

Teaching Plan- B.Sc. Physics, Semester 5

Academic Year 2019-20

Course Name: PH5CRT07: DIGITAL ELECTRONICS AND PROGRAMMING

Name of FIC: Dr. Saji Joseph

Credits – 3

Lecture hours for the semester: 54

Each week 3 hrs

Teaching plan

1stMonth (June)

Module I-Boolean algebra and logic gates (9 hrs), Module II Part 1
Combinational logic (3 hrs)

Objectives: By the end of the month, the student should be able to

1. Analyse Logic Gates
2. Analyse Rules and Laws of Boolean algebra
3. Analyse Adder circuits

Teaching methodology:

1. Lectures—12 hrs
2. Assignment—1 (Problems to be solved)

Evaluation method:

1. Test paper—1
2. Q&A session—every hour

1 st week	Basic gates NOT, OR, AND. Universal Logic Gates- NOR, NAND. XOR and XNOR Gates. Rules and Laws of Boolean algebra.	3 hrs
2 nd week	Duality theorem -De Morgan's Theorems. analysis and simplification of logic circuits.	3 hrs
3 rd week	Boolean equation and truth table - SOP and POS. Minterms and Maxterms. Standard SOP and Standard POS- Conversion between Standard SOP & Standard POS.	3 hrs

4 th week	Karnaugh Map (up to four variables). K map SOP minimization. Half Adder and Full Adder,	3 hrs
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2nd Month (July)

Module II Part 1I Combinational logic (3 hrs), Sequential logic (9 hrs)

Objectives: By the end of the month, the student should be able to

1. Understand the failure of Classical Physics and the concepts discussed.
2. Solve problems related to the topics.

Teaching methodology:

1. Lectures—12 hrs
2. Assignment—1 (Problems to be solved)

Evaluation method:

1. Test paper—1
2. Q&A session—every hour

1 st week	subtractor, 4-bit parallel Adder/Subtractor. Multiplexer, De-multiplexer, Encoder & Decoder.	3 hrs
2 nd week	Flip-flops, RS, Clocked RS, Master Slave	3 hrs
3 rd week	JK FF, DFF, T Flip-flop	3 hrs
4 th week	Buffer registers- Shift register-SISO and SIPO, Counters- Binary ripple counter	3 hrs

3rd Month (August)

Module II Part 1II Sequential logic (4 hrs), Module III Part 1- C++ Programming (8 hrs),

Objectives: By the end of the month, the student should be able to

1. Understand various phenomena that could not be explained by Classical Physics and the explanation of QM.
2. Solve problems related to the topic.

Teaching methodology:

1. Lectures—12 hrs
2. Assignment—1 (Problems to be solved)

Evaluation method:

1. Test paper—1
2. Q&A session—every hour

1st week, 2nd week	D/A converters (Ladder type), A/D Converter (Counter type).	4 hrs
2nd week	Basic C++ program structure –comments-data types-variable types-constantsoperators(arithmetic, relational, logical and assignment operators)-	2 hrs
3rd week	if, if-else and else if	3 hrs
4th week	do while - case	3 hrs

4thMonth (September)

Module III Part 2- C++ Programming (12 hrs),

Objectives: By the end of the month, the student should be able to

1. Understand how to solve Schrodinger equation for a free particle, bound particle.
2. Solve problems related to the topic.

Teaching methodology:

1. Lectures—12 hrs
2. Assignment—1 (Problems to be solved)

Evaluation method:

1. Test paper—1
2. Q&A session—every hour

1st week	loops(while, do-while,	3 hrs
2nd week	For loop	3 hrs
3rd week	nested loops-	3 hrs
4th week	arrays(Defining Arrays,	3 hrs

	Accessing Array Elements, Initializing Arrays	
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5th Month (October) 2 weeks only

Module III Part 3- C++ Programming (6 hrs),

Objectives: By the end of the month, the student should be able to

1. Understand Angular momentum operator, commutation relations, rigid rotator problem.
2. Solve problems related to the topic.

Teaching methodology:

1. Lectures—6hrs
2. Assignment—1 (Problems to be solved)

Evaluation method:

1. Test paper—1
2. Q&A session—every hour

1st week	basic ideas of functions(qualitative idea), object and classes	3 hrs
2nd week	Programs using loops	3 hrs