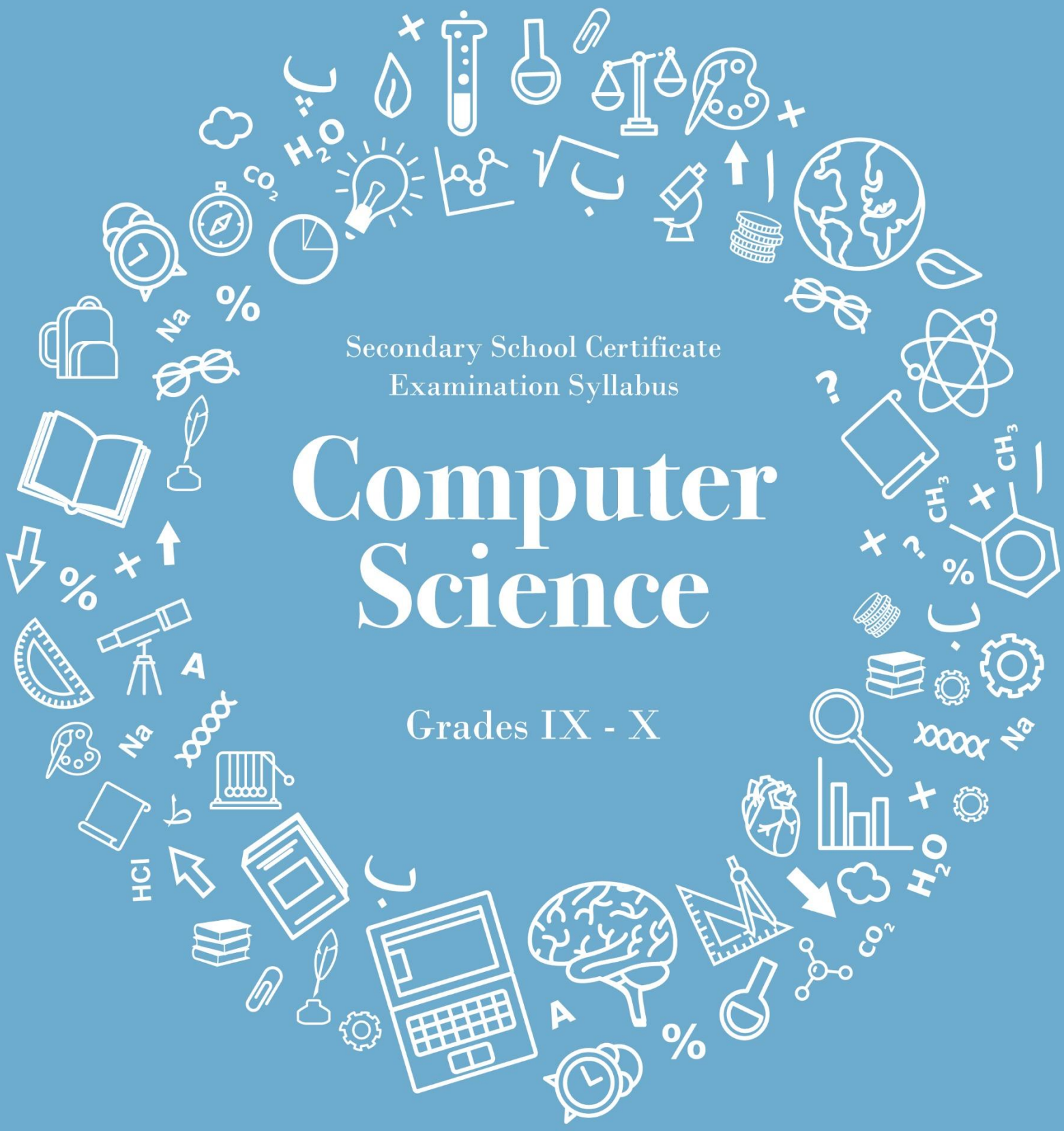
آغا خان یونیورسٹی ایگزامینیشن بورڈ

AGA KHAN UNIVERSITY EXAMINATION BOARD



Secondary School Certificate
Examination Syllabus

Computer Science

Grades IX - X

(Based on New National Curriculum 2022-2023)

FOR ANNUAL EXAMINATION 2026 AND ONWARDS

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Secondary School Certificate Examination Syllabus

COMPUTER SCIENCE

GRADES IX-X

This syllabus will be examined in both Annual and September Examination sessions from Annual Examinations 2026 for Grade IX and Annual Examinations 2027 for Grade X

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Preface

Established in 2002 through the Pakistan government's ordinance, the Aga Khan University Examination Board (AKU-EB) is country's first private autonomous qualification awarding body for Secondary School Certificate (SSC) and Higher Secondary School Certificate (HSSC). Its vision is to be a model of excellence and innovation in education in Pakistan and the developing world.

