Advt. No.: CORP/GRP.A/06/2024

Recruitment of Scientist C (Level 11) against Continuing contract vacancies

Notice regarding Online Examination

Domain wise examination shall be conducted at the defined examination centres.

The details of the examination i.e. duration, date, etc. shall be updated on website in due course of time.

Important Note to the applicants:

- All the applicants must assess their own eligibility as per the notified criteria in our detailed advertisement.
- If you satisfy the criteria then only opt for the further process of exam centre selection.
- If you disqualify at any stage of the selection process, no communication / representation in this regard shall be considered later.
- No TA /DA shall be payable to the applicants for attending the examination

Syllabus for the notified centre wise domains is provided on following pages.

Detailed advertisement (Advt. no. CORP/GRP.A/06/2024) is provided for reference, after the syllabus.

August 5, 2025 **Director (HRD)**

Syllabus

Bengaluru Centre

Domain - AI / ML

a. Artificial Intelligence/Machine Learning Algorithms and Concepts:

i. Concepts and Algorithms of Machine Learning (ML):

- **Types of ML**: Supervised, Unsupervised, and Reinforcement Learning
- **Key algorithms**: Linear Regression, Logistic Regression, Ridge and Lasso Regression, Decision Trees, Support Vector Machines, k-Nearest Neighbors, K-Means, Ensemble methods, Dimensionality Reduction Methods etc.
- **Evaluation metrics**: Precision, Recall, F1 Score, ROC-AUC etc.

ii. Understandable & Robust AI:

- XAI taxonomy including Intrinsic vs Post Hoc, Model-Specific vs Model-Agnostic, and Local vs Global
- XAI methods including Partial Dependence Plot (PDP), Conformal Prediction, Individual Conditional Expectation (ICE), Feature Importance, Saliency Maps, Local Interpretable Model-Agnostic Explanations (LIME), SHAP, Integrated Gradient (IG)
- Adversarial Attack Simulations and Mitigation Strategies
- Metrics for Fairness and Bias Detection

iii. Generative AI:

- **Generative Models Overview:** Introduction to generative vs. discriminative models, probability distributions, and key types
- **Large Language Models (LLMs):** Transformer architecture, Pretraining, fine-tuning and Prompt engineering
- **Diffusion Models:** Basics of diffusion probabilistic models, noise and denoising processes, and applications in image, video, and 3D content generation.

iv. Synthetic Datasets Generation:

- Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), Synthetic Minority Over-sampling Technique (SMOTE), Rule-based Generators, Neural Style Transfer, Text Generation Models (e.g., GPT)

b. Data Structures and Algorithms Concepts:

- **Data Structures:** Stacks, queues, linked lists, trees, and hash tables
- **Search Algorithms:** Linear search and binary search
- **Basic Sorting Algorithms:** Selection sort, bubble sort, and insertion sort
- **Divide and Conquer Techniques:** Mergesort and quicksort
- **Graph Theory and Algorithms:** Introduction to graph theory, graph traversals, and shortest path algorithms

c. Programming & Frameworks:

- **Python Programming and Packages**: NumPy, Pandas, OpenCV etc.
- **ML, DL, AI Frameworks**: Scikitlearn, Tensorflow, Keras, PyTorch etc.
- **Building and Hosting Large Language Models (LLMs):** Hugging Face**,** LangChain, LlamaIndex etc.
- **DevOps for AI:** Docker, Kubernetes, MLFlow etc.
- **PostgreSQL and MongoDB**
- **AI models/app hosting on Cloud and HPC Infrastructure**

e. Artificial Intelligence/Machine Learning Algorithms and Concepts:

i. Concepts and Algorithms of Machine Learning (ML):

- **Types of ML**: Supervised, Unsupervised, and Reinforcement Learning
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v. Machine Learning Theory:

- Generalization bounds via uniform convergence
- Theory for deep learning: Non-convex optimization, Neural tangent kernel, Implicit/algorithmic regularization
- Unsupervised learning and domain adaptation
- Bandit and online earning

vi. Formal Verification for AI models:

- Lipschitz continuity certification
- Mixed-integer linear programming (MILP)
- Interval Bound Propagation

vii. Computer Vision:

- Image Basics and Feature Detection, Geometric Transformations, Image Segmentation, Object Detection and Recognition

viii. Natural Language Translation:

- Fundamentals of NLP and linguistics, Statistical machine translation methods, Neural machine translation architectures, Evaluation metrics and quality assessment, Advanced topics: multimodal and low-resource translation

ix. Semantic Mining

x. Soft Computing- Principles and Algorithms in context of AI

f. Data Structures and Algorithms Concepts:

- **Data Structures:** Stacks, queues, linked lists, trees, and hash tables
- **Search Algorithms:** Linear search and binary search
- **Basic Sorting Algorithms:** Selection sort, bubble sort, and insertion sort
- **Divide and Conquer Techniques:** Mergesort and quicksort
- **Graph Theory and Algorithms:** Introduction to graph theory, graph traversals, and shortest path algorithms

g. Programming & Frameworks:
    a. **Python Programming and Packages**: NumPy, Pandas, OpenCV etc.
    b. **ML, DL, AI Frameworks**: Scikitlearn, Tensorflow, Keras, PyTorch etc.
    c. AIOps

h. Mathematics for Artificial Intelligence:
- **Linear Algebra:** Vectors and matrices, Matrix operations and properties, Eigenvalues and eigenvectors, Singular value decomposition (SVD)
- **Calculus:** Derivatives and gradients, Partial derivatives and multivariable functions, Optimization techniques: Gradient descent and Newton's method, Integrals and area under curves
- **Probability and Statistics**: Basics of probability theory: Events, sample spaces, and conditional probability, Random variables and probability distributions (normal, binomial, Poisson), Expectation, variance, and standard deviation, Statistical inference: Hypothesis testing and confidence intervals
- **Information Theory:** Entropy and information gain, Kullback-Leibler divergence and Mutual information

i. AI-Based SDLC practices and tools

Domain - Quantum Computing

Quantum Mechanics Fundamentals

Mathematical Foundation – Linear Algebra

Quantum Information Science

Basics of Quantum Computing

Quantum Algorithms

Quantum Hardware and Architectures

Control Electronics and Measurement Hardware

Quantum Optics

Quantum Programming and Simulation Tools – (Qiskit, Cirq)

Quantum Error Correction

Post-Quantum Cryptography

Chennai

Domain - IoT, Embedded Systems

Embedded Systems

1. **Embedded C Programming and Data structures**

Overview of C Programming language, Introduction to GNU Toolchain and GNU Make utility, Linux environment and vi editor, Tokens of C - Keywords, Data-Types, Variables, Constants, Operators, Identifiers, Storage Class Specifiers, Control Flow Statements, Arrays, Multidimensional arrays, Data Input & Output, Strings, Loops, Functions and Recursion, Pointers - Introduction, Pointer Arithmetic, Pointers and Arrays, Pointers and Functions, Pointers and Strings, Structures, Unions, Enum, Typedef, Bit field operators and pointers with structures, Preprocessors, C and Assembly, Files, I/O, Variable number of arguments, Command Line arguments, Error handling, Debugging and Optimization of C programs, Bit operations, Handling portability issues in C, Hardware, Time, Space and Power aware Programming. Algorithms and Abstract Data Types, Complexity of Algorithms, Linked Lists, Stacks, Queues, Searching and Sorting Algorithms, Hashing, Trees.

