Programme	ADP Home Economics	Course Code	GQR-101	Credit Hours	3(3+0)
Course Title	**QUANTITATIVE REASONING (I)**				

Course Introduction

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.

Learning Outcomes

On the completion of the course, the students will:

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

	Course Content	Assignments/Readings
Week 1	**Introduction to Quantitative Reasoning and Number Systems** Types of numbers: natural, whole, integers, rational, irrational, and real numbers	Quantitative Reasoning Skills By M. Tahir Aziz Takleed Chap 1 exercises for practice
	Basic arithmetic operations (addition, subtraction, multiplication, division)	
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Week 2	**Fractions, Decimals, and Percentages** Conversion between fractions, decimals, and percentages Ratios, rates, and proportions	Quantitative Reasoning Skills By M. Tahir Aziz Takleed Chap 3 exercises for practice
	Conversion between fractions, decimals, and percentages	
	Ratios, rates, and proportions	
Week 3	**Units and Conversions** Systems of units (SI and non-SI) Converting between units (length, area, volume, mass, and time)	Quantitative Reasoning Skills By M. Tahir Aziz Takleed Chap 1 exercises for practice
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Week 4	**Perimeter, Area, and Volume** Formulas for common geometrical shapes (square, rectangle, circle, triangle)	Quantitative Reasoning Skills By M. Tahir Aziz Takleed Chap 8 exercises for practice
	Formulas for common geometrical shapes (square, rectangle, circle, triangle)	
	Surface area and volume of solids (cube, cuboid, cylinder, sphere)	
	Data and Measurement Scales Types and sources of data (primary vs secondary)	Quantitative Reasoning Skills By M.

Week 5	Measurement scales: nominal, ordinal,	Tahir Aziz Takleed Chap 9 exercises for practice
	Measurement scales: interval, and ratio	
Week 6	**Graphical Representation of Data** Bar charts, histograms,	Quantitative Reasoning Skills By M. Tahir Aziz Takleed Chap 9 exercises for practice **Quiz of 5 marks in week 7**: Topics covered in week 5 and 6
	pie charts, and line graphs	
	Reading and interpreting graphs	
Week 7	**Introduction to Geometry and Sets** Basic geometric terms: lines, angles, circles, polygons	Quantitative Reasoning Skills By M. Tahir Aziz Takleed Chap 2 exercises for practice
	Types of angles and triangles, Concept of sets, notation, and types of sets	
	Quiz	
Week 8	**Relations, Functions, and Graphs** Concept of relations and mappings	Quantitative Reasoning Skills By M. Tahir Aziz Takleed Chap 4 exercises for practice
	Domain, range, and types of functions	
	Graphical representation of linear and simple quadratic functions	
Week 9	**Mid Term Exam**	
Week 10	**Algebraic Expressions and Exponents** Laws of exponents and radicals	Quantitative Reasoning Skills By M. Tahir Aziz Takleed Chap 5 exercises for practice
	Simplifying algebraic expressions	
	Factoring and expansion techniques	
Week 11	**Equations and Inequalities** Linear equations in one and two variables	Quantitative Reasoning Skills By M. Tahir Aziz Takleed Chap 6 exercises for practice
	Quadratic equations – solutions by factorization and formula	
	Graphical interpretation and inequalities	
Week 12	**Introduction to Statistics** Concept of population and sample	Reading: Khan R. A., *Quatitative reasoning 1*, Ilmi Kitab Khana, Chapter 7 and 8 page 238, 239, 243, 275-315
	Organizing and presenting data Frequency distributions and frequency polygons	
Week 13	**Measures of Central Tendency** Mean, median, and mode	Practice questions: Khan R. A., *Quatitative reasoning 1*, Ilmi Kitab Khana, Chapter 10 Practice question no. 7, 10, 13, 16, 20, 30, 31 and 32
	Applications and interpretation of averages	
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Week 14	**Measures of Dispersion** Range, variance	Practice questions: Khan R. A., *Quatitative reasoning 1*, Ilmi Kitab Khana, Chapter 10 Practice question no. 36-50
	standard deviation	
	Significance of dispersion in data interpretation	
	Rules of Counting and Probability Concepts Fundamental counting rule, permutations, and combinations	**Group Assignment**: Kamal S.,

Week 15	Basic concept of probability	Introduction to Statistics Book I, Ilmi Kitab Khana, Chapter 6 .
	Applications of a priori and relative frequency approaches	
Week 16	**Quantitative Reasoning Applications** Applying arithmetic, algebra, and statistics in real-life contexts	Quantitative Reasoning Skills By M. Tahir Aziz Takleed Chap 2 exercises for practice
	Data-driven decision making	
	Data-driven decision making	
Week 17	Revision of key concepts from all three units	From Books and Class lectures
Week 18	Final Term Exam	

Textbooks and Reading Material

4. "Quantitative Reasoning: Tools for Today's Informed Citizen" by Bernard L. Madison. Lynn and Arthur Steen.
5. "Quantitative Reasoning for the Information Age" by Bernard L. Madison and David M. Bressud.
6. "Fundamentals of Mathematics" by Wade Ellis.
7. Quantitative Reasoning: Thinking in Numbers" by Eric Zaslow.
8. "Thinking Clearly with Data: A Guide to Quantitative Reasoning and Analysis" by Ehtan Bueno de Mesquita and Anthony Fowler.
9. "Using and Understanding Mathematics: A Quantitative Reasoning Approach" by Bennett,
10. J. O., Briggs, W.L., & Badalamentiu, A.
11. "Discrete Mathematics and its Applications" by Kenneth H. Rosen.
12. "Statistics for Technology: A Course in Applied Statistics" by Chatfield, C.
13. "Statistics: Unlocking the Power of Data" by Robin H. Lock, Patti Frazer Lock, Kari Lock Morgan, and Eric F. Lock.
14. Abbas A., *Quantitative Reasoning,* Iqra Publishers
15. Khan R. A., *Quatitative reasoning 1*, Ilmi Kitab Khana,
16. Kamal S., Introduction to Statistics Book I, Ilmi Kitab Khana

Teaching Learning Strategies

Lecture-based learning through lectures and presentations.

Group learning through group assignments discussion and laboratory work.

Individual learning through practical work and application of theory principles.

Assignments: Types and Number with Calendar

- **Quiz of 5 marks in week 7**: Topics covered in week 5 and 6
- **Group Assignment in Week 15:** Kamal S., Introduction to Statistics Book I, Ilmi Kitab Khana, Chapter 6