AKU-EB achieves its vision by developing examination syllabi which inculcates conceptual thinking and higher order learning and is aligned with the National Curriculum and mapped with provincial curricula and international standards. AKU-EB revises its syllabi periodically to support the needs of students, teachers and society.

The aims of the syllabus review of SSC and HSSC are to:

- Ensure continued compatibility with the goals of the National Curriculum of Pakistan.
- Review the content for inclusion of new knowledge and deletion of obsolete knowledge.
- Review the content for clarity and relevance as per the changing needs of students, teachers and society.
- Enhance and strengthen continuation and progression of content both within and across grades IX - XII (SCC and HSSC).
- Ensure the readiness of students for higher education.

During the syllabus review, the needs of all the stakeholders were identified through a needs-assessment survey. Students and teachers of AKU-EB affiliated schools from across Pakistan participated in the survey. Thereafter, a revision panel, which consisted of examiners, teachers of affiliated and non-affiliated schools, teacher trainers and university academicians, reviewed and revised the syllabus following a planned, meticulous and standardised syllabi review process.

The development of the revised syllabus has been made possible by the creativity and relentless hard work of the Curriculum and Examination Development unit and the constant support provided by all the other units of AKU-EB. We are particularly thankful to our Principal Syllabus Reviewers, Syllabus Revision Panelists and all other reviewers for their contribution. We are also thankful to all the students and teachers who took part in the needs-assessment survey and to the principals of AKU-EB affiliated schools who made this endeavor possible by facilitating and encouraging their teachers and students to be a part of the survey and the syllabus revision panel.

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With your support and collective hard work, AKU-EB has been able to take the necessary steps to ensure effective implementation of the National Curriculum of Pakistan through this syllabus. We are confident that this syllabus will continue to provide the support that is needed by students to progress to the next level of education, and we wish the very best to our students and teachers in implementing this syllabus.



Dr Naveed Yousuf
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Understanding of AKU-EB Syllabi

1. The AKU-EB syllabi guide the students, teachers, parents and other stakeholders regarding the topics that will be taught and examined in each grade (IX, X, XI and XII). In each syllabus document, the content progresses from simple to complex, thereby facilitating a gradual, conceptual learning of the content.

2. The topics of the syllabi are divided into subtopics and **student learning outcomes (SLOs)**. The subtopics and the SLOs define the depth and the breadth at which each topic will be taught, learnt and examined. The syllabi also provide enabling SLOs where needed to scaffold student learning.

3. Each SLO starts with an achievable and assessable **command word** such as describe, relate, evaluate, etc. The purpose of the command words is to direct the attention of teachers and students to specific tasks that the students are expected to undertake during their studies. The examination questions are framed using the same command words or their connotations to elicit evidence of these competencies in students' responses.

4. The SLOs are classified under the following **cognitive levels** of Bloom's Taxonomy: Remember (R), Understand (U), Apply and beyond [Apply (A), Analyse (An), Evaluate (E), Create (C)]. This is to facilitate effective planning for teaching, learning and assessment. In addition, some SLOs are identified as Formative Assessments (FA), where applicable.

5. Where applicable, SLOs are followed by the **Practical Activities** section to elaborate regarding the assessment in the Practical Examination.

6. The **Examination Specification** is also provided within this syllabus which elucidates the weightage of each topic in the examinations determined based on the content as well as the relevance of the topic. In addition, **Marks Distribution of Cognitive Level** is provided to explain the weight assigned based on the cognitive level.

7. To implement this syllabus, students and teachers can take support from additional materials provided by the board to its affiliated schools including **Learning Resource Guides**, **Pacing Guides** and **Model Papers**.

8. The AKU-EB syllabi for Secondary School Certificate (SSC) and Higher Secondary School Certificate (HSSC) are designed to foster not only conceptual understanding but also critical thinking and problem-solving skills. These syllabi ensure students develop the cognitive, affective and psychomotor skills essential for success at the university and beyond.

