

# Vidyalankar

S.E. Sem. IV [ETRX]  
Digital Systems Design II

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## SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks  
Practical : 50 Marks  
Term Work : 25 Marks  
Oral : 25 Marks

### 1. Hardware Description Languages :

Introduction to Hardware description Language. Core features of VHDL, Data types, concurrent and sequential statements, data flow, behavioral, structural architectures, Subprograms, modularity, design reuse concepts.

### 2. Application of HDL in Combinational Circuits :

Implementation of Combinational Circuits in VHDL, Use of Component Instantiation and Structural Architecture using VHDL and PLDs Combinational circuit design examples – barrel shifter, simple floating – point encoder, cascading comparator.

### 3. Sequential Logic Design :

Synchronous State Machines : Mealy and Moore Machines. Clocked synchronous state machine analysis, Clocked synchronous state machine design, designing state machines using state diagrams, State Reduction techniques, State Assignment Rules, State machine synthesis using transition list.

### 4. Applications of Sequential Circuits

MSI counters and applications, MSI shift registers and their applications. Implementation of Counters and Shift registers in VHDL, VHDL sequential circuit design features. Implementation of FSM in VHDL.

### 5. Memory, CPLDs and FPGAs :

Types of memory devices, Read-Only Memory (ROM), Read/write memory, Static RAM, Dynamic RAM, Introduction to Xilinx XC9500 CPLD family and Xilinx XC 4000 FPGA family.

### 6. Introduction to Asynchronous Design :

Fundamental and pulse mode Asynchronous sequential machine, Analysis of Asynchronous Sequential Circuits : Transition Table, Flow Table, Race Conditions Stability Considerations, Analysis of Simple circuits like latches is expected.

### References :

1. VHDL Programming by Examples, (*Douglas L. Perry*) Fourth Edition, Tata McGraw hill Publications, 2002
2. Digital Design (*Morris Mano*) Pearson Education, Asia 2002
3. Digital Logic : Applications and Design (*John M. Yarbrough*) Thomson Brooks/Cole, 2004
4. Digital Design Principles and Practices (*John F. Wakerley*) third edition updated, Pearson Education, Singapore, 2002.
5. Fundamentals of Digital Logic with VHDL Design (*Stephen Brown & Zvonko Vranesic*) First edition, McGraw Hill International edition, 2000.

