MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

INSTITUTE OF ADULT EDUCATION

THE ENHANCEMENT OF ACCESS AND QUALITY TO SECONDARY EDUCATION THROUGH ALTERNATIVE EDUCATION PATHWAY

COMPUTER SCIENCE SYLLABUS
FOR ALTERNATIVE SECONDARY EDUCATION PATHWAY

STAGE I & II

2026

Designed and prepared by:
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1.0 Introduction

Computer science Syllabus for Alternative Secondary Education Pathway comprises of both Stage One (Equivalent to Form One and Two) and Stage Two (Equivalent to Form Three and Four) written in a modular format. It has integrated components that originate from formal education syllabus. The integrated syllabus has been prepared to allow learners to complete the ordinary secondary education course in two years' time. It is designed for learners outside the formal education system to enable them sit for Ordinary Certificate of Secondary Education Examinations, using acquired competences, both competently and professionally in their daily undertakings. The syllabus uses Competence Based Education and Training (CBET) approach which is result-based indicating what a learner is expected to do after completing the course.

2.0 Objectives of Education in Tanzania

The objectives of education in Tanzania are to:

a) Guide the development and improvement of the personalities of the citizens of Tanzania, their human resources and effective utilization of their resources in bringing about individual and national development;
b) Promote the acquisition and appreciation of culture, customs and traditions of the people of Tanzania;
c) Promote the acquisition and appropriate use of literary, social, scientific, vocational, technological, professional and other forms of knowledge, skills and understanding for the development and improvement of man and society;
d) Develop and promote self-confidence and an inquiring mind, an understanding and respect for human dignity and human rights and readiness to work hard for self-advancement and national improvement;
e) Promote and expand the scope of acquisition, improvement and upgrading of mental, practical, productive and other skills needed to meet the changing needs of industry and the economy;
f) Enable every citizen to understand and uphold the fundamentals of the National Constitution as well as the enshrined human and civil rights, obligations and responsibilities;
g) Promote love and respect for work, self and wage employment and improved performance in the production and service sectors;
h) Inculcate principles of national ethics and integrity, national and international cooperation, peace and justice through the study, understanding and adherence to provisions of the national constitution and other international basic charters; and
i) Enable a rational use, management and conservation of the environment.

3.0 Objectives of Secondary Education in Tanzania

The objectives of Secondary Education in Tanzania are to:

a) Consolidate and broaden the scope of baseline ideas, knowledge, skills and principles acquired and developed at primary education level;
b) Enhance further development and appreciation of national unity, identity and ethical personal integrity, respect for and readiness to work, human rights, cultural and moral values, customs, traditions and civic responsibilities and obligations;
c) Promote the development of competency in linguistic ability and effective use of communication skills in Kiswahili and at least one foreign language;
d) Provide opportunities for the acquisition of knowledge, skills, attitudes and understanding in prescribed or selected fields of study;
e) Prepare learners for tertiary and higher education; vocational, technical and professional training;
f) Inculcate a sense and ability for self-study, self-reliance and self-advancement in new frontiers of science and technology, academic and occupational knowledge and skills; and
g) Prepare the student to join the world of work.

4.0 Objectives of Secondary Education through Alternative Education Pathway in Tanzania

The objectives of Secondary Education through Alternative Education Pathway are to:

a) Provide equivalent education to children, youth and adults who could not get the opportunity in the formal education system;
b) Complement government efforts of achieving Education for All (EFA) objectives;
c) Cater for youths and adults who dropped out of school due to various reasons; and
d) Provide education to disadvantaged and marginalized groups including girls.

5.0 Competences to be gained in stage I and stage II of the Syllabus

5.1 Main competences

1. Demonstrate mastery of the basic concepts of Computer Science;
2. Demonstrate mastery of the basic principles of Computer Science; and
3. Demonstrate mastery of the basic principles of data management.

5.2. Specific competences

1. Demonstrate an understanding the field of Computer Science and its related fields;
2. Demonstrate an understanding of computer systems;
3. Demonstrate mastery of maintenance and troubleshooting of computer systems;
4. Demonstrate mastery of basics of system administration;
5. Demonstrate mastery of the internet, and basics of cyber security;
6. Demonstrate mastery of the basic principles of problem solving (concept of problem solving, steps of problem solving, concept of algorithms);
7. Demonstrate an understanding of basic principles of computer programming (using an appropriate structured programming language such as C, python, etc);
8. Demonstrate an understanding of the basic principles of computer architecture;
9. Demonstrate an understanding of the basics of computer networks;
10. Demonstrate mastery of basic principles of web development (HTML, CSS, and JavaScript);
11. Demonstrate mastery of basic principles of mobile App;
12. Demonstrate the mastery of basic principles of databases and database management systems; and
13. Demonstrate the mastery of the basic principles of data analysis (data collection, pre-processing, processing, visualization, interpretation).

6.0 The syllabus for Computer Science subject comprises the following:

i) **Name of the Module**

This implies set of separate units that can be joined together to form a part of a subject course of study.

ii) **Main competence**

Main competence is the ability of the learner to perform a certain task accurately and efficiently after learning a subject course.

iii) **Specific competence**

Specific competence is the ability of the learner to perform various activities in a specific period.

iv) **Learning Activities**

These are the observable tasks to be done by a facilitator and learners in realizing the specific competence.

v) **Suggested learning/facilitation strategies**

This part indicates what a facilitator and learners are expected to do in the process of facilitation and learning. This includes self-learning and face to face session.

vi) **Assessment criteria**

Assessment criteria are specific standards or guidelines that outline what is expected of a learner in particular assessment task.

vii) **Facilitation/learning resources**

These are learning and facilitation materials which are used to support the process of facilitation and learning.

viii) **Estimated time of study**

These are proposed hours of learning which can be used for self-study and face to face facilitation.

