TCET

DEPARTMENT OF ELECTRONICS ENGINEERING (ETRX)

Credit Based Grading Scheme(Revised - 2012) - University of Mumbai

CBGS-2012(R)

Semester Plan
(Theory)

Semester: **III** **Course: SE-Electronics**

Subject: **Digital Circuit Design (DCD)** **Class: SE**

S.No.	Prerequisite/ Bridge course:	Duration (Week /Hrs)	Modes of Learning	Recommended Sources
1	Pre requisite Course / This is the basic course for digital electronics. Knowledge of basic Maths will be recommanded. **Bridge Cource - FPGA design using HDL**	20 hours	Online	**Textbooks:** 1. Fundamentals of Digital Logic Design with VHDL, Stephen Brown 2. Fundamentals and standards in hardware Description language edited by Jean Margaret.

No. of Lectures as per syllabus (49)

Sr. No.	Module No.	Lesson No.	Topics Planned (Technology to be used)	Teaching Aids Required	Planned/Completion Date	Module page Numbers	Resource Book Reference	Remarks
1	-	1.1	DCD Lecture (Orientation)	LCD Projector	10-Jul-17	-	-	
2	-	1.2	DCD (OBE)	LCD Projector	12-Jul-17	-	-	
3	-	1.3	DCD Practical (Orientation)	LCD Projector	10-Jul-17	-	-	
4	Module 1	1.4	**Chapter 1: Number System and Codes** Introduction to number systems : Types	LCD Projector/ Black Board	14-Jul-17	1-3	1.8.1	
5	Module 1	2.1	Binary, Octal, Decimal and hexadecimal codes and their conversions	LCD Projector/ Black Board	20-Jul-17	4-9	1.8.2	
6	Module 1	2.2	Sums on number system conversions, Binary Coded Decimal	LCD Projector/ Black Board	21-Jul-17	4-9	1.8.2 - 1.8.4	
7	Module 1	3.1	Binary Arithmetic : Ones and Two's Complements	LCD Projector/ Black Board	24-Jul-17	11-12	1.8.5	
8	Module 1	3.2	Binary codes : Weighted Codes - Excess 3 code	LCD Projector/ Black Board	27-Jul-17	13	1.8.6, 1.8.7	
9	Module 1	4.1	Gray code	LCD Projector/ Black Board	31-Jul-17	14, 15	1.8.7.1, 1.8.7.2	
10	Module 1	4.2	Parity Code : Hamming Code	LCD Projector/ Black Board	3-Aug-17	16	1.8.7.3	
11	Module 2	1.5	**Chapter 2 : Logic Gates and Boolean Algebra** Introduction to logic gates : AND, OR, NAND, NOR, EX-OR, EX-NOR	LCD Projector/ Black Board	14-Jul-17	19-22	2.8.1	
12	Module 2	2.3	Realization using NAND, NOR gaets	LCD Projector/ Black Board	17-Jul-17	22-26	2.8.2, 2.8.3	
13	Module 2	2.4	Boolean Algebra, De Morgans Theorem	LCD Projector/ Black Board	18-Jul-17	27-28	2.8.4	
14	Module 2	3.3	SOP and POS representation	LCD Projector/ Black Board	25-Jul-17	29-30	2.8.5	
15	Module 2	3.4	K amp for three and four variables	LCD Projector/ Black Board	25-Jul-17	31-36	2.8.6	
16	Module 2	4.3	Sums on K Map	LCD Projector/ Black Board	1-Aug-17	31-36	2.8.6	
17	Module 2	4.4	Quine-Mc Clusky method upto four variables	LCD Projector/ Black Board	1-Aug-17	36-39	2.8.7	
18	Module 3	5.1	**Chapter 3: Combinational Logic Circuits and Hazards**	Black Board & Chalk,	8-Aug-17	42-43	3.8.2. 8.3	
19	Module 3	5.2	Half adder, Full adder	Black Board & Chalk,	8-Aug-17	42-43	3.8.2. 8.3	
20	Module 3	9.1	Half Subtractor, Full Subtractor,	Black Board & Chalk,	5-Sep-17	44-45	3.8.4, 8.5	
21	Module 3	9.2	Ripple carry adder,	Black Board & Chalk,	5-Sep-17	50	3.8.6	

