*Recommended template: “Course Description, Syllabus, Course Requirements”*

# course syllabus and course requirements 2023/2024 academic year, spring semester

| ***Course title*** | Digital Logic Design 4. |
| --- | --- |
| ***Course Code*** | IVB037ANVM |
| ***Hours/Week: le/pr/lab*** | 2/1/0 |
| ***Credits*** | 4 |
| ***Degree Programme*** | Electrical Engineering BSc |
| ***Study Mode*** | full time |
| ***Requirements*** | exam |
| ***Teaching Period*** | spring |
| ***Prerequisites*** | IVB034 Digital Logic Design 2. |
| ***Department(s)*** | Department of Automation |
| ***Course Director*** | Kisander Zsolt |
| ***Teaching Staff*** | Kisander Zsolt |
|  |  |

# course description

*A short description of the course (max. 10 sentences).*

*Neptun: Instruction/Subjects/Subject Details/Basic data/Subject description*

This subject provides an introduction to digital signal processing, with the necessary mathematical and programming background to start to develop engineering applications.

# syllabus

*Neptun: Instruction/Subjects/Subject Details/Syllabus*

## **goals and objectives**

*Goals, student learning outcome.*

*Neptun: Instruction/Subjects/Subject Details/Syllabus/Goal of Instruction*

Understanding Discrete Time Signals and Systems: The course aims to provide students with a thorough understanding of discrete time signals and systems, focusing on their properties, representations, and analysis techniques.

Application of Digital Logic Design Principles: It seeks to build upon the principles of digital logic design learned in previous courses, applying them to the design and implementation of discrete time systems using digital signal processing techniques.

Signal Processing Concepts: The course objectives include introducing students to key signal processing concepts such as discrete-time convolution, discrete Fourier transform, and digital filter design.

Practical Skills Development: Through hands-on projects and laboratory exercises, students will develop practical skills in designing, simulating, and implementing discrete time systems using software tools such as MATLAB or Simulink.

Critical Thinking and Problem Solving: Finally, the course aims to enhance students' critical thinking and problem-solving abilities by challenging them to analyze and optimize discrete time systems for various applications, including digital communication, audio processing, and control systems.

## **course content**

*Neptun: Instruction/Subjects/Subject Details/Syllabus/Subject content*

|  | **TOPICS** |
| --- | --- |
| **LECTURE** | 1. *Review of discrete-time signals and systems* 2. *Mathematical representations* 3. *Analog versus Digital comparison* 4. *z-transform, properties and application of z-transform* 5. *Sampling of continuous-time signals* 6. *Transform analysis of LTI systems* 7. *Structures for Discrete-time systems* 8. *Filter design techniques* 9. *Discrete Fourier Transform* 10. *Parametric signal modelling* |
| **PRACTICE** | *Practice topics follow lecture topics with calculation and programming examples.* |
| **LABORATORY PRACTICE** |  |

### **DETAILED SYLLABUS AND COURSE SCHEDULE**

### *academic holidays included*

| ***LECTURE*** | | | | |
| --- | --- | --- | --- | --- |
| *week* | **Topic** | **Compulsory reading; page number**  **(from … to …)** | **Required tasks (assignments, tests, etc.)** | **Completion date, due date** |
| *1.* | Orientation. Review of LTI signals and systems. |  |  |  |
| *2.* | Review of discrete-time signals and systems |  |  |  |
| *3.* | Mathematical representations |  |  |  |
| *4.* | Analog versus Digital comparison |  |  |  |
| *5.* | z-transform, properties and application of z-transform |  |  |  |
| *6.* | Sampling of continuous-time signals |  |  |  |
| *7.* | Transform analysis of LTI systems |  |  |  |
| *8.* | Structures for Discrete-time systems |  |  |  |
| *9.* | spring break |  |  |  |
| *10.* | Filter design techniques |  |  |  |
| *11.* | Discrete Fourier Transform |  |  |  |
| *12.* | Parametric signal modelling |  |  |  |
| *13.* | Mid-term retake and exam orientation |  |  |  |

## **assessment and evaluation**

*(Neptun: Instruction/Subjects/Subject Details/Syllabus/Examination and Evaluation System)*

##### **Attendance**

*In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.*

***Method for monitoring attendance*** *(e.g.: attendance sheet / online test/ register, etc.)*

attendance sheet

##### **assessment**

*Cells of the appropriate type of requirement is to be filled out (course-units resulting in mid-term grade or examination). Cells of the other type can be deleted.*

***Course-unit with final examination***

***Mid-term assessments, performance evaluation and their weighting as a pre-requisite for taking the final exam***

*(The samples in the table to be deleted.)*

| **Type** | **Assessment** | ***Weighting as a proportion of the pre-requisite for taking the exam*** |
| --- | --- | --- |
| 1. *Quiz questions and attendance* | *1 per week* | *100%* |
|  |  |  |
|  |  |  |
|  |  |  |

***Requirements for the end-of-semester signature***

(Eg.: mid-term assessment of 40%)

at least one correct quiz answer during the semester and attendance as per TVSz

***Re-takes for the end-of-semester signature*** (PTE TVSz 50§(2))

*The specific regulations for grade betterment and re-take must be read and applied according to the general Code of Studies and Examinations. E.g.: all the tests and the records to be submitted can be repeated/improved each at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.*

oral, one question per lecture topic on the last lecture or in the first week of the exam period

***Type of examination*** *(written, oral): oral*

***The exam is successful if the result is minimum 40 %.*** *(The minimum cannot exceed 40%.)*

***Calculation of the grade*** *(TVSz 47§ (3))*

The mid-term performance accounts for  ***50***  %, the performance at the exam accounts for  ***50***  % in the calculation of the final grade.

***Calculation of the final grade based on aggregate performance in percentage.***

| **Course grade** | **Performance in %** |
| --- | --- |
| excellent (5) | 85 % … |
| good (4) | 70 % ... 85 % |
| satisfactory (3) | 55 % ... 70 % |
| pass (2) | 40 % ... 55 % |
| fail (1) | below 40 % |

The lower limit given at each grade belongs to that grade.

## **Specified literature**

*In order of relevance. (In Neptun ES: Instruction/Subject/Subject details/Syllabus/Literature)*

##### **compulsory reading and availability**

[1.] Digital Signal Processing 4th ed., Dimitris Manolakis; John G Proakis, 2013.

[2.] Discrete-Time Signal Processing 3rd ed., Alan V. Oppenheim; Ronald W. Schafer, 2014.

##### **recommended literature and availability**

[3.] ……

[4.] ……

[5.] ……