

S1-DIG2

Class Planning



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Document history

Version	Date	Reviewer	Note/Changes
001	19-6-2023	WLGRW	Start of document for course 2025-2026
002	2-10-2025	WLGRW	Update links to video's, Update calendar dates, final release.
003	24-10-2025	WLGRW	Changed order of lab planning according to the assignment

Todo

Date	What	Impact	Status
23-01-2019	Copyright statement shall be verified to meet HAN regulations.	Low	Pending

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About this document

This document is using icons to indicate the priority or type of some information. The used icons are:



Attention: Important information about the topic that will have significant effect.



Learning objective: What we will learn.



Information: Additional information about the topic.



Further reading: There is more information available about this topic.



Suggestion: There is a suggestion on how to execute the activity.

Responsible disclosure

Students and lecturers are encouraged to send in their experiences, problems, errors, any other observation while using these lecture notes. Please send your feedback to one of the lecturers, so we can improve this paper. Thank you.

Copyright

This paper is part of the SOC course at Institute Engineering of HAN University of Applied Sciences HAN in Arnhem.

Calendar icon at first page: <https://kit8.net/freebies/business-icons-2/calendar-icon/>

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Disclaimer

The author of this paper reserves the right to apply changes at any time without prior notice. If any changes are made, the revised paper shall be posted immediately. Please check the latest information posted herein to inform yourself of any changes.

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1 Class content

1.1 Week overview

An overview of the class planning for DIG2 classes is in Table 1. A detailed study planning is followed by the week overview.

Table 1: Week overview

Week	Date	Content 2 nd ed.	Content 3 rd ed.	Weekly exam	Notes
1	10-11-2024	Chapter-1	Chapter-5	Enrolment to ANS	
2	17-11-2024	Chapter-2	Chapter-6	ANS exam WK2	
3	24-11-2024	Chapter-3	Chapter-7(6)	ANS exam WK3	
4	1-12-2024	Chapter-3	Chapter-7(6)	ANS exam WK4	
5	8-12-2024	Chapter-4	Chapter-9	ANS exam WK5	
6	15-12-2024	Chapter-5	Chapter-10	ANS exam WK6	Schedule of oral assessment in week 9
	22-12-2024				Christmas holidays
	29-12-2024				Christmas holidays
7	5-1-2025	Chapter-6	Chapter-12	ANS exam WK7	
8	12-1-2025	Submission of assignment (code and product document) in Handin			Exam week P2
9	19-1-2025	Oral assessments			Exam week P2

1.2 Weekly planning

The week planning is provided for both DIG2-V and DIG2-LAB-V classes.

1.2.1 Theory classes DIG2-V



At “slides” in the week planning, the name of the file is mentioned that can be downloaded from Onderwijs Online.



VHDL projects and code examples may be made available at Gitlab in the following repository: <https://gitlab.com/wlgrw/han-soc-examples>

Week 1: Introduction to VHDL

Book Section 2nd edition	Chapter 1: Introduction. About VHDL, VHDL Versions, Design Flow, EDA Tools, Translation of VHDL Code into a Circuit, Circuit Simulation, VHDL Syntax, Number and Character Representations in VHDL
Book Section 3rd edition	See translation table in attachment of the class manual.
Video:	No video to watch. Slides: INFT1-LC2-wk01-v17.00.pdf
Slides used in class:	<i>Can be downloaded from Onderwijs Online after class.</i>
Pre-class activities:	A Fresh start! Nothing to do in preparation to this class.
In-class activities:	<ul style="list-style-type: none">• Introduction to class, planning and learning objectives.• Introduction to VHDL
Post-class activities:	Review notes, ensure enrolment in ANS is correct.

Week 2: Code structure of VHDL.

Book Section 2nd edition	Chapter 2: Fundamental VHDL Units, VHDL Libraries and Packages, Library/Package Declarations, ENTITY, ARCHITECTURE, GENERIC, Coding Guidelines, VHDL 2008
Book Section 3rd edition	-
Video:	Watch: Video 1 and Video 2 Slides: INFT1-LC2-wk02-v17.00_annotated.pdf
Pre-class activities:	1. Make Example 2.3
In-class activities:	<ul style="list-style-type: none">• Presentation of highlights of theory• Questions on theory by students• Plenary solving a problem
Post-class activities:	Review notes and take week 2 exam at ANS

Week 3: Data types, part 1.

Book Section 2nd edition	Chapter 3: VHDL Objects, Data-Type Libraries and Packages, Type Classifications, Standard Data Types, Standard-Logic Data Types, Unsigned and Signed Data Types, Fixed- and Floating-Point Types, Predefined Data Types Summary, User-Defined Scalar Types, User-Defined Array Types, Integer versus Enumerated Indexing, Array Slicing, Records, Subtypes, Specifying PORT Arrays, Qualified Types and Overloading, Type Conversion, Legal versus Illegal Assignments, ACCESS Types, FILE Types
Book Section 3rd edition	See translation table in attachment of the class manual.
Video:	Watch: Video 1 and video 2 Slides: INFT1-LC2-wk03-v17.00 annotated.pdf
Pre-class activities:	1. Make Example 3.1 2. Make Example 3.2
In-class activities:	<ul style="list-style-type: none"> • Presentation of highlights of theory • Questions on theory by students • Plenary solving a problem
Post-class activities:	Review notes and take week 3 exam at ANS

Week 4: Data types, part 2.

