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THE IMPORTANCE OF MATHEMATICS IN THE FIELD OF ENGINEERING***Mavjuda Ziyodullayevna Sagdullaeva****Tashkent State Transport University, Department Of Higher Mathematics, Uzbekistan****Yuldashev Sanjar Atabekovich****Tashkent State Transport University, Department Of Higher Mathematics, Uzbekistan*

ABOUT ARTICLE**Key words:** Engineering, teachers' background, rigor and approximation, computer engineering.**Received:** 02.03.2023**Accepted:** 07.03.2023**Published:** 11.03.2023**Abstract:** Mathematics is an important domain in science and technology, and is taught in a variety of university programs such as Administration, Economics, Computation, Engineering, and many other scientific fields of study. In Engineering, the interpretation and solution of certain problems require the direct application of mathematical models. To understand and analyse these mathematical models, it is often necessary to use elements of statistics, linear algebra, or differential and integral calculus. This is one reason why the teaching of mathematics in Engineering courses has been addressed in studies as far back as the early twentieth century.

INTRODUCTION

Some authors, such as Murakami (1988), have suggested that mathematics should be taught to Engineering students by mathematicians with the help of engineers, with the latter selecting suitable exercises, to create a learning environment more in tune with students' professional realities. Cardella (2006) sought to better understand how Engineering students use mathematics. She also identified the mathematics Engineering students use, and consequently, the brand of mathematics that should be taught in Engineering programs. Her results show that Engineering students use mathematical thinking in various ways to solve problems while designing a project (they apply informal and intuitive knowledge of a given mathematical field; employ facts, definitions, algorithmic processes, etc.). She noted the importance of these various types of mathematical thinking, indicating that professors must carefully address students' mistakes throughout their learning process to ensure they understand what

is being taught. Regarding teachers, Maaß and Gurlitt (2009) noted that teachers' knowledge of and beliefs on a given topic influence the way they plan, select, implement, and assess tasks. Later, and Maaß (2011) agreed with Schoenfeld (1992), who states that if we know teachers' resources, goals, and orientations — including their beliefs — we can better explain their actions. In this same vein, the study of Clark and colleagues (2014) provides a framework that divides into four categories those elements that can influence teachers' beliefs: "(a) teachers' professional background and experiences, (b) teacher knowledge, (c) teaching contexts, and (d) students' experiences". The conjecture that different teachers will give different lectures on the same topic on the basis of their knowledge and beliefs was confirmed at the university level by Pinto (2013). Pinto analysed the way two different university instructors implemented an identical course plan (both were capable teachers with a solid background in mathematics).

Regarding the teaching of mathematics through applications and modelling in the context of Engineering education, Cardella (2006) drew on the work of Schoenfeld (1992) and Doer (2007) in recognizing the need for mathematics instructors in Engineering programs to better understand how mathematics and mathematical thinking are used in Engineering. She admits that instructors should be familiar with the mathematical content necessary for engineering, and should consider the importance of problem solving, resources, attitudes, practices and of the learning environment. In this vein, we are interested in identifying and discussing the attitudes and beliefs of instructors with different academic backgrounds to pinpoint how these beliefs influence their teaching of mathematical elements in Engineering programs. To do so, we follow Schoenfeld's approach to mathematical thinking.

Mathematics widely used in every engineering fields. They have always been a tough subject to study and the students of top engineering colleges are always struggling with a fear factor associated with mathematics. Although practice makes a man perfect hold truth in many typical tasks, it also holds true for study as well. Mathematics has been too complicated for majority of candidates.

Mathematics as primary subject in core and new engineering course is compulsory in the engineering education industry across the globe. At top engineering colleges in Rajasthan, there are several branches. The branches are computer science engineering, electrical engineering, mechanical engineering, electronics and communication engineering, and civil engineering. Each branch has different study set that is focused on the significance of mathematics.

The role of mathematics in electrical engineering. The differential equations in mathematics find importance in electrical engineering for solving circuit equations. There is another subject in electrical

engineering related to electromagnetic theory. Also, it involves mathematical concepts on calculus, and builds sound knowledge-base on learning triple integrals and integration over a closed surface.

Mathematical linear algebra is inter-connected with the electrical engineering concepts of circuit theory and signal processing. So, engineering students of BTech Colleges Rajasthan has an advantage over mathematics to grasp basic to advanced difficult concepts in core electrical engineering subjects. In engineering, students learn all about extensive use of Laplace and Fourier transforms equations. Which is further related to linear algebra in circuit theory and signal processing. Mathematical complex number algebra finds maximum use in solutions of sinusoidal excited circuits (AC) equations and Power system load flow problems.

Why mathematics is important in electronics engineering? Numerical methods find use in solving non-linear engineering systems. However, mathematics in engineering concept is closely related to the modern simulation software algorithms and Matrix algebra (Linear algebra). In other words, the significance of mathematics in science is equivalent to its being the mother of all science.

Top electronics engineering college offers the requirement to understand typical concept and expand knowledge. Also, they can understand various mathematical concept based on differential, integral calculus and complex numbers. So, students need to be familiar with partial differentiation and advanced calculus. For this, they need a sound knowledge on difficult concept on vectors, matrices, statistics and differential equations. Using the concept of Mathematics in Engineering helps an individual in performing best simplified calculations in problem solving and logical thinking.

