



**RAMAIAH**  
College of Arts, Science &  
Commerce

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M S Ramaiah College of Arts, Science and Commerce  
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Approved by Government of Karnataka, Approved by AICTE, New Delhi.  
Recognized by UGC under 2f & 12B of UGC act 1956

## Department of Electronics

Organizes

Hands on training program on

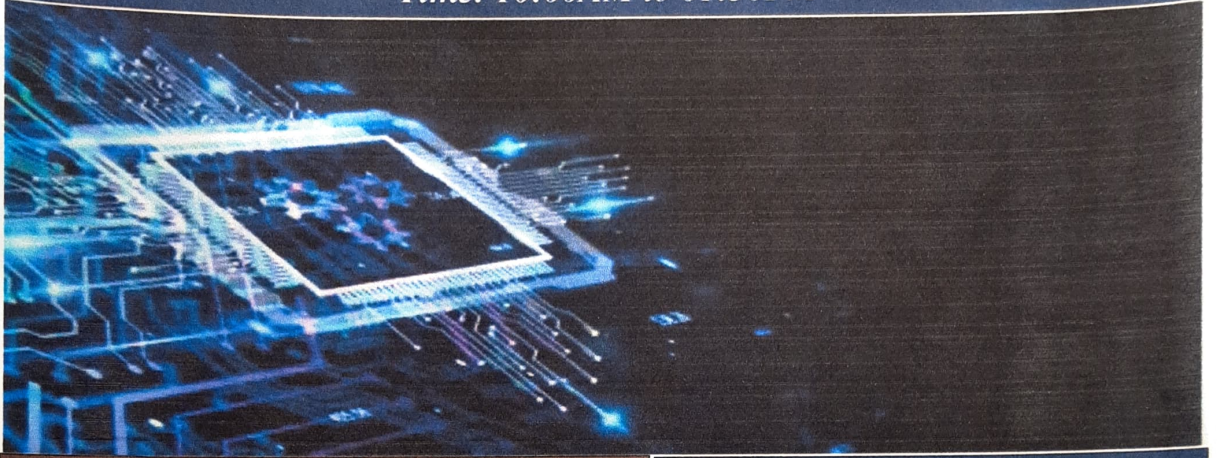
### "Digital Design using VERILOG on FPGA Kit"

On

19/01/2024

Venue: 310 Electronics LAB

Time: 10:00AM to 01:30PM



#### Objectives:

- To get the students familiarize with the FPGA Xilinx Spartan 6 kit with ISE 14.1 installer.
- To make them understand how to create a Verilog code and simulate it
- To make them familiarize with the hardware interfacing with the FPGA kit such as stepper motor, dc motor control of speed and directions and LED, LCD display control.

#### Expected Outcomes

- To enhance the knowledge of students in FPGA Xilinx Spartan 6 kit and synthesizing, implementation and hardware interfacing.
- To bring the wakefulness among the students regarding FPGA kits and inculcated their interest to start a career in VLSI industry.

#### Program Coordinator

Mrs. Asharani R, Assistant Professor, Dept. of Electronics, MSRCASC



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**MSRCASC/ELE\_HT/2023-24/06**

**Date: 12/01/2024**

**CIRCULAR**

The Department of Electronics is conducting hands on training program on “**Digital Design using VERILOG on FPGA Kit**” for 3<sup>rd</sup> Semester BSc-ECs on 19/01/2024 at Room number 310 from 10:00AM to 01:30PM under the DBT star College scheme. The interested candidates can register your name in the Electronics Department.

  
12/1/24  
HOD

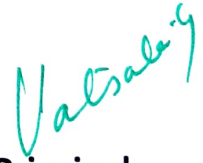
**HEAD OF THE DEPARTMENT**

Department of Electronics  
M. S. Ramaiah College of  
Arts, Science & Commerce  
M.S.R. Nagar, Bangalore-560 054

  
DBT Star College Scheme

**coordinator**

**CO-ORDINATOR**  
**DBT-STAR COLLEGE SCHEME,**  
M.S. Ramaiah College of Arts, Science & Commerce  
MSRIT Post, MSR Nagar, Bangalore - 560 054

  
Vatsalya

**Principal**

*Principal,*

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## Report on

Hands on training program on

### “Digital Design using VERILOG on FPGA Kit”

**Date :** 19<sup>th</sup> January 2024

**COURSE:** BSc ECs 3rd SEMESTER.

**Resource person:** Mr SREENATH, Digitrack Instruments

**Venue:** Electronics Lab

**Time:** 10:00 am to 01:30 pm

**Faculty in charge:** Mrs Asharani R

#### Objectives:

- To get the students familiarize with the FPGA Xilinx Spartan 6 kit with ISE 14.1 installer.
- To make them understand how to create a Verilog code and simulate it
- To make them familiarize with the hardware interfacing with the FPGA kit such as stepper motor, dc motor control of speed and directions and LED, LCD display control.