2. **Microcontroller Architecture and Programming**

a. Microcontroller Architectures – Harvard, Von Neuman, CISC, RISC

b. Memory Architectures – Flash, RAM, NVRAM, Serial Flash, EEPROM

c. Analog circuits – ADC, Comparators, DAC,

d. General Purpose IO

e. Clocks, Timers, Watchdog, Real Time Clock

f. Embedded Peripheral Interfacing - Serial peripherals: UART, SPI, I2C, CAN

g. Interrupts and Nested Interrupts, Interrupt Controllers

3. **Operating System Concepts and Linux Programming**

a. Process Management, File Management, Device Management, Scheduling, Memory Management

b. IPC, Synchronization Techniques, Shared Memory

c. Interrupts and Interrupt Vectors, Handlers and Service Routines

d. Device Drivers, Kernel Programming, Device Tree Sources, System Calls

e. Linux System and Application Programming

f. Filesystem Types, Virtual File Systems - Proc FS, SysFS, Dev FS,

g. Libraries – Static and Dynamic Libraries,

h. Bootloader Concepts

i. Real Time Operating System Concepts - Schedulers, Priority based Scheduling Algorithms, Determinism, Priority Inversion and Inheritance

4. **ARM**

Overview of ARM Architecture and Organization, Introduction to Cortex-M Architecture, Programming Model and Instruction Set Architecture, Alignment and Endianness, Register access, State, Privilege, Stack, System Control Block, Power Modes, Memory Model, NVIC, Exception Handling, Bit- Banding, Peripheral Programming, SVCall, SysTick, PendSv, MPU, DMA, Mixing Assembly and C programs, Introduction to CMSIS & CMSIS Components, Overview of Cortex A & R

architectures.

5. **RISC V**

Why RISC-V processor, RISC-V processor overview, ARM vs RISC-V, Modes in RISC-V, Setting up of necessary tools, RISC-V register set and calling convention, Instruction formats and type, Build Process, Practical examples of instructions, Detail description on Control and Status Registers, Exception handling, Examples in assembly for exception handling, Interrupts, Interrupt Entry and Exit procedure.

6. **Embedded Hardware Design Concepts and Power Supplies**

a. Discrete Analog Circuit Design – OpAmps circuits: Amplifiers, Comparators, Integrators, Differentiators, Hysteresis

b. Microcontroller Board Bring Up – Crystal Oscillators, Power Supply Decoupling, Reset Circuits, Analog and Digital Ground Isolations

c. Power Supply Circuits – Linear Regulators, Low Drop Out oscillators, Switched Mode Power Supplies – Buck, Boost, Buck Boost, Isolated, Non-Isolated

d. Input and Output Device Interfacing – Analog Sensors, Serial Peripheral Interfacing, Digital Sensor Interfacing, LCD Interfacing, OLED Interfacing, Memory Chip Interfacing

e. Power supply requirements for embedded systems, Low-power design techniques, Power modes of microcontrollers (sleep, deep sleep), Energy-efficient software design

7. **Testing and Debugging in Embedded Systems**

a. Testing methodologies: unit testing, integration testing, system testing

b. On-chip debugging techniques: JTAG, SWD, Fault- tolerance and error-handling mechanisms

c. Testing tools: oscilloscopes, logic analyzers, debuggers

IoT

1. **Introduction to IoT**

a. Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, IoT frameworks, IoT and M2M.

b. Sensors Networks: Definition, Types of Sensors, Types of Actuators, Wireless Sensor Networks

2. **Networking and Communication Protocols**

a. Overview of Basic Networking Concepts (TCP/IP, OSI Model), MQTT, CoAP, LoRaWAN and Cellular Technologies in IoT, Bluetooth Low Energy (BLE), Network Topologies for IoT

b. Wireless Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, BACnet, Modbus. c. IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, AMPQ, CoAP, MQTT

3. **IoT Applications**

a. Basics of the Python programming language, Programming on the Raspberry Pi. Python on Raspberry Pi, Python Programming Environment, Python Expressions, Strings, Functions and Function arguments, Lists, List Methods, Control Flow.

b. Data Acquisition Techniques from Sensors

c. Data Analytics in IoT

4. **Security and Privacy in IoT** - Common IoT Security Challenges and Threats, Best Practices for Securing IoT devices, Overview of Encryption Methodologies (TLS, End-to-End Encryption),Privacy Concerns in Data Collection and Compliance Standards, Basics of Network Security

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Delhi

Domain - Applied Computing (e-Governance)

a. Core Java

- **OOP Principles**: Classes, Objects, Inheritance, Polymorphism, Encapsulation, Abstraction
- **Exception Handling**: Checked vs. Unchecked Exceptions, Custom Exceptions, try-catch-finally, Throws/Throw
- **Collections Framework**: Lists, Sets, Maps, Queues, Iterators, Generics
- **Multithreading & Concurrency**: Threads, Executors, Synchronization, Locks, volatile, atomic
- **JVM Internals**: Memory Management, Garbage Collection, Class Loaders, Bytecode
- **I/O Streams & NIO**: File Handling, Byte & Character Streams, Buffering, Channels
- **Lambda Expressions & Streams API**: Functional Programming, Stream Operations, Parallel Streams
- **JDK 8+ Features**: Optional, Default Methods, Stream API, CompletableFuture

b. Java EE & Spring Framework

- **Servlets & JSP**: Request-Response Cycle, Session Management, JSP Scripting
- **JPA & Hibernate**: ORM Concepts, Annotations, Criteria API, JPQL, Caching, Entity Lifecycle
- **Spring Core**: Dependency Injection, Inversion of Control, Beans, ApplicationContext
- **Spring MVC**: Controllers, Views (JSP/Thymeleaf), Form Handling, Validation, REST API Development
- **Spring Boot**: Auto-Configuration, Profiles, Embedded Servers, Starters, Properties Configuration
- **Spring Data JPA**: Repositories, Query Methods, Transactions, Paging & Sorting
- **Spring Security**: Authentication, Authorization, JWT, OAuth2, Method Security
- **Spring Cloud**: Microservices, Eureka, Ribbon, Feign, Config Server, Circuit Breakers (Hystrix)
- **Web Services**: RESTful Web Services, SOAP, JSON/XML Marshalling

c. Database Management & SQL

- **Relational Databases**: ER Modeling, Normalization (1NF, 2NF, 3NF), ACID Properties, Transactions
- **SQL Queries**: SELECT, INSERT, UPDATE, DELETE, Joins, Subqueries, Aggregations, Group By, Having
- **Indexes & Optimization**: Types of Indexes, Indexing Strategies, Query Optimization, Execution Plans
- **Database Design**: Entity-Relationship Diagrams, Foreign Keys, Primary Keys, Constraints
- **Stored Procedures & Triggers**: Writing Procedures, Functions, Event Triggers, Cursors

- **NoSQL Databases**: Key-Value Stores, Document Stores (e.g., MongoDB), Column Stores (e.g., Cassandra)
- **Data Integrity & Consistency**: Constraints, Transactions, Referential Integrity, Isolation Levels

d. Web Technologies

- **HTML & CSS**: HTML5 Elements, CSS3 Layouts, Flexbox/Grid, Responsive Design, Media Queries
- **JavaScript & ES6+**: Variables (let/const), Arrow Functions, Promises, Async/Await, Modules
- **Front-End Frameworks**: React.js, Angular, Vue.js, Component Lifecycle, State Management
- **AJAX & Fetch API**: Asynchronous Requests, XMLHTTPRequest, Fetch API, Promises
- **RESTful APIs**: API Design, CRUD Operations, HTTP Methods, Headers, Status Codes
- **WebSockets & Real-Time Communication**: WebSocket Protocol, Long Polling, Server-Sent Events
- **CSS Preprocessors**: SASS, LESS, Mixins, Variables, Functions
- **Browser DevTools**: Debugging, Performance Analysis, Network Monitoring, Accessibility Testing

e. Software Architecture & Design Patterns

- **Software Architecture Styles**: Monolithic, Microservices, Event-Driven, Layered Architecture
- **Design Patterns**: Singleton, Factory, Builder, Prototype, Strategy, Observer, Decorator, Adapter
- **SOLID Principles**: Single Responsibility, Open/Closed, Liskov Substitution, Interface Segregation, Dependency Inversion
- **Microservices Communication**: REST, RPC, Message Brokers (Kafka, RabbitMQ), gRPC

f. DevOps & CI/CD

- **Version Control Systems**: Git, Branching Strategies, Merge & Rebase, Pull Requests
- **CI/CD Pipelines**: Jenkins, GitLab CI, CircleCI, Automated Builds, Continuous Deployment
- **Containerization**: Docker, Docker Compose, Container Registry, Image Optimization
- **Orchestration**: Kubernetes, Docker Swarm, Helm Charts, Service Mesh (Istio)
- **Monitoring & Logging**: Prometheus, Grafana, ELK Stack (Elasticsearch, Logstash, Kibana), Fluentd
- **Automated Testing in CI/CD**: Unit Tests, Integration Tests, End-to-End Tests, Code Coverage Tools

g. Software Project Management

- **Project Lifecycle Models**: Waterfall, Agile, Scrum, Kanban, Lean Software Development
- **Agile Frameworks**: Sprint Planning, Daily Standups, Retrospectives, Backlog Grooming, Scrum Roles
- **Task Management & Tracking Tools**: Jira, Trello, Asana, GitHub Issues

