Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade) & NBA Accredited
An Autonomous Institute affiliated to RTMNU Nagpur

Second Year (Semester-III) B.Tech. Electronics & Communication Engineering

Minor Subject 1- BEC32321: Introduction to Digital Electronics

Teaching Scheme	
Lectures	3 Hrs/week
Tutorial	- Hrs/week
Total Credit	3

Examination Scheme	
CT-1	**15**
CT-2	**15**
TA	**10**
ESE	**60**
Total	**100**

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Course Outcomes (CO)

Students will be able to

Understand the fundamental principle of basic gates and conversion of number system.
Solve the logical functions using minimization techniques.
Implement flip flops circuit with the help of logic gates.
Determine registers, shift registers, and counters, including sequence generators, for their operation and applications in sequential circuits.
Structure memories by utilizing digital electronics methodologies.

Course Contents

Unit I	Introduction Analog & Digital Signals, Number system, Number system Conversions, Code Conversion, Digital Logic Gates, Universal Gates, Exclusive-OR & NOR, Boolean Algebra, De morgan's Theorem Binary Arithmetic, One's and Two's complement.
Unit II	Standard representations for logic functions, k map representation of logic functions (SOP & POS forms), minimization of logical functions for min-terms and max-terms (upto 4 variables), don't care conditions, Design Examples: Arithmetic Circuits, BCD - to – 7 segment decoder, Code converters. Adders and their use as substractor, Multiplexers and their use in combinational logic designs, multiplexer trees, Demultiplexers, Encoders & Decoders
Unit III	Bit Memory Cell, Clocked SR, JK, MS J-K flip flop, D and T flip-flops. Use of preset and clear terminals, Excitation Table for flip flops. Conversion of flip flops.
Unit IV	Registers, Shift registers, Counters (ring counters, twisted ring counters), Sequence Generators, ripple Counters, up/down counters, synchronous counters. Asynchronous counters.
Unit V	Types of Memory commonly used memory chips. Programmable Logic Devices: ROM as Programmable logic devices (PLD), Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA)

Text Books

1	R.P. Jain : "Modern digital electronics" , TMH Publications.
2	W. Fletcher : "Engg. Approach to Digital Design", PHI Publications.

Reference Books

1	Mark Bach : "Complete Digital Design", Tata MCGraw Hill Publications.

2	Herbert Taub, Donald L. Schilling “Digital Integrated Electronics”, McGraw Hill, 1977.
Useful Links	
1	https://nptel.ac.in/courses/108108111
2	https://nptel.ac.in/courses/117/106/117106086/
3	https://nptel.ac.in/courses/117/106/117106114/