REGENT
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Group of Institutions

Department of Electronics and Communication Engineering

LESSON PLAN

Faculty Name:	**Mr. Sukdeb Saha**	**Branch:**	**ECE**
Designation:	**Assistant Professor**	**Year :**	**2nd**
Subject Name:	**Digital System Design**	**Semester :**	**3rd**
Subject Code :	**EC-302**	**Session :**	**2022-2023**

SYLLABUS

Module I

Review of Number System, Signed and Unsigned Number.

Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De Morgan's Theorem, SOP & POS forms, Canonical forms, Karnaugh's map, Binary codes, Code Conversion.

MSI devices like Comparators, Multiplexers, Encoder, Decoder, Half and Full Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Fast adders, Barrel shifter and ALU. [10L]

Module II

Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Shift registers, Finite state machines, Design of synchronous FSM. Designing synchronous circuits like Synchronous Counter, Pulse train generator, Pseudo Random Binary Sequence generator. [6L]

Module III

Logic Families and Semiconductor Memories: TTL, ECL, CMOS families

Semiconductor Memories, Concept of Programmable logic devices like FPGA. Logic implementation using Programmable Devices.

Different types of A/D and D/A conversion techniques. Sample & Hold Circuit. [8L]

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Module IV

VLSI Design flow: Design entry Schematic, FSM & HDL, different modeling styles in VHDL, Data types and objects, Dataflow, Behavioral and Structural Modeling, Synthesis and Simulation VHDL constructs and codes for combinational and sequential circuits. [8L]

Course Outcomes

CO 1	Design and analyze combinational logic circuits
CO 2	Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder
CO 3	Design & analyze synchronous sequential logic circuits

Sl.No	Total No.of Hour Required	Topics to be covered	Proposed Date	Class Duration	Book	Teaching Mode	CO	PO
01	1	**Data and number systems; Binary, Octal number**	Day1	50 mins	T1,T2,R1	Chalk and talk	1	1
02	2	**Binary, Octal and Hexadecimal representation and their conversions**	Day2, Day3	50 mins	T1,T2	Chalk and talk	1	1
	2	**BCD,ASCII, EBDIC, Gray codes**	Day4, Day5	50 mins	T1,T2	ppt	1	1
03	2	**codes and their conversions**	Day6, Day7	50 mins	T1,T2	Chalk and talk	1	1
04	1	**Signed binary number representation with 1's and 2's complement methods**	Day8	50 mins	T1,T2	Chalk and talk	1	1
	1	**Binary arithmetic**	Day9	50 mins		ppt	1	1
05	1	**Tutorial**	Day10	50 mins	T1,T2	Chalk and talk	1	1
06	1	**Boolean algebra**	Day11	50 mins	T1,T2	Chalk and talk	1	2
	1	**Various Logic gates- their truth tables and circuits**	Day12	50 mins		ppt	1	2
07	1	**Representation in SOP and POS forms**	Day13	50 mins	T1,T2	Chalk and talk	1	1
08	1	**Minimization of logic expressions by algebraic method**	Day14	50 mins	T1,T2	Chalk and talk	1	2
09	2	**K-map method**	Day15,Day16	50 mins	T1,T2	ppt	1	1

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10	1	**Combinational circuits-Adder and Subtractor circuits**	Day17	50 mins		T1,T2	Chalk and talk	1	2
11	1	**Applications and circuits of Encoder ,Decoder, Comparator**	Day18	50 mins		T1,T2,R1	ppt	1	1
12	1	**Multiplexer, De-Multiplexer, Parity Generator**	Day19	50 mins		T1,T2,R1	Chalk and talk	1	2
13	1	**Memory Systems: RAM**	Day20	50 mins		T1,T2,R1	Chalk and talk	2	3
14	1	**ROM, EPROM, EEROM**	Day21	50 mins		T1,T2,R1	Chalk and talk	2	2
15	1	**Design of combinational circuits-using ROM**	Day22	50 mins		T1,T2,R1	Chalk and talk	2	3
16	1	**Programming logic devices and gate array**	Day23	50 mins		T1,T2,R1	Chalk and talk	2	3
17	1	**Sequential Circuits- Basic memory element-S-R, J-K**	Day24	50 mins		T1,T2,R1	Chalk and talk	2	4
18	1	**D and T Flip Flops**	Day25	50 mins		T1,T2,R1	Chalk and talk	2	2
19	2	**various types of Registers and their design**	Day26,Day27	50 mins		T1,T2,R1	Chalk and talk	2	3
20	2	**counters and their design**	Day28,Day29	50 mins		T1,T2,R1	Chalk and talk	2	4
21	2	**State table and state transition diagram**	Day30,Day31	50 mins		T1,T2,R1	Chalk and talk	2	4
22	1	**sequential circuits design methodology**	Day32	50 mins		T1,T2,R1	Chalk and talk	3	3
23	1	**Tutorial**	Day33	50 mins		T1,T2,R1	Chalk and talk	3	3
24	1	**Different types of A/D conversion techniques**	Day34	50 mins		T1,T2,R1	Chalk and talk	3	1
25	1	**Different types of D/A conversion techniques**	Day35	50 mins		T1,T2,R1	Chalk and talk	3	2
26	1	**TTL and their operation and specifications**	Day36	50 mins		T1,T2,R1	Chalk and talk	3	2
27	1	**ECL andtheir operation and specifications**	Day37	50 mins		T1,T2,R1	Chalk and talk	3	3
28	1	**MOS and their operation and specifications**	Day38	50 mins		T1,T2,R1	Chalk and talk	3	2
29	1	**VLSI Design flow: Design entry Schematic, FSM & HDL, different modeling styles in VHDL,**	Day39	50 mins		T3,R2	Chalk and talk	3	2
30	1	**VLSI Design flow: Design entry Schematic, FSM & HDL, different modeling styles in VHDL,**	Day40	50 mins		T3,R2	Chalk and talk	3	3
31	1	**Synthesis and Simulation VHDL constructs**	Day41	50 mins		T3,R2	Chalk and talk	3	3
32	1	**codes for combinational and sequential circuits.**	Day42	50 mins		T3,R2	Chalk and talk	3	3

