App Software)**	Software selection exercise.
1.4.11 F5 · L87	**Methods to Obtain Software**	Describe and choose appropriate methods of obtaining software.
1.4.12 F5 · L88	**Integration Activities (Obtaining Software)**	Software acquisition scenario.

CHAPTER 1.5 · 38 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Productivity Software, Multimedia & Digital Content Creation

Competency: Produce documents, spreadsheets, presentations, publications, multimedia, and hypermedia using traditional and AI tools.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.5.1 F3 · L36	Edit Text Using a Word Processor	Identify key editing features; perform document editing.
1.5.2 F3 · L37	Format Text Using a Word Processor	Identify key formatting features; perform document formatting.
1.5.3 F3 · L38	Manipulate Text Boxes Using a Word Processor	Outline uses of text boxes; create, edit, and format text boxes.
1.5.4 F3 · L39	Notions on Spreadsheets	Explain sheet, cell, address, formula, functions, and range; identify cell addresses.
1.5.5 F3 · L40	Basic Spreadsheet Functions	Perform calculations using basic spreadsheet functions.
1.5.6 F3 · L41	Filter and Chart Data	Filter and sort data; represent cross-sections of data as charts.
1.5.7 F3 · L42	Notions on Presentation Software	Explain slides and animations; add and manipulate slides.
1.5.8 F3 · L43	Animate Objects in a Presentation	Identify when animation is necessary; create animations.
1.5.9 F3 · L44	Using Desktop Publishing Software	Produce a publication from a template; use DTP layout features.
1.5.10 F3 · L45	Notions on Generative Artificial Intelligence	Explain generative AI, prompt, and hallucination; classify GenAI tools; identify core prompt components.
1.5.11 F3 · L46	Using Generative AI to Create Digital Content	Write and refine prompts to generate content; transfer and format AI output in traditional tools.
1.5.12 F3 · L47	Integration Activities (Digital Content 1)	End-to-end digital content creation project.
1.5.13 F4 · L35	Types of Digital Content and File Formats	Describe digital content types and file formats; identify traditional and AI tools; differentiate multimedia vs. hypermedia.
1.5.14 F4 · L36	Creation of Audio and Image Content	Produce and edit audio content using hardware, traditional software, and AI tools.
1.5.15 F4 · L37	Creation of Image Content	Produce and edit image content using hardware, traditional software, and AI tools.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.5.16 F4 · L38	**Creation of Multimedia Content**	Produce and edit multimedia content using hardware, traditional software, and AI tools.
1.5.17 F4 · L39	**Creation of Hypermedia Content 1**	Identify technologies and create hypermedia content using HTML, CSS, and JavaScript.
1.5.18 F4 · L40	**Creation of Hypermedia Content 2**	Continue building interactive hypermedia content with HTML, CSS, and JavaScript.
1.5.19 F4 · L41	**Integration Activities (Multimedia & Hypermedia)**	Multimedia project.
1.5.20 F4 · L52	**Features of a Word Processor**	Choose appropriate word processor features and perform basic formatting.
1.5.21 F4 · L53	**Common Operations on a Page**	Explain page layout; perform basic page operations; create tables.
1.5.22 F4 · L54	**Operations on Tables**	Perform table operations (add, delete, resize rows/columns).
1.5.23 F4 · L55	**Integration Activities (Word Processing)**	Formatted document production task.
1.5.24 F4 · L56	**Notions on Cell Referencing**	Explain cells, formulas, ranges, and cell references; differentiate reference types.
1.5.25 F4 · L57	**Operations Using Cell Referencing**	Perform SUM, AVERAGE, PRODUCT, and COUNT using relative, absolute, and mixed references.
1.5.26 F4 · L58	**Conditional Functions: IF**	Describe IF, identify when to use it, and solve problems with IF.
1.5.27 F4 · L59	**Conditional Functions: SUMIF & PRODUCTIF**	Describe and apply SUMIF and PRODUCTIF to solve problems.
1.5.28 F4 · L60	**Conditional Functions: COUNTIF & AVERAGEIF**	Describe and apply COUNTIF and AVERAGEIF to solve problems.
1.5.29 F4 · L61	**Represent Data Using Charts**	Identify chart types; create and format charts from spreadsheet data.
1.5.30 F4 · L62	**Integration Activities (Spreadsheets)**	Spreadsheet modeling lab.
1.5.31 F5 · L50	**Using a Word Processor 1**	Produce a formatted document using text, tables, graphics, and text boxes.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.5.32 F5 · L51	**Using a Word Processor 2**	Reproduce a multi-element document of at most two pages accurately.
1.5.33 F5 · L52	**Solve Problems with Spreadsheets 1**	Reproduce spreadsheet data/formatting; determine appropriate formulas.
1.5.34 F5 · L53	**Solve Problems with Spreadsheets 2**	Determine formulas, create charts, and use sort and filter features.
1.5.35 F5 · L54	**Create Presentations**	Create up to 5-slide presentations; add/format images, sound, video, and animations.
1.5.36 F5 · L55	**Create Publications**	Produce a publication matching a given model.
1.5.37 F5 · L56	**Create Digital Content Using Generative AI**	Produce word-processed documents, presentations, and publications using generative AI tools.
1.5.38 F5 · L57	**Integration Activities (Digital Content 2)**	Integrated office & AI practical.