Field Programming Logic arrays(FPGA) kits used in data center, aerospace engineering, defense, artificial intelligence (AI), industrial IoT (internet of things), wired and wireless networking, automotive, and countless other industries. Such devices are often in environments where users need real-time information. Field Programmable Gate Arrays (FPGAs) are widely used in the digital hardware industry as they provide flexibility and efficiency in hardware design. Xilinx is a leading manufacturer of FPGAs, and the Spartan 6 FPGA is one of their popular product lines. Xilinx Spartan 6 FPGA is a powerful hardware device that can interface with various sensors



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and actuators. Spartan 6 devices offer industry-leading connectivity features such as high logic-to-pin ratios, small form-factor packaging, soft processor, and a diverse number of supported

I/O protocols. Ideally suited for a range of advanced bridging applications found in consumer, automotive infotainment, and industrial automation.

The Resource person Mr Sreenath, Digitrack Instruments educated the students regarding the Verilog & VHDL language and how it is used in the industrial applications and why it is preferred. He explained to the students how to run a Verilog code in ISE 14.1 installer in Xilinx Spartan 6 and also demonstrated how to interface the sensors like thermistors, servo motors, stepper motors with the Xilinx kits using General Purpose Input output units(GPIO).

Mr Sreenath explained to the students the sequential steps need to be followed for the synthesising and implementation of Verilog code. He explained to them how to create a new Project, which package need to be selected, to select the package TQG144 with 144 pins and to select the preferred language Verilog or VHDL. The IC selected was XC<sup>4</sup>SLX9. He demonstrated to them how to create a module by selecting new source.

He also demonstrated to them how to check the syntax error and the simulation and how to verify the output by observing the waveforms corresponding to digital inputs. He had done the simulation for verification of Truth tables of Basic gates, multiplexer, demultiplexer, encoder, decoder logic circuits and counters.

Mr Sreenath elaborated on the implementation steps and instructed to students that in order to assign pin numbers they have to refer the manual. He showed to the students the different components on the FPGA Board and how to identify the pins in I/O slots. The Flat Ribbon Cable(FRC) are connected according to the pin numbers. Input FRC and output FRC are used for interfacing of FPGA kits with LED display. Each of the FRC slots are having provision of power supply and ground. Some of the FRCs like FRC 8 is having both +3.5 and -3.5 power supply especially used for Digital to Analog Converters(DAC).

Mr Sreenath showed to the students how the Verilog code was compiled using Xilinx ISE and synthesized to generate the netlist. He told that further they have to map the netlist to the target device and should be placed and routed to create a bitstream file. The bitstream file should be then uploaded to the Xilinx Spartan 6 FPGA kit using the Xilinx Platform Cable USB II. The design was interfaced with the FPGA kit using a breadboard and LEDs.



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The resource person also demonstrated to the students how to dc, stepper motors and sensors like thermistors with FPGA kit. He demonstrated to the students interfacing of a DC motor with the Xilinx Spartan 6 FPGA kit with the dc motor card containing motor driver

circuit that can control the direction and speed of the motor. He told that L293D is a popular motor driver IC that can be used for this purpose. The motor driver IC has two input pins, IN1 and IN2, which control the direction of the motor, and two output pins, OUT1 and OUT2, which drive the motor.

He demonstrated to the students interfacing a stepper motor with the Xilinx Spartan 6 FPGA kit, and requirement of a stepper motor driver IC that can control the step and direction of the motor. He told that L298N is a popular motor driver IC that can be used for this purpose. The motor driver IC has two input pins, DIR and STEP, which control the direction and step of the motor.

**Outcome:-**

- The student gained deep understanding of FPGA Xilinx Spartan 6 kit and synthesizing, implementation and hardware interfacing.
- It enhanced their knowledge, provided hands on training on FPGA kits and inculcated their interest to start a career in VLSI industry.
- It also demonstrated the power and flexibility of FPGAs in digital hardware design

  
**Faculty in charge:**  
**(Mrs Asharani R)**

  
**HOD**

**HEAD OF THE DEPARTMENT**

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**DBT Star College Scheme  
Coordinator**

