भारतीय सांकेतिक विज्ञान संस्थ हैदराबाद्
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

INDICATIVE SYLLABUS AND SCHEME OF EXAM

POST NO. 16.11.2-JUNIOR TECHNICIAN-BIOTECHNOLOGY

Ref: Notification No. IITH/2024/NF/16 dated 19.10.2024.

1. **Selection Process:** The selection process would comprise of two stages viz., (a) Skill test (b) Written test. The skill test is purely qualifying in nature and will not carry any weightage in final selection. The final selection will be based on the performance of the candidates in this written test.

2. **Syllabus and weightage:**

    The written and skill test will cover both general and subject-specific topics related to the fields of bioinformatics, computer science, and computational biology, as outlined below.

1. General aptitude

   i.   Logical Reasoning
   ii.   Numerical Ability (Basic math, probability, statistics)
   iii. Verbal Ability (Comprehension, grammar, vocabulary)

2. Subject-specific knowledge:

   i.   **Bioinformatics / Computational Biology:**
        a. Biological databases (e.g., GenBank, PDB)
        b. Sequence analysis (BLAST, FASTA)
        c. Genomics, proteomics, and transcriptomics tools
        d. Structural bioinformatics (protein structure, modelling)
        e. Algorithms used in bioinformatics (e.g., dynamic programming, sequence alignment)
        f. Molecular biology and biotechnology basics relevant to computational biology.

   ii. **Computer Science / IT:**
        a. Data structures (arrays, linked lists, trees, etc.)
        b. Algorithms (sorting, searching, dynamic programming)
        c. Basic programming (Python, Perl, R, Linux commands)
        d. Database management systems (SQL, NoSQL)
        e. Networking basics

f. Software installation, troubleshooting, and hardware handling (Linux/Windows environments).
g. Practical coding exercises in Linux commands, Python, R, or Perl
h. Writing scripts to automate tasks or analyze biological data
i. Basic tasks such as file handling, text processing, and computational logic.

iii. **Operating systems:**
a. Installation and troubleshooting of Linux/Windows OS
b. Installation of software packages (e.g., bioinformatics software or development environments)
c. System performance and hardware issue troubleshooting
d. File systems, partitioning, and basic system commands
e. User management and basic network settings
f. Installation and management of software packages on Linux/Windows.

3. Bioinformatics data analysis:

i. Hands-on knowledge of omics data analysis (e.g., genomics, transcriptomics)
ii. Familiarity with R or Python for bioinformatics analysis
iii. Practical exercises in using bioinformatics tools (e.g., BLAST, sequence aligners)
iv. Omics data analysis tasks (gene expression data, protein sequence analysis)
v. Practical knowledge of biological databases and software used in bioinformatics.
vi. Use of pipelines and tools for sequence, structure, and pathway analysis.

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