

1.	Title of the course	Linear System Dynamics and Control
2.	Course number	ME312M
3.	Structure of credits (L-T-P-C)	3-0-2-4
4.	New course/modification to	Modified with ME308M/SYSTEM DYNAMICS AND CONTROL
5.	To be offered by	Mechanical Engineering
6.	Proposed by	MITIKIRI YUJENDRA
7.	Prerequisite	None
8.	<b>Course Objective(s):</b> To mathematically model the dynamics of real-world systems. To quantitatively measure the dynamic performance of a system. To quantify the effects of feedback on stability and performance. To design controllers that achieve specified performance.	
9.	<b>Course Content:</b> Mathematical modelling of systems; Dynamics of robots and vehicles; Taylor series and linearization; Laplace transform and its properties; Block diagrams and state-space representation of systems; Initial state and input response; Transfer functions; Steady-state error, settling time, latency, and overshoot in second order systems; Feedback and control; Open-loop and closed-loop response; Characteristic polynomial and equation; Poles, zeros and root locus; Frequency response, bode plots, gain and phase margin; Eigenvalues and eigenvectors; Eigen-decomposition of state-space systems; Design of proportional-integral-derivative (PID) controllers; Vibration isolation systems. Experiments on free, forced, damped and undamped vibrations; Active control experiments.	
10.	<b>Textbook(s):</b> 1. Dorf R C and Bishop R H, Modern Control Systems, 10th Edition, Pearson (2014). 2. Ogata K, Modern Control Engineering, 5th Edition, Pearson (2017).	
11.	<b>Reference(s):</b> 1. Hespanha J P, Linear Systems Theory, 2nd Edition, Princeton University Press (2018). 2. Oppenheim A V and Willsky A S, Signals and Systems, 2nd Edition, Pearson (2015).	