COMPUTER SCIENCE

10TH GRADE

Unit-wise Heading, Sub-heading, SLO & Teaching-Method Plan | Based on National Curriculum of Pakistan 2022-23 (NBF Model Textbook)

Unit no	CONTENT (Heading / Sub-heading)	SLO	METHOD (How to Teach)	RESPONSE
Unit 1 **COMPUTER SYSTEMS** *Pg. 8-53*	**1.1 Machine Level Representation of Data**	01	Lecture method	
	1.2 Numbering Systems	02	Lecture method	
	1.2.1 Types of Number Systems (binary, octal, decimal, hexadecimal)	03	Demonstration method	
	1.2.2 Conversions from One Number System to the Other	04	Problem solving method	
	1.2.3 Binary Arithmetic (addition, subtraction, multiplication)	05	Drill and practice method	
	1.2.4 Overflow and Underflow	06	Discussion method	
	1.2.5 Complements (1's and 2's)	07	Problem solving method	
	1.2.6 Signed and Unsigned Numbers Representation	08	Lecture method	
	1.3 Common Coding Schemes (ASCII and Unicode)	09	Demonstration method	
	1.4 Operating System	10	Lecture method	
	1.4.1 Main Tasks/Functions of an Operating System	11	Discussion method	
	1.4.2 Types of Operating Systems	12	Compare & contrast method	
	1.4.3 Memory Management	13	Lecture with diagram method	
	1.4.4 Process Management	14	Demonstration method	
	1.5 Computer Software	15	Lecture method	

Unit no	CONTENT (Heading / Sub-heading)	SLO	METHOD (How to Teach)	RESPONSE
	1.5.1 Comparing Different Software Types	16	Compare & contrast method	
	1.5.2 Offline and Online Applications	17	Discussion method	
	1.5.3 Uses of Common Productivity Applications	18	Hands-on/Practical method	
	1.5.4 Application Patch (updates)	19	Discussion method	
	1.5.5 Software Hosting	20	Lecture method	
	1.5.6 Programming Software	21	Demonstration method	
Unit 2 **COMPUTATIONAL THINKING & ALGORITHMS** *Pg. 54-74*	**2.1 Computing Problems**	01	Question answer method	
	2.2 Basics of Counting Problems	02	Problem solving method	
	2.3 Basic Counting Principles	03	Problem solving method	
	2.4 Algorithms and their Characteristics	04	Lecture method	
	2.5 Logical Reasoning	05	Problem solving method	
	2.6 Standard Algorithms	06	Demonstration method	
	2.7 Steps in Algorithm to Solve Computational Problems	07	Problem solving method	
	2.8 Abstraction	08	Lecture method	
	2.9 Creating Generalized Solutions	09	Activity based method	
	2.10 Modular Design	10	Demonstration method	
	2.11 Algorithm Dry Run	11	Practical/drawing method	
	2.12 Errors (syntax, logical, runtime)	12	Problem solving method	
Unit 3	**3.1 Website Development**	01	Project based/Hands-on method	

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PROGRAMMING FUNDAMENTALS *Pg. 75-116*	**3.2 Additional Features of HTML/CSS**	02	Hands-on/Lab method	
	3.2.1 Forms in HTML	03	Hands-on/Practical method	
	3.2.2 Tables in HTML	04	Hands-on/Practical method	
	3.2.3 Animations in CSS	05	Demonstration method	
	3.3 Advanced Programming Constructs in JavaScript	06	Hands-on/Lab method	
	3.3.1 Advanced Function Concepts	07	Hands-on/Practical method	
	3.3.2 Bullet Points in HTML	08	Hands-on/Practical method	
	3.3.3 Bullet Points can be Values from Arrays	09	Hands-on/Practical method	
	3.4 Complex Algorithms in JavaScript	10	Problem solving/Lab method	
	3.4.1 Array & List are Similar	11	Demonstration method	
	3.4.2 Find an Element in a List	12	Problem solving method	
	3.5 Advanced Techniques for Testing and Debugging	13	Problem solving/Lab method	
	3.5.1 Unit Test	14	Hands-on/Practical method	
Unit 4 DATA AND ANALYSIS *Pg. 117-147*	**4.1 Data Science**	01	Lecture method	
	4.1.1 Data Science and its Scope	02	Discussion method	
	4.1.2 Artificial Intelligence	03	Lecture method	
	4.1.3 Machine Learning and its Scope	04	Discussion method	

