

## C Course Info (35 YHP)

PU21PO Utveckling av inbyggda system (YH3556005-2)

### Embedded System Programming

In this course, the students learn programming and development of embedded systems.

Content of the course:

- Introduction to electrical and electronic circuits and basic components
- Introduction to Embedded Systems & Programming
- Digital and analog signals and convertors
- Time, timers and timing
- Sensors & Actuators
- Advanced programming in C/C++
- Computer System Components and Architecture
  - Microcontrollers and microprocessors
  - I/O, Serial, Parallel, Digital, Analog and PWM
  - Memories and Direct Memory Access
  - Interrupts and event-driven programming
- Device Driver Development
- Multitasking, Task Scheduling and Process Control
- Operating Systems & Real-Time Operating Systems
- Dual Targeting , Design for test and SOLID module design
- Software Unit and Integration Testing Including
  - Test Driven Development (TDD) & Behavior Driven Development (BDD)
- Software Debugging, Troubleshooting and Code Instrumentation
- Software analysing and calibration
- Safety-critical embedded systems & MISRA C

**Teacher:** Faroch Mehri (email: [faroch.mehri@ya.se](mailto:faroch.mehri@ya.se) and phone: 0730301292)

**Contact and communication:** itslearning, Zoom, slack

You can contact the teacher from 09:00 to 16:00 all working days, Mondays to Fridays .

## Lectures

**Time:** Weeks 48 - 07 (Tuesdays: 16:00 - 20:00 and Thursdays: 16:00 - 20:00)

The lectures are run on Zoom, room Software Developer VT2021 Trollhättan (3556).

The literature/materials are uploaded to itslearning before the lectures and it is important to watch/study the materials before the lectures in order to prepare yourself for the lectures.

In this course most of the lectures are followed by exercises.

## Planning

Week	Contents/Lectures	Activities/Assignment/Comment
48	Introduction to Electrical Circuits Resistors, Capacitors, Inductors, Diodes and Transistors	
49	Introduction to Embedded Systems Digital and analog signals and convertors Time, timers and Timing	9 Exercises
50	Introduction to Software Testing	1 Exercise
51	Modularity and Software Testing	3 Exercises
02	Modularity and Software Testing	3 Exercises
03	Modularity and Software Testing	<b>Assignment 1</b>
04	Computer System Components and Architecture	2 Exercises
05	Programming of Safety Critical Systems	<b>Assignment 2</b>
06	Multitasking	3 Exercises
07	Real-Time Operating Systems	1 Exercise

**Examination**

The examination of the course is done by two individual assignments.

**Grading**

The criteria for G(Godkánt) and VG(Väl Godkánt) will be specified in the assignments.

**Resources**

1. The uploaded materials to itslearning