CHAPTER 1.6 · 14 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Ergonomics, System Optimisation, Maintenance & Assistive Tech

Competency: Evaluate workplace ergonomics, optimise performance, troubleshoot issues, and select assistive technologies.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.6.1 F4 · L63	**Computer-Related Health Hazards**	Describe computer-related health hazards and outline their major causes.
1.6.2 F4 · L64	**Computer Ergonomics: Equipment & Workplace Setup**	Identify poor equipment placement/design; explain how ergonomic setup prevents injury.
1.6.3 F4 · L65	**Computer Ergonomics: Habits & Exercises**	Identify poor posture/habits; explain workplace habits and exercises that prevent injuries.
1.6.4 F4 · L66	**Integration Activities (Ergonomics)**	Ergonomic audit.
1.6.5 F4 · L67	**Software Methods for Optimising Performance**	Explain malware and fragmentation; explain how antivirus, defragmenter, disk cleaner, and OS settings help.
1.6.6 F4 · L68	**Hardware Methods for Optimising Performance**	Explain how RAM size, disk size, and SSDs vs. HDDs improve performance.
1.6.7 F4 · L69	**Integration Activities (System Optimisation)**	System optimisation scenarios.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
1.6.8 F4 · L70	**Notions on Computer Maintenance**	Explain hardware, software, preventive, and corrective maintenance; classify problems.
1.6.9 F4 · L71	**Hardware Maintenance**	Classify solutions; match symptoms to hardware problems; explain preventive hardware tips.
1.6.10 F4 · L72	**Software Maintenance**	Match symptoms to software problems; determine logical fixes; explain preventive software tips.
1.6.11 F4 · L73	**Integration Activities (Maintenance)**	Troubleshooting workshop.
1.6.12 F5 · L58	**Assistive Technology and Disabilities**	Explain disability and assistive technology; describe common assistive technologies per disability.
1.6.13 F5 · L59	**Assistive Technologies for Disabilities & Elderly**	Outline OS accessibility features; explain and describe assistive technologies for the elderly.
1.6.14 F5 · L60	**Integration Activities (Assistive Tech)**	Accessibility case studies.

MODULE 02 · 4 CHAPTERS · 20 LESSONS

Data Manipulation & Digital Logic

Complete coverage of number systems, base conversions and arithmetic, binary data encoding, logic gates, truth tables, logic circuits, De Morgan's laws, and Boolean simplification.

CHAPTER 2.1 · 8 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Number Systems & Base Arithmetic

Competency: Convert and perform addition and subtraction across bases 2, 8, 10, and 16.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
2.1.1 F4 · L19	**Notions on Number Systems**	Outline symbols of base 2, 8, 10, and 16; identify symbols and recognise numbers in a base.
2.1.2 F4 · L20	**Conversion from Any Base to Base 10**	Explain the principle and convert from base 2, 8, and 16 to base 10.
2.1.3 F4 · L21	**Conversion from Base 10 to Any Base**	Explain the principle and convert from base 10 to base 2, 8, and 16.
2.1.4 F4 · L22	**Conversion from Base 2 to Base 8 and 16**	Explain direct grouping and convert base 2 to base 8 and 16.
2.1.5 F4 · L23	**Base 16 to Base 2/8 & Addition in Base 2, 8, 16**	Convert base 16 to base 2 and 8 directly; apply addition in base 2, 8, and 16.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
2.1.6 F4 · L24	**Subtraction in a Number System**	Explain and apply subtraction in base 2, 8, and 16.
2.1.7 F4 · L25	**Integration Activities (Number Systems)**	Number base conversion and arithmetic drills.
2.1.8 F5 · L46	**Addition and Subtraction in Base 2, 8 and 16**	Identify symbols of base 2, 8, 16; perform addition and subtraction in any number system.

