



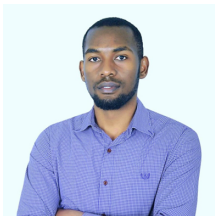
DVA494

Programming of Reliable Embedded Systems

Obed Mogaka | Hamid Mousavi | Masoud Daneshtalab

IDT, Mälardalens University

January 19, 2026



Obed Mogaka
(Teacher)
PhD student @ IDD
obed.mogaka@mdu.se



Seyedhamidreza Mousavi
(Assistant)
PhD student @ IDD
seyedhamidreza.mousavi@mdu.se



Masoud Daneshtalab
(Responsible)
Professor @ IDD
masoud.daneshtalab@mdu.se

Course Overview

- The course is on **intermediate** level!
- Grading system 3-5
 - 3-5 (passed), U (failed)
- To pass the course students have to fulfill the following requirements:
 - Complete the labs and have them approved (4 credits).
 - Project (3.5 credits)

Course Objectives & Roadmap

- **By the end of this course, you will be able to:**
 - Translate complex algorithms into efficient hardware architectures using the **Register Transfer Methodology (RTM)**.
 - Design and simulate digital systems using **VHDL (IEEE 1076)**.
 - Analyze timing constraints (**setup, hold, clock skew**) to ensure stability.
 - Implement control logic using **FSMs** and **ASM charts** to drive datapaths.
 - Develop reliable embedded systems on **Xilinx Artix-7 FPGAs** using **Vivado**.
- **Course Roadmap (9 Lectures, 3 Parts)**
 - **Part 1: The Fundamentals (Lectures 1–2)**
Digital Logic, Boolean Algebra, VHDL syntax (review + refresh).
 - **Part 2: FPGA Architecture & Sequential Design (Lectures 3–6)**
Timing analysis, FSMs, ASM methodology for control.
 - **Part 3: Advanced Reliable Systems (Lectures 7–9)**
Memory design, Fault Tolerance, industry coding standards.

- **Labs and project**

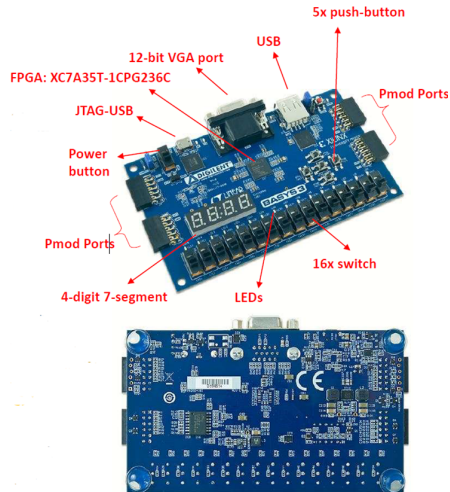
- Students work in groups (**max 3** per group).

- **Hardware**

- **BASYS3** board for the labs.
- Some labs require **simulation only** (no hardware required).

- **Software tools**

- VHDL editor and synthesizer
 - **AMD Vivado**



Check the **Course Page** on Canvas for more and detailed information!!

Anything else ...