Foundation Course for Computer Science

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I. Course Overview:

Centre for Advanced Studies, AKTU Lucknow is going to start a course for engineering graduate students of **Computer science& Engineering and Information technology**.This"**Foundation Course for Computer Science"**is designed for B.Techand M.tech students to strengthening their core subjects.

II. Objective:

- The main objective of courseis to provide quality education to aspiring students with commitment in every possible manner that helps them to achieve their career objective.
- Course has unique teaching methodology is designed in such a way that the aspirants are involved in classroom study and practice sessions with an exam-oriented approach rather than just following the curriculum.
- Course covers the core technical subjects of the engineering student that help them to achieve success in top engineering exams such as ESE, GATE, PSUs and all other competitive exam.
- Course benefits the student to enhance their technical skills, soft skills which are helpful during campus placement.
- Comprehensive Quiz and mock interview is conducted for each module after its completion.

III. Target Audience of Course:

- B.Tech,M.Tech, M.C.A Students of Computer Science &Engineering, andInformation Technology.
- All students preparing for campus and IT industries placement.

IV. Curriculumof Course

This Course covers following modulesin three phases

PHASE –I (June-July,2019)

Module 1: Programming and Data Structures

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

Module 2: 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.

Module 3: 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.

- Quiz Test for each module separately.
- Mock interviews.

PHASE –II (August-September,2019)

Module 4: Digital Logic

Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).

Module 5: 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.

Module 6: Operating System

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

- Quiz Test for each module separately.
- Mock interviews.

PHASE –III (October-November,2019)

Module 7: Compiler Design

Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation.

Module 8: 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.

Module 9: Computer Organization and Architecture

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

- Quiz Test for each module separately.
- Mock interviews.

V.Duration of Course

- This course required **Three phase, each phase is sixweek ,**to complete the above curriculum.

Phase	Module	Name of Module
Phase I	**Module**1	Programming and Data Structures
	Module 2	Algorithms
	Module 3	Theory of Computation
Phase II	**Module** 4	Digital Logic
	Module 5	Computer networks
	Module 6	Operating System
Phase III	**Module** 7	Compiler Design
	Module 8	Databases
	Module 9	Computer Organization and Architecture

- **Classes will be conducted in evening after college timing, weekendand end semester break.**

VII. Key Feature of Course

- We have chosen nothing but the best teachers who can impart their vast knowledge to students in classroom.
- Comprehensive Study Material having numerical problems.
- Course is having placement and exam oriented approach when it comes to teaching.

VIII. Registration Process

You may visit Centre for Advanced Studies, AKTU Lucknow where you are required to complete the following formalities:

- Fill the Application Form on Centre for Advanced studies, AKTU website .

IX. Fees Structure for Program

- Fees for the each phase is RS 12,000/-
- If any students want to study some specific module than fees for each module is RS 5,000/-
- The fees can be paid via Demand draft

XI. Course Expected Outcomes

- Students are able to apply the knowledge of these concepts to solve the analytical problem.
- Students are able to understand the concept of subject domainto analyze, and apply the knowledge on particular domain.
- Student will be able to apply the knowledge in technical/ aptitude test during placement activities and interviews.
- Student will be able to apply the knowledge for solving technical test for various competitive exam and interviews.