National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	**Bachelor of Technology in Electrical and Electronics Engineering**	Year of Regulation	**2019-20**
Department	**Electrical Engineering**	Semester	**VI**

Course Code	Course Name	Credit Structure				Marks Distribution		
		L	T	P	C	Continuous Assessment		Total
EE352	**Control Systems Lab**	**0**	**1**	**2**	**2**	**10 Experiment**	**10**	**100**

Course Objectives		Course Outcomes		
		After the completion of the course, the student should be able to:		
	To introduce the basic concepts, elements and terminologies of control systems toolbox in MATLAB.		CO1	**acquire knowledge about the control systems commands.**
	To model different physical systems (plants) in Laplace and state-space frameworks in MATLAB.		CO2	**obtain the mathematical models of dynamic systems in transfer function and state-space forms.**
	To study the performance and stability of LTI systems in time and frequency domains using MATLAB		CO3	**analyse and define the LTI system performance and stability in both time-domain and frequency domain.**
	To design compensators/ controllers using graphical techniques in MATLAB.		CO4	**compute the Root locus and design the appropriate compensator using Root locus technique.**
			CO5	**compute Bode, Nyquist plots and design the appropriate compensator using Bode plot technique.**

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	**3**	**2**	**1**	**0**	**2**	**2**	**2**	**0**	**0**	**2**	**0**	**2**	**1**	**1**	**1**
2	CO2	**1**	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**0**	**1**	**0**	**2**	**3**	**2**	**2**
3	CO3	**2**	**3**	**3**	**3**	**2**	**2**	**1**	**1**	**2**	**1**	**1**	**2**	**3**	**2**	**3**
4	CO4	**2**	**2**	**3**	**2**	**2**	**2**	**2**	**1**	**2**	**2**	**1**	**2**	**2**	**3**	**3**
5	CO5	**2**	**2**	**3**	**2**	**2**	**2**	**2**	**1**	**2**	**2**	**1**	**2**	**3**	**3**	**3**
6	CO6															

SYLLABUS

No.	Content	Hours	COs
1	**Introductory Laboratory Class**	**03**	**All CO's**

2	**Introduction to Control Engineering MATLAB Commands**	**03**	**CO1**
3	**Block Diagram Reduction and Pole-Zero plot**	**03**	**CO2**
4	**Dynamic response of a plant model with different inputs**	**03**	**CO2**
5	**Determination of Step & Impulse Response for First and Second Order Unity Feedback System**	**03**	**CO3**
6	**Determination of Damping Effect on the Standard Second Order System**	**03**	**CO3**
7	**Study the Transient Performance Specifications of Standard Second Order System**	**03**	**CO3**
8	**Determination of Impulse and Step Response for a Type '0' Type '1' and Type '2' Systems**	**03**	**CO3**
9	**Determination of Root Locus plot using MATLAB control system toolbox**	**03**	**CO4**
10	**Determination of Bode plot using MATLAB control system toolbox**	**03**	**CO5**
11	**Design the appropriate compensator using Root locus and Bode plot technique**	**03**	**CO4** **CO5**
12	**Make – up Laboratory Class**	**03**	
Total Hours		**36**	

Essential Readings

1. K. Ogata, "Modern Control Engineering", Prentice Hall, 5th Edition, 2010.
2. I. J. Nagrath, M. Gopal, "Control System Engineering", New Age International, 6th Edition, 2018.

1. **Supplementary Readings**

2. N. S. Nise, "Control System Engineering", Wiley India, 7th Edition, 2015.
3. R. C. Dorf, R. H. Bishop, "Modern Control Systems", Pearson, 13th Edition, 2017.