- **Risk Management**: Risk Identification, Mitigation Strategies, Risk Logs
- **Stakeholder Communication**: Communication Plans, Reporting, Client Interactions

h. Quality Assurance & Testing

- **Unit Testing**: JUnit, Mockito, TestNG, TDD (Test-Driven Development), BDD (Behavior-Driven Development)
- **Integration Testing**: Testing APIs, Databases, Microservices Communication
- **End-to-End Testing**: Selenium, Cypress, Puppeteer, Postman for API Testing
- **Performance Testing**: JMeter, LoadRunner, Stress Testing, Benchmarking, Bottleneck Analysis
- **Security Testing**: Penetration Testing, Vulnerability Scanning, OWASP Testing Guide
- **Automated Testing**: Continuous Testing, Frameworks for Test Automation (Selenium, Appium)
- **Test Coverage & Metrics**: Code Coverage, Test Reports, SonarQube, Static Code Analysis

i. Security & Compliance

- **Web Security Principles**: XSS (Cross-Site Scripting), SQL Injection, CSRF (Cross-Site Request Forgery)
- **Authentication & Authorization**: OAuth2, JWT, SSO (Single Sign-On), Multi-Factor Authentication
- **Data Encryption**: Symmetric/Asymmetric Encryption, TLS/SSL, HTTPS, Hashing Algorithms (SHA, MD5)
- **Compliance Standards**: GDPR, HIPAA, PCI-DSS, ISO/IEC 27001
- **Security Audits & Penetration Testing**: Vulnerability Assessment, Threat Modeling, Red Team/Blue Team Exercises
- **Secure SDLC (Software Development Life Cycle)**: Security in Design, Secure Coding Practices, Security Testing

j. Microservices

- **Microservices Design**: Decomposition Strategies, Bounded Contexts, Independent Deployment
- **Service Discovery**: Eureka, Consul, Zookeeper, Dynamic Service Registration
- **API Gateway**: Zuul, API Gateway Patterns, Rate Limiting, Circuit Breaking
- **Inter-Service Communication**: REST, Message Brokers (Kafka, RabbitMQ), gRPC, Event-Driven Architecture
- **Resilience Patterns**: Circuit Breaker (Hystrix, Resilience4j), Bulkheads, Retry Patterns, Fallback
- **Data Consistency & Transactions**: Saga Pattern, Eventual Consistency, Two-Phase Commit (2PC)
- **Microservices Security**: OAuth2, JWT, Secure Communication between Services

Observability in Microservices: Distributed Tracing (Zipkin, Jaeger), Metrics (Prometheus), Log Aggregation

Hyderabad

Domain - Cyber Security R&D

1. Basic Concepts

Fundamental aspects of Network, Firmware, Application, and Cryptography Security, Attack Types, Malware Types

Network Security

- **Network Security Basics**: OSI and TCP/IP models, and secure communication protocols etc
- **Common Network Attacks**: Man-in-the-middle, DoS/DDoS, packet sniffing, IP spoofing etc
- **Firewall & Intrusion Detection/Prevention Systems (IDS/IPS), XDR**: Functions and types etc
- **VPN and Wireless Security**: SSL/TLS, IPSec, WPA3, and vulnerabilities in wireless communication.

Firmware Security

- **Firmware Basics**: Firmware architecture, types of firmware, and secure boot processes.
- **Firmware Vulnerabilities**: Buffer overflows, memory corruption, hardware backdoors, supply chain risks.
- **Firmware Integrity Checks**: Techniques for secure firmware updates, encryption, and verification processes.

Application Security and OS Security

- **OWASP Top 10 Vulnerabilities**: Cross-site scripting (XSS), SQL injection, CSRF, etc.
- **API Security**: Authentication, authorization, and best practices for securing APIs etc
- **Mobile Application Security**: Secure storage, encryption, app sandboxing, mobile-specific threats, etc
- **OS Security:** SELinux, AppArmor, Container etc

Cryptography and Security Protocols

- **Encryption Algorithms**: AES, RSA, ECC, and symmetric vs. asymmetric encryption.
- **Hashing Functions**: SHA, MD5, and their security implications.
- **Key Management**: Key generation, distribution, storage, and secure lifecycle management.
- **Digital Signatures and Certificates**: PKI, certificate authorities, and the chain of trust.

Attack Types & Malware Types

- **Malware Types**: Viruses, worms, trojans, ransomware, rootkits, adware, spyware.
- **Common Attack Vectors**: Phishing, spear-phishing, social engineering, insider threats.

- **Advanced Persistent Threats (APT)**: Definition, behavior, and common examples.
- **Botnets and DDoS Attacks**: Concepts, attack methods, and mitigation strategies.

2. Advanced Concepts

Threat Analysis, Malware Analysis, Vulnerability Analysis, Penetration Testing, Secure Coding, Cryptographic Algorithms, Static & Dynamic Analysis

Threat Analysis

- **Threat Modeling**: STRIDE, DREAD, and risk assessment methodologies.
- **Threat Intelligence**: Gathering, sharing, and responding to threat intelligence data.
- **Incident Response**: Phases of incident response and mitigation techniques.

Malware Analysis

- **Static Analysis**: Signature-based detection, file hashes, binary inspection.
- **Dynamic Analysis**: Behavioral analysis, sandboxing, and debugging malicious code.
- **Reverse Engineering Malware**: Tools and techniques for deconstructing malware.

Vulnerability Analysis

- **Common Vulnerabilities**: CVEs, zero-day exploits, memory corruption, race conditions.
- **Exploitation Techniques**: Buffer overflows, privilege escalation, remote code execution.

Penetration Testing

- **Penetration Testing Phases**: Reconnaissance, scanning, exploitation, reporting.
- **Reporting and Remediation**: Vulnerability disclosure, patch management, and reporting procedures.

Secure Coding Practices

- **Secure Coding Principles**: Input validation, error handling, data sanitization.
- **Best Practices**: Use of static analysis tools, code review, secure memory management.
- **Development Security Standards**: Secure SDLC, SAST, and DAST techniques.

Advanced Cryptographic Algorithms

- **Quantum-Safe Cryptography**: Basics of post-quantum algorithms.
- **Elliptic Curve Cryptography (ECC)**: Use cases, strengths, and weaknesses.
- **Blockchain-based Cryptography**: Merkle trees, hash-based cryptography, zero-knowledge proofs.

3. Fundamentals of Emerging Technologies in Cybersecurity

Blockchain Technology for Cybersecurity

- **Blockchain Fundamentals**: Decentralized ledgers, consensus mechanisms (PoW, PoS) etc.
- **Smart Contracts**: Security vulnerabilities, formal verification of contracts.
- **Blockchain Use in Cybersecurity**: Decentralized identity management, supply chain security, data integrity.

AI for Cybersecurity

- **AI Techniques in Cybersecurity**: Machine learning for threat detection, behavior analysis, and anomaly detection.
- **AI-based Security Tools**: AI-driven SIEM, intrusion detection, and malware classification systems.
- **Challenges in AI Security**: Adversarial attacks, AI model poisoning, and defense techniques.

Cybersecurity of AI

- **Securing AI Models**: Protecting against data poisoning, evasion, and inference attacks.
- **Trust and Explainability in AI**: Issues with transparency and accountability in AI-driven systems.
- **AI Bias and Fairness in Security**: Recognizing and mitigating biases in AI security models.

