

## 강의계획서

검색조건 :	
교양/교직/군사학	▼
핵심교양(영역1) 글쓰기(1-①)	▼
<input type="button" value="조회"/>	
[수업시간][건물 및 교과구분 코드][검색]	

[영문강의계획서보기(Syllabus)]

과목명	선형계통론
과목번호	ELEC731001
학점	3.0
개설대학	전자공학부
개설학기	20162
교과구분	전공
담당교수	양정민
강의시간	화1A1B2A 화2B3A3B
강의실명	IT대학1호관(공대10호관)318 IT대학1호관(공대10호관)318
연락처/E-mail	** 통합정보시스템 로그인- 수업/성적- 수업- "강의담당교수조회"에서 확인 가능함.
면담시간	
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 application of state-space methods and state feedback to various engineering systems.
교재 및 참고문헌
- Textbook: Chi-Tsong Chen, Linear System Theory and Design, Third Edition, Oxford University Press, 1999.
- 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	
<ul style="list-style-type: none"> <li>- Writing on blackboard</li> <li>- Use PC for presenting relevant materials</li> </ul>	
과제, 평가방법, 선수과목	
<ul style="list-style-type: none"> <li>- Midterm exam: 35%</li> <li>- Final exam Term project: 35%</li> <li>- Homework: 20%</li> <li>- Attendance: 10%</li> </ul> <p>Total: 100%</p>	
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	
<p>A. Hearing Impaired : first row priority seating, Class transcripts may also be provided.</p> <p>B. developmental Challenged : Extended Test Period.</p> <p>C. Brain lesions : Extended Test Period, Class transcripts may also be provided.</p> <p>D. Visually Impaired : Larger Font test A. Hearing Impaired : first row priority seating, Class transcripts may also be provided.</p> <p>B. Developmentally Challenged : Extended Test Period</p> <p>C. Brain lesions : Extended Test Period, Class transcripts may also be provided</p> <p>D. Visually Impaired : Larger Font test will be provided</p> <p>Other : Aid offered dependant on specific disabilities t will be provided.</p> <p>Other : Aid offered dependent on specific disabilities.</p>	

### [ 강의 내용 및 일정 ]

no	강의 요목 및 수업목표	과제 및 연구문제	교재 및 참고자료	비고
1	Introduction <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Overview</li> </ul>		Ch. 1	
2	Review of automatic control <ul style="list-style-type: none"> <li>- Transfer function</li> <li>- Stability</li> <li>- Root locus</li> <li>- Frequency response</li> </ul>		Ch. 1	
3	Mathematical Descriptions of Systems I <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Causality, Lumpedness, and Time-Invariance</li> <li>- Linear Time-Invariant (LTI) Systems</li> </ul>		Ch. 2	

	<ul style="list-style-type: none"> <li>- Linear Time-Varying Systems</li> <li>- RLC circuits--Comparisons of Various Descripti</li> </ul>			
4	<p>Mathematical Descriptions of Systems II</p> <ul style="list-style-type: none"> <li>- Mechanical and Hydraulic Systems</li> <li>- Proper Rational Transfer Functions</li> <li>- Discrete-Time Linear Time-Invariant Systems</li> </ul>		Ch. 2	
5	<p>Linear Algebra I</p> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Basis, Representation, and Orthonormalization</li> <li>- Linear Algebraic Equations</li> <li>- Similarity Transformation</li> <li>- Diagonal Form and Jordan Form</li> </ul>		Ch. 3	
6	<p>Linear Algebra II</p> <ul style="list-style-type: none"> <li>- Functions of a Square Matrix</li> <li>- . Lyapunov Equation</li> <li>- Some Useful Formula</li> <li>- Quadratic Form and Positive Definiteness</li> <li>- Singular Value Decomposition</li> <li>- Norms of Matrices</li> </ul>		Ch. 3	
7	<p>State-Space Solutions and Realizations</p> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- General Solution of CT LTI State-Space Equations</li> <li>- Computer Computation of CT State-Space Equations</li> <li>- Equivalent State Equations</li> <li>- Realizations</li> <li>- Solution of Linear Time-Varying (LTV) Equations</li> <li>- Equivalent Time-Varying Equations</li> <li>- Time-Varying Realizations</li> </ul>		Ch. 4	
8	Midterm exam		Ch. 1~4	
9	<p>Stability</p> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Input-Output Stability of LTI Systems</li> <li>- Discrete-Time Case</li> <li>- Internal Stability</li> <li>- Lyapunov Theorem</li> <li>- Stability of LTV Systems</li> </ul>		Ch. 5	
10	<p>Controllability and Observability I</p> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Controllability</li> <li>- Observability</li> <li>- Canonical Decomposition</li> </ul>		Ch. 6	
11	<p>Controllability and Observability II</p> <ul style="list-style-type: none"> <li>- Conditions in Jordan-Form Equations</li> <li>- Discrete-Time State-Space Equations</li> <li>- Controllability After Sampling</li> <li>- LTV State-Space Equations</li> </ul>		Ch. 6	
12	<p>Minimal Realizations and Coprime Fractions</p> <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Implications of Coprimeness</li> <li>- Computing Coprime Fractions</li> </ul>		Ch. 7	

	<ul style="list-style-type: none"> <li>- Balanced Realization</li> <li>- Realizations from Markov Parameters</li> <li>- Degree of Transfer Matrices</li> <li>- Minimal Realizations- Matrix Case</li> <li>- Matrix Polynomial Fractions</li> <li>- Realization from Matrix Coprime Fractions</li> </ul>			
13	State Feedback and State Estimators <ul style="list-style-type: none"> <li>- Introduction</li> <li>- State Feedback</li> <li>- Regulation and Tracking</li> <li>- State Estimator</li> <li>- Feedback from Estimated States</li> <li>- State feedback--MIMO case</li> <li>- State Estimators--MIMO case</li> <li>- Feedback from Estimated States--MIMO Case</li> </ul>	Term project proposal (TBD)	Ch. 8	
14	Pole Placement and Model Matching <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Preliminary--Matching Coefficients</li> <li>- Unity-Feedback Configuration-Pole Placement</li> <li>- Implementable Transfer Functions</li> <li>- MIMO Unity Feedback Systems</li> <li>- MIMO Model Matching--Two-Parameter Configuration</li> </ul>		Ch. 9	
15	Final exam	Term project presentation	Ch. 1~9	

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