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Subject Rationale of AKU-EB Computer Science

Why study Computer Science?

Studying Computer Science undoubtedly opens doors to an impressive array of career opportunities, ranging from software development to cutting-edge artificial intelligence. This field equips you with essential problem-solving skills, critical thinking, and creativity, enabling you to tackle innovative projects that significantly impact various industries. As technology continues to shape nearly every aspect of modern life, the demand for computer science skills is skyrocketing. The ever-evolving nature of this field guarantees lifelong learning and continuous growth. Whether your passion lies in creating groundbreaking apps, analysing complex data, or building robust systems, computer science offers both intellectual fulfillment and the chance to make a tangible difference in the world. Furthermore, the potential for high salaries and job security only enhances its attractiveness, making it a compelling choice for anyone looking to make their mark in the tech industry.

Why study AKU-EB Computer Science?

Computer Science is a field of study that will help you as a student to learn theoretical and practical concepts of computation. You must have used the computer for playing games, surfing the internet, streaming videos, using media networking websites, preparing presentations and reports, etc. However, this syllabus would add to your knowledge, understanding and skills about some advanced uses of computers such as programming, web designing, computer networking, artificial intelligence, entrepreneurship, etc.

While learning through the AKU-EB syllabus of Computer Science, you will learn theoretical concepts of computer hardware and software, programming languages, data analysis and applications to solve real-life problems.

To be more specific, you will learn the following content areas in the syllabus:

- Computer Systems
- Data Communication and Computer Networks
- Web Designing
- Data and Analysis
- Computational Thinking
- Programming Languages
- Application and Impact of Computers
- Entrepreneurship

Where will it take you?

The subject will take you from simple real-life problems to different computational solutions and from basic computing technologies to emerging advanced hardware and software technologies. The set of skills learned in this syllabus will help you to select your career in the areas of computer science such as:

- Software Development
- Computer Hardware Engineering
- System Analysis and Design

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- Computer Network Engineering
- Web Development
- Web Designing
- Data Science
- Artificial Intelligence
- Machine Learning
- Mobile Applications Development
- Software Quality Assurance
- Content Creation and Blogging
- Graphic Designing

How to approach the syllabus?

The AKU-EB syllabi is carefully designed with a reader-friendly approach to ensure that students and teachers can easily comprehend it, making it functional for teaching, learning and assessment purposes. The syllabus includes the following parts:

Subject Rationale	It is an introductory document for students.
Student Learning Outcomes (SLOs)	These guide regarding the details about what must be achieved.
Exam Specification	It guides what will be expected in the examination.
Practical Activities	These include lab activities to be performed during an academic year.
Additional Resources:	
Pacing Guide	It ensures smooth transition and curricular continuity of a school's academic year. It also predicts the time and pace of syllabi implementation.
Resource Guide	It includes teaching and learning resources for students and teachers.
Model Paper	It guides regarding exam pattern, types of questions and marking scheme.
Command Word Guide	It clarifies expectations regarding the cognitive levels and skills that should be acquired by the students, and which are assessed in its examinations.

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Student Learning Outcomes of AKU-EB SSC Computer Science

Part I (Grade IX)

Topics and Sub-topics		Student Learning Outcomes		Cognitive Level[1]		
				R	U	A and beyond
1. The Computer System		Students should be able to:				
1.1	Understanding of Natural and Artificial Systems	1.1.1	differentiate between natural and artificial systems with real-world examples;		*	
1.2	Computational Architecture	1.2.1	define various input and output devices, including keyboards, touchscreen, pointing devices, biometric scanners, sensors, recognition systems, audio devices, display screens, printers, plotters, cutters, and actuators;	FA[2]		
		1.2.2	identify the use of types of sensors, i.e., temperature, moisture, light, infra-red, pressure, sound/ acoustic, gas and pH;		FA	
		1.2.3	describe primary and secondary storage devices based on location, cost, capacity, access time, data processing method, and storage technology such as semiconductor (SSD), magnetic (HDD), and optical;		FA	
		1.2.4	illustrate the Von Neumann Architecture using a block diagram;			A
		1.2.5	illustrate the system bus and its types, including data bus, address bus and control bus, along with their roles in computer architecture using a diagram;			A

