



**Birla Institute of Technology & Science, Pilani**  
Hyderabad Campus

**FIRST SEMESTER 2021 - 2022**

Course Handout Part II

20-08-2021

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

*Course No.* : EEE F348  
*Course Title* : FPGA Based System Design Laboratory  
*Instructor-in-Charge* : Chetan Kumar V

### **Scope and Objective of the Course:**

HDL (hardware description language) and FPGA (field-programmable gate array) devices allow designers to quickly develop and simulate a sophisticated digital circuit, realize it on a prototyping device, and verify operation of the physical implementation. It combines together the flexibility of a microprocessor and high performance of an Application Specific Integrated Circuit (ASIC). The ease of programming and debugging with FPGAs, as compared to ASICs, decreases the overall non-recurring-engineering (NRE) costs and time-to-market of FPGA-based products. In this lab-oriented course, students will develop their skills by working on more challenging digital system design using Verilog hardware description language (HDL) in an industry-standard design environment. Students will also implement real-world designs in field programmable gate arrays (FPGAs) as well as test and optimize the FPGA-implemented systems.

### **Textbooks :**

1. Wolf Wayne, FPGA Based System Design, Pearson Edu, 2004.
2. Verilog HDL: A Guide to Digital Design and Synthesis Book by Samir Palnitkar.

### **Course Plan:**

The practices are intended to provide hands-on experience on the simple Verilog code writing to implement on fpga. Then the real life examples will be taken and will be implemented. Then some interface examples will be experimented. Finally, some complex problem will be taken and will be worked by students in project mode.

PTO.



### List of Experiments

Introduction to Verilog, Modelling Styles (Lecture)  
Basics of Verilog HDL (Lecture)  
Simple Programs in Verilog (Exercise)  
Demonstration of Design, Synthesis and Implementation of digital block on FPGA (Demo + Exercise)  
Design of Counter on FPGA (Demo + Exercise)  
Design of Counter on FPGA (Exercise)  
FSM Design using Verilog (Lecture + Exercise)  
VIO (Virtual Input/output) IP for Debugging (Lecture + Demo)  
Implementation of ALU using VIO (Exercise)  
Integrated Logic Analyzer IP (Demo)  
System Generator (Demo)  
Projects and Assignments

### Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Mid-Term Lab Exam	90 Min	30%(60M)	To be announced	Open Book
Laboratory Practical Regular class work	4 hours/ week	10%(20M)	Regular lab Performance	Open Book
Project/Assignments	Continuous	25%(50M)	To be announced	Open Book
Final Lab Exam	105 Min	35%(70M)	To be announced	Open Book

**Chamber Consultation Hour:** Chamber consultation hours of Instructors will be announced separately.

**Notices:** All notices of this course will be displayed in CMS

**Make-up Policy:** Make-up will be given on **genuine** grounds only. Prior application should be made for seeking the make- up examination.

**Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**INSTRUCTOR-IN-CHARGE**