**CO-ORDINATOR  
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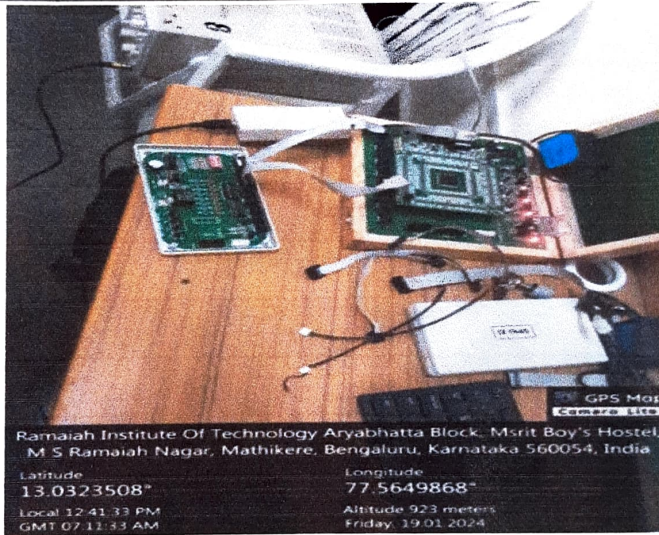
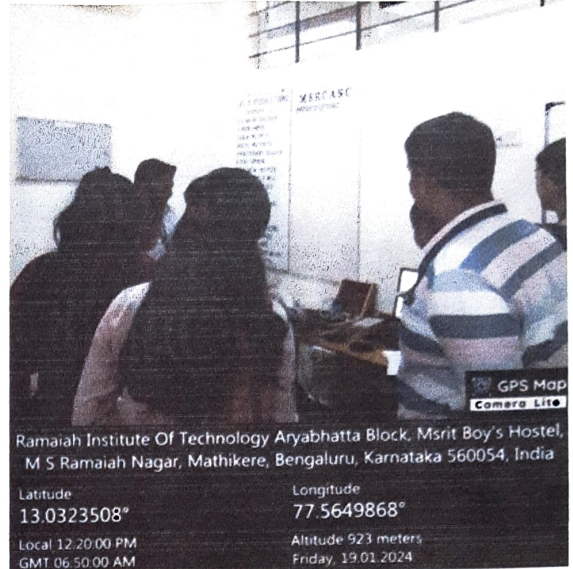
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**Photos of Hands on Training Program on “Digital Design using VERILOG on FPGA Kit” for 3<sup>rd</sup> semester students of BSc ECs**



**Faculty in charge:**  
**(Mrs Asharani R)**

*[Signature]*  
**HOD**

*[Signature]*  
**DBT Star College Scheme**

*[Signature]*  
**Principal**  
*Principal,*

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**Hands on Training Program on on “Digital Design using VERILOG on FPGA Kit” for 3<sup>rd</sup> semester students of BSc ECs**

**Participant list**

**Date:** 19<sup>th</sup> January 2024

**COURSE:** BSc ECs 3<sup>rd</sup> SEMESTER.

SI No:	Register Number	Student name	Signature of the student
1	U18EV22S0218	SHIVAM CHAUBEY	
2	U18EV22S0276	SHARATH KUMAR B	
3	U18EV22S0052	SANATH VISHNU	
4	U18EV22S0219	HEMANTH S	
5	U18EV22S0061	NAYANA H L	
6	U18EV22S0062	SRIDHARAN ISHA	
7	U18EV22S0063	HARSHITH GOWDA M	
8	U18EV22S0220	M ROHINI	
9	U18EV22S0064	ANUSHA R	
10	U18EV22S0065	THRISHA N	
11	U18EV22S0066	T GOUTHAM KUMAR	
12	U18EV22S0231	PAVITHRA N	
13	U18EV22S0349	PAVAN KUMAR V	
14	U18EV22S0353	SANGEETHA R	
15	U18EV22S0362	SHREYA GONI	
16	U18EV22S0363	TEJASWINI S	
17	U18EV22S0373	SANJANA R	
18	U18EV22S0374	SARANYA M P	
19	U18EV22S0372	KEERTHI PRAHALAD K	
20	U18EV22S0365	R KRISHNA MURTHY	
21	U18EV22S0218	SHIVAM CHAUBEY	

**Faculty in charge:**  
(Mrs Asharani R)

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**DBT Star College Scheme Coordinator**

**CO-ORDINATOR  
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**Hands on Training Program on "Digital Design using VERILOG on FPGA Kit" for 3<sup>rd</sup> semester students of BSc ECs**

**Feedback**

Date : 19<sup>th</sup> January 2024

COURSE: BSc ECs 3<sup>rd</sup> SEMESTER.

SI No:	Register Number	Student name	Feedback	Signature of the student
1	U18EV22S0218	SHIVAM CHAUBEY	Good	
2	U18EV22S0276	SHARATH KUMAR B	Good	
3	U18EV22S0052	SANATH VISHNU	Good	
4	U18EV22S0219	HEMANTH S	Good	
5	U18EV22S0061	NAYANA H L	u good	
6	U18EV22S0062	SRIDHARAN ISHA	Good	
7	U18EV22S0063	HARSHITH GOWDA M	Good	
8	U18EV22S0220	M ROHINI	Satisfied	
9	U18EV22S0064	ANUSHA R	Satisfied.	
10	U18EV22S0065	THRISHA N	Satisfied	
11	U18EV22S0066	T GOUTHAM KUMAR		
12	U18EV22S0231	PAVITHRA N	SATISFIED	
13	U18EV22S0349	PAVAN KUMAR V	Satisfied	
14	U18EV22S0353	SANGEETHA R		
15	U18EV22S0362	SHREYA GONI	Very Good	
16	U18EV22S0363	TEJASWINI S	very Good	
17	U18EV22S0373	SANJANA R	very good	
18	U18EV22S0374	SARANYA M P	Very Good	
19	U18EV22S0372	KEERTHI PRAHALAD K	Very Good	
20	U18EV22S0365	KRISHNA MURTHY	very Good	
21	U18EV22S0218	SHIVAM CHAUBEY		

Faculty in charge:  
(Mrs Asharani R)

HOD  
19/1/24

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