Book Section 2nd edition	Chapter 3: VHDL Objects, Data-Type Libraries and Packages, Type Classifications, Standard Data Types, Standard-Logic Data Types, Unsigned and Signed Data Types, Fixed- and Floating-Point Types, Predefined Data Types Summary, User-Defined Scalar Types, User-Defined Array Types, Integer versus Enumerated Indexing, Array Slicing, Records, Subtypes, Specifying PORT Arrays, Qualified Types and Overloading, Type Conversion, Legal versus Illegal Assignments, ACCESS Types, FILE Types
Book Section 3rd edition	See translation table in attachment of the class manual.
Video:	Watch: Video 1 and Video 2 Slides: INFT1-LC2-wk04-v17.00 annotated.pdf
Pre-class activities:	1. Make Example 3.9
In-class activities:	<ul style="list-style-type: none"> • Presentation of highlights of theory • Questions on theory by students • Plenary solving a problem
Post-class activities:	Review notes and take week 4 exam at ANS

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Week 5: Operators and attributes.

Book Section 2nd edition	Chapter 4: Predefined Operators, Overloaded and User-Defined Operators, Predefined Attributes, User-Defined Attributes, Synthesis Attributes, GROUP, ALIAS
Book Section 3rd edition	See translation table in attachment of the class manual.
Video:	Watch: Video 1 and Video 2 Slides: INFT1-LC2-wk05-v17.00 annotated.pdf
Pre-class activities:	1. Make Example 4.1 2. Make Example 4.2 3. Make Example 4.4
In-class activities:	<ul style="list-style-type: none">• Presentation of highlights of theory• Questions on theory by students• Plenary solving a problem
Post-class activities:	Review notes and take week 5 exam at ANS

Week 6: Concurrent code.

Book Section 2nd edition	Chapter 5: Using Operators in concurrent code, The WHEN Statement, The SELECT Statement, The GENERATE Statement, Implementing Sequential Circuits with Concurrent Code, Implementing Arithmetic Circuits with Operators, Preventing Combinational-Logic Simplification, Allowing Multiple Signal Assignments
Book Section 3rd edition	-
Video:	Watch: Video 1 and Video 2 Slides: INFT1-LC2-wk06-v17.00.pdf
Pre-class activities:	1. Make Example 5.2 2. Make Example 5.7 3. Make Example 5.8 (if time allows)
In-class activities:	<ul style="list-style-type: none">• Presentation of highlights of theory• Questions on theory by students• Plenary solving a problem
Post-class activities:	Review notes and take week 6 exam at ANS

Week 7: Sequential code.

Book Section 2nd edition	Chapter 6: Latches and Flip-flops, PROCESS, The IF Statement, The WAIT Statement, The LOOP Statement, The CASE Statement, CASE versus SELECT, Implementing Combinational Circuits with Sequential Code
Book Section 3rd edition	See translation table in attachment of the class manual.
Video:	Watch: Video 1 and Video 2 Slides: INFT1-LC2-wk07-v17.00 annotated.pdf
Pre-class activities:	1. Make Example 6.3 2. Make Example 6.4 3. Make Example 6.6
In-class activities:	<ul style="list-style-type: none">• Presentation of highlights of theory• Questions on theory by students• Evaluation and feedback to teacher on classes
Post-class activities:	Review notes and take week 7 exam at ANS

Week 8: Exam week 1.

Post-class activities:	Submit your product document and the release of your project repository for your group in Handin.
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Week 9: Exam week 2.

Post-class activities:	Have an oral exam at the time slot you reserved.
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1.2.2 Lab classes DIG2-LAB-V



In the lab classes extensive use is made of the document “SOC_Assignment-1_xxx.docx” that can be downloaded from Onderwijs Online.

Week 1: Installing and setting up your development chain.

Pre-class activities:	Download all files required for assignment 2: Install the software
In-class activities:	<ul style="list-style-type: none">• Assignment 1: Obtain the board.• Assignment 2: Install the software
Post-class activities:	Prepare for and execute Assignment 3: Getting started and GIT

Week 2: Using the IDE.

Pre-class activities:	Ensure that all software is installed and working.
In-class activities:	Assignment 3: Getting started and GIT. (Assignment 4: n-bit buffer)
Post-class activities:	Exercise the use of git in collaboration with your fellow student.

Week 3: Latches and Flipflops.

Pre-class activities:	Study Example 2.4: Generic Address Decoder
In-class activities:	Assignment 4: 7-segment display, testing
Post-class activities:	Test your implementation using “waveforms” and prepare documentation for your product report.

Week 4: Multiplexers.

Pre-class activities:	Study Example 5.3: ALU
In-class activities:	Assignment 5: logic- and arithmetic unit
Post-class activities:	Test your implementation using “waveforms” and prepare documentation for your product report.

Week 5: logic- and arithmetic operations and a multiplexer.

Pre-class activities:	Study 5.7 Implementing Arithmetic Circuits with Operators
In-class activities:	Assignment 6: Operand- Result interpreter
Post-class activities:	Test your implementation using “waveforms” and prepare documentation for your product report.

Week 6: Hands on with 2s complement.

Pre-class activities:	Study paragraph 6.2 Latches and Flipflops
In-class activities:	Assignment 7: n-bit buffer
Post-class activities:	Test your implementation using “waveforms” and prepare documentation for your product report.

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Week 7: Integration testing and documenting.

Pre-class activities:	-
In-class activities:	Assignment 8: Integration, testing
Post-class activities:	Test your implementation using “waveforms” and prepare documentation for your product report.

Week 8: Exam week 1.

Post-class activities:	Submit your product document and the release of your project repository for your group in Handin.
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Week 9: Exam week 2.

Post-class activities:	Have an oral exam at the time slot you reserved.
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Bibliography

Wikimedia. (2022, 02 18). *Arithmetic logic unit*. Retrieved from Wikipedia:
https://en.wikipedia.org/wiki/Arithmetic_logic_unit