Pune

Domain - Hardware System Design

- **Advanced Electronics System Design**

  - Introduction to Electronics: Signals, frequency Spectrum of Signals, Analog and Digital Signals, Linear Wave Shaping Circuits: RC LPF, Integrator, RC HPF, Differentiator. Diodes: p-n junction theory, Current-Voltage characteristics, Analysis of Diode circuits, Rectifiers, Clippers, Clampers, Special diodes. Bipolar junction Transistor (BJTs): Physical Structures & Modes of Operation, Transistor Characteristics, DC analysis, Introduction to Small Signal Analysis, Transistor as an amplifier, The RC coupled amplifier, Introduction to Power Amplifiers, Transistor as switch. Field Effect Transistors (FETs): Physical Structures & Modes of Operation of MOSFETs, MOSFET Characteristics, DC Analysis. Feedback Amplifiers & Oscillators: General Principles, Different types of feedback amplifier. Voltage regulators, Voltage converters, Level Shifters. Operational Amplifiers (OP-Amps): Ideal OP-AMP, Inverting Amplifier, Non-Inverting Amplifier. Adder, Subtractor, Integrator, Differentiator. Digital Fundamentals: Binary Numbers, Hexadecimal Number Systems, Logic Gates, Boolean Algebra. Combinational and sequential logic design, Digital Logic families.
  - Advanced Digital Design, Hardware Description Languages (HDL) and their use in digital logic design.
  - Programmable Logic Devices: PLD, PGA, PLA, PAL, FPGA etc. PLD Logic Elements, SRAM, Flash Memory and Anti-fuse Configuration, Technology Mapping for FPGAs: Logic Synthesis, Lookup Table Technology Mapping.
  - Measuring and Test equipment: Introduction to Electronic Instruments, such as Oscilloscope, Multi-meter, Signal Generators, Logic Analyzer etc.
  - Board bring-up, testing, debugging, and hardware-software co-design.

- **Computer Architecture Fundamentals:**

  - Introduction to Computer Architecture and Organization. Von Neuman Architecture, Harvard Architecture, Flynn Classification.
  - Computer Organisation: General register organization, Instruction formats. RISC, CISC characteristics. Instruction Set Architecture (ISA). Pipeline and Vector processing. Arithmetic pipeline and Instruction pipeline.
  - Memory Organisation: RAM, ROM, Memory Hierarchy, Organization, Associative memory, Cache memory, and Virtual memory. DDRx memories, flash memories.

- Input-Output Organization: Input-Output Interface, Modes of Transfer, Priority Interrupt, DMA.
- Common Bus Architectures such as PCIe, LVDS, SPI, I2C, USB etc.
- Basics of Computer Networking, common networking protocols, TCP, IP, UDP, ICMP, OSI Model, functionality of common networking devices such as network switches, routers.
- Performance analysis of a Compute System: CPU performance–CPU Power Consumption, Analysis and Optimization of CPU Power Consumption, program execution time–Analysis, low-power modes (sleep modes), clock request feature, low power programming and interrupts.
- Basics of Operating Systems

- **Embedded System Design:**

- Overview of Embedded System: Definition, Design Challenges and Characteristics, Categories and Requirements of Embedded Systems. Embedded Hardware and Software Development environment. Difference between microprocessor, microcontroller and DSP. General capability of microcontroller; microcontrollers in embedded systems. Suitability/selection of a microcontroller based on - Cost, Performance, Power dissipation and architecture- 8-bit, 16-bit, 32-bit. Concepts of system-on-chip.
- Interfacing: I/O interfacing of devices such as LED, LCD, different sensors, ADC, DAC etc.

- **PCB Design:**

- Principles and practices of PCB design, schematic entry, component engineering, Library creation and managing, netlist creation, exporting and importing schematic data, stack creation, layout design, standards to be followed at various stages.
- Implications of highspeed multilayer PCB design, EMI/EMC implications, PCB dielectric material selection, layer stack creation.
- PCB design concepts such as DFM, DFT, DFA.
- PCB manufacturing techniques, data exchange formats, processes followed.
- PCB assembly techniques

Domain - HPC Tech System Software

1. Operating Systems
   Process Management, Scheduling, Interprocess Communication & Synchronization, Memory Management, I/O subsystem & File Systems, POSIX Thread Programming, POSIX Semaphores, Mutexes, Conditional Variables, Shared Memory, Linux OS, Boot- loader, BIOS, Kernel, Root File System, RTOS, Virtualization

2. C programming
   Data-Types, Variables, Constants, Operators, Identifiers, Preprocessors , arrays, pointers, basics of Data Structures, Algorithms and Abstract Data Types, Complexity of Algorithms, Linked Lists, Stacks, Queues, Searching and Sorting Algorithms, Hashing, Trees.

3. Linux programming
   GNU Toolchain, Linux environment and editors, Debugging and Optimization of C programs, file handling, signal handling, shell commands, scripting, static linking & dynamic linking, cross-compilation

4. Device driver programming
   Linux Kernel Modules and Module Programming, Char Device Drivers, Kernel Internals: Dynamic memory allocations, Handling Delays, Timers, Synchronization, Locking, I/O Memory and Ports, Interrupts, Deferred Executions, Driver Debugging Techniques, Drivers for GPIO, I2C, and SPI, Pseudo Filesystems

5. Embedded programming
   Programming in Assembly and Embedded C, Microcontrollers, Microprocessors and SoC, RISC vs CISC, Timers/Counters, UART, SPI, PWM, Input & Output, I2C, CAN, LED, LCD, RTC, Bus Standards (USB, PCI), ARM, RISC-V

6. Network programming
   OSI layer, Socket Programming, IP addressing

7. Parallel programming
   Message Passing Interface, OpenMP, Accelerator programing, profiling, optimization and debugging of parallel programs

8. Computer Architecture and Organization
   Instruction Set Architecture, Cache design and coherency, Arithmetic Logic Unit, Floating Point Unit, Instruction Set Pipelining, Parallel Processing Architectures, Distributed systems

Recruitment to Group A S&T posts of Executive Director and Scientist C

Advt. No.: CORP/GRP.A/06/2024

Centre for Development of Advanced Computing (C-DAC), is a Scientific Society of the Ministry of Electronics & Information Technology, Government of India. C-DAC has today emerged as a premier R&D organization in IT&E (Information Technologies and Electronics) in the country working on strengthening national technological capabilities in the context of global developments in the field and responding to change in the market need in selected foundation areas. In that process, C-DAC represents a unique facet working in close junction with MeitY to realize nation's policy and pragmatic interventions and initiatives in Information Technology. As an institution for high-end Research and Development (R&D), C-DAC has been at the forefront of the Information Technology (IT) revolution, constantly building capacities in emerging/ enabling technologies and innovating and leveraging its expertise, caliber, skill sets to develop and deploy IT products and solutions for different sectors of the economy, as per the mandate of its parent, the Ministry of Electronics and Information Technology, Government of India and other stakeholders including funding agencies, collaborators, users and the market-place.

C-DAC's areas of expertise range from R&D work in ICT&E Technologies to Product Development, IP Generation, Technology Transfer and Deployment of Solutions.

