



**DIRECTORATE OF TECHNICAL EDUCATION**

**DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING**

**II YEAR**

**M SCHEME**

**III SEMESTER**

**2015-2016 onwards**

**DIGITAL ELECTRONICS**

**CURRICULAM DEVELOPMENT CENTRE**

## M SCHEME

(Implemented from the Academic year 2015-2016 onwards)

**Course Name** : Electronics and Communication Engineering

**Subject Code** : 34043

**Semester** : IV Semester

**Subject Title** : DIGITAL ELECTRONICS

### **TEACHING AND SCHEME OF EXAMINATION:**

Number of Weeks/ Semester : 15 weeks

Subject	Instruction		Examination			
			Marks			
	Hrs Week	Hrs Semester	Internal Assess ment	Board Examination	Total	Duration
Digital Electronics	5	75	25	75	100	3 Hrs

### **TOPICS AND ALLOCATION:**

UNIT	TOPIC	TIME(HRS)
I	Number System, Boolean Algebra, Logic Gates and Digital Logic Families	13
II	Combinational Logic	13
III	Sequential Logic	13
IV	Memory Devices	12
V	Microprocessor – 8085	12
Revision Test		12
TOTAL		75

**RATIONALE:**

The subject of Digital Electronics holds applications in all branches of engineering. This subject will impart in depth knowledge of Number systems, Logics of Combinational & Sequential circuits and also about various & recent Memory devices and microprocessor. The concept of Digital Electronics will be implemented in all processor.

**OBJECTIVES:**

- To understand various Number System.
- To understand basic Boolean postulates and laws.
- To understand the De-Morgan's theorem.
- To understand the concept of Karnaugh Map.
- To Learn about Basic logic Gates.
- To Study about Boolean techniques.
- To learn the different digital logic families
- To learn arithmetic circuits-adder/subtractor, BCD adder.
- To understand the encoder/decoder & MUX / DEMUX
- To understand the concept of parity Generator, and checkers
- To understand various types of flip-flops.
- To understand various types of counters.
- To understand various modes of shift registers
- To understand the concept of RAM & ROM and its types.
- To understand the history and need of Microprocessor.
- To understand the internal architecture details of 8085 Microprocessor.
- To know the instruction set of 8085
- To understand Interrupt Structure of 8085

## **34043 DIGITAL ELECTRONICS**

### **DETAILED SYLLABUS**

<b>UNIT</b>	<b>NAME OF THE TOPIC</b>	<b>HRS</b>
<b>1</b>	<b><u>NUMBER SYSTEM AND BOOLEAN ALGEBRA</u></b> Binary, Octal, Decimal, Hexadecimal - Conversion from one to another. Binary codes – BCD code, Gray code, Excess 3 code. Boolean Algebra- Boolean postulates and laws- De-Morgan's theorem- Simplification of Boolean expressions using Karnaugh map (up to 4 variables-pairs, quad, octets)- Don't care conditions and constructing the logic circuits for the Boolean expressions.	<b>7</b>
	<b><u>LOGIC GATES AND DIGITAL LOGIC FAMILIES:</u></b> Gates – AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR - Implementation of logic functions using gates - Realization of gates using universal gates- Simplification of expression using Boolean techniques- Boolean expression for outputs. Digital logic families –Fan in , Fan out, Propagation delay - TTL,CMOS Logics and their characteristics - comparison and applications -Tristate logic.	<b>6</b>
<b>2</b>	<b><u>COMBINATIONAL CIRCUITS</u></b> Arithmetic circuits - Binary – Addition, subtraction, 1's and 2's complement - Signed binary numbers- Half Adder- Full Adder- Half Subtractor - Full Subtractor- Parallel and serial Adders- BCD adder. Encoder and decoder – 3 to 8 decoder, BCD to seven segment decoder- Multiplexer- basic 2 to 1 MUX, 4 to 1 MUX, 8 to 1 MUX - applications of the MUX – Demultiplexer - 1 to 2 demultiplexer, 1 to 4 demultiplexer, 1 to 8 demultiplexer - Parity Checker and generator.	<b>7</b>  <b>6</b>
<b>3</b>	<b><u>SEQUENTIAL CIRCUITS</u></b> FLIP FLOPS – SR, JK, T, D FF, JK- MS FF - Triggering of FF – edge & level , Counters – 4 bit Up - Down Asynchronous / ripple counter - Decade counter- Mod 3, Mod 7 counter. 4 bit Synchronous Up - Down counter - Johnson counter, Ring counter <b>REGISTERS</b> 4-bit shift register- Serial IN Serial OUT- Serial IN Parallel OUT - Parallel IN Serial OUT- Parallel IN Parallel OUT	<b>7</b>  <b>6</b>
<b>4</b>	<b><u>MEMORY DEVICES</u></b> Classification of memories - RAM organization - Address Lines and Memory Size- Read /write operations- Static RAM - Bipolar RAM cell- Dynamic RAM- SD RAM- DDR RAM. Read only memory – ROM organization- Expanding memory- PROM- EPROM- and EEPROM - Flash memory- Anti Fuse Technologies.	<b>12</b>

<b>5</b>	<b><u>MICROPROCESSOR – 8085</u></b> Evolution of microprocessor 8085 – Architecture of 8085- Instruction sets- Addressing modes - Memory mapped I/O and I/O mapped I/O and its Comparison. Machine cycle – Opcode fetch - memory read- memory write- I/O read, I/O write - Instruction cycle (Timing diagram) for MOV r1, r2 instruction. Interrupts (types & Priorities)	<b>12</b>
	Revision & Test	<b>12</b>

### REFERENCE BOOKS:

SL.No	Title	Author	Publisher with Edition
1.	Principles of Digital Electronics	K.Meena	PHI – 2011
2.	Modern Digital Electronics	R.P.Jains	TMH -2003
3.	Microprocessor architecture programming and application	Ramesh S. Gaonkar,	Wiley Eastern Limited.
4.	Digital principles & Applications	Albert Paul Malvino & Donald P.Leach	TMH - 4 <sup>th</sup> Edition 2002
5.	Digital Electronics	William H.Gothmann	prentice Hall of India – 2 <sup>nd</sup> Edition ,1995
6.	Introduction to Microprocessor	Aditya P Mathur	Tata McGraw-Hil publishing Company Limited
7.	Digital Electronics	Roger L.Tokheim Macmillan	McGraw hill -1994
8.	Digital Electronics- an introduction to theory and practice	William H.Gothmann	PHI 1998