7.0 Number of modules

This syllabus has two stages which makes a total of six modules as shown.

Stage I Modules

Module 1: Applying Basic Concepts of Computer Science in Daily Life;

Module 2: Practicing Computer Safety and Cyber Security in Daily Life;

Module 3: Applying Basic Programming Skills in Practical Life.

Stage II Modules

Module 1: Demonstrating Skills in Computer Architecture and Data Management in Real-Life Situation;

Module 2: Applying Programming Skills to Develop Mobile APPs;

Module 3: Applying Web Programming Languages to Create and Publish Websites

8.0 Further readings

Several books have been suggested for further reading in each module at the end of the syllabus.

COMPUTER SCIENCE SYLLABUS STAGE I

COMPETENCES FOR COMPUTER SCIENCE STAGE I

Upon completion of Stage I Modules of Computer Science, learners should be able to:

1. Demonstrate mastery of the basic concepts of Computer Science; and
2. Demonstrate mastery of the basic principles of Computer Science.

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
1.0: APPLYING BASIC CONCEPTS OF COMPUTER SCIENCE IN DAILY LIFE	1.1 Demonstrate mastery of the basic concepts of computer science	1.1.1 Demonstrate an understanding of the concepts of computer science	a) Describe the concept of computer science *(meaning, importance, application)*	**i) Library search:** A learner should carry out a library search for information about the concepts of computer science. **ii) Internet search:** A learner should use internet to search for information on importance of computer science. **iii) Self-Reflection Task:** A learner should write a short reflection explaining how computer science affects their daily life and future careers.	**i)Brainstorming and Think-Ink-Pair Share (TIPS):** Through brainstorming and Think-Ink-Pair Share (TIPS) guide learners to describe the concept of computer science.	Concepts of computer science are clearly described.	Handouts with contents about computer science concepts.	5 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
			b) Describe fields related to computer science *(IT, ICT, IS, Computer Engineering)*	**i) Library search:** A learner should carry out a library search for information about the fields related to computer science. **Internet search:** **A l**earner should use internet to search information about the fields related to computer science. **ii) Assignment:** A learner should complete tasks or exercises from the module to describe the meaning, scope, and applications of IT, ICT, IS, and computer engineering.	**ii) Question and answer: A** facilitator should guide learners to brainstorm about fields related to computer science. **iii) Group discussion:** A facilitator to guide learners in manageable groups to discuss the fields related to Computer science. **iv) Case Study or Scenario Analysis: A** facilitator presents real world problem and learners identify	Fields related to computer science are clearly described.		5 Hours	2 Hour

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
					which field of computer science would solve it.				
		1.1.2: Demonstrate an understanding of computer systems	ae) Describe computer systems (*Meaning, types, functions, and significance*)	**i) Internet search:** A learner should use internet to search information on computer systems. **ii) Library search** A learner should carry out a library search on information about the computer systems. **iii) Guided Questions:** A Learner should answer guided questions from the module to describe computer systems, meaning, types, functions, and significance. **iv) Self-**	**i) Questions and answers:** Through questions and answers guide learners to describe computer system.	Computer systems are clearly described.	Computer, hand-out, flip board, digital podium, and electronic blackboard.	6 Hours	2 Hour

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				Testing/Quiz A learner should design or take online quizzes to test knowledge about computer systems and record areas needing improvement.					
			b) Describe computer hardware (*meaning, components, functions, computer generation)*	**i) Internet search:** A learner should use internet to search information on computer hardware **ii) Library search:** **A** learner should carry out a library search on information about the computer hardware. **iii) Assignment:** A learner should complete tasks or exercises from the module to describe computer hardware, its meaning, components,	**i) Small groups:** Guide learners in small groups to describe computer hardware**.** **ii)Demonstration:** Use demonstration to show different components of computer hardware. iii)**Practical work**: Guide	Computer hardware are clearly described.	computer, printer, scanner, camera, projector, flash disk, hard disk memory card, smart phone, tablets and motherboard visual images.	8 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				functions, and generations. **Self-Reflection:** iv) A learner should write a brief reflection explaining how computer hardware affects daily life and work.	learners through practical work to connect different parts of computer hardware.				
			c) Describe computer software (meaning, types, functions)	**i) Online Learning:** A learner should use internet to search information on computer software. **ii) Library Search:** A learner should carry out a library search on computer software to understand its meaning, types, and functions. **iii) Note-Making:** A learner should summarize findings by creating notes or concept maps	**i)TIPS and Demonstration:** Using TIPS and demonstration to guide learners to describe computer software.	Computer software are clearly described		6 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				showing different types of software and their functions. **iv) Self-Testing/Quiz:** A learner should take or design an online quiz to test knowledge on software types and their functions.					
			d) Describe and observe principles of computer system handling (safety measures, management, cleanliness, data backup and utilities)	**i) Library search;** A learner should carry out a library search on information about principles of computer system handling. **ii) Internet search:** A learner should use internet to search information on principles of computer system handling. **iii) Self-Practice:** A learner should	**i) Group discussion:** Though group discussion learners to describe principles of computer handling. **ii)Demonstration:** A facilitator should demonstrate on how to perform computer	Principles of computer system handling are clearly described and observed	Computer, printer, scanner, projector, flash disk, memory card, smart phone, tablets and hard disk	8 Hours	2 Hour

