# Information & Communication Technology

| Content to be covered | Completed |
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| **1. Basic Concepts of ICT** | |
| 1.1. Basic Building Blocks of Information & Their Characteristics | |
| 1.2. Need of Technology to Create, Disseminate & Manage Data | |
| 1.3. An Abstract Model of Information Creation | |
| 1.4. Basic Components of Computer System | |
| 1.5. Activities of Data Processing | |
| 1.6. Applications of ICT in Different Domains | |
| 1.7. Impact of ICT in the Society | |
| **2. Evolution of Computing Devices** | |
| 2.1. Changes occurred in the Computers from Generation to Generation | |
| 2.2. Functionality of a Computer (with hardware and interfaces) | |
| 2.3. Von-Neumann Architecture | |
| 2.4. PC Memory System | |
| **3. Representation of Data and Instructions in Computers & Arithmetic and Logical Operations** | |
| 3.1. Number Representation in Computers | |
| 3.2. Character Representation in Computers | |
| 3.3. Basic Arithmetic & Logical Operation on Binary Numbers | |
| **4. Basic Digital Circuits and Devices** | |
| 4.1. Basic Digital Logic Gates and their Functionalities | |
| 4.2. Simplification of Logical Expressions (Boolean Algebra and K'Map) | |
| 4.3. Simple Logic Circuits using Logic Gates | |
| 4.4. Combinational Logic Circuits and Sequential Circuits | |
| **5. Operating Systems** | |
| 5.1. Operating System and its need in the Computer System | |
| 5.2. Directories/Folders and Files in Computers | |
| 5.3. Process Management | |
| 5.4. Resource Management | |
| **6. Data Communication & Communication Networking Technologies** | |
| 6.1. Signals and their Properties | |
| 6.2. Signal Transmission Media | |
| 6.3. Encoding Digital Data using Signal Elements | |
| 6.4. Public Switch Telephone Network (PSTN) to connect Remote devices | |
| 6.5. Connecting Multiple Devices into Network | |
| 6.6. Media Access Control Protocol (MAC) | |
| 6.7. Interconnect Multiple Networks to form the Internet | |
| 6.8. Transport Protocols in the Internet | |

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| 6.9. Applications on the Internet | |
| 6.10. Role of Reference Modes to describe network Architecture | |
| 6.11. Security Aspects of the Communication and Protection of Internet connected Devices | |
| 6.12. ISPs and Technologies to connect Home Networks to Internet | |
| **7. Systems and uses System Analysis and Design Methodology in Developing Information Systems** | |
| 7.1. Characteristics of a System | |
| 7.2. Man-made Systems | |
| 7.3. Information System Development models and Methods | |
| 7.4. Structured System Analysis and Design Methodology (SSADM) | |
| 7.5. Need for a New Information System and Its Feasibility | |
| 7.6. Analyze a Current System | |
| 7.7. Design a Proposed System | |
| 7.8. Develop and Test the Proposed System | |
| 7.9. Deploy the Developed System | |
| 7.10. System Implementation | |
| **8. Database Systems to manage Data Efficiently and Effectively** | |
| 8.1. Basics of Information and Data, and Need for Databases | |
| 8.2. Main Components of the Relational Database Model | |
| 8.3. Main Components of a Database System | |
| 8.4. Conceptual Schema of a Database | |
| 8.5. Logical Schema of a Database | |
| 8.6. Transforms ER Diagram to Logical Schema | |
| 8.7. Normalization | |
| **9. Algorithms to Solve Problems and Python Programming Language** | |
| 9.1. Problem Solving Process | |
| 9.2. Top-Down & Stepwise Refinement Methodologies in Solving Problems | |
| 9.3. Algorithmic Approach to Solve Problems | |
| 9.4. Different Programming Paradigms | |
| 9.5. Program Translations | |
| 9.6. Integrated Development Environment (IDE) | |
| 9.7. Imperative Programming Language to Encode Programs | |
| 9.8. Control Structures in Developing Programs | |
| 9.9. Sub Programs in Programming | |
| 9.10. Data Structures in Programs | |
| 9.11. Files and Databases in Programs | |
| 9.12. Data Management in Databases | |
| 9.13. Searching and Sorting Data | |

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| **10. Website Development with Multimedia Technologies (Using HTML 5)** | |
| 10.1.  Need for Web | |
| 10.2.  User Requirement Analysis | |
| 10.3.  HTML Tags to Design a Single Web Page | |
| 10.4.  Create Linked Web Pages | |
| 10.5.  Cascaded Style Sheets (CSS) | |
| 10.6.  Authoring Tools | |
| 10.7.  Dynamic Web Pages with PHP and MySQL | |
| 10.8.  Publish a Website & Maintenance of a Web Site | |
| **11. IoT and Basic Building Blocks of Embedded Systems** | |
| 11.1.  Basic Building Blocks of Embedded Systems | |
| 11.2.  Internet of Things (IoT) to Create Simple Applications | |
| **12. Applicability of ICT to Business Organizations and the Competitive Marketplace** | |
| 12.1.  Role of ICT in World of Business | |
| 12.2.  Relationship between ICT and Business Operations | |
| 12.3.  ICT for Generating and Delivering an Improved Products and Services to Consumers | |
| **13. New Trends and Future Directions of ICT** | |
| 13.1.  New Trends and Future Directions in Computing | |
| 13.2.  Fundamentals and Applications of Agent Technology | |
| 13.3.  Existing Models of Computing and New Models | |