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Recommended books for reference

Text Books:

T1: A.Anand Kumar, Fundamentals of Digital Circuits- PHI

T2: S.Aligahanan, S.Aribazhagan, Digital Circuit & Design- Bikas Publishing

T3: Douglas Perry, "VHDL", Tata McGraw Hill, 4th edition, 2002.

References Books:

R1: H.Taub & D.Shilling, Digital Integrated Electronics- Mc Graw Hill.

R2: Charles Roth, "Digital System Design using VHDL", Tata McGraw Hill 2nd edition 2012.

	Prepared by	Approved by
Name	**Mr. Sukdeb Saha**	Dr. Dipankar Biswas Head of the Department Electronics and Communication Engineering
Signature and date		
Designation	**Assistant Professor (ECE Department)**	

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Department of Civil Engineering

Subject Name and code : Concrete Technology / CE(PC)404

Name of the Program : B.Tech. in Civil Engineering

Year and Semester : 2nd Year / 4th Semester

Credit Points : 3

Prerequisites:

- Introduction to Civil Engineering CE (HS)302
- Chemistry BS-CH101

Objectives:

1. Understand the theoretical concept of Concrete material which includes Cement, Admixtures and Aggregates
2. Learn different types of aggregates, admixtures & know the mechanism of hydration of cement.
3. Comprehend the properties of Fresh Concrete, & manufacturing process of concrete
4. Understand the properties of hardened concrete, factors affecting Elasticity, creep & Shrinkage in concrete.
5. . Understand the concept of mix design of concrete& its importance in estimation of composition of materials.
6. . Know various types of special concretes & its application

Course Content:

Module	Content	Hrs. / Module
1.	**Cement:** Manufacturing of cement, Oxides composition of cement and the calculation of compounds, Heat of hydration, Types of cement-OPC, RPC. Low heat cement, PPC, PSC, Sulphate resisting cement, High Alumina cement, Expansive cement, White cement; Test on cement- fineness, consistency, initial setting time & final setting time, soundness test, strength test, specific gravity of cement, storage of cement.	8
2.	**Aggregates**: Classification, Grading, alkali-aggregate reaction, deleterious substances in aggregates, physical properties, testing of aggregates- fineness modulus, bulking, specific gravity, sieve analysis, flakiness & elongation index. Quality of Water for mixing and curing - use of sea water for mixing concrete.	4

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3.	**Properties of fresh concrete**: Workability, factors affecting workability, segregation and bleeding, tests on workability- slump test, compacting factor test, vee-bee test, flow table test.	4
4.	**Properties of Hardened concrete**: Tensile & compressive strength, flexural strength, stress-strain characteristics, modulus of elasticity, poisson's ratio, Creep, shrinkage, permeability of concrete, micro cracking of concrete.	4
5.	**Strength of concrete**: curing methods, water-cement ratio. gel-space ratio, maturity of concrete,	4
6.	**Admixtures**: types, uses, superplasticizers, plasticizers, Bonding admixtures.	3
7.	**Mix Design** – Objective, factors influencing mix proportion - Mix design by I.S. 10262-2019. (with & without admixture)	4
8.	**Non-destructive test**: Rebound hammer and Ultra-sonic pulse velocity testing methods. Quality control - Sampling and testing, Acceptance criteria.	4
9.	**Special Concrete** – Ferrocement - Fibre reinforced concrete - Polymer concrete - Sulphur Concrete - Self compacting concrete. Ready mix concrete Batching plant.	5

Learning Resources

Text Books:

1. Concrete Technology (Theory & Practice) by Shetty M.S.
2. Concrete Technology by Gambhir, M.L.

Reference Books:

1. Properties of Concrete by A.M.Neville
2. IS CODE -10262:2019

WEB RESOURCES:

1. https://nptel.ac.in/
2 https://testbook.com/objective-questions/mcq-on-concrete--5eea6a0c39140f30f369e0b8

Module Wise Lesson Plan

Sl No.	Topic name	Preferred book	No. Of periods	Cumulative no. Of periods	CO Aimed	Delivery method
	Module1: Cement					
1	Manufacturing of cement, Oxides composition of cement and the calculation of compounds.	T1	1	1	CO1,CO4	Chalk & Talk
2	the calculation of compounds.	T1	1	2	CO1,CO4	Chalk & Talk
3	Heat of hydration	T1,R1	1	3	CO1,CO4	Chalk & Talk
4	Types of cement-OPC, RPC. Low heat cement,	T1	1	4	CO1,CO	Chalk &

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	PPC, PSC.				5	Talk
5	Sulphate resisting cement, High Alumina cement, Expansive cement, White cement	T1	1	5	CO1,CO 4	Chalk & Talk
6	Test on cement- fineness, consistency, initial setting time & final setting time.	T1	1	6	CO1,CO 4	Chalk & Talk
7	Soundness test, strength test	T1,R1	1	7	CO1,CO 4	Chalk & Talk
8	Specific gravity of cement, storage of cement.	T1	1	8	CO1,CO 4	Chalk & Talk
	Module 2: Aggregates					
9	Classification, Grading, alkali-aggregate reaction, deleterious substances in aggregates,	T1,R1	1	9	CO1,CO 4	Chalk & Talk
10	physical properties, sieve analysis, flakiness & elongation index.	T1	1	10	CO1,CO 4	Chalk & Talk
11	Testing of aggregates- fineness modulus, bulking, specific gravity.	T1	1	11	CO1,CO 4	Chalk & Talk
12	Quality of Water for mixing and curing - use of sea water for mixing concrete.	T1	1	12	CO1,CO 4	Chalk & Talk
	Module 3: Properties of fresh concrete					
13	Workability, factors affecting workability,	T1, T2	1	13	CO2	Chalk & Talk
14	Tests on workability- slump test	T1, T2	1	14	CO2	Chalk & Talk
15	Compacting factor test, vee-bee test, flow table test.	T1, T2	1	15	CO2	Chalk & Talk
16	Segregation and bleeding	T1, T2	1	16	CO2	Chalk & Talk
	Module 4: Properties of Hardened concrete					
17	Tensile & compressive strength, flexural strength	T1, T2	1	17	CO2	Chalk & Talk
18	Stress-strain characteristics, modulus of elasticity, poisson's ratio	T1, T2	1	18	CO2	Chalk & Talk
19	Creep, shrinkage	T1, T2	1	19	CO2	Chalk & Talk
20	Permeability of concrete, micro cracking of concrete.	T1, T2	1	20	CO2	Chalk & Talk
	Module 5: Strength of Concrete					
21	Curing methods, water-cement ratio.	T1, T2	1	21	CO4	Chalk & Talk
22	Gel-space ratio	T1, T2	1	22	CO4	Chalk & Talk
23	Maturity of concrete	T1, T2	1	23	CO4	Chalk & Talk
	Module 6: Admixtures					
24	types, uses,	T1	1	24	CO6	Chalk & Talk
25	Superplasticizers, plasticizers	T1, T2	1	25	CO6	Chalk & Talk
26	Bonding admixtures	T1, T2	1	26	CO6	Chalk & Talk
	Module 7 : Mix Design					
27	Objective	T2, R2	1	27	CO3	Chalk & Talk

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28	Factors influencing mix proportion	T2,R2	1	28	CO3	Chalk & Talk
29	Mix design by I.S. 10262-2019. (with & without admixture)	T2,R2	1	29	CO3	Chalk & Talk
30	Related Numerical	T2,R2	1	30	CO3	Chalk & Talk
	Module 8: Non-destructive test					
31	Non-destructive test: Rebound hammer	T1	1	31	CO2,CO4	Chalk & Talk
32	Ultra-sonic pulse velocity testing methods	T1	1	32	CO2,CO4	Chalk & Talk
33	Frequency limitation of CRO	T1	1	33	CO2,CO4	Chalk & Talk
34	Quality control - Sampling and testing	T1	1	34	CO2,CO4	Chalk & Talk
35	Acceptance criteria.	T1	1	35	CO2,CO4	Chalk & Talk
	Module 9: Special Concrete					
36	Special Concrete – Ferrocement - Fibre reinforced concrete -	T1	1	36	CO5	Chalk & Talk
37	Polymer concrete	T1	1	37	CO5	Chalk & Talk
38	Sulphur Concrete	T1	1	38	CO5	Chalk & Talk
39	Self compacting concrete.	T1	1	39	CO5	Chalk & Talk
40	Ready mix concrete, Batching plant.	T1	1	40	CO5	Chalk & Talk

Note:- Delivery method could be chalk & talk, tutorial session, seminar, digital demonstration, assignments

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