[1]R = Remember, U = Understand, A = Apply and beyond [Apply (A), Analyse (An), Evaluate (E), Create (C)]
[2]FA= Formative Assessment, not to be assessed under examination conditions

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Topics and Sub-topics		Student Learning Outcomes		Cognitive Level		
				R	U	A and beyond
1.3	Memory Measurement Units	1.3.1	distinguish among the memory measuring units such as bits, bytes, kilobytes, megabytes, and gigabytes in computer memory;		*	
		1.3.2	compare the types of primary memory, i.e., Random Access Memory (RAM) and Read Only Memory (ROM);		*	
1.4	Software and Hardware Engineering	1.4.1	differentiate between software engineering and hardware engineering, based on their roles, significance, and applications in computer science;		*	
1.5	Computer Software	1.5.1	compare system software and application software, highlighting their roles in a computer system;		FA	
		1.5.2	explain the following types of system software: a. operating system, b. device drivers, c. utility programs, d. language processors;		FA	
		1.5.3	describe the purpose of the following application software: a. word processor, b. spreadsheet, c. database management, d. presentation/ desktop publication, e. communication, f. entertainment;		FA	
		1.5.4	distinguish between open-source, shareware, and freeware software based on their licensing, accessibility, cost, and usage limitations;		*	

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Topics and Sub-topics		Student Learning Outcomes		Cognitive Level		
				R	U	A and beyond
1.6	Programming Languages	1.6.1	describe characteristics, significance, and generation of programming languages;		*	
		1.6.2	classify programming languages into low-level (machine and assembly) and high-level (procedural and object-oriented) languages;		*	
		1.6.3	describe the following types of language translators: a. compilers, b. interpreter, c. assembler;		*	
1.7	Data Communication	1.7.1	describe data communication and its components, i.e., sender, message, medium, protocol and receiver;		*	
		1.7.2	describe the modes of network communication, i.e., simplex, half duplex and full duplex;		*	
		1.7.3	differentiate between the synchronous and asynchronous data transmission methods;		*	
1.8	Communication Devices	1.8.1	explain the following communication devices: a. hub, b modem, c. switch, d. router, e. gateway;		*	
		1.8.2	explain structure and functionality of network architecture and its types, including client-server, peer-to-peer, and point-to-point;		*	

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Topics and Sub-topics		Student Learning Outcomes		Cognitive Level		
				R	U	A and beyond
1.9	Computer Networks	1.9.1	explain computer networks and their uses in different fields;		*	
		1.9.2	explain different types of computer networks, i.e., Local Area Network (LAN), Wide Area Network (WAN), and Metropolitan Area Network (MAN), highlighting their characteristics and applications;		*	
		1.9.3	explain guided media and unguided media;		*	
		1.9.4	explain the following network topologies emphasising their structure, functionality, advantages, and disadvantages: a. bus topology, b. ring topology, c. tree topology, d. star topology, e. mesh topology;		*	
1.10	Packet Switching and Circuit Switching	1.10.1	explain packet switching and circuit switching;		*	
1.11	Data Communication Standards	1.11.1	explain the following data communication protocols highlighting their functions and significance: a. Transmission Control Protocol/ Internet Protocol (TCP/IP), b. Hypertext Transfer Protocol (HTTP), c. File Transfer Protocol (FTP);		*	

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Topics and Sub-topics		Student Learning Outcomes		Cognitive Level		
				R	U	A and beyond
1.12	OSI Model	1.12.1	explain the purpose and functions of OSI model and its following seven layers: a. layer 7 Application layer, b. layer 6 Presentation layer, c. layer 5 Session layer, d. layer 4 Transport layer, e. layer 3 Network layer, f. layer 2 Data Link layer, g. layer 1 Physical layer;		*	
1.13	The Internet	1.13.1 1.13.2	trace the evolution of the internet; discuss the advantages and disadvantages of the internet, considering its impact on communication, education and society.		*	E