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				practice handling a computer system by observing and applying safety measures, maintaining cleanliness, performing data backup, and using system utilities correctly.	handling technique **iii) Practical work:** A facilitator should guide learners through practical work to practice on computer handling.				
		1.1.3 Demonstrate mastery of using the Internet	a) Describe the concept of Internet	**i) Online Learning:** A learner should use internet to search information on concept of Internet. ii) **Library search;** A learner should carry out a library search on concept of Internet. **iii) Note-Making:** A learner should summarize findings by creating notes or a concept map showing the meaning, uses, and	**i)Group discussion and Case study: A facilitator should guide** learners through group discussion and case study to describe the concept of internet.	Concept of internet is clearly described	Projector, computer, hand-out, TV, smart board, digital podium, internet connectivity	4 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				importance of the Internet.					
			b) Use internet services *(Searching information, www,* electronic *Mail)*	**i) Online Learning:** A learner should use internet to search information on the use of internet services. **ii) Library search:** A learner should carry out a library search on the use of internet services. **iii) Self-Practice:** A learner should practice using internet services by searching information, browsing the WWW, and sending or receiving electronic mail. **iv) Self-Quiz:** A learner should take online quizzes on searching information, WWW,	**ii)Practical Work: A facilitator should guide** learners through practical work to use internet service.	Internet services terminologies are clearly used	Computer with internet connectivity	6 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				and electronic mail.					
2.0 PRACTICING COMPUTER SAFETY AND CYBER SECURITY IN DAILY LIFE	2.1 Demonstrate mastery of the basic Concepts of Computer Science	2.1.1 Demonstrate mastery of maintenance and troubleshooting of computer system	a) Install simple computer software	**i) Library search;** A learner should carry out a library search on information about installation of simple computer software. **ii) Internet search:** A learner should use internet to search for information on principles of installing simple computer software. **ii) Case Study / Scenario Method** A learner should analyse software installation scenarios to identify solutions and avoid common errors. **iii) Collaborative Learning:** A learner should demonstrate how to	**i)Demonstration**: A facilitator should guide learners to install simple computer software. **ii) Practical work: A facilitator should** guide learners through practical work on installation of simple computer software.	Simple computer software is clearly installed	Computer, CDs with different software, hand-out and hard disk	8 Hours	2 Hour

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				install software to reinforce understanding and teamwork.					
			b) Organise computer files in different operating systems *(Windows, Linux etc)*	**i) Library Search:** A learner should carry out a library search on file management concepts, including creating, naming, and organising files and folders in different operating systems. **ii) Internet Search:** A learner should use the internet to find information on file organisation techniques and best practices in Windows, Linux, or other operating systems. **iii) Self-Practice:** A learner should practice creating, naming, organising,	**i)Demonstration Practical Work:** Through demonstration a facilitator should guide learners to organise computer files and do practical work to organise computer files.	Computer files in different operating systems are clearly organised	Computer installed with recommended OSs, hand out, simulated steps videos and smart phone	8 Hours	2 Hour

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				copying, moving, and deleting files and folders in Windows, Linux, or other operating systems. **iv) Case Study / Scenario Method:** A learner should analyse file management scenarios to identify efficient organisation strategies and troubleshoot common file-related problems**.**					
		2.1.2 Demonstrate mastery of the basics of cyber security	a) Describe the concept of cyber security (ethics, security, and privacy)	**i) Library Search:** A learner should review library materials to gather key information on cyber security, including ethics, security principles,	**i) Group discussion and Case study:** Through group discussion and case study a facilitator	Concept of cyber security are clearly described	Projector, computer, hand-out, TV, smart board, digital podium, internet connectivity	8 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				and privacy protection. **ii) Internet Search:** A learner should use online resources to explore up-to-date concepts, best practices, and examples of ethical, secure, and privacy-conscious online behaviour. **iii) Self-Quizzes Online Test:** A learner should assess understanding of cyber-security, ethical behaviour, and privacy protection through short quizzes or online practice questions. **iv) Self-Practice:** A learner should practice safe	should guide learners to describe the concept of cyber security.				

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				online activities, apply security measures, and reinforce ethical and privacy-conscious behaviour in controlled exercises.					
			b) Understand Cyber Security Threats and related countermeasures	**i) Online Learning:** A learner to should use internet to search information on cyber security threats and related countermeasures. **ii) Library search:** A learner should gather information from library materials to identify common cyber security threats and recommended countermeasures.	**i) TIPS:** Through TIPS a facilitator should guide learners to elaborate security threats and related counter measures **ii) Case Study: A facilitator should** use a case study for example	Cyber security threats and related measures are clearly understood	Projector, computer, Hand-out, Internet connectivity	8 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				iii) Self-Quizzes A learner should test knowledge of cyber threats and countermeasures through short quizzes or exercises to reinforce understanding. **iv) Case Study / Scenario Method** A learner should analyze real-life or hypothetical cyber-attack scenarios to evaluate risks and determine appropriate countermeasures. **v)Collaborative Learning** A learner should discuss cyber threats and demonstrates	to demonstrate threats and counter measures.				

