Paper Code: ARI 210	L	T/P	Credits
Subject: Switching Theory and Logic Design	4	-	4

Marking Scheme:
Teachers Continuous Evaluation: As per university examination norms from time to time.
End Term Theory Examination: As per university examination norms from time to time.

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: As per University Norms

➢ There should be 9 questions in the end term examination question paper.

➢ Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 15 marks.

➢ Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, students may be asked to attempt only 1 question from each unit. Each question should be 15 marks.

➢ The questions are to be framed keeping in view the learning outcomes of course/paper. The standard/ level of the questions to be asked should be at the level of the prescribed textbooks.

➢ The requirement of (scientific) calculators/ log-tables/ data-tables may be specified if required.

Course Outcomes[Bloom's Knowledge Level (KL)]:

CO1	Understand number systems and its applications. **[K1, K2]**
CO2	Minimize Boolean expressions and its applications to design digital circuits, design Combinational circuits using logic gates. **[K1, K3, K4]**
CO3	Design Sequential logic Circuits and its application with Digital Logic Families **[K2, K3]**
CO4	Analysis of Synchronous & Asynchronous Sequential Circuits. **[K1, K3]**

CO/ PO	**PO01**	**PO02**	**PO03**	**PO04**	**PO05**	**PO06**	**PO07**	**PO08**	**PO09**	**PO10**	**PO11**	**PO12**
CO1	3	2	1	1	-	-	-	-	-	-	-	1
CO2	1	2	3	-	-	-	-	-	-	-	-	2
CO3	1	2	2	-	-	-	-	-	-	-	-	2
CO4	3	2	1	1	-	-	-	-	-	-	-	1

Course Content	**No of Lectures**

Unit I **Number systems** – Decimal, Binary, Octal and Hexadecimal – conversion from one system to another – representation of negative numbers – representation of BCD numbers – character representation – character coding schemes – ASCII – EBCDIC etc. Addition, subtraction, multiplication and division of binary numbers. Addition and subtraction of BCD, Octal and Hexadecimal numbers.	[10]
Unit II **Introduction** — Postulates of Boolean algebra – Canonical and Standard Forms — logic functions and logic gates, methods of minimization of logic functions — Karnaugh map method and QuinMcClusky method Product-of-Sums Simplification — Don't-Care Conditions **Combinational Logic**: Combinational Circuits: Analysis Procedure, Design procedure, Binary adder-subtractor, Decimal adder, Binary multiplier, Magnitude comparator, Multiplexers, Demultiplexers, Decoders, Encoders.	[10]
Unit III **Sequential Logic and Its Applications**: Storage elements: latches & flip flops, Characteristic Equations of Flip Flops, Flip Flop Conversion, Shift Registers, Ripple Counters, Synchronous Counters, Other Counters: Johnson & Ring Counter. **Memory & Programmable Logic Devices: Digital Logic Families**: TTL, CMOS Logic families, Fan Out, Fan in, Noise Margin; RAM, ROM, PLA, PAL.	[10]
Unit IV **Synchronous & Asynchronous Sequential Circuits**: Analysis of clocked sequential circuits with state machine designing, State reduction and assignments, Design procedure. Analysis procedure of Asynchronous sequential circuits, circuit with latches, design procedure, Reduction of state and flow table, Race-free state assignment, Hazards.	[10]

Text Books:

[T1] Mano M. M., Digital Logic & Computer Design, 4/e, Pearson Education, 2013
[T2] Floyd T. L., Digital Fundamentals, 10/e, Pearson Education, 2009.
[T3] M. Morris Mano, Computer System Architecture, 3/e, Pearson Education, 2007.
[T4] Harris D. M. and, S. L. Harris, Digital Design and Computer Architecture, 2/e, Morgan Kaufmann Publishers, 2013

Reference Books:

[R1] Tokheim R. L., Digital Electronics Principles and Applications, 7/e, Tata McGraw Hill.
[R2] Mano M. M. and M. D Ciletti, Digital Design, 4/e, Pearson Education, 2008.
[R3] Rajaraman V. and T. Radhakrishnan, An Introduction to Digital Computer Design, 5/e, Prentice Hall India Private Limited, 2012.
[R4] Leach D, Malvino A P, Saha G, Digital Principles and Applications, 8/e, McGraw Hill.