



Kadi Sarva Vishwavidyalaya
Faculty of Engineering & Technology
Second Year Bachelor of EE Engineering- Semester IV
 With effect from: Academic Year 2018-19

EEC403-N	Control System
Pre-requisite	

Teaching Scheme (Credits and Hours)

Teaching scheme				Total Credit	Evaluation Scheme					Total Marks
L	T	P	Total		Theory		IE Marks	CIA Marks	Pract. Marks	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks				
03	00	02	05	04	03	70	30	20	30	150

Course Objective:

At the end of this course, students will demonstrate the ability to

- Understand the basics of open loop and closed loop feedback systems.
- Understand the concept of stability.
- To Understand Root Locus, Bode Plot and Nyquist Plot.

Outline of The Course:

Sr. No	Title of the Unit	Minimum Hours
1.	Control System Introduction	3
2.	Block Diagram Representation and Signal Flow Graphs	10
3.	Time Response Analysis	10
4.	Stability Analysis	4
5.	Root Locus	8
6.	Frequency Domain Analysis	8
7.	State Space Analysis	5
	Total	48

- **Total hours (Theory): 48**
- **Total hours (Lab): 30**
- **Total hours: 78**



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DETAILED SYLLABUS

Sr. No	Title	Lecture Hours	Weight age(%)
1.	Control System Introduction: Various Control Systems, Comparison Between Closed Loop And Open Loop Control Systems.	3	5%
2.	Block Diagram Representation and Signal Flow Graphs: Basic definitions, advantages and disadvantages of block diagram, Block diagram reduction rules, Examples based on block diagram reduction techniques, Important definitions related to SFG, comparison of block diagram and SFG methods, Mason's gain Formula for SFG, Formation of SFG from equations and electrical networks	10	25%
3.	Time Response Analysis: Transient and steady state response, stability and sensitivity, various test signals, steady state error, First and Second order system analysis, Damping Ratio, Time Domain Specifications.	10	20%
4.	Stability Analysis: Routh's Stability Criterion, Advantages and disadvantages of Routh's Stability Criterion, Hurwitz's criterion.	4	10%
5.	Root Locus: Introduction, General Rules for Constructing Root Loci. Root-locus technique.	8	15%
6.	Frequency Domain Analysis: Bode Plot, Nyquist plot.	8	15%
7.	State Space Analysis: State variables, state model, State variables, state model	5	10%
	Total	48	100



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Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

LEARNING OUTCOME:

On successful completion of the course

- The student can be acquired the basic knowledge of control system and their applications, The students will be able to effectively solve the problems related to stability and analyze the systems based on the techniques learnt in the course.
- The students will be able to use the MATLAB as a tool for the control system applications.

TEXT BOOKS & REFERENCE BOOKS:

- Feedback Control Systems by Dr. S.D. Bhide, R.A. Barapate, S. Satyanarayan, Tech-Max Publication, Pune.
- Modern Control System Theory – by Dr. M. Gopal, New Age International Publishers, 2nd edition, 1996.
- Control Systems by Ashfaq Hussain, Haroon Ashfaq, Dhanpat Rai & Co.
- Design of Feedback Control Systems by Stefani, Shahian, Savant, Hostetter, Oxford University Press
- Linear Control Systems by B.S. Manke, Khanna Publishers
- Modern Control Engineering By Katsuhiko Ogata, 4th Edition, Prentice Hall of India



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LIST OF EXPERIMENTS

Sr No.	Experiment Title
1.	To study Open Loop Control system.
2.	To study feedback control system.
3.	To study different applications of control system.
4.	To study response of Type “0” Control system.
5.	To study response of Type “1” Control system.
6.	To study response of Type “2” Control system.
7.	To study Test Signal Generator.
8.	Introduction to MATLAB/SCILAB Tool.
9.	To study Root Locus using MATLAB/SCILAB.
10.	To study Bode Plot using MATLAB/SCILAB.
11.	To study Nyquist Plot using MATLAB/SCILAB.
12.	Draw chart of any close loop control system.