Which type of mathematics is significant in civil engineering? For Civil engineers of Best Private Engineering College used on a daily basis and they work exclusively on differential equations in engineering mathematics, statistics, and calculus. Civil engineers use mathematics equation to study the chemistry of materials. To use the right material for the project, engineers measure the strength of the material and apply chemical equations to judge the strength of the material. Besides, the Mathematical trigonometry used for surveying the structure. Where land elevation and various angel measurement of the structure considered.

Physics equation share a common similarity with mathematical equations. It allows students of BTech colleges to study the ascertain the functionality of the structure. In civil engineering industry, bridges constructed. Where it is decided how large the supporting piers should be, thickness of the steel columns of bridge, how many of them should be installed. Physics mathematics in engineering applications are based around algebra, calculus, and trigonometry. Also, the cost estimation of the

project is very important and involve the basic principles of accounts and statistics. The planning phase of the project and the financial budget allocation is purely based on mathematics of figures.

How mathematics plays a key role in mechanical engineering. In mechanical engineering colleges, there is vibrational mechanics with an application of calculus for figuring out the velocity and acceleration of the vibrating object. Also, the simultaneous linear equation and differential equation used to find out the exact equation for the displacement of nodes in vibrations. In engineering mechanics, algebra concept and solution to multi degree equations with knowledge of graphs to compare various parameters.

Engineering thermodynamics and heat transfer involve different concepts on heat waves and gradients for the students of the list of engineering colleges. So, concept of logarithmic for heat and temperature calculation, ratios and proportion for ideal gas laws. In production engineering in mechanical stream, colleges have applied mathematics in engineering on geometry, angles, and trigonometry for calculations on forces and velocities, logarithmic equations for true stresses and engineering stress equations. Besides, there is fluid mechanics, where multi variable equations for solutions on states and calculus flow variables is used.

What is the main importance of mathematics in computer science engineering? Mathematical models and algebra involved and equally interconnected in handling all the database queries of complex algorithmic and working on website CSS. If the programmers of best computer science engineering colleges in Rajasthan are working on high-end technologies. Such as machine learning and artificial intelligence computer science programmers should have solid foundation in maths subjects such as Statistics, calculus, probability in engineering mathematics theory.

Core mathematical topics like discrete mathematics syllabus including Set theory, graph theory, probability, number theory, algebra is the basic foundation for programming and computer science. Cryptography programming is logical based and mathematics Number theory has multiple applications in cryptography. On the other hand, BTech colleges Jaipur offers Boolean algebra and relational algebra. Which used in logic gates and databases.

The best engineering college in India offers specialization in Computer Science and Engineering, Electronics and Communication Engineering, Mechanical Engineering, Electrical Engineering, Civil Engineering with several value-added courses, state-of-the-art infrastructure, highly qualified faculty, Employability enhancement, guest lectures, live industry projects and industrial visits.

The importance of Mathematics. In such a modern and non-stop developing world nowadays, most people need mathematics as an important tool for their occupation, no matter what it is. Obviously, mathematics plays a vital role in daily use such as architecture, business, clerical work, etc... We even use math to balance our budget, pay bills, check our saving accounts, etc. Math is an important part of our civilization. Most people using mathematics recently wondered if they should learn about its history. Some claimed that the mathematics' history itself would help nothing at all and it makes virtually no sense to study the history of this science. Because obviously in practice, they only need those formula to do the calculations. However, according to the research of Alexander (2011), he stated that "mathematics is seen not as the static skeleton of science but, instead, as a dynamic and historically evolving field in its own right – just like science itself." Mathematics was developed early in Babylonia since 2000 BC. The Babylonian basis of mathematics was inherited by the Greeks and independent development by the Greeks began from around 450 BC. After that, mathematics continued to flourish in some countries such as Iran, Syria, and India. In general, many famous major progresses were made by the well-known names, for examples, Galileo revolutionized the applications of mathematics to the study of the universe, Newton and his mass of new discoveries showing the interaction between mathematics, physics, and astronomy, and so on. No one denies the important and worldwide common uses of mathematics in every corner of our lives. Lynch (2012) noted that in this modern age of science and technology, emphasis was given on science such as Agriculture, Chemistry, Biology, Medicine, Business and Engineering.

Mathematics is a wide discipline and has many forms. In the various engineering fields, different forms of math may be applied to achieve a specific solution. For instance, linear algebra is widely applied in electrical engineering to design electrical circuits. Boolean algebra is the basis of digital logic design, a key component of building computers.

In civil and mechanical engineering, geometry is used to design structures and ensure that they perform in a safe and meaningful way. When designing a bridge, civil engineers may use differential equations to calculate the approximate size of the supporting piers needed. They may also use complex mathematical modeling to predict the lifespan of the structure to be constructed.

Industrial engineers use calculus to find the rate at which certain variables will change in a given operation. Industrial engineering routinely entails making approximations and safe estimations to ensure that all processes are properly controlled. One or more forms of mathematics are used in these approximations and estimations.

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