CHAPTER 2.2 · 3 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Data Encoding & Computer Representation

Competency: Explain how numbers, characters, images, and sound are encoded in binary.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
2.2.1 F5 · L44	**Notions on Data Encoding**	Explain computer data representation; distinguish numbers, characters, images, and sound; outline encoding techniques.
2.2.2 F5 · L45	**Character and Positive Integers Encoding**	Apply character encoding schemes; determine base 2 representation of positive integers.
2.2.3 F5 · L47	**Integration Activities (Data Encoding)**	Encoding and base arithmetic review.

CHAPTER 2.3 · 7 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Logic Gates, Circuits & Truth Tables

Competency: Analyse and draw logic circuits and determine truth tables and outputs.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
2.3.1 F4 · L26	**Basic Logic Gates (NOT, AND, OR)**	Explain logic gates and truth tables; identify, explain, and draw truth tables for NOT, AND, OR.
2.3.2 F4 · L27	**Derived Gates (NAND, NOR, XOR)**	Identify, explain, and produce truth tables for NAND, NOR, and XOR.
2.3.3 F4 · L28	**Analyse Logic Circuits**	Deduce the logic expression and output values of a logic circuit.
2.3.4 F4 · L29	**Draw Logic Circuits**	Produce the logic circuit for a given logic expression and deduce outputs.
2.3.5 F4 · L30	**Integration Activities (Logic Circuits)**	Logic gate synthesis.
2.3.6 F5 · L74	**Logic Gates (Review & Synthesis)**	Identify and describe logic gates; draw truth tables.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
2.3.7 F5 · L75	**Logic Circuits and Expressions**	Identify gates in circuits/expressions; produce truth tables and draw circuits from expressions.

CHAPTER 2.4 · 2 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

De Morgan's Laws & Boolean Simplification

Competency: Apply De Morgan's laws and Boolean algebra to simplify logic expressions.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
2.4.1 F5 · L76	**De Morgan's Law and Boolean Simplification**	State De Morgan's laws, identify when to apply them, and state Boolean simplification laws.
2.4.2 F5 · L77	**Integration Activities (Boolean Logic)**	Boolean simplification & circuit drills.

MODULE 03 · 9 CHAPTERS · 75 LESSONS

Problem Solving, Algorithms, Programming & Information Systems

A complete software engineering and computational thinking track: PDLC, flowcharts, control structures, dry running, data structures, subroutines, searching/sorting, Python, HTML/CSS, information systems, SDLC, relational databases, and project management.

CHAPTER 3.1 · 6 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Program Development & Basic Algorithms

Competency: Decompose problems and design basic algorithms and flowcharts.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.1.1 F3 · L18	**Program Development Life Cycle**	Explain program development; describe stages of the PDLC and apply them to a problem.
3.1.2 F3 · L19	**Decomposition & Representation of Solutions**	Decompose problems into component parts; design solutions using structure diagrams and pseudocode.
3.1.3 F3 · L20	**Notions on Algorithms**	Explain algorithms and characteristics of a good algorithm.
3.1.4 F3 · L21	**Algorithmic Instructions**	Describe simple algorithmic instructions; explain the purpose of a given algorithm.
3.1.5 F3 · L22	**Flowcharts**	Explain flowcharts; represent solutions to problems as flowcharts.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.1.6 F3 · L23	**Integration Activities (Basic Algorithms)**	Practice designing algorithms and flowcharts.

