III. Quantitative Reasoning–I

Course Code: GQR-101
Credit Hours: 3 (3-0)
Semester: I
Discipline: General Education
Category: General Education
Course Title: Quantitative Reasoning – I

Course Introduction

Quantitative Reasoning – I is an introductory undergraduate course designed to develop students' basic quantitative literacy, mathematical reasoning and ability to understand and interpret numerical information. The course introduces fundamental concepts of mathematics and statistics and develops students' capacity to use quantitative information in academic and everyday contexts.

Through theoretical concepts and practical exercises, students develop skills in numerical operations, measurement, algebra, functions, data presentation, descriptive statistics, counting and probability. The course emphasizes problem-solving and interpretation of quantitative information presented through numbers, tables, graphs, charts and equations.

Learning Outcomes

On completion of the course, students will be able to:

1. Demonstrate basic numerical literacy and perform fundamental arithmetic operations.
2. Apply fundamental mathematical concepts to solve quantitative problems.
3. Interpret quantitative information presented through tables, graphs and charts.
4. Explain basic statistical concepts and measures.
5. Apply basic counting and probability concepts to quantitative problems.
6. Use quantitative reasoning skills in academic and everyday situations.

Course Content / Assignments / Readings

Week	Course Content	Assignments / Activities
1–2	Unit-I: Numerical Literacy 1.1 Number system and basic arithmetic operations 1.2 Units and conversions 1.3 Area, perimeter and volume 1.4 Rates, ratios, proportions and percentages 1.5 Types and sources of data 1.6 Measurement scales 1.7 Tabular and graphical presentation of data	Quantitative reasoning exercises
3–5	Unit-II: Fundamental Mathematical Concepts 2.1 Basics of geometry 2.2 Sets and their operations 2.3 Relations and functions 2.4 Graphs of functions 2.5 Exponents and factoring 2.6 Simplification of algebraic expressions 2.7 Linear and quadratic equations and inequalities	Problem-solving exercises
6–8	Unit-II: Fundamental Mathematical Concepts (Continued) 2.8 Algebraic solutions of equations 2.9 Graphical solutions of equations and inequalities 2.10 Quantitative reasoning exercises using fundamental mathematical concepts	Individual assignment
9	Mid-Term Examination	Mid-Term Assessment
10–12	Unit-III: Fundamental Statistical Concepts	Statistical exercises

Week	Course Content	Assignments / Activities
	3.1 Population and sample 3.2 Graphical presentation of data 3.3 Summarizing data 3.4 Measures of central tendency 3.5 Measures of dispersion and their applications	
13–14	Unit-III: Fundamental Statistical Concepts (Continued) 3.6 Rules of counting 3.7 Multiplicative principle 3.8 Permutations and combinations	Problem-solving exercises
15–17	Unit-III: Fundamental Statistical Concepts (Continued) 3.9 Basic concept of probability 3.10 A priori and relative frequency approaches 3.11 Applications of probability 3.12 Quantitative reasoning exercises using fundamental statistical concepts	Applied quantitative exercise
18	Final Term Examination	Final Assessment

Textbooks and Reading Material

1. Madison, B. L., & Steen, L. A. *Quantitative Reasoning: Tools for Today's Informed Citizen*.
2. Madison, B. L., & Bressoud, D. M. *Quantitative Reasoning for the Information Age*.
3. Ellis, W. *Fundamentals of Mathematics*.
4. Zaslow, E. *Quantitative Reasoning: Thinking in Numbers*.
5. Bueno de Mesquita, E., & Fowler, A. *Thinking Clearly with Data: A Guide to Quantitative Reasoning and Analysis*.
6. Bennett, J. O., Briggs, W. L., & Badalamenti, A. *Using and Understanding Mathematics: A Quantitative Reasoning Approach*.
7. Rosen, K. H. *Discrete Mathematics and Its Applications*.
8. Chatfield, C. *Statistics for Technology: A Course in Applied Statistics*.
9. Lock, R. H., Lock, P. F., Lock Morgan, K., & Lock, E. F. *Statistics: Unlocking the Power of Data*.

Teaching Learning Strategies

1. Interactive lectures
2. Demonstration and explanation
3. Problem-solving exercises
4. Individual practice
5. Group exercises
6. Question-and-answer sessions

Assignments: Types and Number with Calendar

Assignment / Activity	Timing	Type
Numerical Literacy Exercises	Weeks 1–2	Individual
Mathematical Problem-Solving Assignment	Weeks 3–5	Individual
Algebra and Functions Exercises	Weeks 6–8	Individual
Statistical Data Analysis Exercise	Weeks 10–12	Individual
Counting and Probability Exercises	Weeks 13–17	Individual