MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

NAAC Accredited with A++ Grade

Department of Electronics Engineering

<u>Multiple Mode Teaching Learning Pattern</u>

Name of Course with Code		Class	Session
OC-I		B. Tech. III Year	Jan-June 2024
Intelligent Control (900104)		(VI Sem)	

S. No.	Unit	Content to be Covered	Teaching Session	Mode
1.	Unit 1	Introduction of Subject, Scheme, Syllabus and CO Discussion	1-3	Offline & Open discussions
2.		Control System Basics, Few Examples	4-6	Offline & group based problem solving based learning
3.		Linear Control System, Manual control and Automatic Control System	7	Offline & Open discussions learning through project
4.		Introduction of Adaptive Control Systems Open Loop and Close loop adaptive Control System.	8	Offline & open discussion
5.		Parameter estimation using least square and recursive least square techniques	9	Offline & Open discussions
6.		Self-tuning Controller, Self Tuning Regulators	10	Offline & Open discussions
7.		Adaptive Smith predictor control	11	Offline & problem solving based learning
8.		Auto tuning and self-tuning smith predictor.	12	Offline & problem solving based learning
9.		Gain Scheduling,	13	Offline & problem solving based learning
10.		Model Reference Adaptive Control	14	Offline & demonstration based learning
11.	Unit 2	Introduction to Artificial Neural Network (ANN)	15-18	Offline & problem solving based learning
12.		Different activation functions	19	Offline & problem solving based learning Activity and Demonstration
13.		Different architectures and different learning methods	20	Offline and open discussion, learning through project
14.		Back Propagation.	21-22	Offline & Open discussions
15.		Radial Basis Function networks	23	Offline & Open discussions
16.	Unit 3	Modeling of Control System: Representation and identification	24	Offline & Open discussions
17.		Modeling the plant, Control Structures– Supervised control	25	Offline & Open discussions
18.		Model reference control, Internal model control, Predictive control	26	Offline & Open discussions

19.		Indirect and direct adaptive controller design using neural network.	27-28	Offline & Open discussions
20.		Introduction Fuzzy Controllers	29	Offline & Open discussions
21.		Preliminaries–Mamdani and Sugeno inference methods	30	Offline & Open discussions
22.		Fuzzy sets in commercial products – basic construction of fuzzy controllers	31	Offline & Open discussions
23.	**Unit 4**	Basics of PI, PD, and PID Controllers	27	Offline & problem solving based learning
24.		Fuzzy PI, PD and PID controller	28	Offline & demonstration based learning, learning through project, activity based
25.		Analysis of static properties of fuzzy controller,	29	Offline & demonstration based learning
26.		Analysis of dynamic properties of fuzzy Controller.	30	Offline & Open discussions
27.		Simulation studies and case studies, Stability issues in fuzzy control.	31	Offline & activity based learning
28.	**Unit 5**	Introduction to Genetic Algorithm (GA).	32-33	Offline & Open discussions
29.		Neuro-Fuzzy based hybrid system design.	34-35	Offline & problem solving in group based learning
30.		Fuzzy-GA based hybrid system design.	36-37	Offline & Open discussions

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
--	63%	6%	2%	18%	--	11%	--

Dr. Deepak Batham
Assistant Professor
Department of Electronics Engineering
MITS, Gwalior

Madhav Institute of Technology & Science, Gwalior
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Department of Electronics Engineering