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								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				countermeasures to peers, reinforcing understanding through collaboration.					
			c) Evaluate ethical issues, related principles and practise of cyber security	**i) Online Learning:** A learner should use the internet to search for information on ethical issues, principles, and practices in cyber security. **ii) Library Search:** A learner should carry out a library search on ethical issues, principles, and practical approaches in cyber security. **iii) Self-Quizzes / Online Test:** A learner should assess understanding of cyber security ethics, principles, and practices	**i) Case study:** Using a case study guide a facilitator should learners to evaluate ethical issues and related principles and practices of cyber security.	Ethical issues, related principles and practice of cyber security are clearly evaluated	Projector, computer, hand-out, internet connectivity	8 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				through quizzes or reflective exercises. **iv) Case Study / Scenario Method:** A learner should analyse real-life or hypothetical cyber security cases to evaluate ethical issues and apply relevant principles**.** **v) Collaborative Learning:** A learner should discuss and present ethical issues, principles, and practical practices with peers to reinforce understanding.					
			d) Apply basic Cybersecurity Measures *(Password, Safe Browsing, Netiquette)*	**i) Online Learning:** A learner should use internet to search information on application of cybersecurity measures **ii) Library search:** A learner should	**i) Case study:** A facilitator should use case studies to guide learners to apply basic cyber	Basic cyber security measures are clearly applied	Projector, computer, hand-out, internet connectivity	10 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				carry out a library search on application of cybersecurity measures **iii) Competency Checklist:** A learner should check understanding of basic cybersecurity measures through short quizzes and practical questions. **iv) Self-Practice:** A learner should practice applying cybersecurity measures such as setting passwords, recognizing safe browsing signs, and using netiquette in simulated activities. **v) Case Study / Scenarios:** A learner should analyse online behaviour scenarios to decide	security measures. **ii)Practical work: A facilitator should guide** learners to do practical work to set password.				

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				appropriate cybersecurity actions and ethical responses. **vi) Collaborative Learning:** A learner should work in groups to demonstrate and reinforce correct use of passwords, safe browsing habits, and netiquette.					
3.0 APPLYING BASIC PROGRAMMING SKILLS IN PRACTICAL LIFE.	3. 1 Demonstrate mastery of the basic principles of Computer Science	3.1.1 Demonstrate mastery of the basic principles in problem solving (concept of problem solving, steps of problem solving, concept of algorithms)	a) Describe the steps in solving a problem using computers	**i) ICT Based Learning:** A learner should use internet and computers to search information on steps in solving a problem using computers. ii)**Self-Practical:** A learners should carry out self-practical task on steps in solving a problem using computers. **iii) Case Study / Scenario Method:** A learner should	**i) Brainstorming:** Through brainstorming a facilitator should guide learners to describe the steps of solving a problem using computers.	Steps of solving a problem using computers is clearly described.	Computer, smart phone, handouts of the basic principles in problem solving and tablets	8 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				analyse simple problem scenarios and describe the steps required to solve them using a computer. **iv) Collaborative Learning:** A learner should discuss and explain problem-solving steps to peers, reinforcing understanding through collaboration.					
			b) Demonstrate an understanding of basic principle of algorithms	**i) Library Search:** A learner should carry out a library search on basic algorithm concepts, including definition, structure, and common steps. **ii) Internet**	**i)Brainstorming and Demonstration:** Through brainstorming and demonstration a facilitator should guide learners to describe the concept of an algorithm.	Basic principles of algorithms are clearly demonstrated		6 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				Search: A learner should use online resources to explore examples of algorithms, their principles, and applications in solving problems. **iii)Self-Quizzes / Online Test:** A learner should test understanding of basic algorithm principles through quizzes or practice exercises.					
			c) Design and present a single algorithm using flow charts and pseudocode	**i) ICT Based Learning:** A learner should use internet and computers to search information on single algorithm using flow charts and pseudocode **ii)Library search;** A learner should carry out a library search on single	**i)Demonstration:** A facilitator should guide learners through demonstration on how to present algorithms using flow charts and	Single algorithm using flow charts and pseudocode are well designed and presented		8 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				algorithm using flow charts and pseudocode. **iii)Self-Practice:** A learner should practice designing simple algorithms for solving basic computational problems using flowcharts, pseudocode, or step-by-step instructions. **iv)Case Study / Scenario Method:** A learner should analyse a simple problem and design an appropriate algorithm using flowcharts and pseudocode.	pseudocode.				
		3.1.2 Demonstrate an understanding of basic principles of computer programming *(using an appropriate*	a) Describe concept of programming language *(categories, paradigm, generic*	**i) Online Learning:** A learner should use internet to search information on concepts of programming language	**i) TIPS, question and answer, and group discussion:** Through TIPS,	Concept of programming language are clearly described	Computer installed with appropriate programming tools	8 Hour	4 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
		structured programming language such as C, python, etc.)	*structures)*	**ii) Library search;** A learner should carry out a library search on concepts of programming language. **iii) Self-Reflection Task:** A learner should reflect on personal understanding of programming language concepts, identifying areas of strength and topics needing further practice. **iv)Self-Quizzes:** A learner assesses their understanding of programming language concepts through short quizzes and practice questions.	question and answer, and group discussion a facilitator should guide learners to describe computer programming language.				
			b) Describe programming tools *(compiler/ interpreter,*	**i) Online Learning:** A Learner should use internet to search information on programming	**i)Group discussion:** Through group discussion a	Programming tools are clearly described		10 hours	6 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
			text editor, IDE, Debugger)	tools. **ii)Library search:** A learner should carry out a library search on programming tools **iii) Self-Reflection Task:** A learner should reflect on their understanding of programming tools and identify which tools are most useful for specific tasks. **iv)Self-Quizzes:** A learner should assess understanding of programming tools through short quizzes and practice questions.	facilitator should guide learners to describe programming tools.				
			c) Install and configure the selected programming language *(compiler/ interpreter, text editor,*	**i) Online Learning:** A learner should use internet to search information on installation and configuration of the selected programming	**i)Demonstration and Practical work:** Through demonstration and practical	Selected programming language are clearly installed and configured		12 Hours	8 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
			IDE, Debugger)	language **ii) Library search:** A learner should carry out a library search on installation and configuration of the selected programming language. **iii)Self-Practice:** A learner should practice installing and configuring a compiler/interpreter, text editor, IDE, and debugger, and test the setup by running simple programmes.	work a facilitator should guide learners to install and configure the selected programming language tools.				
			d) Use programming tools of selected programming language to write a programme *(compile/run and debug a simple*	**i) Online Learning:** A learner should use internet to search information on the use of programming tools of selected programming language to write a programme **ii)Library search: A** learner should	**i)Practical work:** Through practical work a facilitator should guide learners to use programme tools of	Programming tools of selected programming language are clearly used		15 Hours	8 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
			program)	carry out a library search on the use programming tools of selected programming language to write a programme. **iii)Self-Practice:** A learner should practice writing, compiling, running, and debugging simple programmes using a programming tool (text editor, IDE, compiler/interpreter, and debugger.) iv) **Case Study / Scenario Method**: A learner should analyse sample programme scenarios, identify errors, and apply appropriate debugging techniques using programming tools.	selected programming language to write a simple programme.				