CHAPTER 3.2 · 10 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Control Structures, Testing & Dry Running

Competency: Write algorithms with sequence, selection, and iteration, and verify them with trace tables.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.2.1 F4 · L5	**Sequence and Selection Control Structures**	Explain sequence and selection; illustrate with flowcharts; write simple selection algorithms.
3.2.2 F4 · L6	**Multiple Selection Constructs**	Explain, illustrate, and write algorithms using multiple selection constructs.
3.2.3 F4 · L7	**Iterative Constructs**	Identify loop needs; describe 4 main parts of a loop; explain pros and cons of iteration.
3.2.4 F4 · L8	**Definite Iterative Constructs**	Choose when to use definite iteration; build and write definite iteration algorithms.
3.2.5 F4 · L9	**Indefinite Iterative Constructs**	Differentiate pretest and post-test loops; illustrate with flowcharts and write algorithms.
3.2.6 F4 · L10	**Flowchart Representation**	Represent algorithms using control structures as flowcharts.
3.2.7 F4 · L11	**Integration Activities (Control Structures)**	Control structure problem-solving.
3.2.8 F4 · L12	**Notions on Testing and Debugging**	Explain testing, test case, test data, and bug; differentiate testing vs. debugging and black-box vs. white-box testing.
3.2.9 F4 · L13	**Dry Running**	Explain dry running and trace tables; perform a dry-run test on an algorithm.
3.2.10 F4 · L14	**Integration Activities (Testing & Dry Running)**	Trace table and debugging exercises.

CHAPTER 3.3 · 9 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Data Structures, Subroutines & Searching/Sorting Algorithms

Competency: Select data types/structures, write subroutines, and implement linear search and bubble

sort.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.3.1 F5 · L31	**Simple Data Types**	Explain data type; describe simple data types; choose appropriate types for variables.
3.3.2 F5 · L32	**Data Structures**	Differentiate data type and data structure; describe and select appropriate data structures.
3.3.3 F5 · L33	**Integration Activities (Data Structures)**	Data type and structure selection exercises.
3.3.4 F5 · L34	**Algorithms to Solve Common Problems 1**	Differentiate pseudocode and flowchart; write algorithms for swapping, maximum, and minimum.
3.3.5 F5 · L35	**Algorithms to Solve Common Problems 2**	Differentiate searching vs. sorting; explain linear search and bubble sort; write totalling and counting algorithms.
3.3.6 F5 · L36	**Notions on Subroutines**	Explain subroutines, local/global variables, formal/actual parameters; differentiate procedures and functions.
3.3.7 F5 · L37	**Algorithms as Subroutines**	Produce procedures or functions for totalling, counting, max, min, and swap.
3.3.8 F5 · L38	**Algorithm Correctness and Efficiency**	Explain dry running for correctness; describe simple efficiency measures; evaluate algorithms.
3.3.9 F5 · L39	**Integration Activities (Algorithms & Subroutines)**	Algorithm design and trace-table practice.

CHAPTER 3.4 · 19 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Programming Languages, IDEs & Python Coding

Competency: Select programming tools/IDEs and implement algorithms in Python from basics to subroutines and sorting.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.4.1 F3 · L48	**Types of Programming Language**	Differentiate algorithm and program; describe language types; compare high-level and low-level languages.
3.4.2 F3 · L49	**Language Translators and IDE**	Explain translators and IDEs; differentiate compiler and interpreter; explain the role of IDEs.
3.4.3 F3 · L50	**Integration Activities (Programming Tools)**	Language and tool selection exercises.
3.4.4 F3 · L51	**Introduction to Programming**	Explain programming, keywords, syntax, and bug; identify program structure, data types, and I/O instructions.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.4.5 F3 · L52	**Write, Compile & Execute a Program 1 (Python)**	Write Python programs using declarative, input, and output instructions.
3.4.6 F3 · L53	**Write, Compile & Execute a Program 2 (Python)**	Outline operators and assignment instructions; write programs using assignment.
3.4.7 F3 · L54	**Write, Compile & Execute a Program 3 (Python)**	Produce a complete Python program from a given algorithm.
3.4.8 F3 · L55	**Integration Activities (Intro Python)**	Practical Python coding lab.
3.4.9 F4 · L42	**Programming Tools**	State roles of text editor, translator, and IDE; differentiate compiler vs. interpreter; compare IDE vs. separate tools.
3.4.10 F4 · L43	**Installation of Programming Tools**	Install an IDE, run a program, and test tool functionalities.
3.4.11 F4 · L44	**Introduction to Coding (Python)**	Explain coding and strategies; recognise program structure; use I/O, math, and assignment operators.
3.4.12 F4 · L45	**Coding 1 (Python — Selection)**	Write Python source code using single and multiple selection control structures.
3.4.13 F4 · L46	**Coding 2 (Python — Definite Loops)**	Write Python source code using definite iterative control structures.
3.4.14 F4 · L47	**Coding 3 (Python — Indefinite Loops)**	Write Python source code using indefinite iterative control structures.
3.4.15 F4 · L48	**Integration Activities (Python Control Flow)**	Python control-flow lab.
3.4.16 F5 · L40	**Coding 1 (Python — Totalling & Counting)**	State coding best practices; produce Python source code for totalling and counting algorithms.
3.4.17 F5 · L41	**Coding 2 (Python — Subroutines)**	Produce Python source code for maximum, minimum, and swapping algorithms using subroutines.
3.4.18 F5 · L42	**Coding 3 (Python — Search & Sort)**	Produce Python source code for linear search and bubble sort algorithms.
3.4.19 F5 · L43	**Integration Activities (Python Algorithms)**	Python algorithm implementation lab.