Name of Course with Code: Artificial Intelligence & Machine Learning (140617)			Class: Electronics (EC A & B) VI Sem.		Session: January-June 2024
S. No.	Unit	Content to be Covered	Teaching Session	CO Level	Mode
1.	Unit 1	**Artificial Intelligence:** Definition, Goals of AI, Task of AI	1	1	Offline & Open discussions
2.		AI - Computation, Psychology and Cognitive Science	2	1	Black Board Teaching
3.		AI - Perception, Understanding, and Action	3	1	Black Board Teaching
4.		Artificial intelligence vs machine learning vs deep learning and other related fields	4	1	Black Board Teaching
5.		Applications of Artificial intelligence and Machine Learning in the real world.	5	1	Black Board Teaching & problem solving based learning
6.	Unit 2	**Problem, Problem Space**	6	2	Online & demonstration based learning
7.		Search : Production Systems	7	2	Black Board Teaching & Group based Learning
8.		Blind Search: BFS	8	2	Black Board Teaching & problem solving based learning
9.		Blind Search: DFS	9	2	Black Board Teaching & problem solving based learning
10.		Heuristic Search	10	2	Black Board Teaching & problem solving based learning
11.		Hill Climbing	11	2	Black Board Teaching & problem solving based learning
12.		Best First Search	12	2	Black Board Teaching & problem solving based learning
13.		Introduction to Neural Networks: History, Biological Neuron, Artificial Neural Network	13	2	Online & demonstration based learning
14.		Neural Network Architectures	14-15	2	Online & demonstration based learning
15.		Classification, & Clustering	16	2	Black Board Teaching
16.	Unit 3	Introduction to Machine Learning: Traditional Programming vs Machine learning. Key Elements of Machine Learning: Representation	17	3	Black Board Teaching
17.		Key Elements of Machine Learning: process (Data Collection, Data Preparation, Model selection, Model Training, Model Evaluation and Prediction), Evaluation and Optimization.	18	3	Black Board Teaching
18.		Types of Learning: Supervised, Unsupervised and reinforcement learning, Regression vs classification problems.	19	3	Online & demonstration based learning
19.		Supervised Machine Learning: Linear regression:implementation,	20-21	4	Black Board Teaching & Open discussions

	Unit 4	applications & performance3 parameters			
20.		Decision tree classifier, terminology	22	4	Black Board Teaching & problem solving based learning
21.		classification vs regression trees, tree creation with Gini index and information gain	23-24	4	Black Board Teaching / Slides & Group based Learning
22.		IDE3 algorithms, applications and performance parameters	25	4	Black Board Teaching / Slides + Learning through experimentation
23.		Random forest classifier	26	4	Black Board Teaching / Slides + Activity based Learning
24.		Case study on regression and classification for solving real world problems.	27	4	Black Board Teaching & Learning through projects
25.	Unit 5	Unsupervised Machine Learning: Introduction, types: Partitioning	28	5	Flipped Class Online Mode
26.		Types: density based, DBSCAN	29	5	Black Board Teaching / Slides
27.		Types : distribution model-based, hierarchical, Agglomerative and Divisive	30-31	5	Flipped Class Online Mode
28.		Common Distance measures, K-means clustering algorithm	32-33	5	Learning through projects + Learning through experimentation
29.		Case study on clustering for solving real world problems	34	5	Black Board Teaching & Learning through projects

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Open discussion
17.64%	61.75%	5.88%	5.88%	11.76%	5.88%	2.9%	2.9%

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.)

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DEPARTMENT OF ELECTRONICS ENGINEERING

Multiple Mode Teaching Learning Pattern

Name of Course with Code: VLSI Design (140603)		Class: B. Tech. III Year		Session: Jan- june 2024
S. No.	Unit	Content to be Covered	Teaching Session	Mode
1.	Unit 1	The Metal Oxide Semiconductor (MOS) Structure	1	Offline & Open discussions
2.		The MOS System under External Bias, Structure and Operation of MOS Transistor (MOSFET)	2-3	Offline & problem solving based learning
3.		MOSFET Current-Voltage Characteristics	4-5	Offline & problem solving based learning
4.		MOSFET Scaling and Small-Geometry Effects	6-7	Offline & problem solving based learning
5.		MOSFET Capacitances.	8-9	Offline & problem solving based learning
6.	Unit 2	Introduction, Voltage Transfer Characteristic (VTC)	10	Offline & problem solving based learning
7.		Noise Immunity and Noise margins Resistive-Load Inverter, Inverters with n-Type MOSFET Load and CMOS Inverter,	11-12	Offline & problem solving based learning
8.		DC Characteristics of CMOS Inverter, Calculation of VIL, VIH, VOL, VOH and Vth, Design of CMOS Inverters	13-14	Offline & problem solving based learning
9.		Supply Voltage Scaling in CMOS Inverters, Power and Area considerations.	15	Offline & problem solving based learning
10.	Unit 3	Switching Characteristics of CMOS Inverter- Delay-Time Definitions	16	Online & demonstration based learning
11.		CMOS Propagation Delay	17	Online & demonstration based learning
12.		Calculation of Delay times, Power Dissipation-Switching	18-19	Offline & problem solving based learning
13.		Short-Circuit and Leakage Components of Energy and Power, Power-DelayProduct	20-24	Offline & problem solving based learning
14.		Combinational MOS logic circuits	25	Online & demonstration based learning
15.		CMOS Logic circuits (NAND, NOR and Complex Logic Gates, Multiplexers etc.)	26	Offline & problem solving based learning

