Faculty of Engineering and Technology
Datta Meghe Institute of Medical Sciences
(Deemed to be University)

NAAC Re-accredited Grade "A+"

Curriculum of General Aptitude
for AIPHDCET under DMIMS (DU)

Content:

Curriculum of **General Aptitude** for AIPHDCET, DMIMS (DU)

S. N.	Title
1	Verbal Aptitude**,** Quantitative Aptitude**,** Analytical Aptitude and Spatial Aptitude

Detailed Content

(Weightage = 15%)

Verbal Aptitude:

Basic English grammar: tenses, articles, adjectives, prepositions, conjunctions, verb-noun agreement, and other parts of speech Basic vocabulary: words, idioms, and phrases in context reading and comprehension narrative sequencing.

Quantitative Aptitude:

Data interpretation: data graphs (bar graphs, pie charts, and other graphs representing data) and 3-dimensional plots, maps, and tables.

Numerical computation and estimation: ratios, percentages, powers, exponents and logarithms, permutations and combinations, and series Mensuration and geometry Elementary statistics and probability.

Analytical Aptitude:

Logic: deduction and induction, Analogy, Numerical relations and reasoning.

Spatial Aptitude:

Transformation of shapes: translation, rotation, scaling, mirroring, assembling, and grouping paper folding, cutting, and patterns in 2 and 3 dimensions.

References:

1. Dr. R.S. Aggarwal, *A modern Approach to Logical Reasoning* S. Chand Publisher, 2018
2. P.N. Arora and S. Arora, *Quantitative Aptitude Mathematics*, S. Chand India Publication.
3. Dr. R.S. Aggarwal, *A modern Approach to Verbal and Nonverbal Reasoning* S. Chand Publisher, 2018
4. Abhijit Guha, *Quantitative Aptitude for All Competitive Examinations*, McGraw Hill Publication.
5. Dr. R.S. Aggarwal, *Quantitative Aptitude* S. Chand, 2013

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NAAC Re-accredited Grade "A+"

Curriculum of Computer Science Engineering (AIDS) for AIPHDCET under DMIMS (DU)

(Theme based)

Content:

Curriculum of **Computer Science Engineering (AIDS)** for AIPHDCET, DMIMS (DU)

Theme	Title
1	Engineering Mathematics
2	Digital Logic, Computer Organization and Architecture, and Operating System
3	Programming, Data Structure, and Algorithms
4	Theory of Computation, and Compiler Design
5	Databases, Computer Networks, and AI

Detailed Content

Theme1: Engineering Mathematics (Weightage = 13%)

Linear Algebra: Matrix algebra, systems of linear equations, Eigenvalues and Eigenvectors.

Calculus: Mean value theorems, theorems of integral calculus, partial derivatives, maxima and Minima, multiple integrals, Fourier series, vector identities, line, surface and volume integrals, Stokes, Gauss and Green's theorems.

Differential equations: First order linear and nonlinear differential equations, higher order linear differential equations with constant coefficients, method of separation of variables, Cauchy's and Euler's equations, initial and boundary value problems, and solution of partial differential equations.

Analysis of complex variables: Analytic functions, Cauchy's integral theorem and integral formula, Taylor's and Laurent's series, residue theorem.

Probability and Statistics: Sampling theorems, conditional probability, mean, median, mode and standard deviation, random variables, discrete and continuous distributions: normal, Poisson and binomial distributions, Tests of Significance, statistical power analysis, and sample size estimation, Linear Regression and correlation analysis.

Numerical Methods: Matrix inversion, numerical solutions of nonlinear algebraic equations, iterative methods for solving differential equations, numerical integration.

Theme 2: (Weightage = 18 %)

Digital Logic: Boolean algebra, Combinational and sequential circuits, Minimization, Number

representations and computer arithmetic (fixed and floating point).

Computer Organization and Architecture

Machine instructions and addressing modes, ALU, data-path and control unit, Instruction pipelining, pipeline hazards, Memory hierarchy: cache, main memory and secondary storage, I/O interface (interrupt and DMA mode).

Operating System

Processes, threads, inter-process communication, concurrency and synchronization, Deadlock, CPU scheduling, Memory management and virtual memory File systems.

Theme 3: (Weightage = 18%)

Programming and Data Structure: Programming in C, Recursion, Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Algorithms: Searching, sorting, hashing, asymptotic worst case time and space complexity, Algorithm design techniques: greedy, dynamic programming and divide-and-conquer, Graph search, minimum spanning trees, shortest paths.

Theme 4: (Weightage = 18%)

Theory of Computation: Regular expressions and finite automata, Context-free grammars and push-down automata, Regular and contex-free languages, pumping lemma, Turing machines and undecidability.

Compiler Design: Lexical analysis, parsing, syntax-directed translation, Runtime environments, Intermediate code generation, Local optimization.

Theme 5: (Weightage = 18%)

Databases: ER-model, Relational model: relational algebra, tuple calculus, SQL, Integrity constraints, Normal forms, File organization, indexing (e.g., B and B+ trees), Transactions and Concurrency control.

Computer Networks: Concept of layering, LAN technologies (Ethernet), Flow and error control techniques, switching, IPv4/IPv6, routers and routing algorithms (distance vector, link state), TCP/UDP and sockets, congestion control, Application layer protocols (DNS, SMTP, POP, FTP, HTTP), Basics of Wi-Fi, Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls.

AI: Searches, Game theory. Neural networks, fuzzy logic, Optimization Techniques

References:

1. Jain, Rajendra Prasad. *Modern digital electronics*. Tata McGraw-Hill Education, 2003.
2. Stallings, William. *Computer organization and architecture: designing for performance*.

Pearson Education India, 2003

3. Abd-El-Barr, Mostafa. *Fundamentals of computer organization and architecture*. John Wiley and Sons, 2005.
4. Null, Linda, and Julia Lobur. *Essentials of Computer Organization and Architecture*. Jones & Bartlett Publishers, 2014.
5. Aho, Alfred V., and John E. Hopcroft. *The design and analysis of computer algorithms*. Pearson Education India, 1974
6. Ritchie, Dennis M., Brian W. Kernighan, and Michael E. Lesk. *The C programming language*. Englewood Cliffs: Prentice Hall, 1988.
7. Kanetkar, Yashavant. *Let us C*. BPB publications, 2018.
8. Krithivasan, Kamala. *Introduction to formal languages, automata theory and computation*. Pearson Education India, 2009
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11. Silberschatz, Abraham, Henry F. Korth, and Shashank Sudarshan. *Database system concepts*. Vol. 4. New York: McGraw-Hill, 1997.
12. Tanenbaum, Andrew S., and David J. Wetherall. *Computer networks*. Prentice-Hall international editions ,1996.
13. Dass, H. K. *Higher Engineering Mathematics*. S. Chand Publishing, 2011.
14. Grewal, B. S., and J. S. Grewal. *Higher engineering mathematics*." Khanna Publishers, New Delhi, 2002.
15. Khanna, Tarun. *Foundations of neural networks*. Addison-Wesley Longman Publishing Co., Inc., 1990.
16. Joshi, Prateek. *Artificial intelligence with python*. Packt Publishing Ltd, 2017.
17. Dadios, Elmer, ed. *Fuzzy logic: controls, concepts, theories and applications*. BoD–Books on Demand, 2012.