Unit no	CONTENT (Heading / Sub-heading)	SLO	METHOD (How to Teach)	RESPONSE
	4.1.4 Data Science, AI and Machine Learning Skills	05	Discussion method	
	4.1.5 Machine Learning Models	06	Lecture method	
	4.1.6 Supervised Learning Model	07	Demonstration method	
	4.1.7 Unsupervised Learning Model	08	Demonstration method	
	4.1.8 Reinforcement Learning Model	09	Demonstration method	
	4.1.9 Choose an Appropriate Machine Learning Model	10	Problem solving method	
	4.1.10 Artificial Intelligence, Machine Learning and Data Science (relationship)	11	Compare & contrast method	
	4.1.11 Churn Prediction and Behavioral Segmentation	12	Case study method	
	4.2 Data Visualization	13	Hands-on/Practical method	
	4.2.1 Methods of Data Visualization	14	Demonstration method	
	4.2.2 Types of Data Visualization (charts, graphs)	15	Hands-on/Practical method	
	4.2.3 Uses of Data Visualization	16	Discussion method	
	4.2.4 Advantages/Benefits of Data Visualization	17	Discussion method	
	4.2.5 Database and Machine Learning	18	Discussion method	
	4.3 Stages of the Data Science Life Cycle	19	Lecture with diagram method	
	4.3.1 Case Study: Understanding a Real-world Business Problem	20	Case study method	
Unit 5 **APPLICATIONS OF COMPUTER SCIENCE** *Pg. 148-174*	**5.1 Internet of Things (IoT)**	01	Lecture method	
	5.2 Foundational Components of IoT	02	Demonstration method	
	5.2.1 Sensors/Devices	03	Demonstration method	
	5.2.2 User Interface	04	Demonstration method	

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	5.2.3 Cloud	05	Lecture method	
	5.2.4 Connectivity	06	Discussion method	
	5.2.5 Data Processing	07	Lecture method	
	5.3 Applications of IoT	08	Discussion method	
	5.3.1 Smart Homes	09	Discussion method	
	5.3.2 Healthcare	10	Discussion method	
	5.3.3 Traffic Monitoring	11	Discussion method	
	5.3.4 Hospitality	12	Discussion method	
	5.3.5 Industrial Automation	13	Discussion method	
	5.3.6 Smart Grid	14	Discussion method	
	5.3.7 Smart Farming	15	Discussion method	
	5.4 Blockchain Technology	16	Lecture method	
	5.5 Applications of Blockchain	17	Discussion method	
	5.5.1 Management of Supply Chain	18	Discussion method	
	5.5.2 Healthcare	19	Discussion method	
	5.5.3 Protection of Copyright and Intellectual Property	20	Discussion method	
	5.5.4 Voting	21	Discussion method	
	5.5.5 Cryptocurrency	22	Discussion method	
	5.5.6 Asset Administration	23	Discussion method	
	5.6 Cloud Computing	24	Lecture method	
	5.6.1 Benefits of Cloud Computing	25	Discussion method	
	5.6.2 Uses of Cloud Computing	26	Discussion method	

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	5.7 Speech Recognition and Voice Recognition	27	Demonstration method	
	5.7.1 Speech to Text Typing Applications (Dictation Software)	28	Demonstration method	
	5.7.2 Call Centers	29	Discussion method	
	5.7.3 Healthcare	30	Discussion method	
	5.7.4 Virtual Assistants	31	Demonstration method	
	5.7.5 Quran Memorization Applications	32	Demonstration method	
	5.7.6 Language Translation	33	Demonstration method	
	5.7.7 Voice Recognition for Security	34	Discussion method	
	5.7.8 Criminal Investigation and National Security	35	Discussion method	
	5.8 Natural Language Processing	36	Lecture method	
	5.8.1 Email Filtering	37	Demonstration method	
	5.8.2 Chatbots and Virtual Assistants	38	Demonstration method	
	5.8.3 Document Analysis	39	Discussion method	
	5.8.4 Predictive Text	40	Demonstration method	
	5.8.5 Sentiment Analysis	41	Discussion method	
	5.9 Robotics	42	Discussion method	
	5.9.1 Robots in Rescue Operations	43	Discussion method	
	5.9.2 Robots in Manufacturing Industries	44	Discussion method	
	5.9.3 Roomba Robots	45	Discussion method	
	5.9.4 Robots in Farming	46	Discussion method	
	5.9.5 Robots in Space Exploration	47	Discussion method	
	5.9.6 Robots in Healthcare	48	Discussion method	

