

Bihar Secondary Teacher Eligibility Test (STET) 2026

Paper-II (Higher Secondary, Classes 11-12): Computer Science (Subject Code 226)

Syllabus, Scheme of Examination and Expected Unit-wise Weightage

The syllabus below follows the Computer Science Paper-II syllabus prescribed by the Bihar School Examination Board (BSEB), Patna, for STET 2026 (Advt. No. 183/2026). Expected marks per unit are estimates based on previous year papers and are given only as a guide for preparation. BSEB does not fix unit-wise weightage.

1. Scheme of Examination

S.No.	Subject	No. of Questions	Marks
1	Specific Subject (Computer Science)	100	100
2	Art of Teaching	30	30
3	General Knowledge	05	05
4	Environmental Science	05	05
5	Mathematical Aptitude	05	05
6	Logical Reasoning	05	05
	Total	150	150

Mode of examination: Computer Based Test (CBT), objective multiple choice questions, 1 mark each. Duration: 150 minutes. There is no negative marking. Application dates: 17 August 2026 to 31 August 2026. Date of examination will be notified separately by BSEB. Candidates should check the category-wise qualifying marks in the official notification on bsebstet.org.

2. Expected Unit-wise Distribution of Questions (Computer Science)

Based on analysis of 8 Paper-II Computer Science papers/shifts held in 2023, 2024 and 2025 (about 1,200 questions), giving 50% weight to 2025, 30% to 2024 and 20% to 2023. Actual numbers may vary by 1-2 questions per unit.

S.No.	Unit	Expected Questions (approx.)
1	Computer Network (Unit 7)	11
2	Programming and Data Structure (Unit 3)	9
3	Web-Based Application Development (Unit 10)	8
4	Operating System (Unit 5)	8
5	Theory of Computation (Unit 11)	7
6	Database Management System (Unit 6)	7
7	Software Engineering (Unit 8)	6

8	Internet of Things (Unit 12)	6
9	Digital Logic (Unit 1)	6
10	Object Oriented Programming (Unit 9)	6
11	Artificial Intelligence (Unit 13)	6
12	Algorithms (Unit 4)	6
13	Multimedia (Unit 15)	5
14	Computer Organization and Architecture (Unit 2)	5
15	Fundamentals of E-Commerce (Unit 14)	4
	Total	100

3. Detailed Syllabus: Computer Science (100 Marks)

Unit	Topics
Unit 1: Digital Logic (Expected: 6 marks)	1. Data and number systems; binary, octal and hexadecimal representation and their conversions; BCD, ASCII, EBCDIC, Gray codes and their conversions; signed binary number representation with 1's and 2's complement methods; binary arithmetic. Venn diagram, Boolean algebra; various logic gates, their truth tables and circuits; representation in SOP and POS forms; minimization of logic expressions by algebraic method and K-map method. 2. Combinational circuits: adder and subtractor circuits; applications and circuits of encoder, decoder, comparator, multiplexer, de-multiplexer and parity generator. Memory systems: RAM, ROM, EPROM, EEROM; design of combinational circuits using ROM; programmable logic devices and gate arrays (PLAs and PLDs). 3. Sequential circuits: basic memory element; S-R, J-K, D and T flip flops; various types of registers and counters and their design; irregular counter; state table and state transition diagram; sequential circuit design methodology. 4. Different types of A/D and D/A conversion techniques. Logic families TTL, ECL, MOS and CMOS, their operation and specifications.
Unit 2: Computer Organization and Architecture (Expected: 5 marks)	1. Introduction to data representation and number system: decimal, binary, octal, hexadecimal number systems; conversion of numbers from one system to another; binary arithmetic: addition (simple method, using 1's complement, using 2's complement), subtraction, multiplication and division (simple method). 2. Error detection codes: parity bit method, checksum method; error correction code: Hamming code; alphanumeric codes: ASCII, EBCDIC; Excess-3 code; BCD addition method; Gray code: Gray to binary and binary to Gray conversion. 3. Introduction to ideal microcomputer; an actual microcomputer: CPU, address bus, data bus, control bus; memory: RAM (SRAM, DRAM), ROM (PROM, EPROM, UVEPROM, EEPROM); history of microprocessor; microcontroller (application only); addressing techniques. 4. Introduction to digital electronics; logic gates: inverter, OR, AND, NOR, NAND, EX-OR and EX-NOR gates; De Morgan's theorems. 5. Universal gates (only for logic conversion); K-map simplification: pair, quad, octet (up to 4 variables), don't care condition; Arithmetic Logic Unit: half adder, full adder, binary adder, 2's complement adder-subtractor.

