Technology & Engineering Exam Syllabus
Grades 9-10

1. Engineering Design, Systems Thinking, and Project Planning

- Engineering design cycle: define, research, generate, prototype, test, improve
- Design briefs, design criteria, success criteria, user needs, accessibility, usability, and inclusive design
- Constraints: materials, cost, time, safety, sustainability, usability, and user needs
- Systems thinking: inputs, processes, outputs, feedback
- Technical sketching and annotated design communication
- Planning tools: step plans, timelines, task allocation
- Prototype testing and iterative improvement
- Evaluating performance against criteria

2. Digital Literacy, Information Evaluation, and Responsible Technology Use

- Digital identity, privacy, authentication, and security practices
- Responsible communication and online collaboration
- Evaluating sources, credibility, and digital evidence
- Misinformation, bias, and manipulation in digital content
- AI tools: strengths, limitations, and responsible use
- Human vs AI-generated outputs: evaluation and verification
- Copyright, attribution, and originality in digital production
- Digital wellbeing and balanced technology use

3. Computational Thinking and Algorithmic Modelling

- Decomposition of complex problems
- Pattern recognition and abstraction
- Algorithm design for real tasks and simulations
- Flowcharts and structured pseudocode
- Inputs, outputs, variables, and conditions in algorithm design
- Logical operators and introductory decision structures
- Trace tables and dry runs
- Introductory algorithm efficiency: fewer steps and clearer logic

4. Programming and Software Development

- Text-based programming in a high-level language
- Variables, data types, and expressions
- Input/output and user interaction
- Selection: if / elif / else
- Iteration: for and while loops
- Lists and basic data handling
- Functions/procedures and modular design
- Testing with normal, edge, and invalid cases
- Debugging syntax, runtime, and logic errors
- Readable code, comments, and documentation

5. Data, Spreadsheets, and Introductory Data Systems

- Data types and data collection methods
- Spreadsheet structure and formula use
- Relative references and simple functions: sum, average, min, max
- Sorting, filtering, and validating data
- Charts and graph selection for communication
- Data interpretation and trend spotting
- Introductory databases: records, fields, simple query concept
- Data quality, accuracy, and bias in data sets
- Using data to support design and STEM decisions

6. Computer Systems, Networks, and Cybersecurity Foundations

- Hardware components and basic system architecture
- Software types: system software, applications, utilities
- Binary representation for text, numbers, and images at an introductory level
- Logic and simple logic-gate ideas at an introductory level
- Network types: LAN/WAN and internet basics
- Data transmission and communication principles at an introductory level
- Cybersecurity risks: malware, phishing, weak passwords, unsafe downloads, and social engineering
- Security measures: updates, backups, authentication, permissions, and introductory encryption
- Ethical and responsible use of computer systems

7. Electronics, Control Systems, and Physical Computing

- Circuit design and safe practical electronics
- Series and parallel circuits in applied contexts
- Inputs, outputs, and control logic
- Sensors and actuators: light, temperature, motion, and other examples
- Microcontroller basics and introductory programming for control
- Thresholds, conditions, and automated responses
- Troubleshooting circuit and control faults
- Designing and testing a simple automated device

8. Materials, Manufacturing, Structures, and Mechanisms

- Material categories and properties: strength, stiffness, toughness, conductivity
- Material selection under constraints: cost, safety, sustainability
- Structures and load distribution
- Stability, reinforcement, and triangulation
- Mechanisms: gears, pulleys, levers, cams, linkages
- Accuracy in measuring, marking, cutting, and joining
- Manufacturing methods: forming, cutting, joining, assembly
- Testing prototypes for strength, movement, and function
- Design improvements based on performance evidence

9. Robotics, Automation, and Engineering Applications

- Robotics systems: sensing, processing, acting

- Automated decision-making in devices and machines
- Simple robotic logic and control sequences
- Feedback loops and system improvement
- Real-world automation: manufacturing, transport, home systems, health technology
- Efficiency, reliability, and safety in automated systems
- Human oversight, ethics, and risk in automation
- Designing a small automation or robotics concept solution

10. STEM Media Analysis, Technical Communication, and Evidence-Based Evaluation

- Analysing STEM media, technical diagrams, scientific demonstrations, and engineering videos for claims and evidence
- Identifying variables, controls, and measurements in demonstrations
- Distinguishing observation, inference, and explanation
- Checking whether conclusions follow from the evidence shown
- Spotting missing information or possible bias in demonstrations
- Linking STEM media content to science, computing, and engineering concepts
- Writing technical summaries and short evaluations
- Proposing a follow-up test, redesign, or investigation