EASWARI ENGINEERING COLLEGE, CHENNAI-600 089
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN

SUBJECT CODE : CS 6201

SUBJECT TITLE : Digital Principles and System Design

HOURS DISTRIBUTION **:** (L T P C 3 0 0 3)

COURSE/ BRANCH : B.Tech (IT)

SEMESTER : II

ACADEMIC YEAR : 2014 - 2015

FACULTY NAME : L.BHAGYALAKSHMI / S.DEEPA

OBJECTIVE OF COURSE :

- To learn how to design digital circuits
- To learn how to simplify Boolean functions
- To give an idea about designs using PLDs
- To write codes for designing larger digital systems

OUTCOME OF COURSE :

At the end of this course, the student will be able to:

- Perform arithmetic operations in any number system.
- Simplify the Boolean expression using K-Map and Tabulation techniques.
- Use boolean simplification techniques to design a combinational hardware circuit.
- Design and Analysis of a given digital circuit – combinational and

sequential.

PREREQUISTE : To have knowledge in Number System with base 2, 8,16.

S.No	Topic	No. of Periods	Reference books	Page Nos
UNIT I	**BOOLEAN ALGEBRA AND LOGIC GATES 9**			
	Objective: To learn the concepts of Boolean Algebra and Logic gates			
1	Review of Binary Number Systems	1	T1	3 - 13
2	Arithmetic Operations	1	T1	15 - 16
3	Binary Codes	1	T1	17 - 22
4	Boolean Algebra and Theorems	1	T1	34 - 41
5	Boolean Functions	1	T1	42 - 46
6	Simplifications of Boolean Functions using Karnaugh Map and Tabulation Methods	2	T1	46 - 53, 70 - 74, 84 - 87
7	Logic gates	1	T1	57 - 60
8	NAND and NOR Implementations	1	T1	87 - 94
	OUTCOME: At the end of this unit, the student should understand arithmetic operations, simply Boolean expresions using K map and Tabulation techniques			
	UNIT II COMBINATIONAL LOGIC 9			
	Objective: To learn the concepts of Combinational circuits which includes adders, subtractors, multiplier, comparator and to learn the concepts of decoders, encoders, multiplexers and demultiplexers			
9	Combinational Circuits, Analysis and Design Procedure	1	T1	135 - 140
10	Circuits for Arithmetic Operations	2	T1	143 - 161
11	Code Conversion	1	T1	140 - 142

12	Decoders	1	T1	162 - 165
13	Encoders	1	T1	166 - 168
14	Multiplexers	1	T1	168 - 174
15	Demultiplexers	1	Internet (URL 1)	
16	Introduction to HDL, HDL Models for Combinational Circuits	1	T1	174 - 184

OUT COME: At the end of this unit, the student should be able to the basic concept of combination circuits with different applications

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC 9

Objective: To learn the concepts of sequential logic which includes flip-flops, registers and counters.

17	Sequential Circuits	1	T1	197 - 203
18	Latches and Flip Flops	1	T1	203 - 210
19	Analysis and Design Procedures	1	T1	210 - 221, 238 - 246
20	State Reduction and State Assignment	1	T1	233 - 238
	Registers and Counters			
21	Shift Registers	2	T1	255 - 267
22	Counters	2	T1	268 - 293
23	HDL for Sequential Logic Circuits	1	T1	293 - 298

OUT COME: At the end of this unit, the student should be able to the basic concept of Synchronous Sequential circuits with different applications like register and counter.

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 9

Objective: To learn the concepts of asynchronous sequential logic.

24	Analysis and Design of Asynchronous Sequential Circuits	2	T1	437 - 457
25	Reduction of State and Flow Tables	3	T1	457 - 464
26	Race-Free State Assignment	2	T1	464 - 469
27	Hazards	2	T1	469 - 474

OUT COME: At the end of this unit, the student should be able to the basic concept of ASynchronous Sequential circuits

UNIT V MEMORY AND PROGRAMMABLE LOGIC 9

Objective: To learn the concepts of memory and programmable devices

28	RAM and ROM	2	-	308 - 314, 322 - 325
29	Memory Decoding	1	T1	314 - 319
30	Error Detection and Correction	1	T1	319 - 322
31	Programmable Logic Array	1	T1	328 - 332

32	Programmable Array Logic	1	T1	332 - 336
33	Sequential Programmable Devices	2	T1	336 - 351
34	Application Specific Integrated Cicruits	1	Handouts	

OUT COME: At the end of this unit, the student should be able to the basic concept of Memory and it array applications