Unit	Topics
Unit 3: Programming and Data Structure (Expected: 9 marks)	1. Data, entity, information; difference between data and information; data type, built-in data type, abstract data type; definition and types of data structures: linear and non-linear. Introduction to algorithms: definition, difference between algorithm and program, properties of algorithm, algorithm design techniques, performance analysis, complexity of various code structures, order of growth, asymptotic notations. 2. Arrays: definition, single and multidimensional arrays; representation of arrays: row major order and column major order; derivation of index formulae for 1-D and 2-D arrays; applications of arrays; sparse matrices and their representations. Recursion: recursion in C, examples of recursion, Tower of Hanoi problem, simulating recursion, backtracking, recursive algorithms, principles of recursion. 3. Array implementation and pointer implementation of singly linked lists, doubly linked list, circularly linked list; operations on a linked list: insertion, deletion, traversal; polynomial representation and addition, subtraction and multiplication of single variable polynomials. 4. Stack: abstract data type, primitive stack operations push and pop, array and linked implementation of stack in C; applications of stack: prefix and postfix expressions, evaluation of postfix expression; iteration and recursion: principles of recursion, tail recursion, removal of recursion; problem solving using iteration and recursion with examples such as binary search, Fibonacci numbers and Hanoi towers. 5. Queue: create, add, delete, full and empty; circular queues; array and linked implementation of queues in C; dequeue and priority queue. 6. Concept of searching: sequential search, index sequential search, binary search; concept of hashing and collision resolution techniques used in hashing. 7. Sorting: insertion sort, selection sort, bubble sort, heap sort; comparison of sorting algorithms; sorting in linear time: counting sort and bucket sort. 8. Graphs: terminology; data structures for graph representation: adjacency matrices, adjacency list; graph traversal: depth first search and breadth first search; connected component. 9. Trees: basic terminology, binary trees; binary tree representation: array and pointer (linked list) representation; binary search tree, complete binary tree, extended binary trees; tree traversal algorithms: inorder, preorder and postorder; constructing binary tree from given traversals; insertion, deletion, searching and modification of data in binary search tree; threaded binary trees; Huffman coding using binary tree; AVL tree and B tree.

Unit	Topics
Unit 4: Algorithms (Expected: 6 marks)	1. Algorithm analysis, time space tradeoff, asymptotic notations, conditional asymptotic notation, removing condition from the conditional asymptotic notation, properties of big-Oh notation. 2. Recurrence equations, solving recurrence equations, analysis of linear search. 3. Divide and conquer: general method, binary search, finding maximum and minimum, merge sort. 4. Dynamic programming: general method, multistage graphs, all-pair shortest paths, optimal binary search trees. 5. Backtracking: general method, 8-queens problem, Hamiltonian problem. 6. Connected components, spanning trees, biconnected components; introduction to NP-hard and NP-completeness.
Unit 5: Operating System (Expected: 8 marks)	1. Introduction to OS: functional behaviour and responsibilities; need for monitor / command interpreter; types of operating systems; system structure; hierarchical and layered organization of OS; I/O methods and interrupt structure. 2. Process definition, process states and state transitions; parallel processes and constructs; process interaction; operating system kernel; data structures for processes and resources; context switching; process control primitives; process scheduling. 3. The determinacy problem, mutual exclusion, semaphores, process synchronization. 4. Conditional critical regions and monitors; inter-process communication; deadlock problem and its solutions. 5. Memory management concepts: relocation, linking, multiprogramming with fixed partitions, swapping, variable partitions, overlays, virtual memory, segmentation, paging, storage allocation strategies, load control and thrashing. 6. Organization of file and I/O subsystems: directory management, basic file system, file descriptors, file manipulation, file organization methods, management of auxiliary storage space, command language and file system utilities; I/O subsystems: programmed I/O, DMA, interrupt driven I/O; recovery procedures. Protection and security: safeguards, penetration, access and information flow control, protection problems, formal models of protection.

