BMD103 - Direct Current Circuit Analysis - Meslek Yüksekokulu - Elektronik ve Otomasyon Bölümü

General Info

Objectives of the Course

To provide the ability to analyze direct current circuits using basic theorems and circuit solution methods in electrical and electronics science.

Course Contents

Current-voltage concepts, dc circuit elements, ohm and kichhoff's laws, power and energy, circuit models, circuit analysis methods, circuit theorems, storage elements in direct current and transient analysis.

Recommended or Required Reading

Karakoç, T. (2019). Direct Current Circuit Analysis. Ankara: Seçkin Publishing House/Projection device and experiment sets/Yagimli, M. Akar, F. (2004). Direct Current Circuits and Problem Solutions. Istanbul Beta Printing Publishing Distribution Inc.

Planned Learning Activities and Teaching Methods

Lecture, question-answer, problem solving, experiment, demonstration, group work, homework

Recommended Optional Programme Components

Doing the assigned homework on time, doing it again after class, preparing for the relevant topic before class, and not being absent.

Instructor's Assistants

Lecturer Rıdvan CANBAZ

Presentation Of Course

Face to face

Dersi Veren Öğretim Elemanları

Inst. Rıdvan Canbaz

Program Outcomes

1. Explain basic circuit elements and their properties.
2. Be able to analyze circuits using the Basic Laws.
3. Can do to perform circuit analysis by using node tension method.
4. Be able to perform circuit analysis using circuit theorems.
5. Perform transient analysis of energy storage elements in direct current.

Weekly Contents

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
1	Textbook: Pages 21–46; Pre-study within the scope of LO1	Identify resistor values through color codes and verify them using a measuring device	Lecture, question–answer, problem solving, demonstration, experiment	Explain basic circuit concepts and analyze the voltage–current relationship using Ohm’s Law	Measure resistors and demonstrate the validity of Ohm’s Law on the circuit
2	Textbook: Pages 46–66; Preparation within the scope of LO1 and LO2	Perform power and energy measurement applications and conduct verification studies in circuits	Lecture, question–answer, problem solving, demonstration, practice	Defining circuit elements, explaining power and energy concepts, applying basic current–voltage laws in circuit analysis	Reinforcing concepts through power–energy measurements and solving sample problems
3	Textbook: Pages 73–87; Preparation within the scope of LO2	Verification of circuit analyses through sample problem solving	Lecture, question–answer, problem solving	Analyzing series, parallel, and mixed connected circuits using basic laws	Solving sample problems in series, parallel, and mixed connected circuits
4	Textbook: Pages 88–108; Preparation within the scope of LO2	Applying series–parallel circuit analyses through sample problem solving	Lecture, question–answer, problem solving	Examining analysis methods of series, parallel, and mixed connected circuits using basic laws	Conducting problem-solving exercises in series, parallel, and mixed connected circuits
5	Textbook: Pages 117–138; Preparation within the scope of LO2 and LO3	Solving sample problems related to source transformation and the mesh current method	Lecture, question–answer, problem solving	Application of source transformation in circuit analysis and examination of the mesh current method	Carrying out problem-solving practices based on source transformation and the mesh current method in circuits
6	Textbook: Pages 139–144; Preparation within the scope of LO2 and LO3	Solving sample problems related to the node analysis method	Lecture, question–answer, problem solving	Application of node analysis in circuit solving and methodological examination	Carrying out circuit solving practices using the node analysis method

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
7	Textbook: Pages 145–150; Preparation within the scope of LO2 and LO3	Performing sample problem solving using the node analysis method	Lecture, question–answer, problem solving	Advanced applications of node analysis and its use in circuit solving	Carrying out problem-solving practices in different circuit types using the node analysis method
8	Review the textbook topics covered up to this week			Midterm Exam	
9	Textbook: Pages 157–164; Preparation within the scope of LO2, LO3, and LO4	Demonstrating circuit solutions using the superposition theorem through sample problems	Lecture, question–answer, problem solving	Application of the superposition theorem in circuit analysis	Performing circuit problem-solving practices using the superposition theorem
10	Textbook: Pages 165–179; Preparation within the scope of LO2, LO3, and LO4	Demonstrating circuit solutions using Thevenin's theorem through sample problems	Lecture, question–answer, problem solving	Application of Thevenin's theorem in circuit analysis	Performing circuit problem-solving practices using Thevenin's theorem
11	Textbook: Pages 180–199; Preparation within the scope of LO2, LO3, and LO4	Solving sample problems related to Norton's theorem and the maximum power transfer theorem	Lecture, question–answer, problem solving	Application of Norton's theorem and the maximum power transfer theorem in circuit analysis	Carrying out circuit problem-solving practices using Norton's theorem and the maximum power transfer theorem
12	Textbook: Pages 207–224; Preparation within the scope of LO1 and LO5	Conducting capacitor experiments to observe their effects on the circuit	Lecture, question–answer, problem solving, experiment	Examination of capacitor behavior in direct current circuits	Solving problems and performing experimental verification with capacitors in DC circuits
13	Textbook: Pages 225–235; Preparation within the scope of LO1 and LO5	Conducting inductor experiments to observe their effects on the circuit	Lecture, question–answer, problem solving, demonstration, experiment	Examination of inductor behavior in direct current circuits	Solving problems and performing experimental verification with inductors in DC circuits
14	Textbook: Pages 243–285; Preparation within the scope of LO2, LO4, and LO5	Demonstrating transient behavior in RL and RLC circuits through sample problem solving	Lecture, question–answer, problem solving	Examination of transient analysis of RL and RLC circuits in direct current	Carrying out problem-solving practices by performing transient analysis in RL and RLC circuits
15	Textbook: Pages 285–290; Preparation within the scope of LO2, LO4, and LO5	Demonstrating RL and RLC circuits with DC input through sample problem solving	Lecture, question–answer, problem solving	Examination of the analysis of RL and RLC circuits with DC input	Carrying out problem-solving practices in RL and RLC circuits with DC input