22	Module 3	10.1	BCD adder,	Black Board & Chalk, Ppts	12-Sep-17	51-52	3.8.7	
23	Module 3	10.2	Magnitude Comparator	Black Board & Chalk, Ppts	12-Sep-17	52-54	3.8.8	
24	Module 3	11.1	Multiplexer	Black Board & Chalk, Ppts	19-Sep-17	47-49	3.8.9	
25	Module 3	11.2	cascading of Multiplexer	Black Board & Chalk, Ppts	19-Sep-17	60 -61	3.8.10	
26	Module 3	12.1	Boolean Function implementation using single multiplexer and basic gates	Black Board & Chalk, Ppts	26-Sep-17	61 - 62	3.8.11	
27	Module 3	12.2	De-multiplexer	Black Board & Chalk,	26-Sep-17	54-56	3.8.12	
28	Module 3	13.1	encoder and decoder,	Black Board & Chalk, Ppts	3-Oct-17	47-49, 54-56	3.8.9	
29	Module 3	13.2	Timing hazards static and dynamic	Black Board & Chalk, Ppts	3-Oct-17	63-65	3.8.15, 3.8.12	
30	Module 4	5.3	**Chapter 4: Logic Families** Introduction to logic families, Basics of standard TTL (Two input AND gate operation)	LCD Projector/ Black Board	7-Aug-17	70-79	4.8.1	
31	Module 4	5.4	CMOS (Inverter, Two input NAND gate, Two Input NOR gate)	LCD Projector/ Black Board	10-Aug-17	79-82	4.8.2	
32	Module 4	6.1	Interfacing of TTL to CMOS	LCD Projector/ Black Board	14-Aug-17	82- 90	4.8.3	
33	Module 4	7.1	Interfacing of CMOS to TTL	LCD Projector/ Black Board	24-Aug-17	90- 92	4.8.4	
34	Module 4	8.1	ECL - Working and characterisitcs	LCD Projector/ Black Board	31-Aug-17	92- 93	4.8.5	
35	Module 4	9.3	Comparison of TTL and CMOS logic families	LCD Projector/ Black Board	4-Sep-17	93	4.8.6	
36	Module 5	9.4	**Chapter 5 - Sequential Logic Principles**	Black Board & Chalk, Ppts	7-Sep-17	99 & 102	5.8.1	
37	Module 5	10.3	Difference between latches and flip flops	Black Board & Chalk, Ppts	11-Sep-17	102	5.8.1	
38	Module 5	10.4	Flip Flops : RS, JK, Master slave flip flops,	Black Board & Chalk, Ppts	14-Sep-17	103 & 108	5.8.2	
39	Module 5	11.3	Flip Flops: T & D flip flops with various triggering methods	Black Board & Chalk, Ppts	18-Sep-17	109	5.8.2	
40	Module 5	11.4	Conversion of flip flops	Black Board & Chalk, Ppts	21-Sep-17	117-118	5.8.3	
41	Module 5	12.3	Applications of latches and flip flops in switch debouncing,	Black Board & Chalk, Ppts	25-Sep-17	118-119	5.8.4	
42	Module 5	13.3	bus holder circuits, Flip flops timing considerations and Metastability	Black Board & Chalk, Ppts	5-Oct-17	120-121	5.8.5	
43	Module 6	13.4	**Chapter 6** - Counters and Registers Asynchronous and Synchronous	Black Board & Chalk, Ppts	7-Oct-17	123	6.8.1	
44	Module 6	13.5	BCD counter using Decade counter,Ring counters	Black Board & Chalk, Ppts	7-Oct-17	126-127	6.8.3	
45	Module 6	13.6	MOD N counter, , Up/Down counter	Black Board & Chalk, Ppts	7-Oct-17	124-125	6.8.2, 6.8.4	
46	Module 6	14.1	Shift registers, Universal Shift Register	Black Board & Chalk, Ppts	12-Oct-17	127-132	6.8.5	

47	Module 1 and 2	15.1	Revision of the number system and codes & Logic gates and Boolean Algebra	LCD Projector/ Black Board	16-Oct-17	-	-	
48	Module 3 and 4	15.2	Revision of Combinational logic circuits and Hazards & Logic Families	LCD Projector/ Black Board	17-Oct-17	-	-	
49	Module 5 and 6	15.3	Revision of Sequential Logic Principles & Counters and registers	LCD Projector/ Black Board	17-Oct-17	-	-	
Remark:			Syllabus Coverage:		Practice Session:		Beyond Syllabus:	
Course:								
No. of (Lectures planned)/ (Lecture taken): 49 /								
Advanced course: Digital Circuits and Design					9 weeks	Online NPTEL videos	Web Sources: 1. NPTEL- https://onlinecourses.nptel.ac.in	

Text Books:

1. Embedded Systems, Rajkamal , TMH, 2008.
2. Frank Vahid - Embedded Systems , Wiley India, 2002
3. ARM System-on-Chip Architecture, Steve Furber - Pearson 2005
4. Jean J Labrose - MicroC / OS-II, Indian Low Price Edition 2002
5. DR.K.V.K.K. Prasad - Embedded / real time system, Dreamtech
6. Iyer, Gupta - Embedded real systems Programming , TMH
7. Embedded systems software primer, David Simon - Pearson

Reference Books:

8. ARM System Developers Guide- Sloss, Symes, Wright, ElsevierMorgan Kaufman,
9. LPC2148 Data Sheets www.arm.com
10. ARM Programers/architectural manual.
11. MSP430 architectural manual.
12. Embedded Microcomputer Systems – Real Time Interfacing – Jonathan W. Valvano; Cengage Learning; Third or later edition.

Digital Reference:

1. https://onlinecourses.nptel.ac.in/explorer
2. www.circuitstoday.com/8051-microcontroller
3. electronicsforu.com/microcontroller-projects-ideas
4. https://www.arm.com
5. ARM Processor - nptel
6. www.TI.com

Name & Signature of Faculty Signature of HOD Signature of Principal/Dean (Academic)
Date: Date: Date:

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.