B.E ELECTRICAL AND ELECTRONICS ENGINEERING(EEE)
CHOICE BASED CREDIT SYSTEM (CBCS)
SEMESTER -VI
CONTROL SYSTEM LABORATORY

Subject Code	15EEL67	IA Marks	20
Number of Practical Hours/Week	03	Exam Hours	03
Total Number of Practical Hours	42	Exam Marks	80

Credits - 02

Course objectives:

- To determine the time and frequency domain reposes of a given second order system using software package or discrete components.
- To design and analyze Lead, Lag and Lag – Lead compensators for given specifications.
- To draw the performance characteristics of ac and dc servomotors and synchro-transmitter receiver pair.
- To simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system.
- To write a script files to plot root locus, bode plot, Nyquist plots to study the stability of the system using a software package.■

Sl. NO	Experiments
1	Experiment to draw the speed torque characteristics of (i) AC servo motor (ii) DC servo motor
2	Experiment to draw synchro pair characteristics
3	Experiment to determine frequency response of a second order system
4	(a) To design a passive RC lead compensating network for the given specifications, viz, the maximum phase lead and the frequency at which it occurs and to obtain the frequency response. (b) To determine experimentally the transfer function of the lead compensating network.
5	(a)To design a passive RC lag compensating network for the given specifications, viz, the maximum phase lag and the frequency at which it occurs and to obtain the frequency response. (b) To determine experimentally the transfer function of the lag compensating network
6	Experiment to draw the frequency response characteristics of the lag – lead compensator network and determination of its transfer function.
	Experiments 7 to 11 must be done using MATLAB/SCILAB only.
7	(a) To simulate a typical second order system and determine step response and evaluate time response specifications. (b) To evaluate the effect of additional poles and zeros on time response of second order system. (c) To evaluate the effect of pole location on stability (d) To evaluate the effect of loop gain of a negative feedback system on stability.
8	To simulate a second order system and study the effect of (a) P, (b) PI, (c) PD and (d) PID controller on the step response.
9	(a) To simulate a D.C. Position control system and obtain its step response. (b) To verify the effect of input waveform, loop gain and system type on steady state errors. (c) To perform trade-off study for lead compensator. (d) To design PI controller and study its effect on steady state error.
10	(a) To examine the relationship between open-loop frequency response and stability, open-loop frequency and closed loop transient response (b) To study the effect of open loop gain on transient response of closed loop system using root locus.
11	(a) To study the effect of open loop poles and zeros on root locus contour (b) To estimate the effect of open loop gain on the transient response of closed loop system using root locus. (c) Comparative study of Bode, Nyquist and root locus with respect to stability.
Revised Bloom's Taxonomy Level	L_1 – Remembering, L_2 – Understanding. L_3 – Applying, L_4 – Analysing, L_5 – Evaluating.

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CHOICE BASED CREDIT SYSTEM (CBCS)
SEMESTER -VI
15EEL67 CONTROL SYSTEM LABORATORY(continued)

Course outcomes: At the end of the course the student will be able to:
- Use software package or discrete components in assessing the time and frequency domain reposes of a given second order system.
- Design and analyze Lead, Lag and Lag – Lead compensators for given specifications.
- Determine the performance characteristics of ac and dc servomotors and synchro-transmitter receiver pair used in control systems.
- Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system.
- Write a script files to plot root locus, bode plot, Nyquist plots to study the stability of the system using a software package.
- Work with a small team to carryout experiments and prepare reports that present lab work. ∎

Graduate Attributes (As per NBA)
Engineering Knowledge,Problem Analysis, Individual and Team work, Modern tool usage, Communication.

Conduct of Practical Examination:
1. All laboratory experiments are to be included for practical examination.
2. Breakup of marks and the instructions printed on the cover page of answer script to be strictly adhered by the examiners.
3. Students can pick one experiment from the questions lot prepared by the examiners.
4. Change of experiment is allowed only once and 15% Marks allotted to the procedure part to be made zero.∎