

Department of Electrical & Electronics Engineering			
ADVANCED CONTROL SYSTEMS (ETEE 403)			
ACADEMIC PLAN FOR SEMESTER-VIII 2022			
S. No.	Topic covered	No. of Lectures	
Unit-1			
1	Introduction to state space modelling , State space Formulation	3	
2	Block Diagram, State Space Formulation from Electrical Circuits	1	CO1
3	Canonical forms (CCF, OCF, DCF, JCF)	2	
4	Transfer Function from State Space Model	1	
Unit 2			
5	State Transition Matrix	1	CO2
6	Solution of non-homogeneous Equations	1	
7	Concept of Controllability and Observability	1	
8	Introduction to Digital Control System Sample and Hold Circuits	1	
9	Z transform & Inverse Z transform	2	
10	Transfer function of zero-order hold, 1st order hold	2	
11	Difference Equation representation	1	
12	Pulse transfer Function	1	
13	State Space Representation of Discrete System, transfer function, Canonical forms	2	
14	State transition matrix, Solution of LTI system	1	
15	Controllability and Observability of discrete system	1	
16	Stability of Digital Control system (Jury stability test)	1	

Unit-3			
17	Introduction to non-linear system, type of non-linearities	1	CO3
18	Describing function approach, Assumptions and Analysis	1	
19	DF of different non-linearities	2	
20	Phase plane Analysis, singular points, construction of phase portraits	2	
21	Phase plane analysis of linear/non-linear systems	2	
22	Existence of limit cycle, Jump Phenomenon, stability analysis	2	
UNIT-4			
23	Lyapunov stability criterion, Positive definite functions, Lyapunov function	3	CO4
24	Lyapunov stability analysis of LTI system	2	
25	Variable gradient method, Popov stability criterion, Kravoskii methods	2	
26	Introduction to Model reference adaptive control system	1	
27	Self tuning regulators	1	
28	Adaptive control system	1	
	Total Lectures	42	