CHAPTER 3.5 · 8 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Web Programming & Authoring (HTML & CSS)

Competency: Build and style structured web pages using HTML, CSS, and web authoring tools.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.5.1 F3 · L77	**Introduction to Web Programming**	State roles of HTML and CSS; outline tools needed to create and view a web page.
3.5.2 F3 · L78	**Writing HTML Code 1**	Explain element, tag, attribute, content, and page structure; use <p>, <h1>–<h6>, <img>, <a> with relative paths.
3.5.3 F3 · L79	**Writing HTML Code 2**	Explain nesting, inline vs. block elements; use <b>, <i>, <u>, , <sub>, <sup>.
3.5.4 F3 · L80	**Writing HTML Code 3**	Use , , , and HTML table tags.
3.5.5 F3 · L81	**Introduction to CSS**	Explain CSS importance; apply CSS rules and selectors to style HTML.
3.5.6 F3 · L82	**Common CSS Properties and Values**	Use CSS properties to format text, background, and borders.
3.5.7 F3 · L83	**Integration Activities (Web Programming)**	Mini web-page project.
3.5.8 F5 · L83	**Web Authoring Services**	Outline web authoring tools; state role of HTML; build a simple web page using HTML and CSS.

CHAPTER 3.6 · 7 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Information Systems & Data Integrity

Competency: Evaluate information systems, processing modes, data capture, validation, verification, and integrity.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.6.1 F5 · L8	**Notions on Organizations and Information**	Explain information and organization, characteristics of good information, and information flow.
3.6.2 F5 · L9	**Information Systems**	Define information system; differentiate manual vs. automated; describe IS elements.
3.6.3 F5 · L10	**Types of Information System**	Describe common IS types; differentiate batch vs. real-time processing; explain processing efficiency.
3.6.4 F5 · L11	**Data Capture Methods**	Explain data capture; describe manual/automated methods; differentiate verification vs. validation.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.6.5 F5 · L12	**Data Verification and Validation**	Describe verification and validation methods and how they ensure effectiveness and reliability.
3.6.6 F5 · L13	**Data Integrity**	Explain data integrity, its importance, and ways of ensuring it in an information system.
3.6.7 F5 · L14	**Integration Activities (Information Systems)**	IS evaluation case study.

CHAPTER 3.7 · 4 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

System Development Life Cycle (SDLC)

Competency: Apply SDLC stages, prototyping, documentation, and implementation strategies.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.7.1 F5 · L15	**Stages of SDLC: Investigation, Analysis, Design**	Describe investigation, analysis, and design stages; outline system functions, prototyping, and hardware/software choice.
3.7.2 F5 · L16	**Stages of SDLC: Development, Testing, Implementation, Maintenance**	Describe development, testing, implementation, and maintenance stages; explain documentation.
3.7.3 F5 · L17	**Implementation Strategies**	Describe system implementation strategies and outline their advantages and disadvantages.
3.7.4 F5 · L18	**Integration Activities (SDLC)**	SDLC design scenario.