Unit	Topics
Unit 6: Database Management System (Expected: 7 marks)	1. Introduction to database; components and structure of DBMS; logical structure: the 3 level architecture and mapping among them; comparison between traditional file based system and DBMS; advantages and drawbacks of DBMS. 2. Relational model; relational key constraints: candidate key, primary key, foreign key. ER model: entities, attributes, relationship and cardinality; entity types, entity sets, attributes and keys; relationship types and relationship sets; converting ER diagram to relational tables; database schema. 3. Database anomalies, Codd's rules and normalization theory: 1NF, 2NF, 3NF and BCNF. 4. Introduction to transaction and concurrency control; transaction and system concepts; desirable properties of transactions; transaction support in SQL; concurrency control techniques: locking protocol, serializable schedules, locks, 2 phase commit; concurrency control based on timestamp ordering.
Unit 7: Computer Network (Expected: 11 marks)	1. Introduction to data communication and computer network; network topologies; classification of computer network; parallel and serial transmission; transmission modes; transmission channel; data rate, bandwidth; signal encoding schemes; data compression; transmission impairments; layering and design issues; OSI model and TCP/IP model. 2. Data link layer: need for data link control, frame design consideration, flow control and error control; MAC sublayer: contention based and polling based MAC protocols. 3. Network layer: routing, congestion control, internetworking principles; Internet protocols (IPv4, packet format, hierarchical addressing, subnetting, ARP, PPP); bridges, routers; classless IP address. 4. Transport layer: process to process communication; socket meaning and socket address; upward and downward multiplexing; UDP and TPDU. 5. Application layer: HTTP, FTP, Telnet, SMTP, SNMP.

Unit	Topics
Unit 8: Software Engineering (Expected: 6 marks)	1. Introduction to software engineering: characteristics, emergence of software engineering, software metrics and models, process and product metrics. Software life cycle models: waterfall, prototype and spiral models and their comparison. 2. Software project management: size estimation (LOC and FP metrics), cost estimation (Delphi and basic COCOMO), introduction to Halstead's software science, staffing level estimation (Putnam's model). Software requirements specification: SRS documents, their characteristics and organization. 3. Software design: classification, software design approaches, function oriented software design, structured analysis (data flow diagrams) and structured design, introduction to object oriented design. 4. Coding and testing of software: unit testing, black box testing, white box testing, debugging, program analysis tools, system testing. Software reliability and quality assurance: reliability metric, Musa's basic model. 5. Software quality assurance: ISO 9000 and SEI CMM and their comparison. Software maintenance: maintenance process models and reverse engineering, estimation of maintenance costs.
Unit 9: Object Oriented Programming (Expected: 6 marks)	1. Review of fundamentals of procedural programming 2. Class and objects 3. Data abstraction 4. Information hiding and encapsulation 5. Constructors, destructors and object creation 6. Namespace and references 7. Class methods, method overloading 8. Inheritance 9. Polymorphism 10. Abstract classes and abstract methods 11. Exceptions, exception handling
Unit 10: Web-Based Application Development (Expected: 8 marks)	1. Internet basics 2. Introduction to web development 3. Node.js and Git 4. HTML, CSS, jQuery 5. JavaScript and HTTP (forms) 6. Sessions and HTTP 7. JavaScript and Document Object Model (DOM) 8. Extensible Markup Language (XML) 9. Document Type Definition (DTD), Dreamweaver 10. PHP: Hypertext Preprocessor; PHP, SQL and MySQL 11. Integrating PHP and MySQL, database interaction