Primary Thematic or Thrust Areas addressed by C-DAC are:

- High Performance Computing and Grid & Cloud Computing
- Multilingual Computing & Heritage Computing
- Professional Electronics, VLSI & Embedded Systems
- Software Technologies including FOSS
- Cyber Security & Cyber Forensics
- Health Informatics
- Education & Training

Mission Mode Programmes:

- Exascale Computing Mission
- Microprocessor and Professional Electronics Mission
- Quantum Computing Mission
- AI and Language Computing Mission
- Internet of Everything (IoE), Dependable and Secure Computing Mission
- GenNext Applied Computing Mission

JOB DETAILS:

Sr.	Post/Designation	No. of Posts	Domain(s)	Location	View Details
1	Executive Director (Kolkata)	1		Kolkata	View Details & Apply
2	Executive Director (Mohali)	1		Mohali	View Details & Apply

3	Executive Director (Thiruvananthapuram)	1		Thiruvananthapuram	View Details & Apply
4	Scientist C (Level 11)	2	Hardware System Design, HPC System Software Development	Pune	View Details & Apply
5	Scientist C (Level 11)	1	IoT, Embedded Systems	Chennai	View Details & Apply
6	Scientist C (Level 11)	1	Applied Computing (e-Governance)	Delhi	View Details & Apply
7	Scientist C (Level 11)	2	Cyber Security (R&D)	Hyderabad	View Details & Apply
8	Scientist C (Level 11)	4	AI/ML, Quantum Computing	Bangalore	View Details & Apply

To meet with the immediate requirement, applications are invited (only online) from the persons of Indian nationality for the following Group A S&T positions:

Table-1

Post & Pay Level	Pay Matrix	No. of Posts	Initial Posting	Method of Recruitment
Executive Director (Level 14)	Rs. 144200 - 218200	3 (Regular)	Kolkata, Mohali, Thiruvananthapuram	Direct Recruitment failing which by transfer(absorption) / Deputation
Scientist C (Level 11)	Rs. 67700 - 208700	10 (Continuing Contract)	Bengaluru, Chennai, Delhi, Hyderabad, Pune	Direct Recruitment only

Post/Appointment details: The appointment would be against position sanctioned by the Governing council, available at C-DAC subject to the applicable provisions of Bye laws and other applicable rules.

C-DAC reserves the right to not to recruit against the posts notified in this notification at its discretion without any notice.

Regular: The appointment will be till attaining the age of superannuation i.e. 60 years after clearing the probation period.

Continuing Contract: The Appointment will be on contract basis for a duration of 5 years including the probation period, which shall be renewable based on satisfactory performance review for further periods of five years at a time, till attaining the age of superannuation i.e 60 years.

Table-2

For Scientist C posts - Domains / work area (Single or in combination)

Centre	Domain / work area
Bengaluru	1. Artificial Intelligence / Machine Learning 2. Quantum Computing
Chennai	Embedded Systems & IoT
Delhi	Applied Computing (e-Governance)
Hyderabad	Cyber Security (Audit & Operations)
Pune	1. HPC System Software Development 2. Hardware - System Design

Note:

i. The no. of posts is subject to change based on final assessment.
ii. Location specified in this is only for the initial posting and the incumbents are liable to be transferred/posted to other location subsequently.

Job Responsibilities (Indicative and not exhaustive):

A. Executive Director

i. Head of the Centre and responsible for planning, management and running of the Centre as a self-sustained centre and for providing leadership on all technical, administrative and financial functions;
ii. To lead, guide, motivate and harness a group of highly specialized pool of scientific, R&D, technical and administrative professionals working in the centre.
iii. Responsible for planning the overall projects/operations and monitoring of activities of the centre.
iv. Coordinate various projects and their interdependencies.
v. Aligning the activities of the centre with the C-DAC's vision & mission.
vi. Manage project risks & issues and take corrective measures.
vii. Catalyse the capacity building process, change management initiatives etc.
viii. Leading collaboration with other C-DAC centres and various R&D institutes.
ix. Liasioning with Administrative Ministry and other Government Departments.
x. Learning & Knowledge Management.
xi. Perform the roles and discharge the responsibility as assigned by the management from time to time.

B. Scientist C

i. The Candidate is expected to elicit the expectation requiring involvement of emerging technologies.
ii. Effectively & efficiently transform the requirement into implementation with required feasibility study, system analysis, design, implementation & testing etc. in light of the state of the art.
iii. Work in different modern High performance computing, electronics and information technology domains in a challenging environment to meet the expectation of time bound deliveries of the projects under different verticals of design, development, testing, deployment etc.
iv. Strategically collaborate with various stakeholders, drive intellectual property initiatives, and shape our technology roadmap to maintain a competitive edge in high-impact research domains.
v. Publish high-quality research in top-tier conferences and journals, contributing to the broader research community and advancing knowledge in the field for Impact through publication and scientific dissemination

Please note: For each post of Scientist C, specific job profile is notified.

General Terms and Conditions:

1. Educational Qualification

a. All the essential qualifying qualifications should be regular course(s) must be from UGC recognized Indian University/ UGC recognized Indian Deemed University or AICTE approved courses from Autonomous Indian Institutions/ concerned statutory council (wherever applicable). The courses offered by autonomous institutes should be recognized as equivalent to the relevant courses approved/ recognized by Association of Indian Universities (AIU)/UGC/AICTE.
b. Wherever CGPA/OGPA or letter grade in a qualifying degree is awarded, equivalent percentage of marks should be indicated in the application form as per norms adopted by the respective University/Institute. Please also obtain a certificate to this effect from University / Institute, which shall be required at the time of interview.

2. **Experience:**

a. Only those experiences which are relevant and acquired after the passing date of the qualifying qualification will be considered. The decision of C-DAC in this regard will be final and binding.
b. Minimum Essential Post Qualification Experience in line in State/ Central Government/ Department(s)/Organization(s)/ Undertaking(s) and/or Large Private Sector Organization(s)/ Institution(s)/ Company(ies) of repute/ Public Sector Enterprise/ Large Private Sector Enterprise should be as on the last date of online application. However, Industrial/ Vocational/ Apprentice Training will not be considered as experience.
c. With respect to experience in Govt. organisation, experience of candidates working on contract basis through empanelled agency/ contractor (i.e., those who have been deployed on contract basis by some other agency/ organization for working on project/ construction/O&M or any other activity) will not be considered. Only direct work experience including fixed term basis employment in an organization will be taken into consideration.
d. **For Deputation/Transfer(Absorption) – For Executive Director Post only:** Employees from Central/State Government /PSUs/Govt. Autonomous bodies holding analogous (or equivalent) posts on regular basis OR having minimum 5 years of regular service in the Pay Level-13A of the Pay Matrix or equivalent as on the last date of online application and having essential educational qualifications and experience as required for direct recruitment.
e. The other terms & conditions of the appointment on deputation/ transfer (absorption) will be governed in accordance with the guidelines issued by DoPT vide O.M No.6/8/2009-Esst(Pay-II) dated 17/06/2010 and as amended/issued from time to time.

3. **Reservation:**
   a. The posts are Unreserved (UR). Reservation not applicable as in C-DAC S&T posts above Level 10 i.e. the lowest rung of Group A, are exempt from reservation.
   b. Parallel Reservation for PwD shall be applicable to all the posts notified.
   c. Persons with Disabilities can also apply even if no vacancies are specifically reserved for them.

4. **Age Limit/Relaxation:**

a. The Upper Age Limit specified is as on last date of application.
b. Age Relaxations applicable as per the Govt. of India norms, for PwD category. The upper age is relaxed by 10 years for PWD candidates.
c. Government employees will be eligible for relaxation in age by 5 years as per GoI rules.
d. In case of deputation and Transfer (absorption), age shall as follows:

Post	Age limit	
	Deputation	Transfer (Absorption)
Executive Director	Age not exceeding 58 years on the closing date of application.	not exceeding 56 years on the closing date of application.
Scientist C	Not applicable	

e. In case of Ex-servicemen who have put in not less than six months continuous service in the Armed Forces of the Union, they shall be allowed to deduct the period of such service from their actual age, and if the resultant age does not exceed by more than 03 years the maximum age limit prescribed for the posts/ services for which a candidate seeks appointment, he/ she be deemed to satisfy the conditions regarding the age limit.

f. The cut-off date for ascertaining the age and experience will be the last date of online application.

5. **Mode of Selection:**

a. Selection processes viz. Written test, multi-level Interviews, group discussions etc., as deemed fit by the management will be deployed.