CHAPTER 3.8 · 7 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Relational Databases & RDBMS Implementation

Competency: Design normalized relational models (1NF–3NF) and build tables, relationships, queries, and reports.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.8.1 F5 · L19	**Introduction to Databases**	Describe database types; outline flat-file pros/cons; state common DBMS features.
3.8.2 F5 · L20	**Relational Database Design**	Explain attribute, record, table, primary key, foreign key, and relationship; identify them in context.
3.8.3 F5 · L21	**Normalization and Relational Models**	Explain normalization; state 1NF, 2NF, and 3NF properties; design normalized models.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.8.4 F5 · L22	**Use an RDBMS to Create Tables**	Outline RDBMS examples; identify GUI RDBMS features; create tables.
3.8.5 F5 · L23	**Use an RDBMS to Create Relationships**	Create relationships, enter table data, and sort/filter data in a GUI RDBMS.
3.8.6 F5 · L24	**Use an RDBMS to Create Queries and Reports**	Explain queries and reports; create coherent queries and reports in a GUI RDBMS.
3.8.7 F5 · L25	**Integration Activities (Databases)**	End-to-end relational database practical.

CHAPTER 3.9 · 5 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

IT Project Management, Gantt Charts & Critical Path

Competency: Use Gantt charts and critical path metrics (ES, EF, LS, LF, slack) to schedule projects.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
3.9.1 F5 · L26	**Introduction to Project Management**	Explain project, need for project management, and phases of the project life cycle.
3.9.2 F5 · L27	**Project Management Tools**	Describe planning/monitoring tools and produce a Gantt chart for a project.
3.9.3 F5 · L28	**Project Management Concepts & Metrics 1**	Explain task, milestone, critical path, slack time, and duration; determine them from a Gantt chart.
3.9.4 F5 · L29	**Project Management Concepts & Metrics 2**	Explain and determine early start, early finish, late start, and late finish.
3.9.5 F5 · L30	**Integration Activities (Project Management)**	Critical path & Gantt chart lab.

MODULE 04 · 6 CHAPTERS · 33 LESSONS

Network Systems, Internet & Cybersecurity

Unifies data communication, packet switching, LAN setup and IP configuration, internet services, search engines, social networks, digital currency/blockchain, system security, and digital footprints.

CHAPTER 4.1 · 5 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Data Communication Systems & Transmission Mediums

Competency: Explain signals, wired/wireless mediums, bandwidth, and transmission modes.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
4.1.1 F3 · L60	Notions of Communication Systems	Define communication system and components; differentiate digital and analogue signals.
4.1.2 F3 · L61	Wired Transmission Mediums	Describe wired mediums; explain bandwidth and data throughput.
4.1.3 F3 · L62	Wireless Transmission Mediums	Describe the different types of wireless mediums.
4.1.4 F3 · L63	Transmission Mechanisms	Describe serial/parallel, simplex/half-duplex/duplex, and synchronous/asynchronous transmission.
4.1.5 F3 · L64	Integration Activities (Data Communication)	Communication systems review.

CHAPTER 4.2 · 3 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Packets, Error Detection & Packet Security

Competency: Describe packet structure, packet switching, USB transmission, error detection, and encryption.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
4.2.1 F5 · L61	Notions on Packets	Explain packet header, payload, trailer, and packet switching; describe packet structure and USB transmission.
4.2.2 F5 · L62	Error Detection and Packet Security	Explain transmission errors, encryption purpose, and error-detection/encryption methods.
4.2.3 F5 · L63	Integration Activities (Packets)	Packet and error-checking exercises.

CHAPTER 4.3 · 8 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Local Area Networks (LANs), Hardware & IP Configuration

Competency: Prescribe network topologies, devices, ad-hoc setup, MAC/IPv4/IPv6 addressing, and LAN IP configuration.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
4.3.1 F3 · L65	Introduction to Networks	Explain computer networks, advantages/disadvantages; describe LAN, MAN, and WAN.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
4.3.2 F3 · L66	**Network Devices and Architecture**	Explain network device functions; differentiate client-server and peer-to-peer architecture.
4.3.3 F3 · L67	**Network Topologies**	Explain topology; describe bus, ring, and star topologies with advantages and disadvantages.
4.3.4 F3 · L68	**Setup an Ad-Hoc Network**	Describe an ad-hoc network and set up a simple ad-hoc network.
4.3.5 F3 · L69	**Integration Activities (Simple LANs)**	LAN design and configuration practice.
4.3.6 F5 · L64	**Network Hardware**	Explain NIC, modem, router, multiplexer, bridge, repeater; identify internet connectivity hardware.
4.3.7 F5 · L65	**Network IP Configuration**	State MAC vs. IP purpose; differentiate IPv4/IPv6 and static/dynamic IPs; explain LAN IP configuration.
4.3.8 F5 · L66	**Integration Activities (LAN IP & Hardware)**	LAN hardware & IP configuration lab.