16.	Unit 4	CMOS Transmission Gates (Pass Gates), CMOS n-Well Process,	27-29	Offline & problem solving based learning
17.		Layout design rules, layout design of CMOS Inverter, designing of stick diagram.	30-31	Offline & demonstration based learning
18.		Semiconductor memories: non-volatile and volatile memory devices, flash memories	32	Offline & Open discussions
19.	Unit 5	SRAM cell design,	33	Offline & problem solving based learning
20.		1T DRAM cell design, dynamic CMOS logic circuits ,domino logic CMOS circuits	34-35	Offline & problem solving based learning

Online	Offline						
	BlackBoardTeaching	GroupbasedLearning	Learningthroughprojects	Learningthroughdemonstration	Learningthroughexperimentation	ActivitybasedLearning	Onsite/fieldbasedlearning
13.22%	85.71%	37.21%	13.95	27.90%	48.84.%	13.95%	%

Prof. Madhav Singh

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DEPARTMENT OF ELECTRONICS ENGINEERING

Multiple Mode Teaching Learning Pattern

Name of Course with Code: Mobile Communication (200619)		Class: B. Tech. IIIrd Year		Session: Jan-June 2024
S. No.	**Unit**	**Content to be Covered**	**Teaching Session**	**Mode**
1.	Unit 1	Introduction to cellular mobile systems: Basic Cellular System,	1	Offline & activity based learning
2.		Cellular communication infrastructure: Cells, Clusters, Cell Splitting	2	Offline & Open discussions
3.		Frequency reuse concept, Cellular system components.	3	Offline & Open discussions
4.		Fixed and dynamic, Cellular interferences: Co-Channel and adjacent channel and sectorization.	4-5	Offline & Experiment with problem solving in group based learning
5.		Operations of cellular systems, Handoff/Handover, Channel assignment	6	Online & demonstration based learning
6.		Problem Solving Session	7	Offline & Open discussions
7.	Unit 2	Properties of mobile radio channels – Intersymbol interference	8-9	Offline & problem solving based learning
8.		Multipath and fading effects	10	Offline & problem solving based learning
9.		Interleaving and diversity	11	Online & demonstration based learning
10.		Multiple access schemes (TDMA, FDMA)	12	Offline & problem solvingbased learning
11.		CDMA, SDMA	13	Offline & problem solving based learning
12.		Interuser interference	14	Offline & problem solving based learning
13.		Traffic issues and cell capacity	15	Offline & Experiment with problem solving in group based learning
14.		Problem Solving Session	16	Offline & Open discussions
15.	Unit 3	Pulse shaping, Linear and non-linear Modulation techniques	17	Offline & Onsite/ field visit based Learning
16.		Constant Envelop modulation,	18	Offline & Onsite/ field visit based Learning
17.		QPSK, MSK, GMSK	19	Offline & Open discussions
18.		Spread spectrum modulation techniques	20	Online & demonstration based learning

19.		Direct sequence and Frequency Hopping Spread Spectrum and their applications.	21-22	Offline & Onsite/ field visit based Learning
20.		Problem Solving Session	23	Offline & Open discussions
21.	Unit 4	2G Architecture such as GSM and CDMA based – 2.5G	24	Online & demonstration based learning
22.		GPRS: GPRS and its features	25	Online & demonstration based learning
23.		3G standard details such as UMTS	26-27	Offline & Open discussions
24.		Introduction to LTE	28	Online & demonstration based learning
25.		Basic concept of massive MIMO.	29	Online & demonstration based learning
26.	Unit 5	5G potential and applications	30	Offline & Open discussions
27.		Usage scenarios: enhanced mobile broadband (eMBB),	31	Offline & activity based learning
28.		ultra reliable low latency communications (URLLC)	32	Online & demonstration based learning
29.		massive machine type communications (MMTC)	33	Offline & Experiment with problem solving in group based learning
30.		D2D communications,	34	Offline & Open discussions
31.		V2X communications; Spectrum for 5G and sharing	35	Offline & Onsite/ field visit based Learning