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				v) Collaborative Learning: A learner should work with peers to write, compile, run, and debug simple programmes, comparing solutions and debugging strategies. **vi) Assignment:** A learner should complete module tasks by writing a simple programme, compiling, running, and debugging it using the selected programming language tools.					
			e) Use variables, constants, and data types of a selected programming language in a programme (operators and expressions)	**i) Online Learning:** A learner should use internet to search information on use variables, constants, and data types of a selected programming language in a programme.	**i) Practical work:** Through practical work a facilitator should guide learners to use variables and data	Variables, constants, and data types of a selected programming language is clearly used		12 Hours	6 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				ii) Library search: A learner should carry out a library search on use variables, constants, and data types of a selected programming language in a programme. **iii) Self-Practice:** A learner should practice writing programmes that define variables and constants, use appropriate data types, and apply operators and expressions to perform calculations or manipulate data. **iv) Case Study /** Scenario Method: A learner should analyse sample programmes to identify the correct use of variables, constants, data	types of a selected programming language.				

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				types, and expressions, and suggest improvements. **v) Self-Reflection Task:** A learner should reflect on challenges and errors encountered while using variables, constants, and data types, and identify strategies for correct implementation.					
			f) Use syntax and constructs of the selected programming language to write programmes branching	**i) Online Learning:** A learner should use internet to search information on syntax and constructs of the selected programming language to write programs branching. **ii) Library search:** A learner should carry out a library search on syntax and constructs of the	**i)Practical work:** Through practical work a facilitator should guide learners to syntax and constructs of the selected programming language to write programmes	Syntax and constructs of the selected programming language to write programmes branching are clearly used		12 Hours	6 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	FACE TO FACE				
				selected programming language to write programmes branching. **iv)Self-Practice:** A learner to practice writing programmes that use branching constructs (if, if-else, switch) to make decisions based on conditions. **v) Case Study / Scenario Method:** A learner to analyse sample programmes and scenarios, identifying correct and incorrect use of branching constructs and suggesting improvements.	branching.				
			g) Debugging computer programmes	**i) Online Learning:** A learner to use internet to search information on debugging computer programmes **ii) Library search:**	**i) Demonstration:** A facilitator should guide learners through	Programmes are clearly debugged		8 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
								SELF LEARNING	FACE TO FACE
				SELF LEARNING	**FACE TO FACE**				
				A learner to carry out a library search on debugging computer programmes. **iiii) Self-Practice:** A learner should practice debugging programmes using IDE or compiler/debugger tools, detecting syntax, logic, and runtime errors. **iv) Case Study / Scenario Method:** A learner should analyse sample programmes with errors and apply debugging strategies to correct them.	demonstration to debug a programme.				

COMPUTER SCIENCE SYLLABUS STAGE II

COMPETENCES FOR COMPUTER SCIENCE STAGE II

Upon completion studying Stage II Modules of Computer Science, learners should be able to:

1. Demonstrate mastery of the basic principles of computer science;
2. Demonstrate mastery of the basic concepts of computer Science; and
3. Demonstrate mastery of the basic principles of data management.

