GQR-102: Quantitative Reasoning (II)   **(03 Credit Hrs)**

Pre-Requisite: Quantitative Reasoning (I)
Offering: Undergraduate Degrees (including Associate Degrees)
Placement: 2 – 4 Semesters
Type: Mandatory
Fields: All

DESCRIPTION

Quantitative Reasoning (II) is a sequential undergraduate course that focuses on logical reasoning supported with mathematical and statistical concepts and modeling / analysis techniques to equip students with analytical skills and critical thinking abilities necessary to navigate the complexities of the modern world. The course is designed to familiarize students with the quantitative concepts and techniques required to interrupt and analyze numerical data and to inculcate an ability in students the logical reasoning to construct and evaluate arguments, identifying fallacies, think systematically. Keeping the pre-requisite course of Quantitative Reasoning (I) as its base, this course will enable students further their quantitative, logical and critical reasoning abilities to complement their specific major / field of study.

COURSE LEARNING OUTCOMES

By the end of this course, students shall have:

1. Understanding of logic and logical reasoning:
2. Understanding of basic quantitative modeling and analyses;
3. Logical reasoning skills and abilities to apply them to solve quantitative problems and evaluate arguments;
4. Ability to critically evaluate quantitative information to make evidence based decisions through appropriate computational tools.

SYLLABUS

1.   Logic, Logical and Critical Reasoning

- Introduction and importance of logic;
- Inductive, deductive and adductive approaches of reasoning;
- Propositions, arguments (valid; invalid), logical connectives, truth tables and propositional equivalences;
- Logical fallacies;
- Venn Diagrams;
- Predicates and quantifiers;
- Quantitative reasoning exercises using logical reasoning concepts and techniques.

2.   Mathematical Modeling and Analyses;

- Introduction to deterministic models;
- Use of linear functions for modeling in real-world situations;
- Modeling with the system of linear equations and their solutions;
- Elementary introduction to derivatives in mathematical modeling;
- Linear and exponential growth and decay models;
- Quantitative reasoning exercises using mathematical modeling.

3. Statistical Modeling and Analyses

- Introduction to probability models; Basic concept of Normal distribution and Binomial
- distribution with simple applications
- Bivariate analysis, scatter plots; Pearson correlation; Simple linear regression
- Concept of statistical Inference in decision making; Chi-square test of association
- Quantitative Reasoning exercises using statistical modeling.

SUGGESTED INSTRUCTIONAL / READING MATERIAL

1. "Using and Understanding Mathematics: A Quantitative Reasoning Approach" by Bennett, J. O., Briggs, W. L., & Badalmenti, A.

2. "Discrete Mathematics and its Applications" by Kenneth H. Rosen.

3. "Discrete Mathematics with Applications" by Susanna S. Epp.

4. "Applied Mathematics for Business, Economics and Social Sciences" by Frank S Budnick.

5. "Elementary Statistics: A Step by Step Approach" by Allan Bluman.

6. "Introductory Statistical Modeling" by Prem S. Mann.

7. "Applied Statistical Modeling" by Salvatore Babones.
8. "Barrons SAT" by Sharvon Weiner Green, M.A and Ira K. Wolf.