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
20.93%	69.77%	37.21%	13.95	27.90%	48.84.%	13.95%	08.30%

Prof. Prateek Bhadauria

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DEPARTMENT OF ELECTRONICS ENGINEERING

Multiple Mode Teaching Learning Pattern

Name of Course with Code: Intellectual Property Rights (100008)			Class: B. Tech. III Year VI Sem	Session :Jan-June 2024
S. No.	Unit	Content to be Covered	Teaching Session	Mode
1.	Unit 1	Introduction to IPRs	1	Online and Open discussions
2.		Basic concepts and need for Intellectual Property – Meaning and practical aspects of Patents	2-3	Online and Open discussions
3.		Copyrights, Geographical Indications, IPR in India and Abroad.	4	Online and Open discussions
4.		Nature of Intellectual Property, Industrial Property,	5	Online and Open discussions
5.		Technological Research	6	Online and Open discussions
6.		Inventions and Innovations – Important examples of IPR.	7	Online and Open discussions
7.	Unit 2	The IPR tool kit	8	Online and Open discussions
8.		Patents and patenting process	9-10	Online and Open discussions
9.		Patent cooperation treaties: International Treaties and conventions on IPRs	11-12	Online and Open discussions
10.		TRIPS Agreement, PCT Agreement,	13-14	Online and Open discussions
11.		Patent Act of India,	15-16	Online and Open discussions
12.		Patent Amendment Act,	17-18	Online and Open discussions
13.		Design Act	19-20	Online and Open discussions
14.		Trademark Act, Geographical Indication Act.	21-22	Online and Open discussions
15.	Unit 3	IPR of Living Species, protecting inventions in biotechnology	23	Online and Open discussions
16.		Protections of traditional knowledge, bio-piracy and documenting traditional knowledge	24	Online and Open discussions
17.		Digital Innovations and Developments as Knowledge Assets	25	Online and Open discussions
18.		IP Laws- Cyber Law and Digital Content Protection	26	Online and Open discussions
19.		Case studies: The basmati rice issue,	27	Online and Open discussions
20.		Case studies: revocations of turmeric patent, revocation of patent.	28	Online and Open discussions

21.	Unit 4	Rights of an IPR owner, licensing agreements	29	Online and Open discussions
22.		Criteria for patent infringement. Case studies of patent infringement	30	Online and Open discussions
23.		IPR – a contract	31	Online and Open discussions
24.		IPR – a contract, unfair competitions and control,	32	Online and Open discussions
25.		Provisions in TRIPs.	33	Online and Open discussions
26.	Unit 5	Commercialization, Recent changes in IPR laws impacting patents	34	Online and Open discussions
27.		Recent changes in IPR laws impacting copy rights	35	Online and Open discussions
28.		intellectual cooperation in the science and allied industry	36	Online and Open discussions
29.		Patentable and non-patentable research.	37	Online and Open discussions
30.		Case studies	38	Online and Open discussions
31.		Open Discussion	39-40	Online and Open discussions

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
100%	0%	0%	0%	0%	0%	0%	0%

Pooja Sahoo

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DEPARTMENT OF ELECTRONICS ENGINEERING

Multiple Mode Teaching Learning Pattern

Name of Course with Code: Mobile Communication & 5G Networks 200619		Class: B. Tech. IIIrd Year	Session: Jan-June 2024