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Topics and Sub-topics		Student Learning Outcomes		Cognitive Level		
				R	U	A and beyond
2. Computational Thinking and Algorithms		Students should be able to:				
2.1	Understanding the Problem	2.1.1	define the concept of a problem in computing;	*		
		2.1.2	describe the types of problems, including decision, searching, and counting;		*	
		2.1.3	describe the following steps of the problem-solving process: a. define the problem, b. analyse the problem, c. plan the solution of the problem, d. find candid solutions to the problem, e. select the best solution;		*	
2.2	Algorithm	2.2.1	explain the algorithm and its essential components including inputs, processing, decision, and outputs, highlighting their roles in problem-solving;		*	
		2.2.2	write algorithms to address the following types of problems: a. performing arithmetic, b. calculating the volume of geometrical shapes, c. converting from one unit to another unit of physical quantities, d. applying the selection process, e. finding the maximum and minimum from input values f. real-life problems;			A

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Topics and Sub-topics		Student Learning Outcomes	Cognitive Level		
			R	U	A and beyond
2.3 Flowchart	2.3.1	explain a flowchart and its importance in solving a computing problem;		*	
	2.3.2	draw flowcharts using the following symbols, for the problems mentioned in SLO # 2.2.2: a. input, b. process, c. decision making, d. outputs, e. terminator/ terminal point, f. connectors;			A
	2.3.3	solve the trace table for a given flowchart.			A

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Topics and Sub-topics		Student Learning Outcomes		Cognitive Level		
				R	U	A and beyond
3. Programming Fundamentals (JavaScript, HTML & CSS)		Students should be able to:				
3.1	Introduction to the World Wide Web (WWW)	3.1.1	define the following terms: a. World Wide Web (WWW), b. web page, c. website, d. web application, e. search engine, f. web server, g. web browser;	*		
		3.1.2	differentiate between the following terms: a. static and dynamic websites, b. front-end development and back-end development;		*	
3.2	Introduction to Hypertext Markup Language (HTML)	3.2.1	define Hypertext Markup Language (HTML);	*		
		3.2.2	write HTML code to: a. create and save an HTML file, b. display a webpage;			A
3.3	Designing Webpage I: Text Formatting	3.3.1	write HTML code to: a. specify a page title, b. create a paragraph, c. insert line breaks, d. insert spaces, e. add headings/ sub-headings;			A
		3.3.2	apply appropriate text formatting tags, i.e., bold, underline, italic, strikethrough, superscript, subscript, centre, font size font colour and font face;			A

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Topics and Sub-topics		Student Learning Outcomes		Cognitive Level		
				R	U	A and beyond
3.4	Designing Webpage II: Creating Lists	3.4.1	write HTML code to create: a. ordered list, b. unordered list, c. definition list;			A
3.5	Designing Webpage III: Images and Backgrounds	3.5.1	write HTML code to: a. insert an image, b. apply a border to an image, c. select width of an image, d. select height of an image, e. select an alternate text for an image;			A
		3.5.2	write HTML code to: a. apply background colour to a web page, b. apply foreground colour to a web page, c. assign a background image to the web page;			A
3.6	Designing Webpage IV: Hyperlinks	3.6.1	write HTML code to: a. create a hyperlink to a web page; b. create an 'anchor' in the context of hyperlinks; c. create an anchor to hyperlink within a web page; d. create a graphical hyperlink;			A

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Topics and Sub-topics		Student Learning Outcomes		Cognitive Level		
				R	U	A and beyond
3.7	Designing Webpage V: Forms	3.7.1	write HTML code to: a. create form, b. insert label, c. insert textbox, d. insert password, e. insert radio button, f. insert checkbox, g. insert button;			A
3.8	Designing Webpage VI: Creating Tables	3.8.1	write HTML code to create a table in the webpage with the following table attributes: a. table border, b. border colour, c. background colour, d. table width, e. table height, f. table row <tr>, g. standard data cell <td>, h. header cell <th>;			A
3.9	Cascading Style Sheet (CSS)	3.9.1 3.9.2	describe the cascading style sheet (CSS) and its syntax ; apply code using inline/ internal CSS: a. background (color and image), b. font (colour, style and size), c. tables (border, size, alignment);		*	A