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
1. 0 DEMONSTRATING SKILLS IN COMPUTER ARCHITECTURE AND DATA MANAGEMENT IN REAL-LIFE SITUATION	1.1 Demonstrate mastery of the basic principles of computer science	1.1.1 Demonstrate an understanding of the basic principles of computer architecture	a) Describe the concept of data representation (digital data, number systems, data type, character coding (UNICODE and ASCII)	**i) Library Search: A** leaner should search library materials to describe the concept of data representation. **ii) Internet search:** A learner should use internet to search online resources on concepts of digital data representation. **iii) Video Tutorials:** Learner should watch various video tutorials on concept of data representation	**i) Question and answer, TIPS, and small group discussion:** Through question and-answer, TIPS, and/or small group discussion a facilitator should guide learners to describe the concept of digital data representation.	Concept of data representation are described clearly	Handouts, standard codes	4 Hours	2 Hours
			b) Represent numbers in different number systems (binary, octal, decimal,	**i) Library Search:** A leaner should search library materials and	**i) Demonstration:** Through demonstrati	Numbers in different number systems are clearly represented		4 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			and hexadecimal)	use the information to represent numbers in different number systems. **ii) Internet search:** A learner should use the internet to search online resources on representing numbers in different number systems. **iii) Simulation:** A learner should do simulations on presenting numbers in different number systems.	on a facilitator should guide learners to represent numbers in different number system.	~~clearly~~			
			c) Convert numbers from one system to another (*binary, decimal, and*	**i) Internet search:** A learner should use the internet to search for	**i) Demonstration:** Through demonstrati	Numbers from one system to another are clearly converted ~~clearly~~		5 Hours	2 Hour

