TCET/FRM/IP-02/09 Revision: A

Semester Plan
(Theory)

Semester: III Course: EXTC

Subject: Digital System Design Class: SE- A

Sr. No.	Bridge courses/Technology	Duration (Week/hrs)	Modes of Learning	Recommended Sources
1.	**Prerequisite course:** Applied Physics	4 hrs	Self learning and classroom revision	1. Applied Solid State Physics – Ranikant, Wiley India 2. Solid State Electronic Devices- B. G. Streetman, Prentice Hall Publisher

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
1	-	-	**SOP**	LCD Projector	10/07/17	-	
2	-	-	Lab-Orientation	LCD Projector	11/07/17	-	
3	-	-	OBE	LCD Projector	12/07/17	-	
4	1	1.1	**Number Systems and Codes:** Review of Number System, Binary Code	Chalk & Blackboard	13/07/17	M1.1	
5	1	1.2	Octal Code, Hexadecimal Code and their conversions	Chalk & Blackboard	14/07/17	M1.2	

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
6	1	2.1	Binary Coded Decimal, Gray Code	Chalk & Blackboard	17/07/17	M1.3	
7	1	2.2	Binary Arithmetic	Chalk & Blackboard	18/07/17	M1.4	
8	2	2.3	**Logic Gates and Combinational Logic Circuits:** Analog and Digital signals and systems, Logic levels, Digital logic gates	Chalk & Blackboard	19/07/17	M2.1	
9	2	2.4	Realization using NAND, NOR gates	Chalk & Blackboard	20/07/17	M2.2	
10	2	2.5	Boolean Algebra, De Morgan's Theorem	Chalk & Blackboard	21/07/17	M2.3	
11	2	3.1	SOP representation	Chalk & Blackboard	24/07/17	M2.4	
12	2	3.2	POS representation	Chalk & Blackboard	25/07/17	M2.5	
13	2	3.3	K-map introduction and examples of 2 and 3 variables	LCD Projector, Chalk & Blackboard	26/07/17	M2.6	
14	2	3.4	K-map up to four variables	LCD Projector, Chalk & Blackboard	28/07/17	M2.7	

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
15	2	4.1	Quine-McClusky method of minimization of logic expressions	LCD Projector, Chalk & Blackboard	31/07/17	M2.8	
16	2	4.2	Quine-McClusky numericals	LCD Projector, Chalk & Blackboard	01/08/17	M2.9	
17	2	4.3	**Arithmetic Circuits:** Half adder, Full adder	Chalk & Blackboard	02/08/17	M2.10	
18	2	4.4	Half Subtractor, Full Subtractor	Chalk & Blackboard	04/08/17	M2.11	
19	2	5.1	Serial and Parallel Addition, Carry Look ahead adder	LCD Projector, Chalk & Blackboard	07/08/17	M2.12	
20	2	5.2	BCD adder. Binary Multiplier,	LCD Projector	08/08/17	M2.13	
21	2	5.3	Magnitude Comparator 1 bit & 2 bit	LCD Projector, Chalk & Blackboard	09/08/17	M2.13	
22	2	5.4	**Multiplexer and De-multiplexer:** Multiplexer operations, Cascading of Multiplexer	Chalk & Blackboard	11/08/17	M2.14	
23	2	6.1	Boolean Function implementation using multiplexer and basic gates, demultiplexer	LCD Projector, Chalk & Blackboard	14/08/17	M2.15	

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
24	2	6.2	Encoder and Decoder	LCD Projector, Chalk & Blackboard	16/08/17	M2.16	
25	2	6.3	TTL Logic families and their characteristics	LCD Projector, Chalk & Blackboard	18/08/17	M2.17	
26	2	7.1	CMOS Logic families and their characteristics	LCD Projector, Chalk & Blackboard	30/08/17	M2.18	
27	4	8.1	**Sequential Logic Circuits:** Difference between combinational & sequential circuits, RS Flip flop	LCD Projector, Chalk & Blackboard	1/09/17	M4.1	
28	4	8.2	JK and Master slave flip flops	LCD Projector, Chalk & Blackboard	4/09/17	M4.2	
29	4	8.3	T & D flip flops, Level triggering & edge triggering of flip-flops	LCD Projector, Chalk & Blackboard	5/09/17	M4.3	
30	4	8.4	Conversion of flip flops from one to another	LCD Projector, Chalk & Blackboard	06/09/17	M4.4	
31	4	9.1	**Registers:** SISO, SIPO, PISO, PIPO, Universal shift registers	LCD Projector	08/09/17	M4.5	
32	4	9.2	**Counters:** Asynchronous counter,	LCD Projector, Chalk & Blackboard	11/09/17	M4.6	

