BMD105 - BASIC ELECTRONICS - Meslek Yüksekokulu - Elektronik ve Otomasyon Bölümü

General Info

Objectives of the Course

Teaching semiconductor materials and their properties. Comprehending structure, types, properties and operating principles of semiconductor circuit devices. Achieving the ability of analyzing the circuits which have semiconductor circuit devices.

Course Contents

Semiconductor materials and their properties; definition, structure, and types of diodes; AC and DC analysis of diodes; rectifiers, clippers, and clampers; definition, structure, and types of transistors; DC analysis of BJT transistors; use of BJT transistors as switching and amplifier elements; structure of operational amplifiers and their operation as amplifiers and adders.

Recommended or Required Reading

Yrd. Doç. Dr. Hüseyin Demirel (2010) Temel Elektrik Elektronik. Birsen Yayınevi

 Yrd. Doç. Dr. Hüseyin Demirel (2012) Elektronik Devre Elemanları ve Elektronik Devreler. Birsen Yayınevi

 Bilgisayar, projeksiyon cihazı, Temel Elektronik Deney Setleri

Planned Learning Activities and Teaching Methods

Narration, Problem solving, Application

Recommended Optional Programme Components

Haftalık Ders Notlarına Linkten Ulaşabilirsiniz:

Instructor's Assistants

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Presentation Of Course

The theoretical part of the course is taught in the classroom, while the practical part is carried out in the electronics laboratory using basic electronic circuit kits with measuring instruments and an oscilloscope.

Dersi Veren Öğretim Elemanları

Inst. Rıdvan Canbaz

Program Outcomes

1. Knows electronic circuit components and can define their characteristics.
2. By understanding the definition, structure, and types of diodes, the student can perform AC and DC analyses and apply rectifier, clipper, and clamper circuits.
3. Can explain the definition, structure, and types of transistors and perform switching and amplification circuit applications.
4. Understands the structure and characteristics of operational amplifiers and applies them in amplifier and summing circuits.

Weekly Contents

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
1	Basic Electrical and Electronics Textbook pp. 12–103 Learning Outcome: LO1	Voltage, current, and power measurements are performed in electrical circuits.	Lecture, Problem solving, Practice	Basic concepts and introduction to electrical circuits	Measurements are performed on basic electronic training sets in the electronics laboratory.
2	Basic Electrical and Electronics pp.104–143 — LO1	Students measure the values of resistors, capacitors, and inductors.	Lecture, Problem solving, Practice	Resistors, capacitors, and inductors	Students identify circuit components using measuring instruments.
3	Electronic Circuit Elements and Circuits pp.2–12 — LO1, LO2, LO3	Students identify semiconductor materials and demonstrate their basic properties.	Lecture, Problem solving, Practice	Semiconductor materials and their properties	Students examine the behavior of semiconductors using training sets
4	Electronic Circuit Elements and Circuits pp.14–37 — LO2	Students measure different types of diodes and read their label values.	Lecture, Problem solving, Practice	Definition, structure, and types of diodes	Students apply diode circuits in training sets and evaluate the results.
5	Electronic Circuit Elements and Circuits pp.42–88 — LO2	Students measure the operating values of diode circuits.	Lecture, Problem solving, Practice	AC and DC analysis of diodes, rectifier, clipper, and clamper circuits	Students construct rectifier circuits and analyze their outputs.
6	Electronic Circuit Elements and Circuits pp.96–155 — LO3	Students identify transistor terminals and perform continuity tests.	Lecture, Problem solving, Practice	Definition, structure, and types of transistors	Students examine different types of transistors using training sets.
7	Electronic Circuit Elements and Circuits pp.96–155 — LO3	Students identify transistor terminals and perform continuity tests.	Lecture, Problem solving, Practice	Definition, structure, and types of transistors (review and reinforcement)	Students implement transistors in circuits and evaluate their operating states.
8	Lecture notes and contents of Weeks 1–7 — LO1, LO2, LO3			Midterm Exam	
9	Electronic Circuit Elements and Circuits pp.164–201 — LO3	Students perform DC analysis of BJT transistors and carry out measurements.	Lecture, Problem solving, Practice	DC analysis of BJT transistors, their use as amplifiers and switching elements	Students apply BJT transistors as amplifiers and switching elements in training sets.
10	Electronic Circuit Elements and Circuits pp.164–201 — LO3	Students connect BJT transistors in circuits and perform amplifier and switching applications.	Lecture, Problem solving, Practice	DC analysis of BJT transistors, their use as amplifiers and switching elements (continued)	Students measure the outputs of BJT circuits in training sets and evaluate the results.
11	Electronic Circuit Elements and Circuits pp.224–261 — LO3	Students examine the packages of JFETs and MOSFETs and perform measurements.	Lecture, Problem solving, Practice	Use of JFET and MOSFET as switching and amplifier elements	Students apply JFET and MOSFET as amplifiers and switching elements in training sets.
12	Electronic Circuit Elements and Circuits pp.302–310 — LO4	Students examine the packages of operational amplifiers and make the necessary pin connections.	Lecture, Problem solving, Practice	Structure and characteristics of operational amplifiers	Students implement the basic connections of operational amplifiers in the training set.
13	Electronic Circuit Elements and Circuits pp.302–310 — LO4	Students make the pin connections of operational amplifiers and examine their operating principle.	Lecture, Problem solving, Practice	Structure and characteristics of operational amplifiers (continued)	Students construct operational amplifier circuits and perform measurements.
14	Electronic Circuit Elements and Circuits pp.312–341 — LO4	Students construct basic operational amplifier circuits and examine their operating principles.	Lecture, Problem solving, Practice	Basic operational amplifier circuits	Students perform basic op-amp applications in the training set.
15	Electronic Circuit Elements and Circuits pp.312–341 — LO4	Students construct operational amplifier circuits and measure their outputs.	Lecture, Problem solving, Practice	Basic operational amplifier circuits (continued)	Students evaluate the performance of operational amplifier circuits in the training set.

Workload

Activities	Number	PLEASE SELECT TWO DISTINCT LANGUAGES
Teorik Ders Anlatım	14	3,00
Uygulama / Pratik	14	1,00
Derse Katılım	14	1,00
Laboratuvar	14	1,00
Ders Öncesi Bireysel Çalışma	14	1,00
Ders Sonrası Bireysel Çalışma	14	1,00
Ara Sınav Hazırlık	3	1,00
Final Sınavı Hazırlık	3	1,00
Vize	1	1,00
Final	1	1,00

Assesments

Activities	Weight (%)
Vize	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		2	1		1					3		2
L.O. 2	4	2		2	1		1					3		2
L.O. 3	4	2		2	2		1					4		3
L.O. 4	3	2		2	1		1					4		3

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 : Elektronik devre elemanlarını bilir ve özelliklerini tanımlayabilir.

L.O. 2 : Diyotların tanımı, yapısı ve çeşitlerini kavrayarak AC ve DC analizlerini yapabilir, doğrultmaç, kırpıcı ve kenetleme devrelerini uygulayabilir.

L.O. 3 : Transistörün tanımı, yapısı ve çeşitlerini açıklayarak anahtarlama ve yükseltme devre uygulamalarını gerçekleştirebilir.

L.O. 4 : İşlemsel yükselteçlerin yapısını ve özelliklerini kavrayarak yükseltici ve toplayıcı devre uygulamalarını gerçekleştirebilir.