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Topics and Sub-topics	Student Learning Outcomes		Cognitive Level		
			R	U	A and beyond
3.10 Programming Basics (JavaScript)	3.10.1	describe the importance of JavaScript;		*	
	3.10.2	explain comments in JavaScript;		*	
	3.10.3	explain the following data types offered by JavaScript: a. String, b. Number, c. BigInt, d. Boolean, e. Undefined, f. Null;		*	
	3.10.4	write a JavaScript program to declare and initialise variables by following the rules for specifying valid variable names;			A
	3.10.5	apply output functions: innerHTML, document.write( ) and window.alert( ) to display the output;			A
	3.10.6	write a JavaScript code that uses input functions prompt( );			A
	3.10.7	write a JavaScript code to use constants;			A
	3.10.8	write a JavaScript code to perform implicit and explicit typecasting;			A
3.11 Operators in JavaScript	3.11.1	write a JavaScript program to solve arithmetic problems by using arithmetic operators;			A
	3.11.2	use the following assignment operators in a JavaScript code: a. assignment operator (=), b. compound assignment operator (+ =, - =, * =, / =, % =);			A
	3.11.3	use the increment (++) and decrement (--) operators in a JavaScript code.			A

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Topics and Sub-topics		Student Learning Outcomes	Cognitive Level		
			R	U	A and beyond
4. Data and Analysis		Students should be able to:			
4.1 Scope of Data Science	4.1.1	explain the following key concepts of data science: a. data science, b. data and dataset, c. data analysis, d. statistics and probability, e. mathematics, f. machine learning, g. deep learning, h. data mining, i. data visualisation, j. big data, k. predictive model, l. natural language processing (NLP), m. image processing;		*	
	4.1.2	explain the scope and application of data science;		*	

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Topics and Sub-topics		Student Learning Outcomes		Cognitive Level		
				R	U	A and beyond
4.2	Data Types, Data Collection, and Data Storage	4.2.1 4.2.2	explain the concept of data and its types (qualitative and quantitative) emphasising their characteristics and importance; evaluate the process of data collection using websites, sensors, and surveys, highlighting its significance and ethical considerations through real-world examples;		*	 E
4.3	Big Data and Applications of Big Data in Real World Business	4.3.1 4.3.2 4.3.3	describe the following concepts of big data within the context of technology and society: a. big data, b. 3 Vs big data, c. big data analytics, d. data visualisation and interpretation; describe big data challenges in business; explain the application of big data in the following business domains: a. healthcare, b. internet of things (IoT), c. manufacturing, d. government.		* * *	

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Topics and Subtopics		Student Learning Outcomes	Cognitive Level		
			R	U	A and beyond
5. Applications of Computer Science		Students should be able to:			
5.1 Applications of Artificial Intelligence	5.1.1	describe the significance and relevance of Artificial Intelligence in modern technology;		*	
	5.1.2	discuss the application of AI in the following fields: a. healthcare, b. robotics, c. education, d. transportation, e. entertainment, f. natural language process (NLP);			E
5.2 Applications of Machine Learning	5.2.1	describe the fundamental concept of Machine Learning (ML), emphasising their importance in various fields;		*	
	5.2.2	describe the following types of machine learning (ML): a. supervised learning, b. unsupervised learning, c. reinforcement learning;		*	
	5.2.3	explain the applications of Machine Learning (ML) in the following fields: a. healthcare, b. finance, c. marketing, d. education;		*	

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Topics and Sub-topics		Student Learning Outcomes	Cognitive Level		
			R	U	A and beyond
5.3 Application of Cloud Computing	5.3.1	describe 'cloud computing' and its models: a. public cloud, b. private cloud, c. community cloud;		*	
	5.3.2	explain the following applications of cloud computing: a. software development, b. data analytics, c. IoT (Internet of Things).		*	

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Topics and Sub-topics	Student Learning Outcomes		Cognitive Level		
			R	U	A and beyond
6. Impact of Computing	Students should be able to:				
6.1 Impact of Computing	6.1.1	illustrate the role of computing in the following fields by demonstrating real-world applications and examples: a. healthcare, b. education, c. business, d. entertainment;			A
	6.1.2	discuss the positive and negative impacts of computing on daily life and society with examples;			E
6.2 Computer Security	6.2.1	describe the following ways through which malware can spread: a. infected flash drives/ CD's, b. pirated software, c. local area network, d. internet, e. e-mail attachments;		*	
	6.2.2	illustrate the symptoms of a malware attack on a computer system by providing real-world examples;			A
	6.2.3	suggest preventive measures to protect/ safeguard computer systems against malware transmission methods as mentioned in SLO # 6.2.1.			E