Management reserves the right to change/modify the selection process at any time, during the process, at its discretion. The decision of the management will be final and binding.

b. The qualification and experience prescribed are the minimum requirements and possession of the same does not automatically make the candidates entitled to be called for selection processes.

c. There will be an initial screening based on the academic and other parameters given in the on-line application and only those screened-in will be considered for further selection process. The management reserves the right to increase the minimum eligibility criteria/cut off limits, in the event of the number of applicants more, for the given posts at its discretion.

d. Candidates will be selected on the basis of their academic credentials, experience profile, performance in the interview and such other selection processes/ parameters, as deemed fit by management.

e. If no candidates are found suitable for a notified position(s), C-DAC reserves the right to not fill the notified vacancy(s).

6. **Benefits:**

a. Besides initial pay in the Pay Level, selected candidates shall be entitled for Medical Reimbursement for self and dependent family members (OPD/IPD), Leave Travel Concession, Leave encashment, Children Education Allowance/ Hostel Subsidy, subsidized canteen food, Mobile Reimbursement, Newspaper Allowance, Books reimbursement, Professional Membership Reimbursement, CPF, Gratuity etc. as per extant rules of the C-DAC.

b. In case of appointment through transfer (absorption)/deputation, the pay fixation shall be pursuant to Govt. of India guidelines.

c. Candidates presently employed in Government Service/PSU's are entitled to Last Pay protection subject to fulfilment of extant rules.

d. **Superannuation Benefits:** Besides Contributory Provident Fund, Gratuity under Payment of Gratuity Act 1972 or as ammended from time to time.

e. All the above benefits will be governed by the Bye-laws & Staff Rules of C-DAC in force & amended from time to time.

7. **Posting:** The selected candidates shall be initially posted at as mentioned in Table 1 above. However, the selected candidates may be posted at any of the offices/ project, etc. of C-DAC or deputed to any Department of Government of India/ other Government organizations etc. The selected candidates may be assigned jobs/ functions/ assignments as per the requirements and larger interest of C-DAC within India and abroad.

8. **How to apply:**

a. The candidates are required to apply through ONLINE process only by visiting the website www.cdac.in. **The opening date of submission of online application is -22nd February 2025 and closing date is 23rd March 2025, till 18.00 Hrs.**

b. Before filling the online application form, Candidates should read '**General Terms and Conditions**' carefully. Candidates are also requested to read the **FAQ on recruitment** at https://cdac.in/index.aspx?id=pdf_hrd&dynamicId=FAQ-for-recrutiment-pay-scale.pdf

c. Candidate should read all the eligibility parameters and ensure that he/she is eligible for the post before starting to apply online.

d. Candidate should have a valid email id and mobile no. which should remain valid & active till the completion of selection process.

e. Candidates can click on the '**Apply**' button provided against each position for which he/she wish to apply.

f. Fill all the details in the application form at the appropriate places.

g. After filling all the details in online application form click on '**Submit**' button.

h. Candidates should scan their photograph in .jpg format (not more than 400 KB) and keep it ready before starting to apply online for uploading.

i. Candidates are required to upload their updated Resume /Curriculum Vitae (PDF only, not more than 1 MB) and brief write up of the project undertaken ((PDF only, not more than 1 MB)) with the online application.

j. The required Application fee is to be paid by the candidates through online payment mode only. It is advised to print and keep the transaction details for own records.

k. A unique application number/applicant ID will be generated by the system, please note this application number for future reference and use. Candidates can take a print of the application form and keep it with them for their own records.

l. No hard copy/printed applications should be sent to C-DAC. Incomplete and defectively filled up forms shall be rejected straightway and no subsequent correspondences will be entertained in this regard.

m. Candidates working in Government/PSUs/Govt. Autonomous bodies should also apply online in advance and print of the application form, duly filled and signed should be forwarded through proper channel to **Corporate HRD, C-DAC, Innovation Park 34, B/1, Panchawati Pashan, Pune – 411008**

n. Those who are not forwarding their application through proper channel are required to produce 'No objection certificate (NOC)'

from their current employer at the time of interview, if called for, falling which they will not be permitted to attend the interview.

9. **Application Fees:**

a. A non-refundable application fee of Rs.500/- is payable for applying for the posts through online payment mode using internet banking or debit/credit cards during the online application process at C-DAC website.
b. Fee Exemption is available for candidates belonging to ST, PWD category and Female applicants
c. Candidates may take note that no cheque, DD or cash will be accepted towards payment of application fees.
d. C-DAC will not be responsible in case of incomplete transactions during the online payment process. Only those applications in respect of which fee payment is made shall be taken into consideration.
e. Application fee once paid shall not be refunded under any circumstances.

10. **Important Notes:**

a. Only Indian Nationals are eligible to apply.
b. Candidates those who are applying for multiple posts should submit separate applications and the application fee should be paid separately for each application.
c. In case of any ambiguity/dispute arises on account of interpretation in version other than English, English version will prevail.
d. Candidates are not required to send printout of application or any other documents in hard copy to C-DAC.
e. Only shortlisted candidates who are found apparently eligible based on the online application data and subsequent screening process including the written test will be called for participating in the Selection Process only **through email communication to the email id provided in the application form**. The shortlisted applicants have to appear for interview or any other process of selection as devised by C-DAC.
f. Written test call letter (if any), Interview Call Letters, other correspondences (if any) etc. will be sent to candidates only as email to the email id provided in their online application. No hard copy will be sent.
g. Mere issue of any call letter / correspondence will not imply acceptance of candidature.
h. Out-station candidates called for interview shall be entitled for reimbursement of travel expenses to the extent of admissibility only from the communication address as mentioned in the application to the venue of Interview, by the shortest route as per C-DAC's rule. Any request for change of address will not be entertained.
i. In case, candidate is called for further Selection Process, he/ she has to bring the downloaded application form with all ORIGINAL DOCUMENTS together with ONE SEPARATE SET OF PHOTO COPY of all documents duly SELF ATTESTED at the time of further Selection Process, failing which he/ she will not be permitted to appear in the further Selection Process.
j. Candidature of the registered candidate is liable to be rejected at any stage of the recruitment process or after recruitment or joining, if any information provided by the candidate is found to be false or is not found inconformity with eligibility criteria mentioned in the advertisement.
k. Appointment to the above posts will be subject to the candidate being medically fit as per the standards prescribed for the post by C-DAC and verification of character & antecedents and/or documents submitted by the candidate at the time of appointment or any time during the tenure of service. In case it is detected that the documents submitted by the candidate are fake/false or the candidate has a clandestine antecedent/background and has suppressed the said information, then his/her service shall be terminated forthwith.
l. All appointments on Direct Recruitment shall have a Probation period of one year.
m. All queries pertaining to recruitment including selection process should be addressed to our Corporate Recruitment Team only through recruitment@cdac.in. **Kindly note that we have not authorized any agent/ agency for representing C-DAC for anything related to recruitment or its processes.**
n. C-DAC strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.
o. C-DAC reserves the right to cancel or introduce any examination/Personal Interview/Other selection process. C-DAC also reserves the right to cancel/ restrict/curtail/enlarge the recruitment process and/or the selection process without any notice and without assigning any reasons.
p. C-DAC reserves the rights to raise the minimum eligibility standards. C-DAC also reserves the right to relax experience in exceptional cases, or in the case of persons already holding analogous positions in Government organization or in case of exceptionally meritorious candidate.
q. All the posts will be filled as per the Recruitment Rules of C-DAC.
r. It is the responsibility of the candidates to assess his/her own eligibility for the post for which he/she is applying in accordance with the advertisement. In case, it is detected at any point of time in future during process of selection or even after appointment that candidate was not eligible as per prescribed qualification, experience etc, which could not be detected at the time of selection due to whatever circumstances, his/her candidature/appointment shall be liable to be cancelled/terminated as case may be.
s. Number of vacancies may increase/decrease based on the final assessment and such changes will be made by C-DAC

without any notice.

t. C-DAC reserves the right not to fill up some or all the posts advertised, if the circumstances so warrant.

u. Location specified in this advertisement is only for initial posting and the incumbents are liable to be transferred / posted to other locations subsequently.

v. C-DAC reserves the right to increase or decrease the number of posts or not to recruit against any post notified in this notification at its discretion without any notice / notification

w. Any canvassing directly or indirectly by the applicant will disqualify his/ her candidature.

x. Any dispute with regard to selection/recruitment process will be subject to Courts/Tribunals having jurisdiction over Pune, Maharashtra only.

