**Digital System Design**

**Paper Code: ETEC-309 L T/P C**

**Paper: Digital System Design 3 1 4**

**INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

*Objective: To enhance the knowledge and skill of the students in digital system design with emphasis on Hardware Description Language (VHDL HDL)*

**UNIT I**

Introduction to VHDL, design units, data objects, signal drivers, inertial and transport delays, delta delay, VHDL data types, concurrent and sequential statements. Subprograms – Functions, Procedures, attributes, generio, generate, package, IEEE standard logic library, file I/O, test bench, component declaration, instantiation, configuration**.**

**[T1][No. of Hrs.: 12]**

**UNIT II**

Combinational logic circuit design and VHDL implementation of following circuits –first adder, Subtractor, decoder, encoder, multiplexer, ALU, barrel shifter, 4X4 key board encoder, multiplier, divider, Hamming code encoder and correction circuits.

**[T1][No. of Hrs.: 10]**

**UNIT III**

Synchronous sequential circuits design – finite state machines, Mealy and Moore, state assignments, design and VHDL implementation of FSMs, Linear feedback shift register (Pseudorandom and CRC).

**[T2][No. of Hrs.: 10]**

**UNIT IV**

Asynchronous sequential circuit design – primitive flow table, concept of race, critical race and hazards, design issues like metastability, synchronizers, clock skew and timing considerations

Introduction to place & route process, Introduction to ROM, PLA, PAL, Architecture of CPLD (Xilinx/Altera).

**[T2][No. of Hrs.: 12]**

**Text Books:**

[T1] Douglas Perry ,”VHDL” 4th Edition, TMH

[T2] Stephen Brown, Zvonko Vranesic, “Fundamentals of Digital Logic with VHDL design”, TMH.

**Reference Books:**

[R1] Charles. H.Roth ,“Digital System Design using VHDL”, PWS (1998)

[R2] John F. Wakerley ,“Digital Design Principles And Practices” ,Pearson Education

[R3] Navabi Z , “VHDL-Analysis & Modelling of Digital Systems”,McGraw Hill.

[R4] [William I. Fletcher](http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22William+I.+Fletcher%22), “An Engineering Approach To Digital Design”, Prentice Hall

[R5] Bhasker, “A VHDL Primmer”, Prentice Hall 1995.