Lecture Syllabus

Module Code	Semester	ECTS	SWS	Lecture	Tutorial	Lab
MECH-M-1-EDY-NLE-VO	1	3	2	2	0	0
Course Name	Non Linear Electronics					
Lecturer	D. T. McGuiness, Ph.D (Daniel.McGuiness@mci.edu) (4A-434c)					
Study Programme	Mechatronik Smart Technologies					
Official Name	Nichtlineare Elektronik				**Lingo**	English
Lecture Prerequisites	The student should have a preliminary knowledge on passive circuit elements (R, L, and C) and should be comfortable applying circut analysis techniques After completion, the student will have a good foundation on advanced circuit analysis, non-linear component knowledge and a good understanding on integrated circuits and amplifier design.					
Course Objectives	The goal of this lecture is to give you a deper understanding of electronic components used in everyday-life from the point-of-view of engineers.					
Primary Course Content	Lecture Homepage on GitHub | WebBook					
Secondary Course Content(s)	*Linear And Nonlinear Circuits* by L. Chua , *Introduction to Electric Circuits (9th Edition)* by J. A. Svoboda, R. C. Dorf , *Microelectronic Circuits (7th Edition)* by K. Smith , *Electrical and Electronic Technology (10th Edition)* by E. Hughes , *Electronic Amplifier Circuits: Theory and Design* by J. M. Petttit, et. al ,					
Homework(s) and Project(s)	Personal Assignment (40) Final Exam (60)					
Assessment Criteria	**Assignment Type**		**Effect**	**Count**		
	Personal Assignment		40	1		
	Final Exam		60	1		

Lecture Structure

Order	Topic	Units	Self Study
1	Signals and Amplifiers	4	8
	Introduction · Signals · Amplifiers · Circuit Models for Amplifiers · Frequency Response of Amplifiers		
2	Semiconductors	4	8
	Introduction · The Ideal Op Amp · The Inverting Configuration · The Non-Inverting Configuration · Difference Amplifiers · Integrators and Differentiators · DC Imperfections · Effect of Finite Open-Loop Gain and Bandwidth on Circuit Performance · Large Signal Operation of Op Amps		
3	Operational Amplifiers	4	8
	Introduction · Intrinsic Semiconductors · Doped Semiconductors · Current Flow in Semiconductors · The PN Junction · PN Junction with Applied Voltage · Capacitive Effects in PN Junction		
4	Diodes	4	8
	Introduction · The Ideal Diode · Terminal Characteristics of Junction Diodes · Modelling the Diode Forward Characteristic · Zener Diodes · Rectifier Circuits · Limiting and Clamping Circuits · Special Diode Types		
5	MOS Field Effect Transistors	4	8
	Introduction · Physical Implementation · Current-Voltage Characteristics · Under DC Operation · Body Effect and Other Topics		
6	Bipolar Junction Transistors	4	8
	Physical Implementation · Current-Voltage Characteristics · Under DC Operation · Breakdown and Temperature Effects		
7	Transistor Amplifiers	4	8
	Fundamentals · Small-Signal Operation and Models · Basic Configurations · Biasing · Discrete-Circuit Amplifiers		
8	**Sum**	28	56
	Final Exam		

- Any major announcements will be made on SAKAI regarding any possible date/content/structural changes for the assignment(s), exam(s).
- Any lecture material will be posted at the lectures corresponding GitHub home-page. The link will be present on the lectures SAKAI homepage.
- If there are any questions regarding course content/exams/assignments please do not refrain from contacting me (Daniel.McGuiness@mci.edu).