Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)
Syllabus for B. Tech in Electrical Engineering
(Applicable from the academic session 2018-2019)

Name of the course	DIGITAL ELECTRONICS
Course Code: PC-EE-402	Semester: 4th
Duration: 6 months	Maximum Marks: 100
Teaching Scheme	**Examination Scheme**
Theory: 3 hrs/week	Mid Semester Exam: 15 Marks
Tutorial: 0 hr/week	Assignment & Quiz: 10 Marks
Practical: hrs/week	Attendance: 05 Marks
Credit Points: 3	End Semester Exam: 70 Marks

Objective:	
1.	To learn the fundamentals of Digital systems and principle of operation of Logic families.
2.	To learn the principle of operation of Combinational digital circuits.
3.	To learn the principle of operation of sequential circuit and systems.
4.	To learn the principle of operation of A/D and D/A converter
5.	To learn the principle of operation of semiconductor memories and Programmable logic devices.
6.	To acquire problem solving skills to solve problems of Digital circuits

Pre-Requisite	
1.	Analog Electronics (PC-EE-302)

Unit	Content	Hrs	Marks
1	**Fundamentals of Digital Systems and logic families:** Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital lCs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.	7	
2	**Combinational Digital Circuits:** Standard representation for logic functions, K-map representation, simplification of Logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial adder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization.	7	
3	**Sequential circuits and systems:** A 1-bit memory, the circuit properties of Bistable latch, the clocked SR flip flop, J- K-T and D types flipflops, applications of flipflops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple(Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of	7	

	counters.		
4	**A/D and D/A Converters:** Digital to analog converters: weighted resistor/converter, R-2R Ladder, D/A converter, specifications for D/A converters, examples of D/A converter, lCs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs.	7	
5	**Semiconductor memories and Programmable logic devices:** Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).	7	

Text books:

1. Digital Principles & Application, 5th Edition, Leach & Malvino, Mc Graw Hill Company.
2. Modern Digital Electronics, 4th Edition, R.P. Jain. Tata Mc Graw Hill Company Limited
3. Fundamental of Digital Circuits, A. Anand Kumar, 4th Edition, PHI.
4. Digital Electronics, R. Anand, Khanna Publishing House (2018).

Reference books:

1. Digital Logic Design, Morries Mano, PHI.
2. Digital Integrated Electronics, H. Taub & D. Shilling, Mc Graw Hill Company.
3. Digital Electronics, James W. Bignell & Robert Donovan, Thomson Delman Learning.
4. Fundamental of logic Design, Charles H. Roth, Thomson Delman Learning.

Course Outcome:

After completion of this course, the learners will be able to

1. describe the function of different building blocks of digital electronics, semiconductor memories and programmable logic devices.
2. explain the principle of operation of combinational and sequential digital circuits, A/D and D/A converter
3. solve numerical problems of Boolean algebra, number system, combinational & sequential digital circuits and A/D and D/A converter.
4. specify applications of combinational and sequential digital circuits.
5. determine specifications of different digital circuits.
6. design combinational and sequential digital circuits

Special Remarks (if any)

The above-mentioned outcomes are not limited. Institute may redefine outcomes based their program educational objective.