S. No.	Unit	Content to be Covered	Teaching Session	Mode
1.	Unit 1	Introduction to cellular mobile systems: Basic Cellular System,	1	Offline & activity based learning
2.		Cellular communication infrastructure: Cells, Clusters, Cell Splitting	2	Offline & Open discussions
3.		Frequency reuse concept, Cellular system components.	3	Offline & Open discussions
4.		Fixed and dynamic, Cellular interferences: Co-Channel and adjacent channel and sectorization.	4-5	Offline & Experiment with problem solving in group based learning
5.		Operations of cellular systems, Handoff/Handover, Channel assignment	6	Offline & demonstration based learning
6.		Problem Solving Session	7	Offline & Open discussions
7.	Unit 2	Properties of mobile radio channels – Intersymbol interference	8-9	Offline & problem solving based learning
8.		Multipath and fading effects	10	Offline & problem solving based learning
9.		Interleaving and diversity	11	Offline & demonstration based learning
10.		Multiple access schemes (TDMA, FDMA)	12	Offline & problem solvingbased learning
11.		CDMA, SDMA	13	Offline & problem solving based learning
12.		Interuser interference	14	Offline & problem solving based learning
13.		Traffic issues and cell capacity	15	Offline & Experiment with problem solving in group based learning
14.		Problem Solving Session	16	Offline & Open discussions
15.		Pulse shaping, Linear and non-linear Modulation techniques	17	Offline & Onsite/ field visit based Learning
16.		Constant Envelop modulation,	18	Offline & Onsite/ field visit based Learning
17.		QPSK, MSK, GMSK	19	Offline & Open discussions

18.	Unit 3	Spread spectrum modulation techniques	20	Offline & demonstration based learning
19.		Direct sequence and Frequency Hopping Spread Spectrum and their applications.	21-22	Offline & Onsite/ field visit based Learning
20.		Problem Solving Session	23	Offline & Open discussions
21.	Unit 4	2G Architecture such as GSM and CDMA based – 2.5G	24	Online & demonstration based learning
22.		GPRS: GPRS and its features	25	Offline & demonstration based learning
23.		3G standard details such as UMTS	26-27	Offline & Open discussions
24.		Introduction to LTE	28	Offline & demonstration based learning
25.		Basic concept of massive MIMO.	29	Online & demonstration based learning
26.	Unit 5	5G potential and applications	30	Offline & Open discussions
27.		Usage scenarios: enhanced mobile broadband (eMBB),	31	Offline & activity based learning
28.		ultra reliable low latency communications (URLLC)	32	Online & demonstration based learning
29.		massive machine type communications (MMTC)	33	Offline & Experiment with problem solving in group based learning
30.		D2D communications,	34	Online & Open discussions
31.		V2X communications; Spectrum for 5G and sharing	35	Offline & Onsite/ field visit based Learning

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
20%	69.77%	37.21%	13.95	27.90%	48.84.%	13.95%	08.30%

Rachit Jain
Assistant Prof, MITS Gwalior

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Multiple Mode Teaching Learning Pattern

Name of Course with Code:200617AI & ML		Class:B. Tech. III Year	Session: January- June 2024	
S. No.	Unit	Content to be Covered	Teaching Session	Mode
1.	Unit 1	Definition,Goals of AI, Task of AI	1	Offline&Opendiscussions
2.		Computation, Psychology and Cognitive Science. Perception, Understanding, and Action	2	Offline&Open discussions
3.		Artificial intelligence vs machine learning vs deep learning and other related fields	3-4	Offline&Open discussions
4.		Applications of Artificial intelligence and Machine Learning in the real world.	5-6	Online&demonstrationbasedlearning
5.	Unit 2	Production System	7	Offline & problem solving based learning
6.		Blind Search: BFS & DFS	8	Offline & problem solving based learning
7.		Heuristic Search, Hill Climbing	9	Offline & problem solving based learning
8.		Best First Search	10	Offline&Open discussions
9.		History, Biological Neuron	11	Online&demonstrationbasedlearning
10.		Artificial Neural Network, Neural Network Architectures	12-13	Offline & problem solving based learning
11.		Classification, & Clustering	14-15	Offline& Experiment withproblem solvingin groupbasedlearning
12.	Unit 3	Traditional Programming vs Machine learning	16	Offline&Open discussions
13.		Key Elements of Machine Learning: Representation, process (Data Collection, Data Preparation, Model selection, Model Training, Model Evaluation and Prediction)	17-19	Online&demonstrationbasedlearning
14.		Evaluation and Optimization	20	Offline& Onsite/ field visit based Learning
15.		Typesof Learning: Supervised, Unsupervised and reinforcement learning	21-22	Online&demonstrationbasedlearning

