Institute of Cyber-physical Systems						
Name of the subject:	Code of the subject:	Credits:	Weekly hours:			
				lec	sem	lab
Electronics Basic	NKXEAIEBNF	5	full-time	2	0	1
Responsible person for the subject: Dr. Mehdi Taassori			Classification:			
Subject lecturer(s):						
Prerequisites:	Physics		KTXFI1EBNF			
Way of the assessment:	Exam					

Course description	
Goal:	The goal of this course is to provide students with a solid understanding of electrical circuit analysis, covering both DC and AC circuits. Students will develop the skills necessary to analyze and solve circuits using fundamental analysis techniques and network theorems.
Course description:	This course covers the fundamentals of electrical circuit analysis, focusing on resistive, capacitive, and inductive components. Key topics include circuit analysis techniques, network theorems, and both DC and AC circuit analysis. Students will gain the foundational knowledge needed to analyze and solve real-world electrical circuits.

Lecture schedule	
Education week	Topic
1.	Introduction, Systems of Units, Charge and Current, Voltage, Power and Energy,
2.	Circuit Elements, Resistance, Conductance, Ohm's Law
3.	Nodes, Branches, and Loops, Kirchhoff's Laws
4.	Series Resistors and Voltage Division
5.	Parallel Resistors and Current Division, Wye-Delta Transformations
6.	Nodal Analysis, Nodal Analysis with Voltage Sources
7.	Mesh Analysis, Mesh Analysis with Current Sources
8.	Linearity Property, Superposition, Source Transformation
9.	Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer
10.	Capacitors, Energy Storage in Capacitors
11.	Series and Parallel Capacitors
12.	Inductors, Energy Storage in Inductors, Series and Parallel Inductors
13.	Sinusoids, Phasors, Phasor Relationships for Circuit Elements – Lab Exam
14.	Impedance and Admittance, Impedance Combinations, Sinusoidal Steady-State Analysis – Retake Lab Exam

Mid-term requirements	
Conditions for obtaining a mid-term grade/signature	Lab, Homeworks A minimum of 51% must be achieved in each part to receive a signature.

Type of the replacement	
Type of the replacement of written test/mid-term grade/signature	The signature retake exam is exclusively available to students whose average grade across lab and homeworks is less than 51%.

Type of the exam (to be filled out only for subjects with exams)
Written and multiple-choice exam

Calculation of the exam mark (to be filled only for subjects with exams)	
• Homework 10 % • Lab 15% • Exam 75% • The submission of homework by the designated deadline is mandatory for all students. • Attendance for lab sessions, lab exam, and the exam is mandatory. • Note that each session of the lab is graded, and attendance will be part of your lab grade. • Students who fail to attend lab sessions and exceed the allowed absence limit will be banned from the course. • A minimum of 51% must be achieved in each exam to pass.	
Final grade calculation methods:	
0-50 points - Fail 51-69 points - Pass 70-79 points – Satisfactory 80-89 points - Good 90-100 points – Excellent	
References	
Obligatory:	Charles K. Alexander and Matthew N.O. Sadiku, Fundamentals of Electric Circuits (Fifth Edition), New York: McGraw-Hill.