



RTU Course "The C Programming Language"

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General data

Code	TRT461
Course title	The C Programming Language
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Elans Grabs
Academic staff	Dmitrijs Čulkovs
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN
Annotation	The study course introduces C / C++ language syntax, however, it is mainly focused on the application of C language for future MCU programming. On the other hand, C++ is briefly described, and the basics of OOP are explained in order to provide students with the full picture of C language evolution and show the differences in MCU and PC application programming. The programming approaches and tools for modern professional software design and development are described in detail in the course. The study course relies on practical application and provides intensive practical work during lectures. The study course materials are focused on solving different telematics tasks of various complexity, such as: process automation and electronic system monitoring.
Goals and objectives of the course in terms of competences and skills	The goal of the study course is to provide and improve knowledge about programming in C language. The main tasks of the course are to teach students: - to use input/output interface; - to use logical/comparison operations; - to create cyclic operations; - to create log files; - to perform data processing from the log files (for electronic sensors state monitoring); - to work with open-source C libraries and create own libraries; - to use delay operations and interrupts (for automation process); - to introduce the basics of object-oriented programming.
Structure and tasks of independent studies	During the study course, the student has to complete homework. The homework is going to be reviewed during consultations and the final exam.
Recommended literature	Obligātā/Obligatory: 1. C Programming: A MODERN APPROACH, Second Edition K. N. King (2008). 2. Programming in C (4th Edition) - Stephen Kochan (2014). 3. C Programming Absolute Beginner's Guide -Greg Perry (2013). Papildu/Additional: 1. The C Programming Language (2nd Edition) - Brian W. Kernighan and Dennis M. Ritchie (1988). 2. Ciparu elektronika un datoru arhitektūra: laboratorijas darbi un metodiskie norādījumi (2015). 3. Modern C++ Programming Cookbook: Master C++ core language and standard library features, with over 100 recipes, updated to C++20, 2nd Edition Paperback – 11 Sept. 2020 – Marius Bancila.
Course prerequisites	Secondary school informatics course knowledge.

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Introduction to C/C++ programming: syntax, procedures, structures, explaining differences in C and C++ and explaining the basics of object-oriented programming.	5	5	0	0
Integrated development environment (IDE), variables and constants, basic programmes.	5	5	0	0
Input/output interfaces.	5	5	0	0
Arrays and loops.	5	5	0	0
Logical/comparison operations.	5	5	0	0
Log files and data processing.	5	5	0	0
Work with open source C libraries and creation of own library.	5	5	0	0
Delay operations and interrupts (automation process).	5	5	0	0
Total:	40	40	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
Ability to create a basic program in C/C++.	Practical works and their defence. Test.
Ability to create a C program using loops and arrays.	Practical works and their defence. Test.

Ability to create a simple log file that collects monitoring data from an electronic system.	Practical works and their defence. Test.
Ability to create C automation program for solving telematics tasks.	Practical works and their defence. Test.

Evaluation criteria of study results

Criterion	%
Tests	40
Practical works and their defence	60
Total:	100

Study subject structure

Part	CP	Hours per Week			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	2.0	1.0	0.0	1.0	*		