

## SYLLABUS

### 1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Civil Engineering
1.3	Department	Structural Mechanics
1.4	Field of study	Civil Engineering
1.5	Cycle of study	Bachelor of Science
1.6	Program of study/Qualification	Civil Engineering (english) / Civil Engineer
1.7	Form of education	Full time
1.8	Subject code	15.00

### 2. Data about the subject

2.1	Subject name	Computer Programming and Programming Languages									
2.2	Subject area	Civil Engineering									
2.3	Course responsible/lecturer										
2.4	Teachers in charge of seminars	Assist.prof. Ilinca MOLDOVAN – ilinca.moldovan@mecon.utcluj.ro									
2.5	Year of study	1	2.6	Semester	2	2.7	Assessment	C	2.8	Subject category	DF DI

### 3. Estimated total time

3.1	Number of hours per week	2	3.2	of which, course:	0	3.3	applications:	2
3.4	Total hours in the curriculum	28	3.5	of which, course:	0	3.6	applications:	28
Individual study								hours
Manual, lecture material and notes, bibliography								28
Supplementary study in the library, online and in the field								8
Preparation for seminars/laboratory works, homework, reports, portfolios, essays								10
Tutoring								–
Exams and tests								1
Other activities								–
3.7	Total hours of individual study	47						
3.8	Total hours per semester	75						
3.9	Number of credit points	3						

### 4. Pre-requisites (where appropriate)

4.1	Curriculum	none
4.2	Competence	none

### 5. Requirements (where appropriate)

5.1	For the course	
5.2	For the applications	Labroom with PCs, videoprojector and screen

## 6. Specific competences

Professional competences	<p>After completing the syllabus, the students will be able to:</p> <ul style="list-style-type: none"> <li>- describe an algorithm through logical scheme (by procedural reasoning);</li> <li>- develop or modify Fortran console applications using development toolkits (CVF, Force2 etc.);</li> <li>- use external mathematical libraries for engineering calculus;</li> <li>- transfer data through network, or by using network storage or external drives;</li> <li>- use the MS Office package, the Compaq Visual Fortran SDK and Force2 PE.</li> </ul>
Cross competences	<p>Knowledge and experience of employing efficient and responsible work strategies, punctuality, seriousness and liability based on the principles, norms and values of professional ethics.</p> <p>Applying efficient technics in team work.</p> <p>Development of self-expression, vocabulary and technical culture.</p> <p>Professional and personal development through continuous training and active adaptation to new technical specifications.</p>

## 7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	To develop skills in applied informatics and to improve deterministic way of thinking by procedural approaches.
7.2	Specific objectives	Assimilation of theoretical and practical knowledge about the use of computers and the development of Fortran applications.

## 8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
8.2. Applications/Seminars	Teaching methods	Notes
Presentation of the laboratory and of the equipment, health and safety issues, rules of conduct, organizational aspects. How to use the equipment and peripherals, available resources. Expected portfolio and assessment.	Short presentation, examples and solutions with discussion, followed by individual subjects for each student	Each student has to work on a PC, the solved topics will be checked and assessed weekly by the teacher
Translation of numerical and logical expressions in Fortran, priority of the operators, exercises.		
The GUI of Force2 SDK. Creating a Fortran console application from a previous flowchart. Compiler options, handling compiling and link-editing errors and warnings, trace and debug.		
Exercises with vector arrays and strings (extreme values and sorting methods).		
Exercises with matrix arrays (transpose, multiplication, use of conformance, sum of the diagonal values).		
Descriptors used for I / O, use of logical units (files), exercises.		
Exercises with vector and matrix arrays using dynamic memory allocation and data files.		
Exercises with procedures using intrinsic subroutines and functions.		
Exercises with user-defined data types and arrays, using subroutines and functions.		
Computing the area and perimeter of a circle (with R radius) and of a right angled triangle (A, B, C) with Select Case and subroutines.		
Exercises with pointers (input / output string handling).		

The user interface of CVF / Intel Visual Fortran. Creating a console application in Developer Studio. Error handling during compile and make. Tracing the program and debugging. Library linking (IMSL). Some IMSL subroutines and how to use the documentation.		
Matrix calculus using IMSL (external mathematical library).		
Practical test. Portfolio rating and discussion of the work done during the semester.		
<b>Bibliography</b> <ol style="list-style-type: none"> <li>1. Class notes and handouts.</li> <li>2. <i>Compaq Visual Fortran, Language Reference Manual</i>, Compaq Computer Corporation, Houston, Texas, 1999.</li> <li>3. Lepsch, G.: Force Fortan – The Force Project (<a href="http://force.lepsch.com/">http://force.lepsch.com/</a>)</li> <li>4. Rogue Wave: IMSL Numerical Libraries, <i>Fortran Library documentation</i> (<a href="http://www.roguewave.com/help-support/documentation/imsl-numerical-libraries#fortran">http://www.roguewave.com/help-support/documentation/imsl-numerical-libraries#fortran</a>).</li> <li>5. <a href="http://users.utcluj.ro/~go/">http://users.utcluj.ro/~go/</a> (samples and further resources)</li> </ol>		

**9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field**

Acquired skills will be needed by engineers working in building design and/or research (also in education).

**10. Evaluation**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course			
10.5 Applications	Activity during the semester (portfolio with solved problems) + Solving a problem in a given time	Assessment of each labwork	40%
		Practical exam on computer	60%
10.6 Minimum standard of performance			
Solving and handing over of labworks by deadlines and getting at least 4.5 points individually at each of the two assessment criteria.			

Date of filling in:		Title Surname Name	Signature
25.09.2019	Responsible	Assoc.prof. F.-Zsongor GOBESZ	
	Teachers in charge of application	Assist.prof. Ilinca MOLDOVAN	

Date of approval in the department of Structural Mechanics

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Head of department  
Prof. Cosmin G. CHIOREAN

Date of approval in the faculty of Vicil Engineering

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Dean  
Assoc.prof. Nicolae CHIRA