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
33	4	9.3	Synchronous Counter, Up/Down counter	LCD Projector, Chalk & Blackboard	12/09/17	M4.7	
34	4	9.4	MOD-N, BCD counter	LCD Projector, Chalk & Blackboard	13/09/17	M4.8	
35	4	10.1	**Applications of Sequential Circuits:** Frequency division, Ring Counter, Johnson Counter.	LCD Projector, Chalk & Blackboard	15/09/17	M4.9	
36	4	10.2	State machines, State transition diagram	LCD Projector	18/09/17	M4.10	
37	4	10.3	Design of Moore and Mealy circuits	LCD Projector, Chalk & Blackboard	19/09/17	M4.11	
38	4	10.4	Design of Serial Adder and vending Machine	LCD Projector	20/09/17	M4.12	
39	4	11.1	**State Reduction Techniques:** Row elimination and Implication table methods	LCD Projector, Chalk & Blackboard	22/09/17	M4.13	
40	5	11.2	**Programmable Logic Devices:** Introduction : Programmable Logic Devices (PLD), Keyboard Encoder system design using PLD	LCD Projector, Chalk & Blackboard	25/09/17	M5.1	
41	5	11.3	Programmable Logic Array (PLA), Programmable Array Logic(PAL)	LCD Projector	26/09/17	M5.2	
42	6	11.4	**VHSIC Hardware Description Language (VHDL):** Data types, Structural modeling using VHDL	LCD Projector	03/10/17	M6.1	

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
43	6	12.1	Attributes, Data Flow model and behavioral modeling using VHDL	LCD Projector	04/10/17	M6.2	
44	6	13.1	Implementation of Priority Encoder and combinational circuit using VHDL	LCD Projector	6/10/17	M6.3	
45	6	13.2	Sequential circuits using VHDL	LCD Projector	13/10/17	M6.4	
46.	6	13.3	Fibonacci Series Generator	LCD Projector	16/10/17	M6.5	
47.	2	14.1	**Different Types of Memory:** Classification and Characteristics of memory, SRAM, DRAM	LCD Projector	17/10/17	M2.1	
48.	2	14.2	ROM, PROM, EPROM and Flash memories	LCD Projector	18/10/17	M2.2	
Remark:: Course:		Syllabus Coverage:		1.		Beyond Syllabus: 1. K-map with 5 variables 2. Octal and Hexadecimal Arithmetic	
Lectures Taken / Lectures Planned (/48)							

Bridge courses Objective: Bridging of gaps with respect to prerequisites and industry skills or to carryout research in signal processing field**. (20 Hrs / Semester / student)**

Sr . No.	Bridge courses/Technology	Duration (Week/hrs)	Modes of Learning	Recommended Sources
1	**Digital System Design II**	10 weeks	Technology Based learning	1. http://nptel.ac.in/courses/117105080/1 2. https://www.um.edu.mt/__data/assets/pdf_file/0016/120625/adsd.pdf
2	**Advanced course:** Introduction to Internet of Things	10 weeks	Technology Based learning	https://swayam.gov.in/course/3727-introduction-to-internet-of-things 1. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)

Text Books:

1. John F. Warkerly, "Digital Design Principles and Practices", Pearson Education, 4th Edition (2008).
2. R. P. Jain, "Modern Digital Electronics", Tata McGraw Hill Education, Third Edition (2003).
3. J. Bhaskar, "VHDL Primer", PHI, Third Edition (2009).
4. Volnei A. Pedroni, "Digital Electronics and Design with VHDL" Morgan Kaufmann Publisher (2008)

Reference Books:

1. Morris Mano / Michael D. Ciletti, "Digital Design", Pearson Education, Fourth Edition (2008).
2. Thomas L. Floyd, "Digital Fundamentals", Pearson Prentice Hall, Eleventh Global Edition (2015).
3. Mandal, "Digital Electronics Principles and Applications", McGraw Hill Education, First Edition (2010).
4. Stephen Brown & Zvonko Vranesic, "Fundamentals of Digital Logic Design with VHDL", 2nd Edition, TMH (2009).
5. Ronald J. Tocci, Neal S. Widmer, "Digital Systems Principles and Applications", Eighth Edition, PHI (2003)
6. Donald P. Leach / Albert Paul Malvino /Gautam Saha, "Digital Principles and Applications", The McGraw Hill, 7th Edition (2011).

Digital Reference:

- Wikipedia
- Google
- Architecture of FPGAs and CPLDs: A Tutorial by Stephen Brown and Jonathan Rose
- **http://www.xilinx.com**

Sd/- Rutvi Thakar Name & Signature of Faculty	Sd/- Signature of HOD	Sd/- Signature of Principal /Dean (Academics)
Date:20/7/17	Date: 20/7/17	Date: 20/7/17

Note:

1. Plan date and completion date should be in compliance
2. Courses are required to be taught with emphasis on resource book, course file, text books, reference books, digital references etc.
3. Planning is to be done for 15 weeks where 1st week will be AOP, 2nd -13th for effective teaching and 14th -15th week for effective university examination oriented teaching, mock practice session and semester consolidation.
4. According to university syllabus where lecture of 4 hrs/per week is mentioned minimum 55 hrs and in case of 3 lectures per week minimum 45 lectures are to be engaged are required to be engaged during the semester and therefore accordingly semester planning for delivery of theory lectures shall be planned.
5. In order to improve score in NBA, faculty members are also required to focus course teaching beyond university prescribed syllabus and measuring the outcomes w.r.t learning course and programme objectives.
6. Text books and reference books are available in syllabus. Here only additional references w.r.t. non –digital/ digital sources can be written (if applicable)
7. Technology to be used in class room during lecture shall be written below the topic planned within the bracket.