16.		Regression vs classification problems	23	Offline& Onsite/ field visit based Learning
17.		Linear regression: implementation, applications & performance parameters	24	Offline & activity based learning
18.		Decision tree classifier, terminology, classification vs regression trees, tree creation with Gini index and information gain	25-26	Offline & activity based learning
19.	**Unit 4**	IDE3 algorithms, applications and performance parameters	27-28	Offline&Opendiscussions
20.		Random forest classifier	29	Offline & activity based learning
21.		Case study on regression and classification for solving real world problems	30	Online&demonstrationbasedlearning
22.		Unsupervised Machine Learning:Introduction, types	31	Offline&Open discussions
23.		Partitioning, density based, DBSCAN	32	Offline & activity based learning
24.		distribution model-based, hierarchical	33	Offline&Open discussions
25.		Agglomerative and Divisive, Common Distance measures	34-35	Offline& Experiment withproblem solvingin groupbasedlearning
26.	**Unit 5**	K-means clustering algorithm	36	Offline&Open discussions
27.		Case study on clustering for solving real world problems	37	Offline& Onsite/ field visit based Learning

Online	Offline						
	BlackBoardTeaching	GroupbasedLearning	Learningthroughprojects	Learningthroughdemonstration	Learningthroughexperimentation	ActivitybasedLearning	Onsite/fieldbasedlearning
21.6%	24.32%	10.8%	10.8%	21.6%	10%	13.5%	8.1%

Dr. R. P. Narwaria

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DEPARTMENT OF ELECTRONICS ENGINEERING

Multiple Mode Teaching Learning Pattern

Name of Course with Code: Embedded Systems(900116)			Class: B. Tech. III Year		Session: Jan-June 2024
S. No.	**Unit**	**Content to be Covered**	**Teaching Session**	**Mode**	
1.	Unit 1	Embedded system architecture, classification, challenges and design issues	1	Offline & Demonstration based discussions	
2.		fundamentals of embedded processor and microcontrollers	2-3	Offline & Open discussions	
3.		Von Neumann/Harvard architectures	4	Offline & Open discussions	
4.		CISC vs. RISC, microcontrollers types and their selection	5	Offline & Demonstration based learning	
5.		Overview of the 8051 family, architecture, pin description	6-8	Offline & problem solving based learning	
6.		Flags, Register Banks, Internal Memory Organization, I/O configuration, Special Function Registers, addressing modes.	9-10	Offline & Open discussions	
7.	Unit 2	An Overview of 8051 instruction set, Introduction to 8051 assembly programming,	11-13	Offline & problem solving based learning	
8.		Arithmetic, logic instructions and programs	14-15	Offline & Open discussions	
9.		Jump, loop and call instructions, IO port programming.	16	Offline & problem solving based learning	
10.		, Assembling and running an 8051 program	17	Offline & problem solving based learning	
11.		Data types and Assembler directives	18	Online & demonstration based learning	

12.			19-20	Offline & problem solving based learning
13.	**Unit 3**	Basics of Timers/Counters, Programming 8051 timers/Counter	21-22	Offline & problem solving based learning

14.		basics of serial communication, 8051 connection to RS232	23	Online & demonstration based learning
15.		8051 serial port programming, basics of 8051 Interrupts, 8051 interrupts programming: Timer interrupts, external hardware interrupts and serial communication interrupt, 8051 Interrupt priority	24	Online & demonstration based learning
16.	**Unit 4**	Memory address decoding, 8051 interfacing with memory,	25-27	Offline & Open discussions
17.		8051 interface with 8255 PPI and various interfacings like: LCD and Matrix Keyboard interfacing with 8051 microcontroller	28-29	Online & demonstration based learning
18.	**Unit 5**	ADC, DAC and Temperature Sensor interfacing with 8051 microcontroller, Stepper motor interfacing.	30	Offline & Open discussions
19.		Overview of Arduino, Configuration, Interfacing	31-32	Online & demonstration based learning
20.		Board layout, Atmega328 specifications,	33	Offline & demonstration based learning
21.		Interfacing of Arduino with LED, Switches, Light dependent resistor (LDR)	34	Offline & demonstration based learning
22.		PWM, 16*2 LCD, Serial, L293D for motor interfacing, ADC	35	Offline & problem solving based learning

Online	Offline						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning

20%	80%	37.21%	13.95%	25.71%	48.84.%	13.95%	-%

Dr. Shubhi kansal