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	5.10 Bias and Unethical Use of Artificial Intelligence	49	Debate method	
	5.11 Responsibilities of AI System Designers	50	Discussion method	
Unit 6 **IMPACTS OF COMPUTING** *Pg. 175-199*	**6.1 What is Technology Addiction**	01	Discussion method	
	6.1.1 Concerns of Technology Addiction	02	Discussion method	
	6.2 Internet	03	Lecture method	
	6.2.1 Use of Internet for Beneficial Purposes	04	Discussion method	
	6.2.2 Use of Internet for Malicious Purposes	05	Debate method	
	6.3 The Effects of Threats to Individual Privacy and Security	06	Discussion method	
	6.4 Cloud Computing (privacy & security)	07	Lecture method	
	6.4.1 Public Cloud	08	Discussion method	
	6.4.2 Private and Hybrid Cloud	09	Compare & contrast method	
	6.4.3 Basics of Security and Privacy of Cloud Computing	10	Discussion method	
	6.5 Hardware and Software Methods to Protect Devices	11	Demonstration method	
	6.5.1 Hardware Methods	12	Demonstration method	
	6.5.2 Software Methods	13	Demonstration method	
	6.6 Cybersecurity	14	Lecture method	
	6.6.1 Need of Cybersecurity	15	Discussion method	
	6.6.2 Cybercrime Laws	16	Lecture method	
	6.6.3 Instances of Cybercrimes	17	Case study method	
	6.6.4 Common Methods of Reporting Cybercrimes	18	Discussion method	
	6.7 Safety and Security Concept	19	Discussion method	

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	6.8 Cyberbullying	20	Discussion method	
	6.8.1 Impact of Cyberbullying/Harassment	21	Discussion method	
	6.8.2 Strategies to Prevent Cyberbullying/Harassment	22	Discussion method	
	6.9 The Environmental, Cultural and Human Impact of Computing and Assistive Technologies	23	Discussion method	
	6.9.1 Environmental Impact	24	Discussion method	
	6.9.2 Cultural Impact	25	Discussion method	
	6.9.3 Human Impact	26	Discussion method	
	6.10 Digital Divide	27	Discussion method	
	6.10.1 Access Divide	28	Discussion method	
	6.10.2 Usage Divide	29	Discussion method	
	6.11 Inequitable Access to Information	30	Debate method	
Unit 7 **DIGITAL LITERACY** *Pg. 200-220*	**7.1 Information Collection**	01	Activity based method	
	7.1.1 Sources for Information Collection (survey, Google forms)	02	Demonstration method	
	7.1.2 Key Ideas Extraction	03	Activity based method	
	7.1.3 Ideas Presentation by Graphics	04	Hands-on/Practical method	
	7.1.4 Components of Digital Literacy	05	Discussion method	
	7.1.5 Billboard Designing	06	Hands-on/Practical method	
	7.1.6 Social Media as a Communication Tool (YouTube, Facebook, Instagram, Podcasts, X)	07	Hands-on/Practical method	
Unit 8	**8.1 Qualitative vs. Quantitative Research | Differences, Examples & Methods**	01	Discussion method	

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ENTREPRENEURSHIP IN DIGITAL AGE *Pg. 221-262*	**8.2 The Differences between Quantitative and Qualitative Research**	02	Compare & contrast method	
	8.3 Questionnaire Design | Methods, Question Types & Examples	03	Activity based method	
	8.4 What is Market Validation?	04	Discussion method	
	8.5 How to Use Research to Create Customer Profiles	05	Activity based method	
	8.6 Business Pitching: Identifying Problems and Creating Solutions	06	Project based method	