Faculty Member Contact Information

Name	Dr. Ashiq Sakib
Contact Info	
SIUE Email	asakib@siue.edu
Campus Box	1801
Department	Electrical and Computer Engineering

1 Funded, 1 Unfunded URCA Assistant

	This position is **ONLY** open to students who have declared a major in this discipline.	**M**
	This project deals with social justice issues.	💙
	This project deals with sustainability (green) issues.	🌿
	This project deals with human health and wellness issues.	✚
	This project deals with community outreach.	✋
	This mentor's project is interdisciplinary in nature.	I

Are you willing to work with students from outside of your discipline? If yes, which other disciplines?

- I am open to taking students outside of my discipline, but only those in similar fields.

How many hours per week will your student(s) be required to work in this position?
(Minimum is 6 hours per week; typical is 9)

- 10

Will it be possible for your student(s) to earn course credit?

- Yes; 1 credit hour of ECE 491

Location of research/creative activities:

- Engineering Building

Brief description of the nature of the research/creative activity?

The study focuses on developing an electronic design automation (EDA) framework to enable the automated synthesis, optimization, mapping, testing, and verification of asynchronous digital circuits.

In recent times, the asynchronous clockless domain of digital designs has emerged as a promising alternative to the conventional synchronous domain, owing to their inherent robustness, low-power operations, and resilience against process, voltage, and temperature (PVT) variations. The domain has found numerous commercial applications. However, with the technology being relatively new, the primary issue that has hindered the widescale implementation is the lack of automated synthesis and optimization tools. The goal of this research project is to address this current gap and develop novel workflows to support automated synthesis and cost-aware optimization of asynchronous circuits to be able to utilize the full potential of the paradigm.

Brief description of student responsibilities?

My research group has already made progress and developed an EDA framework called ASCEND for asynchronous Null Convention Logic circuits. However, the current iteration is a preliminary version, and there are several scopes to further enhancing the tool. This is where the URCA assistant will contribute. The responsibilities will primarily encompass one or more of the following areas: designing software support for algorithm deployment, integrating verification models for validating the synthesized circuits, creating a user-friendly graphical user interface (GUI) for the tool, among others.

URCA Assistant positions are designed to provide students with *research or creative activities* experience. As such, there should be measurable, appropriate outcome goals. What exactly should your student(s) have learned by the end of this experience?

Upon completion, the student will:

-        gain competency in both computer software and hardware.

-        have a more profound comprehension of conventional digital design concepts, such as logic synthesis, logic minimization, transistor level design, testing, and verification, together with more advanced concepts.

-        gain experience in software tool development.

<u>Requirements of Students</u>

If the position(s) require students to be available at certain times each week (as opposed to them being able to set their own hours) please indicate all required days and times:

- There are no set times. The schedule can accommodate the student.

If the location of the research/creative activities involves off campus work, must students provide their own transportation?

- It does not require off-campus activity.

Must students have taken any prerequisite classes? Please list classes and preferred grades:

- ECE 282, CS 140

Other requirements or notes to applicants:

- Competency in C or Python is required.