SL.NO	ASSIGNMENT TOPICS	SUBMISSION DUE
1	ASSIGNMENT PROBLEM SHEET I	**Jan 30 2015**
2	ASSIGNMENT PROBLEM SHEET II	**March 2 2015**
3	ASSIGNMENT PROBLEM SHEET III	**April 1 2015**

CONTENT BEYOND SYLLABUS	
1	Solving Boolean Functions using K-Map and Tabulation Methods including Don't Care Conditions.
2	Parity Generator and Parity Checker

TEXT BOOK

1. M.Morris Mano and Michael D. Ciletti, "Digital Design", 4th edition, Pearson Education, 2008.

REFERENCES

1. John F. Wakerly, "Digital Design Principles and Practices", Fourth Edition, Pearson Education, 2007.
2. Charles H. Roth Jr, "Fundamentals of Logic Design", Fifth Edition – Jaico Publishing House, Mumbai, 2003.
3. Donald D. Givone, "Digital Principles and Design", Tata Mcgraw Hill, 2003.
4. Kharate G. K., "Digital Electronics", Oxford University Press, 2010.

URL

1. http://www.wisc-online.com/objects/ViewObject.aspx?ID=DIG5704

HOD **FACULTY**

Program Educational Outcomes

1. Graduates will be proficient in utilizing the fundamental knowledge of basic sciences and mathematics to the applications relevant to various streams of Engineering and Technology.

UNITS	Course outcome	OB1	OB2	OB3	OB4	OB5	OB6	OCa	OCb	OCc	OCd	OCe	OCf	OCg	OCh	OCi	OCj	OCk	OCl

2. Graduates will possess core competencies necessary for application of knowledge of computers and telecommunications equipment to store, retrieve, transmit, manipulate and analyze data in the context of business enterprise.

3. Graduates will be capable of thinking logically, pursue lifelong learning and will have the capacity to understand technical issues related to computing systems and design optimal solutions.

4. Graduates will be able to develop hardware and software systems by understanding the importance of social, business and environmental needs in the human context.

5. Graduates will gain employment in organizations and establish themselves as professionals by applying their technical skills to solve real world problems and meet the diversified needs of industry, academia and research.

6. Graduates will be aware of professional ethics of the software industry and equip themselves with communication skills essential for working in community.

Program Outcomes

(a) Ability to apply knowledge of computing and mathematics appropriate to Information Technology

(b) Ability to analyze a problem, and identify computing requirements appropriate to its solution

(c) Ability to design, implement, and evaluate a system, process, component, or program to meet requirements .

(d) Ability to interpret and synthesis data to provide valid conclusions

(e) Ability to function effectively as a team member to achieve a common goal

(f) Ability to understand professional, ethical and social issues and responsibilities

(g) Ability to communicate effectively with a diverse groups

(h) Ability to analyze the local and global impact of Information Technology on society

(i) Ability to recognize and engage in continuing professional development and life long learning

(j) Ability to use current techniques, skills, and tools necessary to accomplish projects related to Information Technology.

(k) Ability to understand the impact of the professional engineering solutions in societal and environmental contexts for sustainable development.

(l) Ability to understand engineering and management principles to manage projects in multidisciplinary environment.

BOOLEAN ALGEBRA AND LOGIC GATES	To understand the concepts of Boolean Algebra and Logic gates	M	S	S	M	S	M	S	S	M	S	M	M	W	W	M	M	M	W
	To realize the Boolean functions using logic gates	M	S	S	M	S	M	S	S	S	M	S	M	W	W	S	M	S	W
COMBINATIONAL LOGIC	To understand the concept of combinational circuits using K-map	M	S	S	M	S	M	S	S	M	S	M	M	W	W	M	M	M	W
	To design various combinational circuits based on applications	M	S	S	M	S	M	S	S	S	S	S	M	W	M	S	S	S	W
SYNCHRONOUS SEQUENTIAL LOGIC	To understand the concept of sequential logic using flip-flops	M	S	S	M	S	M	S	S	S	S	S	M	M	M	S	S	S	W
	To design the sequential circuits for registers and counters	M	S	S	M	S	M	S	S	S	S	S	M	W	M	S	S	S	M
ASYNCHRONOUS SEQUENTIAL LOGIC	To understand the concept and design of asynchronous sequential logic	M	S	S	M	S	M	S	S	S	S	S	M	M	M	S	S	S	W
MEMORY AND PROGRAMMABLE LOGIC	To learn the concepts of memory and programmable logic devices	M	S	S	M	S	M	S	S	S	S	S	M	W	M	S	S	S	M