GQR-101: QUANTITATIVE REASONING (I)

General Education Course

Credits: 03
Pre-Requisite: Nil
Offering: Undergraduate Degrees (including Associate Degrees)
Placement: 1 – 4 Semesters
Type: Mandatory
Fields: All

DESCRIPTION

Quantitative Reasoning (I) is an introductory-level undergraduate course that focuses on the fundamentals related to the quantitative concepts and analysis. The course is designed to familiarize students with the basic concepts of mathematics and statistics and to develop students' abilities to analyze and interpret quantitative information. Through a combination of theoretical concepts and practical exercises, this course will also enable students cultivate their quantitative literacy and problem-solving skills while effectively expanding their academic horizon and breadth of knowledge of their specific major / field of study.

COURSE LEARNING OUTCOMES

By the end of this course, students shall have:

1. Fundamental numerical literacy to enable them work with numbers, understand their meaning and present data accurately;
2. Understanding of fundamental mathematical and statistical concepts;
3. Basic ability to interpret data presented in various formats including but not limited to tables, graphs, charts, and equations etc.

SYLLABUS

1. Numerical Literacy

- Number system and basic arithmetic operations;
- Units and their conversions, area, perimeter and volume;
- Rates, ratios, proportions and percentages;
- Types and sources of data;
- Measurement scales;
- Tabular and graphical presentation of data;
- Quantitative reasoning exercises using number knowledge.

2. Fundamental Mathematical Concepts

- Basics of geometry (lines, angles, circles, polygons etc.);
- Sets and their operations;
- Relations, functions, and their graphs;
- Exponents, factoring and simplifying algebraic expressions;
- Algebraic and graphical solutions of linear and quadratic equations and inequalities;
- Quantitative reasoning exercises using fundamental mathematical concepts.

3. Fundamental Statistical Concepts

- Population and sample; Graphical presentation of data
- Summarizing data; Measures of central tendency, dispersion and their applications;
- Rules of counting (multiplicative, permutation and combination);
- Basic concept of probability; Applications of a priori and relative frequency approach
- Quantitative reasoning exercises using fundamental statistical concepts

SUGGESTED INSTRUCTIONAL / READING MATERIALS

1. "Quantitative Reasoning: Tools for Today's Informed Citizen" by Bernard L. Madison. Lynn and Arthur Steen.
2. "Quantitative Reasoning for the Information Age" by Bernard L. Madison and David M. Bressud.
3. "Fundamentals of Mathematics" by Wade Ellis.
4. Quantitative Reasoning: Thinking in Numbers" by Eric Zaslow.
5. "Thinking Clearly with Data: A Guide to Quantitative Reasoning and Analysis" by Ehtan Bueno de Mesquita and Anthony Fowler.
6. "Using and Understanding Mathematics: A Quantitative Reasoning Approach" by Bennett, J. O., Briggs, W.L., & Badalamentiu, A.
7. "Discrete Mathematics and its Applications" by Kenneth H. Rosen.
8. "Statistics for Technology: A Course in Applied Statistics" by Chatfield, C.
9. "Statistics: Unlocking the Power of Data" by Robin H. Lock, Patti Frazer Lock, Kari Lock Morgan, and Eric F. Lock.