Unit	Topics
Unit 11: Theory of Computation (Expected: 7 marks)	1. Introduction; alphabets, strings and languages; automata and grammars; deterministic finite automata (DFA): formal definition, simplified notation, state transition graph, transition table, language of DFA; non-deterministic finite automata (NFA), NFA with epsilon transition, language of NFA; equivalence of NFA and DFA; minimization of finite automata; distinguishing one string from other. 2. Regular expression (RE): definition, operators and their precedence, algebraic laws; Kleene's theorem; RE to FA, DFA to RE; Arden's theorem; non-regular languages; pumping lemma for regular languages and its application; closure and decision properties of regular languages; FA with output: Moore and Mealy machines and their equivalence; applications and limitations of FA. 3. Context free grammar (CFG) and context free languages (CFL): definition, examples, derivation, derivation trees, ambiguity in grammar, inherent ambiguity, ambiguous to unambiguous CFG, useless symbols, simplification of CFGs; normal forms: CNF and GNF; closure properties of CFLs; decision properties: emptiness, finiteness and membership; pumping lemma for CFLs. 4. Push down automata (PDA): description and definition, instantaneous description, language of PDA, acceptance by final state and by empty stack, deterministic PDA, equivalence of PDA and CFG, CFG to PDA and PDA to CFG, two stack PDA. 5. Turing machines (TM): basic model, definition and representation, instantaneous description, language acceptance by TM, variants of TM, TM as computer of integer functions, universal TM, Church's thesis, recursive and recursively enumerable languages, halting problem, introduction to undecidability, undecidable problems about TMs, Post correspondence problem (PCP), modified PCP, introduction to recursive function theory.

Unit	Topics
Unit 12: Internet of Things (Expected: 6 marks)	1. Definitions and functional requirements, motivation, architecture, Web 3.0 view of IoT, ubiquitous IoT applications, four pillars of IoT, DNA of IoT, the toolkit approach for end-user participation in the IoT. Middleware for IoT: overview, communication middleware for IoT, IoT information security. 2. Protocol standardization for IoT: efforts, M2M and WSN protocols, SCADA and RFID protocols, issues with IoT standardization, unified data standards; protocols: IEEE 802.15.4, BACNet, Modbus, KNX, Zigbee network layer, APS layer, security. 3. Web of Things versus Internet of Things: two pillars of the web, architecture standardization for WoT, platform middleware for WoT, unified multitier WoT architecture, WoT portals and business intelligence. Cloud of Things: grid/SOA and cloud computing, cloud middleware, cloud standards, cloud providers and systems, mobile cloud computing, the Cloud of Things architecture. 4. Industrial Internet of Things: introduction, Industrie 4.0, IIoT architecture, basic technologies, applications and challenges; security and safety: systems security, network security, generic application security, application process security and safety, reliable-and-secure-by-design IoT applications, run-time monitoring, the ARMET approach, privacy and dependability. 5. Role of IoT for increased autonomy and agility in collaborative production environments; resource management in IoT: clustering, synchronization and software agents; applications: smart grid, electrical vehicle charging.
Unit 13: Artificial Intelligence (Expected: 6 marks)	1. Introduction to AI and production systems: problem formulation, problem definition, production systems, control strategies, search strategies, problem characteristics, production system characteristics, specialized production systems; problem solving methods: problem graphs, matching, indexing and heuristic functions; hill climbing, depth first and breadth first search; constraint satisfaction and related algorithms; measure of performance and analysis of search algorithms. 2. Representation of knowledge: game playing, knowledge representation using predicate logic, introduction to predicate calculus, resolution, use of predicate calculus, knowledge representation using other logic, structured representation of knowledge. 3. Knowledge inference: production based system, frame based system; inference: backward chaining, forward chaining, rule value approach; fuzzy reasoning, certainty factors, Bayesian theory, Bayesian network, Dempster-Shafer theory. 4. Planning and machine learning: basic plan generation systems (STRIPS), advanced plan generation systems (K-STRIPS), strategic explanations (why, why not and how explanations); machine learning, adaptive learning. 5. Expert systems: architecture and roles of expert systems, knowledge acquisition, meta knowledge, heuristics; typical expert systems: MYCIN, DART, XCON; expert system shells.