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Topics and Sub-topics		Student Learning Outcomes	Cognitive Level		
			R	U	A and beyond
6.3 Cyber Security	6.3.1	explain the following cyber security threats: a. brute force attacks, b. denial of services (DoS), c. distributed denial of service (DDoS) attacks, d. trojan horse, e. spyware, f. adware, g. phishing, h. pharming, i. social engineering;		*	
	6.3.2	explain the following methods to protect data from security threats: a. access levels, b. anti-malware, c. authentication (passwords and usernames, biometrics, two step verification).		*	

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Topics and Subtopics		Student Learning Outcomes	Cognitive Level		
			R	U	A and beyond
7. Entrepreneurship in the Digital Age		Students should be able to:			
7.1 Exploring Entrepreneurship in the Digital Age	7.1.1	explain entrepreneurship and its importance in the economy;		*	
	7.1.2	explore famous entrepreneurs and their success stories;			FA
7.2 The Digital Landscape	7.2.1	explain market trends, consumer needs, and emerging industries of entrepreneurship;		*	
	7.2.2	apply various idea generation techniques to identify business opportunities in the digital space;			A
	7.2.3	analyse the components of a Business Model Canvas (BMC) for a digital venture, explaining their roles and interrelationships in a business model.			An
	7.2.4	apply business models using the Business Model Canvas (BMC);			A

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Practical Activities of AKU-EB SSC Computer Science Syllabus

Student Learning Outcomes

Content Covered	Actions Performed	Attitude Developed
• Introduction to Hypertext Markup Language (HTML) • Designing Webpage: Text Formatting • Designing Webpage: Creating List • Designing Webpage: Images and Background • Programming Basics (JavaScript) • Operators in JavaScript • I/O Functions in JavaScript • Conditional (Selection) Control Structure • Loop Structure	• Follow the procedure provided in the Lab Guidelines. • Start the computer to perform the task. • Perform the task with the help of the given method. • Execute simple programs using a selected programming language. • Demonstrate cybersecurity principles to ensure safe data handling, secure authentication, and protection from malware.	• Ensure safety of yourself, others around you, and your surroundings. • Demonstrate a computational mindset by asking questions. • Display ethical dealings and practices while performing tasks. • Show willingness to solve problems and challenges. • Show self-reliance and cooperation when working independently and in a group setting respectively.

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Topic-Wise Practical Activities

Part I (Grade IX)

S. No	Practical Activity	Equipment	Software
	Topic 3: Programming Fundamental (JavaScript & HTML)		
1.	Construct an HTML file and display it using a web browser;	Computer and Printer	Notepad and Browser
2.	Apply the basic HTML text formats, i.e., heading, bold, italic, underline, strike-out, superscript, subscript, centre, font size, font colour and font face;		
3.	Create ordered, unordered and definition lists;		
4.	Write HTML code to add an image. (background and foreground);		
5.	Apply output functions: innerHTML, document.write( ) and window.alert( ) to display the output;		
6.	Write a JavaScript code that uses input functions prompt( );		
7.	Convert arithmetic expression into JavaScript code;		
8.	Use the arithmetic operators of JavaScript to solve an arithmetic problem;		
9.	Use the following assignment operators in a JavaScript code: a. assignment operator (=), b. compound assignment operator (+ =, - =, * =, / =, % =);		
10.	Use the increment (++) and decrement (--) operators in a JavaScript code;		

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Annexure A: List of Acronyms and Their Full Forms

Acronym	Full Form
2FA	Two-Factor Authentication
AI	Artificial Intelligence
ASCII	American Standard Code for Information Interchange
BCR	Barcode Reader
BMC	Business Model Canvas
CD	Compact Disc
CLI	Command Line Interface
CPU	Central Processing Unit
CSS	Cascading Style Sheets
DoS	Denial of Services
DDoS	Distributed Denial of Services
DOS	Disc Operating System
DSL	Digital Subscriber Line
DVD	Digital Versatile Disc
DVD RAM	Digital Versatile Disc Random Access Memory
FTP	File Transfer Protocol
GiB	Gibibyte
Gb	Gigabit
GB	Gigabyte
GUI	Graphical User Interface
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
HDD	Hard Disk Drive
I/ O	Input/ Output
IoT	Internet of Things
ICT	Information Communication Technology
IDE	Integrated Development Environment
ISDN	Integrated Services Digital Network
IT	Information Technology

