



## THE ROLE OF MATHEMATICS IN OTHER ACADEMIC SUBJECTS

**Turayeva Gavkharbonu Tolibjonovna**

**Alfraganus University, Department of Pedagogy,  
Doctor of Philosophy (PhD) in Pedagogical Sciences.  
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### ABSTRACT

*This thesis examines the role of mathematics as a fundamental science in the teaching and learning of other academic subjects. Mathematics serves as the basis for developing logical thinking, analytical skills, and problem-solving abilities, which are essential in natural sciences, social sciences, and applied disciplines. The integration of mathematical knowledge into other subjects enhances students' understanding and improves the quality of education.*

**Introduction.** Mathematics is considered one of the core disciplines in the education system. It plays a crucial role not only as an independent subject but also as a foundation for other sciences. Many academic disciplines rely on mathematical concepts, formulas, and methods for analysis, measurement, and interpretation of data. Therefore, understanding the role of mathematics in other subjects is essential for improving interdisciplinary teaching and learning.

#### **The Role of Mathematics in Natural Sciences**

Mathematics plays a vital role in natural sciences such as physics, chemistry, and biology. For example:

- in physics, mathematical formulas are used to calculate speed, force, distance, and energy;
- in chemistry, ratios and percentages are applied when calculating the concentration of solutions;
- in biology, statistical methods help analyze population growth and experimental results.

These examples show that without mathematical knowledge, it would be difficult to understand and apply concepts in natural sciences.

#### **Mathematics in Social Sciences**

Mathematics is also widely used in social sciences, including geography, economics, and history. For instance:

- in geography, students use scale, distance, and coordinates to read maps;
- in economics, mathematical calculations are required to analyze income, expenses, and profit;
- in history, timelines and chronological calculations help students understand historical events.

Thus, mathematics supports accurate analysis and interpretation in social sciences.

### **The Role of Mathematics in Technology and Informatics**

In the modern world, mathematics is closely connected with technology and informatics.

For example:

- algorithms and programming are based on logical and mathematical thinking;
- data analysis and modeling rely on mathematical principles;
- engineering and technical sciences require precise calculations and measurements.

Mathematics enables students to understand technological processes and develop digital competence.

### **Interdisciplinary Integration in Teaching**

Integrating mathematics with other subjects enhances students' learning outcomes.

Effective methods include:

- using real-life problems that combine mathematics with science and geography;
- project-based learning involving data collection and analysis;
- cross-curricular lessons that connect mathematical concepts with other subjects.

Such approaches develop students' critical thinking and help them see the practical value of mathematics.

**Conclusion.** In conclusion, mathematics plays a central role in the learning of other academic subjects. It supports logical reasoning, accurate measurement, and data analysis across disciplines. Strengthening interdisciplinary integration of mathematics contributes to higher educational quality and prepares students for real-life problem-solving..

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