CHAPTER 4.4 · 10 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Internet Services, Search Engines, Social Networks & Digital Currency

Competency: Use internet services, advanced search, online social networks, and explain digital currency/blockchain.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
4.4.1 F3 · L73	**Internet Services**	Describe common internet services.
4.4.2 F3 · L74	**Search Engines**	State examples; outline factors influencing search results; identify SERP parts.
4.4.3 F3 · L75	**Advanced Features of a Search Engine**	Give the purpose of and use advanced search engine features.
4.4.4 F3 · L76	**Integration Activities (Online Search)**	Information retrieval practical exercises.
4.4.5 F5 · L1	**Notions on Social Networks**	State reasons, characteristics, advantages, and disadvantages of online social networks.
4.4.6 F5 · L2	**Using Online Social Networks**	Explain impacts; differentiate social network vs. social media; use an online network to share and communicate.
4.4.7 F5 · L3	**Integration Activities (Social Networks)**	Social network communication task.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
4.4.8 F5 · L81	**Notions on the Internet**	Explain internet, intranet, extranet, protocol, ISP, browser, URL nomenclature, and internet services.
4.4.9 F5 · L82	**Notions on Digital Currency**	Explain digital currencies with examples; explain blockchain tracking of transactions.
4.4.10 F5 · L84	**Integration Activities (Internet & Web)**	Internet & web authoring lab.

CHAPTER 4.5 · 4 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

System Security, Threats, Malware & Recovery

Competency: Identify vulnerabilities, threats, attacks, and malware, and apply data/computer/network security measures.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
4.5.1 F5 · L67	**Notions on Security**	Differentiate computer, data, and network security; vulnerability, threat, attack; identify 3 security objectives.
4.5.2 F5 · L68	**Threats and Attacks on Computer Systems**	Identify threats, describe common attacks, and describe types of malware.
4.5.3 F5 · L69	**Data, Computer, and Network Security Measures**	Explain measures to secure data, computers, and networks; outline data recovery strategies.
4.5.4 F5 · L70	**Integration Activities (System Security)**	Security audit workshop.

CHAPTER 4.6 · 3 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Digital Identities & Digital Footprints

Competency: Manage digital identities, strong passwords, and active/passive digital footprints.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
4.6.1 F5 · L71	**Notions on Digital Identities and Digital Footprints**	Explain digital identity, password, identity theft, active/passive footprints, and strong passwords.
4.6.2 F5 · L72	**Digital Identities and Footprints Management**	Outline best practices for multiple identities; state positive/negative effects and footprint protection.
4.6.3 F5 · L73	**Integration Activities (Digital Footprints)**	Digital reputation case study.

MODULE 05 · 6 CHAPTERS · 26 LESSONS

Ethics, Society & Legal Issues

Consolidates all digital citizenship, netiquette, misinformation/credibility, cybercrime, intellectual property, Creative Commons licensing, green computing, and national/international ICT laws.

CHAPTER 5.1 · 4 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Netiquette & Responsible Online Communication

Competency: Apply respectful online communication norms, emoji literacy, and cultural/generational empathy.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
5.1.1 F4 · L15	Notions on Netiquette	Explain netiquette and empathy; state posting/sharing codes of conduct and diversity awareness.
5.1.2 F4 · L16	Emojis	Differentiate emojis from emoticons; state meanings of common emojis and why context matters.
5.1.3 F4 · L17	Communicating Responsibly Online	Choose audience-appropriate strategies; identify hostile/derogatory content; propose digital behaviour rules.
5.1.4 F4 · L18	Integration Activities (Netiquette)	Netiquette scenario analysis.