Note:

1. The candidates are advised to visit C-DAC website regularly for notices/ information. Corrigendum/Extension etc., if any, shall be published in our website www.cdac.in only.
2. For any query or clarification, candidates can **write to** recruitment@cdac.in **or call on** Phone No.020-25503627/765.
3. The candidates must read the Recruitment FAQ at https://cdac.in/index.aspx?id=pdf_hrd&dynamicId=FAQ-for-recrutiment-pay-scale.pdf . Queries related to eligibility Criteria, age relaxation, educational qualification, experience etc. which are clearly mentioned and self-explanatory in the detailed advertisement, will not be replied.

Corporate Human Resource Department
Centre for Development of Advanced Computing (C-DAC)
Innovation Park, Panchvati, Pashan, Pune - 411 008

IMPORTANT DATES:

A	Commencement of on-line Registration of application by candidates	Feb 22, 2025, 0:00 hrs
B	Last date for on-line registration of application by candidates	Mar 23, 2025, 18:00 hrs
C	Interview date	Will be communicated by email only

Centre for Development of Advanced Computing C-DAC
Innovation Park, Panchavati, Pashan, Pune - 411 008, Maharashtra (India)
Phone: +91-20-25503100 Fax: +91-20-25503131

Back

POSITION DETAILS

ADVT. NO.: CORP/GRP.A/06/2024

APPLY

Post	Scientist C (Level 11)
No. of Posts	2
Domain(s)	Hardware System Design, HPC System Software Development
Location	Pune
Age	33 Years (Age relaxation as per Govt. of India Instructions)
Educational Qualification	1) First Class B. E. / B. Tech. / MCA/ or equivalent degree in relevant discipline OR 2) Postgraduate in Engineering/Technology in relevant discipline OR 3) First Class Postgraduate degree in Science in relevant discipline or domain specific discipline OR 4) PhD in relevant discipline
Post Qualification relevant Experience	B.E. / B.Tech. / MCA / or equivalent degree - 3 years; Postgraduate in Engineering/Technology - 1 year; Postgraduate degree in Science - 3 years; PhD - Nil
Skill Sets	A. HPC System Software Development: • C, C++ and Linux kernel internals • Linux System Programming and Embedded Programming • Device Driver Development on Linux / Windows • Firmware design and development using Baseboard Management Controller (BMC) • BMC firmware interactions with BIOS and host CPU • Board bring-up (including BMC, BIOS and OS booting) • Scripting languages • RDMA/InfiniBand (IB) protocol, MPI programming • Able to Manage, guide and mentor a small team B. Hardware - System Design: • High Speed Hardware Design, • knowledge about Signal Integrity analysis • Effective team Management • System Design with 32/64 bit microcontrollers/SOCs/ Processors, DDRx memories, PCIe, LVDS, SPI, I2C, Ethernet, USB • High Speed Serial channel design for multi Gigabit(>10Gpbs) Data rates • Comprehensive knowledge of all phases (Schematic capture, Component engineering, Library creation, Place and route, Manufacturing data, Drawing) for Board designs, Simulation and Signal integrity applications on industry standard toolsets like Cadence Allegro, Mentor, etc. • Multi –layer High Speed PCB Design DFM and DFT, EMI/ EMC etc. • Problem solving skills with experience in hardware debugging • Testing and Board bring up with hardware software co-design • Self-motivated with ability to guide and drive the team • Team player, co-ordinating between team members to complete the activity, Effective team Management

Job Profile

A. HPC System Software Development:

- Team Lead System Software Engineer
- Management Firmware development for server motherboard
- Server Board bring-up (including BMC, BIOS and OS booting), testing and validation of hardware interfaces.
- System software development for proprietary network protocol stack
- Development of device driver/library and supporting tools
- Profiling and benchmarking
- Adaptation of MPI
- Product deployment, maintenance and support

B. Hardware - System Design:

- Senior System Design Engineer:
- System design of Supercomputers/ HPC systems system
- Design of Compute Servers, High speed Switches, Network Interface cards.
- The design includes Latest Server class processors from Intel, ARM, etc. and Switch SOCs with Serial links of 200 Gbps (56 Gbps x 4) or more b/w, along with DDR4/5, PCIe4/5, Ethernet, NVMe drive interfaces, etc.
- All phases of design (Schematic capture, Component engineering, Library creation, Place and route, Manufacturing data, Drawing) for Board designs, Simulation and Signal integrity applications on industry standard toolsets like Cadence Allegro, Mentor, etc. Multi –layer High Speed PCB Design DFM and DFT, EMI/ EMC etc.
- Interaction with PCB and PCBA manufacturer to get the product manufactured as per requirement.
- Testing and Board bring up with hardware software co-design, taking the product through various cycles of development – EVT, DVT and PVT
- Interaction with agencies for getting required Product requirements
- Managing the team of design engineers

Salary

CTC - Rs. 22 LPA

Duration

BACK APPLY

POSITION DETAILS

ADVT. NO.: CORP/GRP.A/06/2024

APPLY

Post	Scientist C (Level 11)
No. of Posts	1
Domain(s)	IoT, Embedded Systems
Location	Chennai
Age	33 Years (Age relaxation as per Govt. of India Instructions)
Educational Qualification	1) First Class B. E. / B. Tech. / MCA/ or equivalent degree in relevant discipline OR 2) Postgraduate in Engineering/Technology in relevant discipline OR 3) First Class Postgraduate degree in Science in relevant discipline or domain specific discipline OR 4) PhD in relevant discipline
Post Qualification relevant Experience	B.E. / B.Tech. / MCA / or equivalent degree - 3 years; Postgraduate in Engineering/Technology - 1 year; Postgraduate degree in Science - 3 years; PhD - Nil
Skill Sets	• Programming Languages: C, C++, Shell Scripting, Assembly • Hardware Development: Analog and Digital Circuit Design, Microcontroller based Hardware Design, Sensor Interfacing, Power Circuit Design -AC to DC, DC to DC,SMPS Design • Embedded Firmware Development: Baremetal Firmware Development in C and C++ for Microcontrollers • RTOS firmware development, Hardware Abstraction Layer Development, Low Level Drivers, Linux Application Development, Linux Kernel Development, Linux Device Drivers, System Calls, IPC mechanisms, POSIX compliant firmware development
Job Profile	IoT and Embedded Systems Development • IoT Hardware Development with wireless communication interfacing, power conditioning, and Sensor Interfacing for Applications such as Agriculture, Smart Cities, Automotive etc. • IoT firmware development for Embedded Linux and RTOS based systems • Build Systems Development, Cross compilations, Board Support Package Development and Customization, SDK Development, Product Debugging, Unit Testing and Integration Testing • Field Testing, Deployment and Productization activities associated with IoT systems for outdoor environments • Documentation, Publications, Patents, Copyrights
Salary	CTC - Rs. 22 LPA
Duration	

