PVP-19

DIGITAL INTEGRATED CIRCUITS DESIGN								
Course Code	19EC4701C	Year	IV	Semester	Ι			
Course	Program	Branch	ECE	Course Type	Theory			
Category	Elective-IV							
Credits	3	L-T-P	3-0-0	Prerequisites	Digital			
					Logic			
					Design			
Continuous	30	Semester	70	Total Marks:	100			
Internal		End						
Evaluation:		Evaluation:						

Course	Outcomes
COULSC	Vultures

Upon	successful completion of the course, the student will be able to
CO1	Design CMOS inverters (L5)
CO2	Analyze different scaling methods for MOS logical circuits (L4)
CO3	Implement different techniques to improve Area, power and speed of MOS logical
	circuits (L3).
CO4	Analyze timing issues and arithmetic building blocks $(I4)$

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)													
Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation													
* - Average value indicates course correlation strength with mapped PO													
PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
3		3		3					3			3	
3		3		3					3			3	
3	3								3			3	
3	3								3			3	
3	3	3	3	3					3			3	
	y of co Weak re value PO1 3 3 3 3 3 3 3	g of courseWeak correctionPO1PO233333333333	of course outcoWeak correlationPO1PO2PO3333333333333333333	g of course outcomesWeak correlation2weak correlation2P01P02P03P0433333333333333333333	Gof course outcomes with Weak correlationWeak correlation2-MecPo1PO2PO3PO4PO1PO2PO3PO43333333333333333333333	Gof course outcomes with ProgramWeak correlation2-Medium ofve value indicates course correlationPO1PO2PO3PO4PO5PO6333333333333333333333	of course outcomes with Program of Weak correlationWeak correlation2-Medium correlation strengP01P02P03P04P05P06P07333331333311333311333311333311333311333331	of course outcomes with Program outcomWeak correlation2-Medium correlationweak correlation2-Medium correlationweak correlationstrength withPO1PO2PO3PO4PO1PO2PO3PO433333333-33-33-33-33-33-33-33-333 <td>g of course outcomes with Program outcomes (Weak correlationWeak correlation2-Medium correlation3a value indicates course correlation strength with maxPO1PO2PO3PO4PO5PO6PO7PO8PO933334444333344443334444433344444333444443333444433333444333334443333344433333444333334443333344433333444333334443333444433334444333344443444444433444444</td> <td>g of course outcomes with Program outcomes (CO/ PWeak correlation2-Medium correlation3-Strona value indicates course correlation strength with mapped PPO1PO2PO3PO4PO5PO6PO7PO8PO9PO10333</td> <td>of course outcomes with Program outcomes (CO/ PO/PS)Weak correlation2-Medium correlation3-Strong correlationve value indicates course correlation strength with mapped POPO1PO2PO3PO4PO5PO6PO7PO8PO9PO10PO11333</td> <td>Go course outcomes with Program outcomes (CO/ PO/PSO MatWeak correlation2-Medium correlation3-Strong correlationye value indicates course correlation strength with mapped POPO1PO1PO1PO2PO3PO4PO5PO6PO7PO8PO9PO10PO11PO12333</td> <td>Go course outcomes with Program outcomes (CO/ PO/PSO Matrix)Weak correlation2-Medium correlation3-Strong correlationrevalue indicates course correlation strength with mapped POPO1PO2PO3PO4PO5PO6PO7PO8PO9PO10PO11PO12PS01333333333333333333334433334443333444333344433333444333334433333333</td>	g of course outcomes with Program outcomes (Weak correlationWeak correlation2-Medium correlation3a value indicates course correlation strength with maxPO1PO2PO3PO4PO5PO6PO7PO8PO933334444333344443334444433344444333444443333444433333444333334443333344433333444333334443333344433333444333334443333444433334444333344443444444433444444	g of course outcomes with Program outcomes (CO/ PWeak correlation2-Medium correlation3-Strona value indicates course correlation strength with mapped PPO1PO2PO3PO4PO5PO6PO7PO8PO9PO10333	of course outcomes with Program outcomes (CO/ PO/PS)Weak correlation2-Medium correlation3-Strong correlationve value indicates course correlation strength with mapped POPO1PO2PO3PO4PO5PO6PO7PO8PO9PO10PO11333	Go course outcomes with Program outcomes (CO/ PO/PSO MatWeak correlation2-Medium correlation3-Strong correlationye value indicates course correlation strength with mapped POPO1PO1PO1PO2PO3PO4PO5PO6PO7PO8PO9PO10PO11PO12333	Go course outcomes with Program outcomes (CO/ PO/PSO Matrix)Weak correlation2-Medium correlation3-Strong correlationrevalue indicates course correlation strength with mapped POPO1PO2PO3PO4PO5PO6PO7PO8PO9PO10PO11PO12PS01333333333333333333334433334443333444333344433333444333334433333333

Syllabus							
Unit	Contents	Mapped					
No.		CO					
Ι	CMOS INVERTER: Introduction, The static CMOS inverter,	CO-1					
	Evaluating the robustness of CMOS inverter, Performance of CMOS						
	inverter, Dynamic behaviour of CMOS inverter, and Power delay						
	product						
II	Technology scaling in VLSI, Full Scaling, Constant Voltage scaling,	CO-2					
	combined(mixed) scaling methods ,scaling factors for MOS circuits:						
	Logic gate Area, gate capacitance, carrier density,, channel						
	resistance, gate delay, maximum operating frequency, saturation						
	current, current density, power dissipation and power –delay product.						
III	DESIGNING COMBINATIONAL LOGIC GATES IN CMOS:	CO-3					
	Ratioed Logic, Pass transistor Logic, Static CMOS design, Dynamic						
	Domino CMOS logic design, performance of Dynamic logic, switching						
	activity of logic gate, short circuit currents in CMOS logic gates, Power						
	Consumption in CMOS Gates, Designing BICMOS logic gates						

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IV	TIMING ISSUES IN DIGITAL CIRCUITS : Introduction, Timing	CO-4
	classification of digital systems, Synchronous design, Clock Skew	
	and Clock Generation. Synchronization at the system level,	
	synchronous verses asynchronous design	
V	DESIGNING ARITHMETIC BUILDING BLOCKS : Data paths	CO-4
	in Digital processor architectures, carry select adder, Carry	
	Skip Adder, Carry Look Ahead Adder, Carry Save Adder, multiplier,	
	shifter, Power and speed trade-offs in data path structures	

---Learning Resources

Text Books

1. Digital Integrated Circuits- Jan M Rabaey, Anantha Chandrakasan, Borivoje Nikolic, Second Edition, PHI.

Reference Books

1. CMOS VLSI Design- Neil H.E.Weste, David Money Harris, Fourth Edition