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			hexadecimal)	information on converting numbers from one system to another.	on a facilitator should guide learners to represent numbers in different number system.				
			d) Perform arithmetic operations (*addition and subtraction) using binary numbers functions*)	**i) Internet search:** A learner should use internet to search information to perform arithmetic operations. **ii) Self-practice:** A learner should use exercises to practice arithmetic operations in various number systems. **iii) Simulation:** A learner should do	**i) Demonstration:** Through demonstration a facilitator should guide learners to perform arithmetic operations.	Arithmetic operations are clearly performed ~~clearly~~		8 Hours	4 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				simulations on performing arithmetic operations.					
		1.1.2 Demonstrate the mastery of basic principles of databases and database management systems	a) Describe the concept of data and information	**i)Library Search:** A leaner should search library materials to describe the concept of data and information. **ii)Internet search: A l**earner should use the internet to search for information on the concept of data and information. **iii)Competency checklist:** A learner should perform competency checklist on the concept of data and information.	**i)Brainstorming**: Through brainstorming a facilitator should guide learners to describe concepts of data and information .	The concepts of data and information are clearly described	Computer installed with appropriate tools for managing data	6 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			b) Manage simple data (create, store, retrieve, check data quality)	**i) Library Search:** A learner should search library materials to describe simple data management. **ii) Online Learning:** A learner should use the internet to describe simple data management. **iii) Self-Practical Task:** A learner should perform self-practical task on managing simple data. **iv) Case study survey:** A learner should find a case study and provide a solution on managing simple data	**i)TIPS:** A facilitator should use TIPS to guide learners to describe the relationship between data and information .	Simple data are clearly managed ~~clearly~~		8 Hours	4 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			c) Describe the concept of database and database management system	**i) Library Search:** A learner should search library materials to describe the concept of database and database management system. **ii) Online Learning:** A learner should use the internet to describe the concept of databases and database management systems. **iii) Interactive Quizzes:** A learner should perform interactive quizzes on concept of database and	**i)Brainstorming:** Through brainstorming a facilitator should guide learners to describe database and database management system concepts.	Concept of database and database management system are clearly described		9 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				database management system.					
			d) Design a database	**i) Self-practice:** A learner should practice designing a database using examples and exercises. **ii) Simulation:** A learner should perform simulation on designing database. **iii) Video Tutorial:** A learner should watch video tutorials on designing database.	**i)Demonstration:** A facilitator should guide learners to design a database through demonstration **ii)Practical work:** A facilitator should guide learners to design a database through practical work.	Database are clearly designed ~~clearly~~	Computer installed with appropriate tools for database design	8 Hours	4 Hours
			e) Create a database using selected software (*e.g., MS – Access)*	**i) Self-practice:** A learner should practice creating a database using selected	**i)Practical work:** A facilitator should guide learners to create a	Database for selected software are clearly created ~~clearly~~		8 Hours	4 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				software.	database using selected software through practical work.				
		1.1.3 Demonstrate the mastery of the basic principles of data analysis	a) Describe principles of data analysis *(data collection, pre-processing, processing, visualization, interpretation)*	**i) Library Search:** A learner should search library materials to describe principles of data analysis. **Ii) Online Learning:** A learner should use the internet to describe principles of data analysis.	**i) Questions and answer**: Through question and answer a facilitator should guide learners to describe principles of data analysis.	Principles of data analysis are clearly described ~~clearly~~	Computer installed with data analysis tools, projector	6 Hours	2 Hours
			b) Analysing simple data using selected tools *(e.g., SPSS, Excel, etc.)*	**i) Self-practice:** A learner should practice analysing simple data using selected tools. **ii) Interactive Quizzes:** A	**i) Practical work**: A facilitator should guide learners to analyse simple data using selected	Simple data using selected tools are clearly analysed ~~clearly~~		5 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				learner should perform self-interactive quizzes on analysing simple data using selected tools.	tools through practical work.				
2.0 APPLYING PROGRAMMING SKILLS TO DEVELOP A MOBILE APPS	2.1 Demonstrate mastery of the basic principles of Computer Science	2.1.1 Demonstrate an understanding of basic principles of computer programming *(using an appropriate structured programming language such as C, python, etc.)*	a) Use the syntax and constructs of selected programming language to write programme (iteration, functions, array, and string)	**i) Online Learning:** A learner should use the internet to search for information about using syntax and constructs of a selected programming language to write programmes. **ii) Self-practice:** A learner should use exercises to practice the syntax and constructs of a selected programming language to	**i)Demonstration:** A facilitator should guide learners through demonstration to use iteration and functions in a programme	Syntax and constructs of selected programming language to write programme are clearly used ~~clearly~~	Computer installed with appropriate programming tools	8 Hours	4 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				write programs.					
			b) Use scope of variable in a programme.	**i) Library Search:** A learner should search library materials to describe and use the scope of variables in a programme. **ii) Internet search:** A learner should use the internet to search for online resources to describe and use the scope of variables in a programme. **iii)Competency checklist:** A learner should perform checklists on use scope of variable in a programme.	**i)Demonstration:** A facilitator should guide learners though demonstration to use scope of variables.	Scope of variable in a program are clearly used ~~clearly~~		5 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			c) Text and debug computer programme that employs iteration, array, string, branching and functions.	**i) Self-practice:** A learner should use exercises to practice writing and debugging programmes using iteration, arrays, strings, branching, and functions. **ii) Case study survey:** A learner should find a case study and provide a solution on text and debug computer programme that employs iteration, array, string, branching and functions.	**Demonstration**: A facilitator should guide learners through demonstration to text and debug computer programme that employs iteration and functions branching and functions.	Computer programme that employs iteration, array, string, branching and functions are clearly texted and debugged ~~clearly~~		6 Hours	3 Hours
			d) Appraise the utility of the developed programme	**i) Self-practice:** A learner should use exercises to appraise the	**i)Questions and answer:** Through questions and answer	Utility of the developed programme are clearly appraised ~~clearly~~		4 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				utility of the developed programme.	a facilitator should guide learners to appraise the utility of the developed application.				
		2.1.2 Demonstrate mastery of basic principles of mobile App	a) Create mobile App using the syntax of the selected program	**i) Online Learning:** A learner should use the internet to describe mobile app using the syntax of the selected programme. **ii)Self-practice:** A learner should practice creating a mobile app using the syntax of the selected programming language.	**i) Demonstration:** A facilitator should guide a learner through demonstration to create mobile app using the syntax of the selected programme.	Mobile App using the syntax of the selected programme are clearly created ~~clearly~~	Computer installed with appropriate programming tools for mobile Apps	10 Hours	4 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			b) Publish Mobile Apps	**iii) Self-practice:** A learner should practice publishing mobile apps. **iv) Simulation:** A learner should perform simulation on publishing Mobile Apps. **v) Competency checklist:** A learner should use checklists to measure competencies on publishing Mobile Apps.	**ii) Demonstration:** A facilitator should guide learners through demonstration to publish Mobile Apps.	Mobile Apps are clearly published ~~clearly~~		6 Hours	2 Hours