Unit	Topics
Unit 14: Fundamentals of E-Commerce (Expected: 4 marks)	1. Introduction to electronic commerce: introduction of commerce, electronic commerce framework, electronic commerce and media convergence, anatomy of e-commerce application. 2. The network for electronic commerce: need of network, market forces influencing the I-way, components of I-way, network access equipment, global information distribution network. 3. The Internet as a network infrastructure: introduction, Internet terminology, NSFNET architecture and components, Internet governance: the Internet Society. 4. Network security and firewalls: client-server network security, security threats in client-server, firewalls and network security, data and message security, encrypted documents and electronic mail. 5. Electronic commerce and World Wide Web: introduction, architectural framework for electronic commerce, WWW as an architecture, security in the web. 6. Consumer oriented electronic commerce: consumer oriented applications, mercantile process models, mercantile models from the consumer's and the merchant's perspective. 7. Electronic payment systems: types, digital token based payment systems, smart cards, credit card systems, threats to electronic payment systems. 8. Inter-organizational commerce and electronic data interchange (EDI): EDI applications in business, legal, security and privacy issues, EDI and electronic commerce. 9. The corporate digital library: dimensions of electronic commerce systems, types of digital documents, issues behind document infrastructure, corporate data warehouses.
Unit 15: Multimedia (Expected: 5 marks)	1. Definition, classification, multimedia applications, multimedia hardware, multimedia software, CD-ROM, DVD. 2. Multimedia audio: digital medium, digital audio technology, sound cards, recording, editing, MP3, MIDI fundamentals, working with MIDI, audio file formats, adding sound to multimedia project. 3. Multimedia text: text in multimedia; multimedia graphics: colouring, digital imaging fundamentals, development and editing, file formats, scanning and digital photography. 4. Multimedia animation: computer animation fundamentals, kinematics, morphing, animation software tools and techniques. Multimedia video: how video works, broadcast video standards, digital video fundamentals, digital video production and editing techniques, file formats. 5. Multimedia project: stages of project, multimedia skills, design concept, authoring, planning and costing, multimedia team. Multimedia looking towards future: digital communication and new media, interactive television, digital broadcasting, digital radio, multimedia conferencing.

4. Art of Teaching (30 Marks)

S.No.	Topic	Expected Questions (approx.)
1	Teaching and Learning: meaning, process and characteristics	4
2	Teaching objectives and instructional objectives: meaning and types, Bloom's Taxonomy	3
3	Teaching methods: types and their characteristics, merits and demerits of methods	6
4	Lesson plan: types, format and various models	2
5	Microteaching and instructional analysis	1
6	Effective ecosystem of classroom	2
7	Textbook and library	1
8	Qualities of teacher	2
9	Evaluation and assessment for learning	3
10	Curriculum	2
11	Factors affecting teaching and learning	2
12	Teaching aids and hands-on learning	2
	Total	30

5. Other Skills (20 Marks)

S.No.	Subject	Topics	Marks
1	General Knowledge	History of India, Geography of India, economic scenario, contribution of Bihar in National Movement, current affairs	5
2	Environmental Science	Pollution, solid waste, deforestation, global warming, flora and fauna	5
3	Mathematical Aptitude	Area, average, compound interest, decimal fractions, LCM and HCF, heights and distances	5
4	Logical Reasoning	Analogy, classification, series, coding-decoding, blood relations	5
	Total		20

6. Note for Preparation

Six units (Computer Network, Programming and Data Structure, Web-Based Application Development, Operating System, Theory of Computation and DBMS) together account for about 50 of the 100 Computer

Science questions and should be prepared first. Multimedia and E-Commerce together carry about 9 questions and are largely theory based.

Units 1 and 2 overlap in number systems, codes, logic gates, K-map and adders, and can be studied together. In Art of Teaching, teaching methods, teaching and learning, objectives (Bloom's Taxonomy) and evaluation together carry about 16 of the 30 questions.