Department of Information Technology
School of Technology
North Eastern Hill University, Shillong- 793022

Ph.D. in IT Entrance Examination (EE) 2020

The admission/selection in the PhD program for a limited number of seats will be done on the basis of a written test (Please refer to the detailed syllabus) of one hour duration (total marks 60) followed by a personal interview (PI) (total marks 40). Merit list shall be prepared as per NEHU rules and based on the performance in EE and PI.

The call letter to the individual candidate will be sent to their registered email id.

The decision of the admission committee in all matters shall be binding and final. **Tentative date, time and venue of the written test as well as personal interview are as follows. Only candidates qualified in the written test will appear for the personal interview. Any change of date, time etc will be notified in the NEHU website.**

Tentative Date of written Test	12th November 2020
Mode of written Test	Online
Time of written Test	11:30 AM – 12:30 PM
Tentative Date & Time of interview(online mode)	12th November '2020: **from 3:30PM onwards** On 13th November '2020: **from 10:30 AM onwards for the remaining candidates if any.**

In case, any candidate fails to report online at the reporting time on the specified date and time mentioned above, he /she will forefeit his /her claim to appear for entrance test.

Sd/-
29.10.2020
f. **Chairman**
PhD (IT) Admission Committee

The detailed syllabus of written test for PhD Entrance Examination-2020

Part I:

(a) Research Methodology

Basic Concepts of Research Methodology, Pictorial representation of Ph.D., Learning outcome of Research, Development of Research Idea, How to give a good seminar presentation, PhD research proposal writing, How to study a Research paper, Selection of PhD thesis topic, Strategies for narrowing a research question, How to write a paper. Ethics & related issues in Research.

(b) Mathematical Tools

Algebra: Matrices, Rank of Matrix, Eigen Values and Eigen Vectors-Inverse of a Matrix, Laws of set theory, partitions, permutation and combination, Functions, Relations, properties of relations, closure operations on relation.

Number Theory: Divisibility, Greatest Common Divisor, Fundamental Theorem of Arithmetic, Modular Arithmetic, Arithmetic with a Prime Modulus.

Calculus: Limit and continuity, differentiability of functions, successive differentiation, integration and properties of definite integrals.

Mathematical Logic & Proofs: Truth table, principles of counting, recurrence relations, Sets, Relations, Propositional Logic and Predicate Logic, Proposition, Induction, Proof by Cases, Proof by Contradiction.

Probability & Statistics: Introduction to probability, Bayes theorem, random variables and probability distributions and density functions, binomial Poisson and normal distributions and their properties, correlation and regression, method of least squares, introduction to sampling and sampling distributions like Chi-square, t and F distributions, test of significance based on t, Chi-square and F distributions.

Part II

(a) Data Structure & Algorithm

Linear Data Structures- List, Stack, Queue, Non-linear Data Structure- Representation of Tree, Binary Trees, Tree traversals, Binary Search Tree, AVL Tree, Graphs, Sorting and Searching, Hashing, B & B+ Tree.

Classification of Algorithms, Complexity, Asymptotic Notations, Dynamic Programming, Greedy Algorithm, NP- Problems, Amortized Analysis, Master Theorem, Probabilistic Analysis: Sort, Search, Random Binary Search trees.

(b) Computer System & Programming

Programming in C, User Defined Functions and Library Functions, Local and Global Variables, Parameter Passing, Pointers, Arrays, Strings, C Preprocessors, Structures.

Number system, Boolean Expression, Instruction, Central Processing Unit, Memory, I/O devices.

Theory of Computation, Regular Grammars, Formal Grammars & Language, Turing Machines & Pushdown Automata

Process and threads, Mutual exclusion, Semaphores, Deadlock, Memory management requirements, Virtual memory, scheduling algorithms.

ISO/OSI Model, TCP/IP Model, Multiple access protocols, IEEE 802.X LANs and MANs-Ethernet, Token Ring, Token Bus, TCP and UDP.