과목명	선형계통론	과목번호	ELEC731001	학점	3.0
개설대학	전자공학부	개설학기	20172	교과구분	전공
담당교수	양정민	강의시간	월 1A1B2A 월 2B3A3B	강의실명	IT 대학 1 호관(공대 10 호관)713 IT 대학 1 호관(공대 10 호관)713
연락처/E-mail	** 통합정보시스템 로그인- 수업/성적- 수업- "강의담당교수조회"에서 확인 가능함.				
면담시간	Tuesday PM 12:00 - 1:00			강의언어	한국어

[강의계획서]

강의개요 및 목적

The purpose of this course is to provide the students with the basic idea of linear systems theory and modern control engineering. Main consideration is on linear algebra, state-space representations, stability analysis, controllability and observability, and state feedback control and estimations. We will also study the applications of state-space methods and state feedback to various engineering systems.

교재 및 참고문헌

- Textbook:

Chi-Tsong Chen, Linear System Theory and Design, (3rd or 4th) Edition, Oxford University Press.

- References:

N. S. Nise, Control Systems Engineering (5th ed.), Wiley, 2008.

R. L. Williams II and D. A. Lawrence, Linear State-Space Control Systems, Wiley, 2007.

W. J. Rugh, Linear System Theory (2nd ed.), Prentice Hall, 1996.

강의진행 방법 및 활용매체

- Writing on blackboard

- Use PC for presenting relevant materials

과제, 평가방법, 선수과목

- Midterm exam: 35%

- Final exam (or Term project): 35%

- Homework: 20%

- Attendance: 10%

Total: 100%

수강에 특별히 참고할 사항

The students should be familiar with the notion of automatic control, electronic circuits, and signals and systems theory.

장애학생을 위한 학습지원 사항

A. Hearing Impaired : first row priority seating, Class transcripts may also be provided.

B.developmental Challenged : Extended Test Period.

C. Brain lesions : Extended Test Period, Class transcripts may also be provided.

D. Visually Impaired : Larger Font tesA. Hearing Impaired : first row priority seating, Class transcripts may also be provided.

B. Develpmenatlly Challenged : Extended Test Period

C. Brain lesions : Extended Test Period, Class transcripts may also be provided

D. Visually Impaired : Larger Font test will be provided

Other : Aid offered dependant on specific disabilities t will be provided.

Other : Aid offered dependent on specific disabilities.

[강의 내용 및 일정]

no	강의 요목 및 수업목표	과제 및 연구문제	교재 및 참고자료	비고
1	Introduction -Introduction -Overview		Ch. 1	
2	Review of automatic control -Transferfunction -Stability -Rootlocus -Frequencyresponse		Ch. 1	
3	Mathematical Descriptions of Systems I -Introduction -Causality,Lumpedness,andTime-Invariance -LinearTime-Invariant(LTI)Systems -LinearTime-VaryingSystems -RLCcircuits--ComparisonsofVariousDescripti		Ch. 2	
4	Mathematical Descriptions of Systems II -MechanicalandHydraulicSystems -ProperRationalTransferFunctions -Discrete-TimeLinearTime-InvariantSystems		Ch. 2	
5	Linear Algebra I -Introduction -Basis,Representation,andOrthonormalization -LinearAlgebraicEquations -SimilarityTransformation -DiagonalFormandJordanForm		Ch. 3	
6	Linear Algebra II -FunctionsofaSquareMatrix -.LyapunovEquation -SomeUsefulFormula -QuadraticFormandPositiveDefiniteness -SingularValueDecomposition -NormsofMatrices		Ch. 3	

7	State-Space Solutions and Realizations -Introduction -GeneralSolutionofCTLTIState-SpaceEquations -ComputerComputationofCTState-SpaceEquations -EquivalentStateEquations -Realizations -SolutionofLinearTime-Varying(LTV)Equations -EquivalentTime-VaryingEquations -Time-VaryingRealizations		Ch. 4	
8	Midterm exam		Ch. 1~4	
9	Stability -Introduction -Input-OutputStabilityofLTISystems -Discrete-TimeCase -InternalStability -LyapunovTheorem -StabilityofLTVSystems		Ch. 5	
10	Controllability and Observability I -Introduction -Controllability -Observability -CanonicalDecomposition		Ch. 6	
11	Controllability and Observability II -ConditionsinJordan-FormEquations -Discrete-TimeState-SpaceEquations -ControllabilityAfterSampling -LTVState-SpaceEquations		Ch. 6	
12	Minimal Realizations and Coprime Fractions -Introduction -ImplicationsofCoprimeness -ComputingCoprimeFractions -BalancedRealization -RealizationsfromMarkovParameters		Ch. 7	

	-DegreeofTransferMatrices -MinimalRealizations-MatrixCase -MatrixPolynomialFractions -RealizationfromMatrixCoprimeFractions			
13	State Feedback and State Estimators -Introduction -StateFeedback -RegulationandTracking -StateEstimator -FeedbackfromEstimatedStates -Statefeedback--MIMOcase -StateEstimators--MIMOcase -FeedbackfromEstimatedStates--MIMOCase	Term project proposal (TBD)	Ch. 8	
14	Pole Placement and Model Matching -Introduction -Preliminary--MatchingCoefficients -Unity-FeedbackConfiguration-PolePlacement -ImplementableTransferFunctions -MIMOUnityFeedbackSystems -MIMOModelMatching--Two-ParameterConfiguration		Ch. 9	
15	Final exam	Term project presentation	Ch. 1~9	

수험부정행위시, 경북대학교 수험부정행위에관한처벌규정에 의거 그 정상에 따라 수험자격박탈, 근신, 유기·무기정학, 또는 제적 처분될 수 있으니, 각별히 유의하여 주시기 바람.