| Course Information | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Code** | **T** | **P** | **L** | **C** | **ECTS** | **Type** C/E | **Language** TR/ENG etc. | **Year/Semester** |
| FİZ3023 | **3** | **0** | **0** | **3** | **5** | **E** | **TR** | **3/FALL** |
| **Course Name (**Turkish**)** | **Elektronik Devre Uygulamaları** | | | | | | | |
| **Course Name (**English**)** | **Electronic Circuit Applications** | | | | | | | |

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| **Unit/Program** | Physics Department/Undergraduate Program |
| **Course Prerequisite** | No |
| **Course Objectives** | To provide an understanding of the fundamentals of electronic circuits and elements in order to provide an understanding of experimental physics and electronic techniques used in modern instruments |
| **Course Outline** | Introduction to Digital Electronics, Fundamentals of Digital Logic, Boolean Algebra Theorems and Circuit Design, Circuit Reduction<br>Methods, Binary System Codes, Counter Circuits, Memory |
| **Textbook/ Material / Resources** | 1. Electronic Devices and Circuit Theory, Robert Boylestad and Louis Nashelsky,<br>2. Electronics, Allan R. Hambley, Second edition,<br>3. A practical introduction to electronic circuits, Martin Hartley Jones, Third edition. |
| **Internship Status** | No |

**Course Precedents**

| **University Name** | **Program Name** | **Course Name** | **T-P-L-C; ECTS** | **Type** |
|---|---|---|---|---|
| **Gazi University** | **Electrical-Electronic** | **Electronics-II** | **3-3-0-3; 5** | **C** |
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| **The instructor who proposed the course (** Title, Name and Surname) | *Signature* |
| | |
| **Instructors who can teach the course** (Title, Name and Surname) | *Signature* |
| | |
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**Academic justification for the opening of the course?** (The effect of course outcomes on program outcomes, etc.)

**Brief explanation of the course** (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)

Face-to-face courses will be taught under the supervision of the relevant faculty member.

**External Stakeholder Opinions About** the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)

| **Stakeholder Name** | **Opinion** (It should be given as a summary, it should not exceed two lines.) |
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| Weekly Course Content Distribution | | |
|---|---|---|
| **Week** | **Theory** | **Application/Laboratory** |
| **1** | History of Digital Electronics, Number, Logic Levels Definition, Binary Number Systems, Digital Integrated Circuits | |
| **2** | Definitions of Logic Gates, AND Function, OR Function, Not Function, True and False Notations | |
| **3** | How to Use Logic Gates, Using and Understanding Time Diagrams, NAND and NOR Functions, Enable and Disable Operations, Exclusive OR Function | |
| **4** | Fundamentals of Boolean Algebra, Application of Boolean Theorems, DeMorgan's Theorems | |
| **5** | Circuit Designs, FS and SOP Methods, FS and POS Methods, Ignoring Method, NAND-NAND and NOR-NOR Networks | |
| **6** | Karnaugh Map, K-Map, Don't Care Levels and Their Use, Quine-McCluskey Reduction Method, Computer Simulation | |
| **7** | Addition, Subtraction, Division and Multiplication, Circuit Reductions with Ignoring Mathematical Methods in Binary System | |
| **8** | Signed Numbers, Addition Circuits, Using Adders, Arithmetic Logic Units (ALU) | |
| **9** | Midterm Exam | |
| **10** | The Nature of Binary System Codes, Practical Addition Circuits, Errors in Binary Systems | |
| **11** | Introduction to Filip-Flops, Filip-Flop Basic Circuits, Closed Latch, D-Latch and Flip-Flop, J-K Filip-Flop, Flip-Flop Variables, | |
| **12** | Flip-Flop Properties, Problems Affecting Flip-Flop Circuit Designs, Timer Circuits | |
| **13** | Digital Counters, Non-Syncrenized Counters, Non-Syncrenized Counter Application Areas, Synchronized Counters, Synchronized Counter Application Areas,<br>Shift Registers, Shift Register Applications | |
| **14** | Three-Step Tools, Memory Classifications, Memory Terminology, RAM Tools, ROM, Expansion of Memory Systems, Testing of Memories | |
| **15** | Final Exam | |
| **16** | | |

| Assessment | | | |
|---|---|---|---|
| **Evaluation Criteria** | **Activity** | **Custom** | **Contribution to Success Grade (%)** |
| | Midterm Exams | 1 | 40 |
| | Quizzes | | |
| | Assignments | | |
| | Projects | | |
| | Term Paper | | |
| | Laboratory | | |
| | Other | | |
| | Final Exam | 1 | 60 |
| | | **Sum:** | 100 |
| **Remarks** | | | |

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| **Content Design and Subject Weight (%)** | Mathematics and Basic Sciences | 60 |
| | Engineering Sciences | 40 |
| | Social Sciences | |
| | Health Sciences | |
| | Educational Sciences | |
| | Culture and Art Sciences | |

| | Design Information | |
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| Workload (ECTS) Calculation | | | |
|---|---|---|---|
| **Events** | **Number** | **Duration (Hours)** | **Total workload (Hours)** |
| Fieldwork | | | |
| Midterm Exam Application | 1 | 2 | 2 |
| Self-Study (including pre-class and exam preparation) | 14 | 2 | 28 |
| Make-up Exam | 1 | 2 | 2 |
| Experiment and Observation | | | |
| Class Participation (Theory) | 14 | 3 | 42 |
| Homework | | | |
| Final Exam Practice | 1 | 2 | 2 |
| Laboratory | | | |
| Article Review | | | |
| Writing an Article | | | |
| Reading | | | |
| Case Study | | | |
| Performance | | | |
| Problem Solution | | | |
| Project Preparation | | | |
| Project Submission | | | |
| Quiz | | | |
| Report Preparation | | | |
| Submitting Reports | | | |
| Role/Drama Work | | | |
| Seminar | | | |
| Oral Exam | | | |
| Team/Group Work | 12 | 3 | 36 |
| Argument | 14 | 1 | 14 |
| Application/Practice | | | |
| Other | | | |
| **TOTAL WORKLOAD:** | | | **126** |
| **ECTS CREDİTS OF THE COURSE:** *(The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)* | | | **5** |

| **Learning Outcomes (LO)** *(Course Outcomes)* / **Program Outcomes (PO)** | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | To be able to define the basic concepts of electronic circuits and elements | **5** | **5** | **5** | **4** | **3** | **3** | **4** | **5** | **5** | **3** | **3** |
| **2** | To be able to define electrical variables, relations between them, electrical circuit elements and electrical circuits | **5** | **5** | **5** | **4** | **3** | **3** | **4** | **5** | **5** | **3** | **3** |
| **3** | To be able to apply circuit theorems in complex circuit systems | **5** | **5** | **5** | **4** | **3** | **3** | **4** | **5** | **5** | **3** | **3** |

**Organizer:** Prof. Dr. Fethi DAĞDELEN
**Preparation Date:** 20.05.2024