2016년도 2학기 자동제어 수업계획서

교과목명 Course Title	(국문) 자동제어	(영문) Automatic Control

담당교수(소속) Lecturer	곽관웅 (기계공학전공)	학수번호/구분/학점 (Course No. /)	004475/전공선택/3학점
전화(연구실/HP) Contact No.	-	강의시간/강의실 (Class Hour/Venue)	월/수 13:30 - 15:00, 광개토관 109
선수과목 (Course Prerequisite)	공업수학, 동역학, 진동학	수강대상 (Target Student)	기계공학과 3학년
E-mail (E-mail Address)		연구실/Office Hour (Office/Office Hour)	화목 06:30-18:30

교과목표 (Objectives)	This course introduces the basic priciples of feedback control of dynamic system, related system analysis technics, and the design of the controller satisfying the given dynamic specifications. To achieve the course goals, system modeling technics descrbing the dynamic systems into mathematical differential equations, technics (root locus, Nyquist) analyzing the dynamic characteristics (stability, tranqusient response) in both time and frequency domain will be studied. Also, PID and lead-lag controller design method that makes the system dynamic characteristics satisfy the required specifications will be investigated.
이번 강의의 개선을 위한 개선계획 CQI (Continuous Quality Improvement Plan)	- 모든 제어 이론을 모터 모델 및 제어 예제를 활용하여 설명 - Term project 강화 - 주파수 영역 추가 고려
교 재 참고도서 (Text book & References)	main text: Franklin, Powell, Emami-Naeini, "Feedback Control of Dynamic Systems", 7th ed., Pearson Education reference: Normal S. Nise, "Control Systems Engineering", 5th ed., Wiley Ogata, "Modern Control Engineering", 4th ed., Prentice Hall
과제도서 (Assignment book)	Franklin, Powell, Emami-Naeini, "Feedback Control of Dynamic Systems", 6th ed., Pearson Education
수업방법 (Lecture Methods)	Power point presentation is used in most classes The course note will be posted on the course homepage. Term-project will be given asking control system design and analysis using MATLAB.
과제물 (Assignment)	
독서물 (Reading Materials)	1. www.engin.umich.edu/class/ctms 2. textbook Matlab/Simulink code --> will be covered in the exams
학업성취 평가방법 (Course Grading)	[상대평가] 중간고사(%) : 40, 기말고사(%) : 40, 수시평가및과제(%) : 10, 출석(%) : 10, midterm(40 %), final(40 %), h/w(10 %), attendance(10 %) absence 10 times --> FA, tardy 2 times = 1 absence
기 타 (Etc.)	

주별 교과내용 (교과목명 : 자동제어)

주 (Week)	교 수 내 용 (Course Contents)	수업형태 및 활용기자재 (Etc.)	비 고
1	Introduction to Feedback Control The Laplace Transform	ppt	
2	The Laplace Transform (Inverse Laplace Transform, Partial Fraction Expansion) Solving linear time-invariant differential equations using L.T.	ppt	HW#1 (Laplace Transform)
3	Transfer Functions, Impulse response block diagrams, block diagram reduction	ppt	
4	block diagram reduction, Signal flow graph Signal flow graph, Mason's rule	ppt	HW#2(System Modeling)
5	state space representation converting s.s. to a T.F. and TF to SS	ppt	
6	Linearization 1st-order system, 2nd order system	ppt	
7	2nd order system, higher order systems, Stability analysis higher order systems, Stability analysis	ppt	HW#3 (Linear System Analysis)
8	steady-state errors in unity feedback control systems 중간고사	ppt	

주별 교과내용 (교과목명 : 자동제어)

주 (Week)	교 수 내 용 (Course Contents)	수업형태 및 활용기자재 (Etc.)	비 고
9	static error constant, steady-state error for nonunity feedback Root-Locus Analysis (Root-Locus plots, pole-zero cancellation)	ppt	HW#4(Steady State Error and PID controller)
10	Root-Locus Analysis (Nonminimum phase system, positive feedback system, conditionally stable system) Control Systems Design by the Root-Locus Method (Lead compensation)	ppt	
11	Control Systems Design by the Root-Locus Method (Lag compensation, Lead-Lag compensation) Control Systems Design by the Root-Locus Method (Lead-Lag compensation, paralle compensation, velocity feedback)	ppt	HW#5 Root Locus
12	Frequency Response Analysis (Bode plots of first-order factors) Frequency Response Analysis (Bode plots of first-order & quadratic factors)	ppt	
13	Frequency Response Analysis (system types and log-magnitude curve) Frequency Response Analysis (polar plots)	ppt	HW#6 Control Design by Root locus
14	Frequency Response Analysis (Nyquist stability criterion) Frequency Response Analysis (Nyquist stability criterion, relative stability)	ppt	
15	Control Systems Design by Frequency Response (Lead compensation, Lag compensation) Control Systems Design by Frequency Response (Lead-Lag compensation)	ppt	HW#7 Frequency domain analysis
16	Review 기말고사	ppt	

추 가 안내사항1 (Additional Guide1)	특별한 지원이 필요한 경우(장애학생 등) 학기 첫 주에 담당교수와의 면담을 통해 출석, 강의, 과제 및 시험 등에 관한 교수학습지원 사항을 요청할 수 있음 Students who require special assistance (including special needs students) may contact their professors during the first week of the semester to discuss issues related to attendance, lectures, assignments and exams and request learning assistance. 세종대학교 Blackboard 시스템을 통하여 수업관련 모든 정보 공유됨
추 가 안내사항2 (Additional Guide2)	