CHAPTER 5.2 · 4 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Misinformation, Disinformation & Information Credibility

Competency: Detect bias, deepfakes, and sponsored content, and verify online information credibility.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
5.2.1 F4 · L31	Notions on Misinformation and Disinformation	Explain misinformation, disinformation, deepfake, infodemic, clickbait; state bias factors.
5.2.2 F4 · L32	Analysis of Online Information	Identify author, source, and sponsored content; analyse purpose or interest.
5.2.3 F4 · L33	Identifying the Credibility of Information	Explain verification strategies; propose credible national and international sources.
5.2.4 F4 · L34	Integration Activities (Information Credibility)	Fact-checking workshop.

CHAPTER 5.3 · 4 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Computer Crimes & Authentication Measures

Competency: Identify computer crimes and propose authentication, access control, encryption, and

forensic countermeasures.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
5.3.1 F3 · L56	Types of Computer Crimes	Explain computer crime and describe different types of computer crime.
5.3.2 F3 · L57	Measures to Combat Computer Crimes	Explain how authentication, access control, encryption, and digital forensics combat crime.
5.3.3 F3 · L58	Authentication Methods	Explain authentication and describe different authentication methods.
5.3.4 F3 · L59	Integration Activities (Computer Crimes)	Cybercrime case analysis.

CHAPTER 5.4 · 7 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Intellectual Property, Copyright, DRM & Digital Licenses

Competency: Protect IP, respect copyright and DRM, and apply Creative Commons licenses legally.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
5.4.1 F3 · L28	Protection of Intellectual Property	Explain IP, copyright, unauthorised use, and fair use; identify fair use and copyright infringement.
5.4.2 F3 · L29	Digital Rights Management	Explain DRM and outline possibilities provided by DRM.
5.4.3 F3 · L30	Creative Commons Licenses	Explain licenses; describe the different types of Creative Commons licenses.
5.4.4 F3 · L31	Integration Activities (IP & Licensing)	Applied copyright and licensing scenarios.
5.4.5 F5 · L89	Protecting Intellectual Property	Explain IP, trademark, patent, copyright, license; identify freedoms and consequences of non-respect.
5.4.6 F5 · L90	Assigning and Respecting Digital Licenses	Identify legal exceptions; match Creative Commons licenses; identify free vs. copyrighted content.
5.4.7 F5 · L91	Integration Activities (IP & Licenses Synthesis)	Final legal and licensing synthesis.

CHAPTER 5.5 · 3 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

Green Computing & Environmental Impact

Competency: Explain green computing technologies and measures to reduce computing's environmental

footprint.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
5.5.1 F3 · L70	**Green Computing**	Explain green computing; state devices and technologies that promote it.
5.5.2 F3 · L71	**Measures for Promoting Green Computing**	State manufacturer measures and general ways of reducing environmental impact.
5.5.3 F3 · L72	**Integration Activities (Green Computing)**	Green computing case study.

CHAPTER 5.6 · 4 LESSONS (CHRONOLOGICAL F3 → F4 → F5)

National & International ICT Laws & Regulatory Bodies

Competency: Appraise Cameroon Law No. 2010/012, international cyber laws, and ICT regulatory bodies.

LESSON	LESSON TITLE	LEARNING OBJECTIVES
5.6.1 F4 · L78	**International Laws or Acts on Digital Technology**	Explain importance of digital regulation; outline international laws and their purposes.
5.6.2 F4 · L79	**National Laws or Policies on Digital Technology**	State Cameroon digital laws/policies; discuss Law No. 2010/012 of 21 December 2010 and ICT malpractice penalties.
5.6.3 F4 · L80	**National & International ICT Regulatory Bodies**	Outline international and Cameroon national bodies regulating ICT and their goals.
5.6.4 F4 · L81	**Integration Activities (ICT Laws)**	Cyber law case studies.

SOURCE DOCUMENTS

Official Progression Sheets

1. Republic of Cameroon (MINESEC) — *National Harmonised Progression Sheet for Computer Science, Form 3* (83 lessons).
2. Republic of Cameroon (MINESEC) — *National Harmonised Progression Sheet for Computer Science, Form 4* (84 lessons).
3. Republic of Cameroon (MINESEC) — *National Harmonised Progression Sheet for Computer Science, Form 5* (91 lessons).