COURSE DESCRIPTION

1. Program identification information

1.1 Higher education institution	POLITEHNICA University of Bucharest
1.2 Faculty	Electronics, Telecommunications and Information Technology
1.3 Department	Electronic Technology and Reliability
1.4 Domain of studies	Electronic Engineering, Telecommunications and Information Technologies
1.5 Cycle of studies	Licence (engineering)
1.6 Program of studies/Qualification	Telecommunications Technologies and Systems

2. Course identification information

2.1 Name of the course				**Computer Programming** (PC)			
2.2 Lecturer				Assoc. prof. dr. eng. Dumitru Iulian NĂSTAC			
2.3 Instructor for practical activities				Dr. eng. Virgil ILIAN			
2.4 Year of studies	**I**	2.5 Semester	**1**	2.6 Evaluation type	**Exam**	2.7 Course choice type	**Mandatory**

3. Total estimated time (hours per semester for academic activities)

3.1 Number of hours per week, out of which	**4**	3.2 course	**2**	3.3 practical activities	**2**
3.4 Total hours in the curricula, out of which	**56**	3.5 course	**28**	3.6 practical activities	**28**

Distribution of time	hours
Study according to the manual, course support, bibliography and hand notes	**20**
Supplemental documentation (library, electronic access resources, in the field, etc)	**20**
Preparation for practical activities, homeworks, essays, portfolios, etc.	**5**
Tutoring	**0**
Examinations	**3**
Other activities	**0**

3.7 Total hours of individual study	**48**
3.9 Total hours per semester	**104**
3. 10 Number of ECTS credit points	**4**

4. Prerequisites (if applicable)

4.1 curricular	Not applicable.
4.2 competence-based	Not applicable.

5. Requisites (if applicable)

5.1 for running the	Not applicable.

course	
5.2 for running of the applications	Compulsory presence at laboratory classes (according to the University Politehnica of Bucharest license studies regulations).

6. Specific competences

Professional competences	C3. Applying the knowledge, concepts and methods concerning the computing systems architecture, microprocessors, microcontrollers, programming languages and computing techniques.
Transversal competences	-

7. Course objectives (as implied by the grid of specific competences)

7.1 General objective of the course	**Course**: during the first part of the lectures the students study structured programming general principles based on the knowledge and understanding of computer structure and operation. During the second part fundamentals of C programming are explained. The C programming language is presented in a gradual manner. All essential C particularities are examined (data organization, instructions, arrays, functions, pointers). **Applications**: fundamental C programming language usage practice is exercised. Applications exercise both elementary syntactic constructions and basic programs' conception. Problems with different levels of difficulty are solved and analyzed. Multiple solutions for same problem are identified and efficiency issues are discussed. Typical errors are also pointed out.
7.2 Specific objectives	The main purpose of this subject is to develop the practical abilities to develop C programs by pursuing the following stages: in-depth and complete subject understanding, choosing/developing the appropriate algorithm and writing down the entire code using the high-level programming language.

8. Content

8.1 Lectures	Teaching techniques	Remarks
1. Introduction - Computing systems: overview, architecture, hardware – software;	Teaching is carried out using video facilities. During classes, a permanent interaction between students and professor is maintained. Students are stimulated to develop solutions and discuss various programming exercises thus stimulating their creativity. Course materials consist of class notes, class bibliography and the platforms for the practical applications. All the materials are available to students on the course	2 hours
2. Programming languages - Fundamentals, solving computational problems using computers, programming language syntax, program structure and algorithm execution;		4 hours
3. Programming fundamentals in C - Introduction to C language, C language characteristics, C compilation model, C program structure; - Data types, variable and constants,		4 hours

operators and expressions, operator precedance, input/ouput statements;	website. (www.euroqual.pub.ro/downloads)	
4. Control instructions - Decision, conditional operator and selection structure; - Initial test loop, final test loop and counter loop;		6 hours
5. Complex data types - Uni- and multi-dimensional arrays of data;		6 hours
6. Functions and recursion - Function definition – arguments, prototypes and recursion;		4 hours
7. Pointes and data files - Fundamentals, pointers and functions, pointers and arrays.		2 hours

