

## **Course List for Ph.D. in Computer Science**

### **Group-A** (at least three) :

1. Computer architecture / Computer organization
2. Data and file structures
3. Design and analysis of algorithms
4. Discrete mathematics
5. Operating systems
6. Automata, languages and computation

### **Group-B** (at least one) :

7. Advanced algorithms for graph and combinatorial optimization problems
8. Advanced database theory and applications
9. Advanced image processing
10. Advanced operating systems
11. Advanced pattern recognition
12. Algebra, i.e., groups, rings, fields and vector spaces
13. Artificial intelligence
14. Compiler construction
15. Computational algebra
16. Computational complexity
17. Computer graphics
18. Computer vision
19. Cryptology
20. Data mining
21. Database management systems

22. Digital signal processing
23. Document processing and retrieval
24. Fault-tolerant computing
25. Formal logic
26. Fuzzy logic and applications
27. Information and coding theory
28. Logic in computer science
29. Multi-dimensional search and computational geometry
30. Neural networks and applications
31. Optimization techniques
32. Parallel processing: architectures and algorithms
33. Pattern recognition and image processing
34. Probability and stochastic processes
35. Topics in algorithms and complexity
36. VLSI design and algorithms
37. Quantum Information and Quantum Computation<sup>1</sup>
38. Machine Learning: Theory and Practice
39. Blockchain Technology
40. Data Science

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<sup>1</sup> Items 37-40 approved in the 65th meeting of the Academic Council, held on November 30, 2017