BACK APPLY

POSITION DETAILS

ADVT. NO.: CORP/GRP.A/06/2024

APPLY

Post	Scientist C (Level 11)
No. of Posts	1
Domain(s)	Applied Computing (e-Governance)
Location	Delhi
Age	33 Years (Age relaxation as per Govt. of India Instructions)
Educational Qualification	1) First Class B. E. / B. Tech. / MCA/ or equivalent degree in relevant discipline OR 2) Postgraduate in Engineering/Technology in relevant discipline OR 3) First Class Postgraduate degree in Science in relevant discipline or domain specific discipline OR 4) PhD in relevant discipline
Post Qualification relevant Experience	B.E. / B.Tech. / MCA / or equivalent degree - 3 years; Postgraduate in Engineering/Technology - 1 year; Postgraduate degree in Science - 3 years; PhD - Nil
Skill Sets	Discipline / Domain - Applied Computing (e-Governance) • Software Development (Mobile / Web) • Open-Source Software Environment • Java: Core Java, Servlets, JSP, J2EE, Spring Boot, Thymeleaf, Maven, Microservices, REST APIs, etc. • ORM: JPA, Hibernate • Front End: HTML, CSS, Bootstrap, JavaScript, JQuery, Ajax, ReactJS • Cross platform Mobile app development for Android, IoS, Windows, Web using React Native, or similar platform • Data Handling: JSON, XML, etc. • Database: RDBMS, NO SQL (Postgres, MySql, Oracle, SQllite, etc.) • Documentation: SRS, HLDD, LLDD • Sound Knowledge in Core Java, Multithreading, Data Structures. • In-depth knowledge on Java Script and object oriented technique. • Design & development of large scale distributed systems in Java on Linux platform & services.
Job Profile	• Database design, writing simple or complex PL/ SQL queries/ stored procedures/ Functions/ Triggers etc. using PostgreSQL database. • Strong knowledge and experience in designing and deploying performant Server-side / backend web services with REST APIs / SOAP / etc. Possess excellent understanding in the areas of web application programming. • Analyze/understand/prepare system/functional requirements documents develop core technical documents including architecture document, high-level design and low-level design. • Knowledge and experience in designing and deploying Micro services and experience working with AWS or other Cloud provider is extremely desirable. • Must have excellent verbal and written communication skills and the ability to interact professionally with a diverse group; developers, Stakeholders, and subject matter experts. • Extensive knowledge in management of typical Web application with high Volume of transactions. • Should have experience in developing J2EE applications with extensive database hits and extensive workflow management.
Salary	CTC - Rs. 22 LPA
Duration	

BACK APPLY

POSITION DETAILS

ADVT. NO.: CORP/GRP.A/06/2024

APPLY

Post	Scientist C (Level 11)
No. of Posts	2
Domain(s)	Cyber Security (R&D)
Location	Hyderabad
Age	33 Years (Age relaxation as per Govt. of India Instructions)
Educational Qualification	1) First Class B. E. / B. Tech. / MCA/ or equivalent degree in relevant discipline OR 2) Postgraduate in Engineering/Technology in relevant discipline OR 3) First Class Postgraduate degree in Science in relevant discipline or domain specific discipline OR 4) PhD in relevant discipline
Post Qualification relevant Experience	B.E. / B.Tech. / MCA / or equivalent degree - 3 years; Postgraduate in Engineering/Technology - 1 year; Postgraduate degree in Science - 3 years; PhD - Nil
Skill Sets	Discipline / Domain - Cyber Security Audit & Operations • Deep knowledge of computer networks and internetworking devices, Virtualization, Cloud Computing & related technologies • Operating System Administration & hardening (Windows, Linux and so on) • Deep knowledge in Network Security Concepts • Experience in managing and hands-on experience in Security solutions/tools usage/deployment, storage and backup • Experience in VA/PT/ Security audit in IT / ICT/ OT/ ICS environment • Understanding of Android operating system and Mobile App analysis • Experience in Reverse Engineering, Malware Analysis on various Platforms • Proficiency in scripting languages and experience in configuring networking devices and Cloud Services • Familiarity with security frameworks and standards • Strong problem solving and analytical skills • A critical thinker, quick learner and team player • Excellent verbal and written communication / documentation skill Desirable: Certification relevant to the job profile
Job Profile	• Lead and execute Cyber Security audits of IT/ICT, ICS/SCADA and other emerging audits • Understand the requirements from stakeholders and document the details • Preparation of security audit reports • Contributing in training activities • Guiding team members towards security audit related efforts • Continuously upgrade the skills in line with the job profile • Interacting with clients and others related to assigned responsibilities
Salary	CTC - Rs. 22 LPA
Duration	

BACK APPLY

POSITION DETAILS

ADVT. NO.: CORP/GRP.A/06/2024

APPLY

Post	Scientist C (Level 11)
No. of Posts	4
Domain(s)	AI/ML, Quantum Computing
Location	Bangalore
Age	33 Years (Age relaxation as per Govt. of India Instructions)
Educational Qualification	1) First Class B. E. / B. Tech. / MCA/ or equivalent degree in relevant discipline OR 2) Postgraduate in Engineering/Technology in relevant discipline OR 3) First Class Postgraduate degree in Science in relevant discipline or domain specific discipline OR 4) PhD in relevant discipline
Post Qualification relevant Experience	B.E. / B.Tech. / MCA / or equivalent degree - 3 years; Postgraduate in Engineering/Technology - 1 year; Postgraduate degree in Science - 3 years; PhD - Nil
Skill Sets	A. Artificial Intelligence, Machine Learning a. Good knowledge of Mathematics for AI/ML b. Excellent understanding and experience in handling large datasets, Semantic Mining, and AI for handling documents/unstructured text, OCR and synthetic data generation c. Hands-on experience in designing retrieval pipelines, Prompt Engineering and training/fine-tuning of GenAI models (OR) Hands-on experience in digital image processing, OCR, Diffusion Models, Feature Detection and Matching and Vision Language Models(VLMs)/Multimodal large language models(MLLM) d. Experience with Distributed training of AI models and AIOPs (e.g., model deployment, scaling, model evaluation, optimization, data processing, debugging etc.). e. Proficiency in programming languages such as Python, with hands on experience in AI/ML libraries and frameworks f. Familiarity with one or more cloud platforms/hyper-scalers (e.g. GCP, Azure, AWS) and experience in deploying AI/ML models in cloud environments g. Experience of architecting AI systems as well as integrating AI/ML features into business applications and solutions h. Should be able to communicate architecture decisions effectively to multiple stakeholders including presenting to client Architecture Review Boards (ARBs) i. Proven experience in customer-facing roles j. Understanding and hands on experience with Agile SDLC practices and tools B. Quantum Computing a. Strong background in one or more of Quantum technologies: computing, communication, cryptography, simulation, applications, hybrid computing. b. Excellent understanding and experience in one or more of the following: Quantum System Software/Firmware design and implementation for quantum control/Embedded programming/modeling and simulation of quantum entities/ Quantum-HPC-AI hybrid computing/Quantum applications/Quantum mechanics/Post Quantum Cryptography/Quantum Cryptography/Quantum algorithms/any other relevant field c. Proficiency in atleast one programming / modeling language relevant to quantum technology where experience is claimed d. Understanding and hands on experience with SDLC practices and tools e. collaboration within and across stakeholders f. Expected to publish patent and generate IPR g. On board and mentor freshers.

Job Profile	A. Artificial Intelligence, Machine Learning a. Interface with customer for understanding requirements b. Collaborate with cross-functional teams to define GenAI/ML/ComputerVision project requirements and objectives, ensuring alignment with overall business goals c. Research and Development to build novel RAGs and train/fine-tune GenAI models d. Research and Development of GenAI architectures and models (Text and Vision) e. Research and Development of multimodal vision models f. Architecting GenAI/ComputerVision systems as well as integrating its features into business applications and solutions g. Automate tedious tasks, improve data extraction, synthetic data generation and gain deeper insights from unstructured or structured document information h. Evaluate the performance of AI models and make necessary adjustments i. Lead the AI solutions from concept to production j. Should be able to quickly develop POC project(s) or develop prototypes k. Technical Documentation B. Quantum Computing: I. Experimental Quantum Physics a. conducting advanced theoretical and experimental research in quantum optics and quantum information processing. b. design and implement quantum optical experiments, analyze and interpret experimental data and should be familiar with implementations of Quantum Cryptographic systems c. Using Quantum programming tools like Qiskit and Cirq d. contribute to the development of novel quantum algorithms and applications in quantum computing and quantum communication II. Quantum Control Electronics a. focus on the control electronics development for quantum technologies b. FPGA development, control electronics, measurement hardware, and the capability in Python programming. c. Quantum communication systems and control subsystems used for operating superconducting based quantum computing systems. d. Understanding and use of quantum communication principles, control systems, and hardware integration.
Salary	CTC - Rs. 22 LPA
Duration	

BACK APPLY