# Department of Electrical, Electronics and Communication Engineering GITAM School of Technology, Bengaluru-561203

**GITAM (Deemed to be University)**

**Capstone Project – Introduction (PROJ2999), 7th Semester Academic year: 2025-26**

**Project Title:** Approximate computing for image / signal processing

**Guide Name:**Shatadal Chatterjee

# Section:A

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**Abstract:**

The increasing demand for high-performance and energy-efficient hardware has become a major challenge in modern computing, particularly for ASICs and embedded systems. To overcome the inherent power consumption and large circuit area of traditional digital signal processing (DSP) hardware, this project help us with this problems. By introducing a controlled amount of imprecision, we can achieve substantial performance gains and demonstrate viable solution for creating high-performance, energy-efficient DSP systems.

We propose that by intelligently introducing a controlled amount of imprecision, we can achieve performance gains. Our methodology involves developing a hardware architecture that leverages approximate arithmetic to create a more efficient.

**Digital filter** or **digital signal processing block**. The design will be modeled in a hardware description language and implemented on a reconfigurable platform such as a Field-Programmable Gate Array (FPGA).

The project's key contribution is the evaluation of the trade-offs between computational accuracy and hardware efficiency.We will quantify the improvements in power consumption and circuit area while analyzing the impact on output quality through standard metrics. Our findings will demonstrate that approximate computing offers a viable solution for creating high-performance, energy-efficient DSP systems where minor errors are tolerable.

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