KiB	Kibibyte
Acronym	**Full Form**
Kb	Kilobit
KB	Kilobyte
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MAN	Metropolitan Area Network
MiB	Mebibyte
Mb	Megabit
MB	Megabyte
MDI	Menu Driven Interface
MICR	Magnetic Ink Character Reader
MFA	Multifactor Authentication
ML	Machine Learning
NIC	Network Interface Card
NLP	Natural Language Processing
OCR	Optical Character Recognition
OMR	Optical Mark Reader
OS	Operating System
OSI	Open System Interconnection
PIN	Personal Identification Number
RAM	Random Access Memory
ROM	Read Only Memory
SSD	Solid State Drive
TCP/ IP	Transmission Control Protocol/ Internet Protocol
UNIX (UNICS)	Uniplexed Information and Computing System
URL	Uniform Resource Locator
USB	Universal Serial Bus
WAN	Wide Area Network
WWW	World Wide Web

Annexure B: Sample Problems for Algorithms, Flowcharts and Programming

1. Find the sum, product and average of five given numbers.
2. Find the acceleration of a moving object with a given mass and the force applied.
3. Find the volume of a cube, cylinder or sphere.
4. Find the area of a triangle, parallelogram, rhombus or trapezium.
5. Convert Celsius to Fahrenheit temperature and vice versa.
6. Prepare an electricity bill including number of units consumed, price per unit, government sales tax (GST) and total amount to be paid within due date and 10% surcharge after due date.
7. Display the larger one out of the three given unequal numbers.
8. Assign a grade to a subject based on the achieved marks.
9. Find the interest on an amount.
10. Determine whether a given number is prime or composite.
11. Generate a sequence of odd numbers starting from a given number.
12. Generate a sequence of even numbers starting from a given number.
13. Produce a multiplication table for a given number.

Scheme of Assessment

Grade IX

Table 1: Exam Specification

Topic No.	Topics	Marks Distribution			Total Marks
		MCQs	CRQs	ERQs	
1.	The Computer System	7		6 Marks Choose any ONE from TWO	20
4.	Data and Analysis	7			
2.	Computational Thinking and Algorithms	6	Total 3 Marks (1 CRQ)		9
3.	Programming Fundamentals (JavaScript, HTML & CSS)	9	Total 7 Marks (3 CRQs)		16
5.	Applications of Computer Science	5		6 Marks Choose any ONE from TWO	14
6.	Impact of Computing	3			
7.	Entrepreneurship in the Digital Age	3	Total 3 Marks (1 CRQ)		6
	Total	**40**	**13**	**12**	**65**
	Practical				**10**
	Total				**75**

Note: The cognitive distribution of marks for Computer Science SSC are as follows
Remember: 0 to 10%
Understand: 30 to 50%
Apply and beyond: 40 to 60%

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Examination Structure and Practical Requirements for Grades IX and X

Theory:

- Multiple Choice Question (MCQ) requires candidates to choose one best/ correct answer from four options for each question. Each MCQ carries ONE mark.
- Constructed Response Question (CRQ) requires students to respond with a short text (few phrases/ sentences), calculations or diagrams.
- Extended Response Question (ERQ) requires students to answer in a more descriptive form. The answer should be in paragraph form, with diagrams where needed, and address all parts of the question.
- Table 1 and 2 contain the marks distribution for each topic.
- There will be two examinations, one at the end of grade IX and one at the end of grade X.
- In each grade, the theory paper will be for 3 hours and will consist of two parts: paper I and paper II.
- Paper I theory will consist of 40 compulsory, multiple choice items. These questions will involve four response options. The answer sheet for paper I will be provided separately.
- Paper II theory will carry 25 marks and consist of Constructed Response Questions (CRQs) and Extended Response Questions (ERQs). Each extended response question will be presented in an either/ or form.
- The booklet for paper II will serve as an answer script.

Practical:

- In each grade, a practical examination (Paper III) will be conducted separately from the theory paper and will consist of 10 marks.
- Practical examination (Paper III) will be based on the list of practical activities given in the examination syllabus. Schools may design their own practical manuals based on these activities for teaching and learning purposes.
- Practical journals/ portfolio should be developed by students and endorsed by a figure of authority, such as a teacher or principal, and submitted at the time of the practical examination (Paper III).
- It is essential for each school to equip its computer labs with the necessary software, hardware, peripherals, and other resources according to the requirements of the practical activities. Each school will be responsible for making sure that each student is provided with the opportunity to do the practical activities.

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