NALLA NARASIMHA REDDY

Education Society's Group of Institutions · Integrated Campus

(UGC AUTONOMOUS INSTITUTION)

School of Engineering

Department of Electronics and Communication Engineering

Date: 26-08-2024

Report

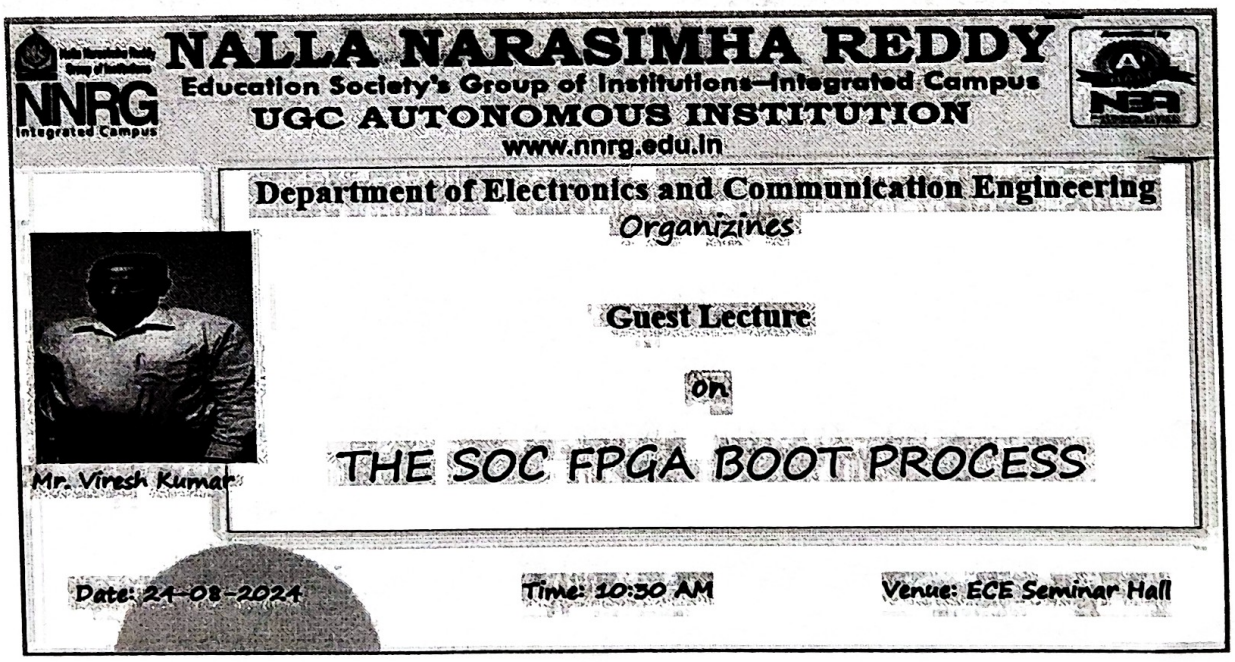
on

Guest Lecture: "THE SOC FPGA BOOT PROCESS"

Overview of Program

The Department of Electronics and Communication Engineering organized a Guest Lecture on **"The SoC FPGA Boot Process"** to familiarize students with the architecture and boot sequence of System-on-Chip (SoC) FPGA devices. The session was delivered by **Mr. Viresh Kumar, Deputy General Manager – HR, Medha Servo Drives (P) Ltd., R&D Cell**, who explained industrial practices in FPGA-based embedded system design.

Date Organized	Title of Program	Name of Resource Person	Participants
24-08-2024	"The SoC FPGA Boot Process"	Mr. Viresh Kumar, Deputy General Manager – HR, Medha Servo Drives (P) Ltd., R&D Cell	B. Tech. ECE III-I (82 Students) and ECE faculty members



Purpose of Program

The programme was organized to strengthen students' knowledge of SoC FPGA architecture, boot mechanisms, and embedded system design. It also aimed to bridge the gap between classroom learning and industrial practices while creating awareness of career opportunities in FPGA and embedded system technologies.

Program Highlights

The resource person explained the architecture of SoC FPGA devices, Boot ROM functionality, First Stage Boot Loader (FSBL), Second Stage Boot Loader (SSBL), and various boot methods using QSPI Flash, SD Card, and eMMC. Industrial case studies and practical examples from Medha Servo Drives were presented, followed by an interactive session where students discussed FPGA applications and career prospects.

1. Introduction to SoC FPGA Architecture

The session began with an introduction to the architecture of System-on-Chip (SoC) FPGA devices, where students learned how programmable logic is integrated with embedded processors on a single chip. The resource person explained the advantages of combining hardware and software functionalities, enabling students to understand the importance of SoC FPGA technology in designing high-performance embedded systems for industrial and real-time applications.

2. Boot ROM, FSBL, and SSBL Concepts

Students gained a clear understanding of the SoC FPGA boot sequence through the explanation of Boot ROM, First Stage Boot Loader (FSBL), and Second Stage Boot Loader (SSBL). The speaker described the role of each stage in initializing the processor, configuring the programmable logic, and loading the operating system. This helped students appreciate the significance of boot loaders in ensuring reliable and efficient system startup.

3. Booting from QSPI Flash, SD Card, and eMMC

The resource person demonstrated different booting methods used in SoC FPGA devices, including booting from QSPI Flash, SD Card, and eMMC memory. Students learned how the choice of boot device depends on system requirements such as speed, storage capacity, and application needs. The practical examples provided enhanced their understanding of memory interfaces and boot configuration techniques used in embedded system development.

4. Industrial Case Studies from Medha Servo Drives

Students were introduced to real-world industrial applications through case studies from Medha Servo Drives (P) Ltd. The speaker explained how SoC FPGA technology is utilized in railway signalling systems, automation, and embedded control applications. These examples helped students relate theoretical concepts to practical engineering solutions and understand the expectations of the electronics industry.

5. Interactive Discussion on FPGA Career Opportunities

The lecture concluded with an interactive discussion on career opportunities in FPGA design and embedded systems. Students actively participated by asking questions related to FPGA programming, hardware description languages, internships, and employment opportunities in the semiconductor and embedded industries. The resource person encouraged students to strengthen their technical skills in Verilog/VHDL, embedded C, and FPGA development tools to build successful careers in this rapidly growing field

Outcome of Program

Students gained knowledge of the SoC FPGA boot process, embedded system architecture, and industrial applications. The lecture enhanced their understanding of FPGA technologies and motivated them to pursue advanced learning in embedded systems.

Guest Lecture	Mapped POs & PSOs	Mapped SDGs
The SoC FPGA Boot Process (24-08-2024)	PO1, PO2, PO3, PO5, PO12 PSO1, PSO2	SDG 4: Quality Education SDG 8: Decent Work and Economic Growth SDG 9: Industry, Innovation and Infrastructure

HoD 26/08/24

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