			c) Appraise the efficacy of the published Mobile Apps	**i)Video Tutorial:** A learner should watch video tutorials on appraising the efficacy of the published Mobile Apps. **ii)Self-practice:**	**Questions and Answer**: A facilitator should guide learners through questions and answer to appraise the efficacy	The efficacy of the mobile Apps is well published		5 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				A learner should use exercises to appraise the efficacy of the published mobile apps.	of the published Mobile Apps.				
3. 0 APPLYING WEB PROGRAMMING LANGUAGES TO CREATE AND PUBLISH WEBSITES	3. 1 Demonstrate mastery of the basic principles of Computer Science	3.1.1 Demonstrate mastery of basic principles of web development (HTML, CSS, and JavaScript)	a) Describe the background of HTML and selected programming languages *(CSS, JavaScript)*	**i)Library Search:** A learner should search library materials to describe the background of HTML and selected programming languages. **ii)Online Learning:** A learner should use the internet to describe the background of HTML and selected programming languages. **iii)Self-Reflection**	**i)Brainstorming or TIPS**: A facilitator should guide learners through brainstorming or TIPS to describe the background of HTML and selected programming languages.	Background of HTML and selected programming are clearly described	Computer installed with appropriate programming tools	6 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				Task: A learner should write a short reflection explaining basic principles of web development.					
			b) Install and configure the CSS and JavaScript interpreter (e.g., a web browser)	**i)Video Tutorial:** A learner should watch video tutorials on installation and configuration of CSS and JavaScript interpreter. **ii)Self-practice:** A learner should practice to install and configure the CSS and JavaScript interpreter.	**i)Demonstration:** A facilitator should guide learners through demonstration to install and configure the CSS and JavaScript interpreter.	CSS and JavaScript interpreter are clearly Installed and Configured		7 Hours	4 Hours
			c) Create webpages using HTML and CSS,	**iii)Library Search:** A learner should	**i)Demonstration:** A facilitator	Webpages using HTML and CSS, JavaScript		10 Hours	4 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			JavaScript	search library materials to create webpages using HTML and CSS, JavaScript. **iv)Self-practice:** A learner should practice to create webpages using HTML, CSS, and JavaScript. **v)Video Tutorial:** A learner should watch video tutorials on creating webpages using HTML and CSS, JavaScript.	should guide learners through demonstration to create webpages using HTML, CSS, and JavaScript.	successfully created			
			d) Publish website	**i)Internet Search:** A learner should use internet search on publishing website	**i)Demonstration:** A facilitator should guide learners through	Website is successfully published		6 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				ii)Self-practice: A learner should practice to publish a website.	demonstration to publish a website.				
			e) Appraise the published website	**i)Internet Search:** A learner should use internet search on appraising the published website. **ii) Self-practice:** A learner should use exercises to appraise the published website **ii)Competency checklist:** A learner should use checklists to measure the competency of the published website.	**i)Demonstration:** A facilitator should guide learner to appraise the published website through questions and answers.	Published website is clearly appraised		5 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
		3.1.2: Demonstrate an understanding of the basics of computer networks	a) Describe the concept of computer network *(meaning, mode, media, components, etc.)*	**i)Library Search:** A leaner should search library materials to describe the concept of computer network. **ii)Internet search:** A learner should use the internet to search for information on the concept of computer networks. **iii) Self-Reflection Task:** A learner should write a short reflection describing concepts of a computer network.	**i)Demonstration:** A facilitator should guide learners to describe the concept of computer network through brainstorming.	Concept of computer network are clearly described	Computer with installed internet, network cables and network card Devices	5 Hours	2 Hours
			b) Design a simple computer network	**i) Video Tutorial:** A learner should	**i)Demonstration:** A facilitator	Simple computer network involving a		7 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			involving a typical topology	watch video tutorials on designing a simple computer network. **ii) Self-practice:** A learner should practice designing a simple computer network using a typical topology. **iii) Simulation:** A learner should perform simulation on designing a simple computer network involving a typical topology.	should guide learners to design a simple network through demonstration.	typical topology are clearly designed			
			c) Create a computer network	**i) Video Tutorial:** A Learner should	**i)Demonstration:** A	Computer network involving typical		8 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			involving typical topology	watch video tutorials on creating a computer network involving typical topology **ii)Self-practice:** A earner should practice creating a computer network using typical topology. **iii)Simulation:** A learner should perform simulation on computer network involving typical topology. iv) **Video Tutorial:** A learner should watch video tutorials on creating a	facilitator should demonstrate on how to create a computer network involving typical topology and data transmission mode and media ii) **Practical work:** A facilitator should guide learners through practical work to create a computer network.	topology are clearly created			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				computer network involving typical topology.					
	3.2: Demonstrate mastery of the basic Concepts of Computer Science	3.2.1 Demonstrate mastery of systems administration	a) Maintain computer systems: desktop, laptop, tablets, mobile (create, delete/ disable user account, create, modify, and reset password, user support, peripherals)	**i) Library Search:** A learner should search library materials to describe the roles of system administrator. **ii)Online Learning:** A learner should use the internet to describe the roles of system administrator. **iii) Self-Reflection Task:** A learner should write a short reflection on maintaining computer systems.	**i)Think-Ink-Pair Share (TIPS):** A facilitator should guide learners to explain the roles of system administrat ed through TIPS. Ii)**Practical work:** A facilitator should guide learners to maintain a computer system through practical work.	Computer systems – desktop, laptop, tablets, mobile are clearly maintained	Projector, Computer (Desktop, laptop, t ablets, mobile), Internet connectivity	8 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
			b) Apply troubleshooting tools and techniques	**i)Video Tutorial:** A learner should watch video tutorials on troubleshooting tools and techniques. **ii) Self-practice:** A learner should practice applying troubleshooting tools and techniques.	**i)Demonstration**: A facilitator should guide learners to apply troubleshooting and maintenance tools through demonstration.	Troubleshooting tools and techniques are clearly applied		8 Hours	3 Hours
			c) Use selected OS to perform system administration tasks	**i)Internet Search** A learner should use internet to search information on how to use selected OS to perform system administration. Ii)**Self-practice:** A learner should practice to use selected OS to	**i) Demonstration:** A facilitator should guide learners through demonstration to use selected OS to perform system administration duty.	Selected OS to Perform system administration tasks are clearly used		7 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION & LEARNING METHODS		ASSESSMENT CRITERIA	FACILITATION /LEARNING RESOURCES	TIME (HOURS)	
				SELF LEARNING	FACE TO FACE			SELF LEARNING	FACE TO FACE
				perform system administration duty tasks.					

Bibliography

Mauritius Institute of Education. (2015, November). *National curriculum framework: Grade 1 to 6*. Ministry of Education and Human Resources, Tertiary Education and Scientific Research, Republic of Mauritius.

Mauritius Institute of Education. (2015, December). *National curriculum framework: Nine-year continuous basic education*. Ministry of Education and Human Resources, Tertiary Education and Scientific Research, Republic of Mauritius.

Ministry of Education and Vocational Training. (2010). *Information and computer studies syllabus for secondary schools (Form I–IV)* (2nd ed.).

Ministry of Education and Vocational Training. (2010). *Computer science syllabus for advanced secondary education (Form V–VI)* (2nd ed.).

Tanzania Institute of Education. (2021). *Information and computer studies for secondary schools: Student's book form one*. Ministry of Education, Science and Technology.

Tanzania Institute of Education. (2021). *Information and computer studies for secondary schools: Student's book form two*. Ministry of Education, Science and Technology.

Tanzania Institute of Education. (2021). *Information and computer studies for secondary schools: Student's book form three*. Ministry of Education, Science and Technology.

Tanzania Institute of Education. (2021). *Information and computer studies for secondary schools: Student's book form four*. Ministry of Education, Science and Technology.