Меѓународен Универзитет Визион - International Vision University
Universiteti Ndërkombëtar Vizion - Uluslararası Vizyon Üniversitesi

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## SYLLABUS

| COURSE NAME | COURSE CODE | SEMESTER | COURSE LOAD | ECTS |
|---|---|---|---|---|
| **DIGITAL CIRCUIT DESIGN** | **CEN-1004** | 1 | 150 | 5 |

| Prerequisite(s) | None |
|---|---|

| Course Language | Macedonian, Turkish, English |
|---|---|
| Course Type | Required |
| Course Level | First Cycle |
| Course Lecturer | |
| Course Assistants | |
| Classroom | |
| Extra-Curricular Office Hours and Location | |

| **Course Objectives** | Recognize, convert and learn to use number systems. To be able to simplify logic gate circuits and construct a logic circuit with the help of bool algebra, Karnaugh and Quine–McCluskey algorithm. To know digital logic elements properties and usage. |
|---|---|
| **Course Learning Outcomes** | Recognizing the types and usage areas of number systems, number conversions, BDC, OCT, BIN and HEX, ASCII codes of International coding and using them in programming. Simplifying the Bool Algebra rules of abstract mathematics with the help of De Morgan's Theorem Simplifying logical functions with the help of Karnough Maps and the Quine–McCluskey algorithm. Converting logical functions into logical circuits. Being able to recognize and use Flip-Flops in accordance with the purposes, to design the circuit |
| **Course Contents** | Number systems and transformations, binary number system and operations, expression of numbers, error detection and correction methods, Bool algebra, Hamming codes and distance, performing mathematical expressions with the help of logical gates, simplification of logical expressions, Karno maps and their application, Quine–McCluskey algorithm, Odd and even complement operations, Multiplexers and demultiplexers, Flip-Flops, digital circuit analysis and synthesis. Moor and Mili automata. Information about registers and counters will be given and practical application will be made. |

**WEEKLY SUBJECTS AND RELATED PREPARATION STUDIES**

| Week | Subjects | Related Preparation |
|------|----------|---------------------|
| 1 | Number systems and conversions | Related Chapters of Course Sources |
| 2 | BIN, OCT, BCD and HEX number systems and operations | Related Chapters of Course Sources |
| 3 | Errors in data transmission. Error detection and correction techniques. Hamming Coding | Related Chapters of Course Sources |
| 4 | Bool algebra, its fundamental rules and DeMorgan's Theorem | Related Chapters of Course Sources |
| 5 | Karno maps and their application. Circuit design using Karnaugh maps. | Related Chapters of Course Sources |
| 6 | Logic gate circuit design with logical function gates | Related Chapters of Course Sources |
| 7 | Midterm | Related Chapters of Course Sources |
| 8 | Quine–McCluskey algorithm | Related Chapters of Course Sources |
| 9 | Odd and even complement operations | Related Chapters of Course Sources |
| 10 | Flip-Flops | Related Chapters of Course Sources |
| 11 | Digital circuit analysis and synthesis. | Related Chapters of Course Sources |
| 12 | Registers, structure and use | Related Chapters of Course Sources |
| 13 | Moor and Mili vending machines | Related Chapters of Course Sources |
| 14 | Johnson counter | Related Chapters of Course Sources |
| 15 | Final Exam | Related Chapters of Course Sources |

## ECTS / WORKLOAD TABLE

| | | | |
|---|---|---|---|
| Presentation / Seminar | | | |
| Hours for off-the-classroom study (Pre-study, practice) | 14 | 3 | 42 |
| Midterm Exam | 1 | 12 | 12 |
| Final examination | 1 | 14 | 14 |
| Total Work Load | | | |
| ECTS | **5** | | |

## GENERAL PRINCIPLE RELATED WITH COURSE

Dear Students,
In order to be included in the lesson, learn the lesson fully and achieve the success you deserve, you must come to each lesson prepared by reading the sections related to the subjects to be covered from the basic and supplementary textbooks. We expect you to meticulously comply with the lesson hours, not to interrupt the lessons unless it is absolutely necessary, to participate actively in the lesson, to communicate fully with your teacher and classmates, and to be active by participating in the discussions in the class. Unethical behaviors that may occur both in classes and in exams will be acted upon within the framework of the relevant regulation. Attendance will be taken at the time your teacher requests, at the beginning, middle or end of each lesson. Students who attend all classes during the semester will be given a 15-point attendance grade in addition to the exam grade.

## SOURCES

| COMPULSORY LITERATURE | | |
|---|---|---|
| No | Name of the book | Author's Name, Publishing house, Publication Year |
| 1 | İnteraksiyon tasarımı | İarp Roger Pirs (2010), Ars Lamina |
| 2 | Dijital mantık Devrelerinin Tasarımı | Orhan Gazi (2012), Seçkin Yayıncılık |
| 3 | Digital Logic Design Principles | Norman Balahanian(2000), Wiley |

| ADDITIONAL LITERATURE | | |
|---|---|---|
| No | Name of the book | Author's Name, Publishing house, Publication Year |
| 1 | Logic Design Principles | Edward J.McCluskey(1986), Prentice Hall |
| 2 | Digital design, 5-th edition | Morris Mano(2013), Pearson |
| 3 | | |

**EVALUATION SYSTEM**

| Underlying the Assessment Studies | NUMBER | PERCENTAGE OF GRADE |
|---|---|---|
| Attendance/Participation | 15 | %10 |
| Project / Event | 1 | %20 |
| Mid-Term Exam | 1 | %35 |
| Final Exam | 1 | %35 |
| **TOTAL** | **17** | **%100** |

**ETHICAL CODE OF THE UNIVERSITY**

In case students are cheating on exams or preparation the same, it is not making reference to the source to be used in studies, as for example in assignments, projects and presentation (plagiarism), in accordance with legislations by Ministry of Education and Science of the Republic of North Macedonia and İnternational Vision University, apply relevant disciplinary rules. İnternational Vision University students are expected never attempts in this kind of behavior.