

## **EA-321 Logic & Critical Thinking**

**Introduction to the Study of Logic:** Definitions, Terminology, Concepts of Logic & Critical Thinking. Scope and Impact. Why study logic and critical Thinking- Intellectual Moral Virtues; Basic

**Principles of Logic:** Structure of an Argument, Valid/Invalid versus Sound/Unsound argumentation, Deduction versus Induction, Three classical Aristotelian Laws of Logic, Principle of sufficient reason; Deductive reasoning- Syllogism, Linear ordering, Tree diagrams; and Inductive Reasoning -Valid and invalid arguments. Fallacies.

**Thinking:** Thinking process while working towards goals, making decisions and analyzing issues. Thinking tools and their applications. Simple tools (e.g. facts and opinions, verification of sources and credibility of authorities etc.); Theoretical Frames (e.g. Scientific Methods/Approach etc.) and Formal Tool (e.g. PMI, STAR method, Shewhart Cycle, Socratic Method, RW & D, Quality Thinking- Paul & Elder Framework etc.)

**Thinking Critically:** Critical Thinking standards: clarity, precision, accuracy, relevance, consistency, logical correctness, completeness, and fairness; **Barriers to Critical Thinking:** Egocentrism, sociocentrism, unwarranted assumptions and stereotypes, relativist thinking, and wishful thinking.

**Critical Thinking Approach:** Thinking actively, using questions for probing situations, evaluating our evidences and their types, Impartial versus adversarial critical thinking.

**Critical Thinking in Everyday Life:** Problem Solving: Defining a problem, attitudes towards problems general and desired, Problem-solving process, case studies on problem analysis.

**Perceiving:** Defining perception and its prominence in succeeding through life, Critical thinking and perception, Evaluating the differences in perception (through tests, optical illusions etc.), Perception processes, Factors governing perception, Difficulties / errors in perception process (perceptual errors).; **Believing and Knowing:** Believing versus knowing, values and their types, identifying one's values in life; defining and classifying beliefs, Accuracy scale for evaluating thoughts, thinking patterns and organizing concepts, Ways to Organize Thoughts, Types of causal relationships – causal chains, contributory and interactive causes.