Bibliography

- course notes and laboratory files at the course site: http://www.euroqual.pub.ro/download/ and on moodle (http://electronica.curs.pub.ro/2016/course/view.php?id=36)

- Bruce Eckel, *Thinking in C++*, 2nd edition, Prentice Hall, 2000, ISBN: 0139798099

- Kris Jamsa and Lars Klander, *Jamsa's C/C++ Programmer's Bible*, Publisher: Cengage Learning, US, 2010, ISBN: 1884133258

- D.I. Năstac, *Programarea calculatoarelor în limbajul C – Elemente fundamentale*, Editura Printech, Bucureşti, 2008.

- D.I. Năstac, *Structuri de date și algoritmi* – Aplicații, Editura Printech, Bucureşti, 2008.

- A. Bacivarov, D.I. Năstac, *Limbaje de programare – Limbajul C. Îndrumar de laborator*, Tipografia UPB, 1997.

8.2 Practical applications	Teaching techniques	Remarks
Laboratory 1 Presentation of the C programming environment; editing, compiling, executing the programs;	The practical applications are carried out individually by each student. Each student has access to a fully equiped PC machine. Programming is carried out using the Dev-C++ environment. Students have to study the materials prior to each of the practical sessions.	2 hours
Laboratory 2 Simple programs, working with variables and constants, in-out operations;		2 hours
Laboratory 3 Basic data types, operators and expressions;		2 hours
Laboratory 4 and **5** Conditional statements: decision and selection;		4 hours
Laboratory 6 and 7 Initial test loops, final test loops and		4 hours

counter loops;		
Laboratory 8 and 9 Data arrays and strings;		4 hours
Laboratory 10 Functions and recursion;		2 hours
Laboratory 11 Basic pointer operations;		2 hours
Laboratory 12 Evaluation of a small project;		2 hours
Laboratory 13 Review of the concepts and problems;		2 hours
Laboratory 14 Final exam at laboratory		2 hours
Bibliography - laboratory files are available at: http://www.euroqual.pub.ro/download/ and on moodle (http://electronica.curs.pub.ro/2016/course/view.php?id=36) - Bruce Eckel, *Thinking in C++*, 2nd edition, Prentice Hall, 2000, ISBN: 0139798099 - Kris Jamsa and Lars Klander, *Jamsa's C/C++ Programmer's Bible*, Publisher: Cengage Learning, US, 2010, ISBN: 1884133258 - D.I. Năstac, *Programarea calculatoarelor în limbajul C – Elemente fundamentale*, Editura Printech, Bucuresti, 2006 - A. Bacivarov, D.I. Năstac, *Limbaje de programare – Limbajul C. Îndrumar de laborator*, Tipografia UPB, 1997 – disponibil pe internet (http://www.euroqual.pub.ro/download/)		

9. Bridging the course content with the expectations of the epistemic community representatives, professional associations and employers representatives for the domain of the program

The course provides the graduates with fundamentals on computational systems and C programming. The current technological progress of electronic and telecommunication devices is conditioned by the ability of engineers to develop and experiment new technologies with the help of computer programming. Therefore, computer programming plays a critical part in training future engineers that will foster new technologies in the field.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight in the final mark
10.4 Lectures	- knowledge of the C fundamentals and theoretical notions from the course; -solving computation	Written examination at the end of the semester. The topics cover the entire course bibliography as	50%

	problems using the C language;	well as the practical aspects of programming in C.	
10.5 Practical applications	- attendance to the application sessions; - solving various computation problems and implementing them in C;	Final exam at laboratory (oral and on computer), with particular emphasis on the practical component. Assessing a homework project, in order to estimate the practical skills.	50%
10.6 Minimal performance standard			
- solve real problems starting from natural language presentations; - designing, implementation, and demonstration of simple solution in C programming language; - assessing the practical skills during the design of a program (implement the acquired knowledge).			

Date Lecturer Instructor for practical activities

25-09-2017 Assoc. prof. eng. Iulian NĂSTAC, PhD Eng. Virgil ILIAN, PhD

Date of department approval Director of Department,

Assoc. prof. eng. Marian VLĂDESCU, PhD

27.09.2017