Workload

Activities	Number	PLEASE SELECT TWO DISTINCT LANGUAGES
Vize	1	1,00
Final	1	1,00
Ara Sınav Hazırlık	3	5,00
Final Sınavı Hazırlık	3	5,00
Uygulama / Pratik	14	1,00
Teorik Ders Anlatım	14	3,00
Ders Öncesi Bireysel Çalışma	14	1,00
Ödev	9	2,00

Assesments

Activities	Weight (%)
Ara Sınav	40,00
Final	60,00

Elektronik ve Otomasyon Bölümü / BİYOMEDİKAL CİHAZ TEKNOLOJİSİ X Learning Outcome Relation

	P.O. 1	P.O. 2	P.O. 3	P.O. 4	P.O. 5	P.O. 6	P.O. 7	P.O. 8	P.O. 9	P.O. 10	P.O. 11	P.O. 12	P.O. 13	P.O. 14
L.O. 1	5	2	1	3	3							2	1	2
L.O. 2	5	1	1	4	4							2	1	2
L.O. 3	5	1	2	4	4		2					1	1	2
L.O. 4	5	1	2	5	4		1					1	1	2
L.O. 5	5	1	2	4	4		1					1	1	2

Table :

P.O. 1 : Mesleği ile ilgili temel, güncel ve uygulamalı bilgilere sahip olur.

P.O. 2 : Mesleği için güncel gelişmeleri ve uygulamaları takip eder, etkin şekilde kullanır.

P.O. 3 : Mesleği ile ilgili bilişim teknolojilerini (yazılım, program, animasyon vb.) etkin kullanır.

P.O. 4 : Mesleki problemleri ve konuları bağımsız olarak analitik ve eleştirel bir yaklaşımla değerlendirme ve çözüm önerisini sunabilme becerisine sahiptir.

P.O. 5 : Mesleki problemleri ve konuları bağımsız olarak analitik ve eleştirel bir yaklaşımla değerlendirme ve çözüm önerisini sunabilme becerisine sahiptir.

P.O. 6 : Bilgi ve beceriler düzeyinde düşüncelerini yazılı ve sözlü iletişim yolu ile etkin biçimde sunabilir, anlaşılır biçimde ifade eder.

P.O. 7 : Alanı ile ilgili uygulamalarda karşılaşılan ve öngörülemeyen karmaşık sorunları çözmek için ekip üyesi olarak sorumluluk alır.

P.O. 8 : Kariyer yönetimi ve yaşam boyu öğrenme konularında farkındalığa sahiptir.

P.O. 9 : Alanı ile ilgili verilerin toplanması, uygulanması ve sonuçlarının duyurulması aşamalarında toplumsal, bilimsel, kültürel ve etik değerlere sahiptir.

P.O. 10 : Bir yabancı dili kullanarak alanındaki bilgileri takip eder ve meslektaşları ile iletişim kurar.

P.O. 11 : Biyomedikal cihazların çalışma prensiplerini açıklar, tasarımını ve montajını yapar.

P.O. 12 : Biyomedikal cihazlarda meydana gelebilecek arızaları tespit eder ve arızaları giderir.

P.O. 13 : Tıbbi cihazlar için yazılım ve kontrol sistemleri geliştirir.

P.O. 14 : Biyomedikal sensörler ve ölçüm sistemleri konusunda bilgi sahibi olur ve uygulamalar geliştirir.

L.O. 1 : Temel devre elemanlarını ve özelliklerini açıklayablir.

L.O. 2 : Temel Kanunları kullanarak devre analizini yapabilir.

L.O. 3 : Klasik devre çözüm yöntemlerini kullanarak devre analizini gerçekleştirebilir.

L.O. 4 : Devre teoremlerini kullanarak devre analizini gerçekleştirebilir.

L.O. 5 : Doğru akımda enerji depolama elemanlarının geçici rejim analizini yapabilir.