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	4.00

2. Data about the subject

2.1	Subject name	Applied Informatics					
2.2	Subject area	Civil Engineering					
2.3	Course responsible/lecturer	Assoc.prof. F.-Zsongor GOBESZ – go@mecon.utcluj.ro					
2.4	Teachers in charge of seminars	Assist.prof. Ioana M. TOMASCU – ioana.tomascu@mecon.utcluj.ro					
2.5 Year of study	1	2.6 Semester	1	2.7 Assessment	C	2.8 Subject category	DF DI

3. Estimated total time

3.1 Number of hours per week	4	3.2 of which, course:	2	3.3 applications:	2
3.4 Total hours in the curriculum	56	3.5 of which, course:	28	3.6 applications:	28
Individual study					hours
Manual, lecture material and notes, bibliography					10
Supplementary study in the library, online and in the field					3
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					5
Tutoring					–
Exams and tests					1
Other activities					–

3.7	Total hours of individual study	19
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	Classroom with blackboard, videoprojector and screen
5.2	For the applications	Labroom with PCs, videoprojector and screen

6. Specific competences

Professional competences	After completing the syllabus, the students will be able to: - use the MS Windows operating system (individually and sharing resources in LAN); - create and handle electronic documents (word processing, spreadsheet etc.); - model and solve specific mathematical problems by using Mathcad (or similar software); - use AutoCAD for engineering sketches, simple graphic models, viewing and ploting; - develop and run an AutoLISP file in AutoCAD; - transfer data through network, or by using network storage or external drives.
Cross competences	Knowledge and experience of employing efficient and responsible work strategies, punctuality, seriousness and liability based on the principles, norms and values of professional ethics. Applying efficient technics in team work. Development of self-expression, vocabulary and technical culture. Professional and personal development through continuous training and active adaptation to new technical specifications.

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

7.1	General objective	To develop skills in applied informatics and to be able to create and modify electronic documents in engineering.
7.2	Specific objectives	Assimilation of theoretical and practical knowledge about the use of computers and of some usual software.

8. Contents

8.1. Lecture (syllabus)	Teaching methods	Notes
Introduction. Overview, objectives, how to conduct the discipline. Brief history of computer equipment and information technology, fundamental concepts, hardware, evolutionary aspects.	Oral and written presentation with examples and comments (stimulating interactivity)	Individual study topics will be announced each week before
Operating systems. Concepts, developments and trends, main components and functions. Physical and logical aspects of storing and managing data. File specifiers and usual formats.		
Algorithms, methods and descriptive tools. Concepts, method classifications and paradigms. Task analysis and software development stages. Analysis and method description tools. Structuring concepts. Types of errors in data collection and automatic data processing.		
Office software – the content and the structure of an electronic document. Text editing, settings, processing and formatting. Embedded parts through software interconectivity. Expressions, tables, drawings, images and references inserted in a document. Conversion options and possibilities.		
Office software – spreadsheet calculus, reference types, expressions and formulas. Adressing cell ranges. Moving and copying content, merging and dividing cells. Formula types, correcting errors. Graphics for sets of values.		
AutoCAD – the user interface. Use and configuration of the menus. Model space, reference systems, absolute and relative coordinates. Modifying the coordinate system (UCS / WCS). Managing layers. Command types. Assisting tools (OSNAP, GRID, ORTHO etc.). Selecting entities.		
AutoCAD – line and hatch types, characteristics and properties. Text types, special characters. Dimensioning commands and settings.		

AutoCAD – setting and using viewing panels. Sample 3D modeling by using several viewing panes. Creating cross sections. Computing geometrical-mechanical characteristics of areas.		
AutoCAD – blocks and attributs. Creating and exploding composed entities. Saving blocks as files, inserting blocs in the model. Commands for define, modify and extract attributes. Creation and use of symbol libraries. Paper space, plotting and printing issues.		
AutoLISP – introduction, basic concepts. Atoms and functions. Use of AutoLISP in the Command Line. Development of an AutoLISP file, sample. Defining variables, settings.		
Visual LISP – runing in AutoCAD, user interface, opening and loading of an AutoLISP file under Visual LISP, the use of an AutoLISP routine (inspection, debugging). The use of AutoCAD commands in AutoLISP programs.		
AutoLISP functions for list processing, conditional structures, loops, the use of modeled entities with their properties.		
BIM – introduction, history (XML applications in civil engineering), basic sample model and viewing options.		
Data and communication networks. Roles, fundamental topologies, network types. Internet – basic aspects. GSM environment, evolution.		

Bibliography

1. Lecture notes.
1. *Basic Computing Using Windows*, Wikibooks.org, 2006.
2. Máthé, A. – Nedelcu, M.: Aplicaţii AutoCAD şi AutoLISP. Îndrumător de laborator. Editura U.T.PRESS, Cluj-Napoca, 2009.
3. Petrina, M. – Bâlc, R. – Máthé, A. et alii: Programarea calculatoarelor în construcţii. Aplicaţii în FORTRAN, EXCEL şi MATHCAD, Editura U.T.PRESS, Cluj-Napoca, 2007.
4. Petrina, M. - Bâlc, R. - Máthé, A. – Petrina, B. et alii: Utilizarea mediului grafic AutoCAD şi Programare în AutoLISP. Aplicaţii în construcţii, Editura U.T.Pres, Cluj-Napoca, 2006.
5. www.autodesk.com
6. http://buildingsmart.org (Open BIM, IFC)
7. https://www.ptc.com/en/products/mathcad
8. http://users.utcluj.ro/~go/ (handouts and further resources)

8.2. Applications/Seminars	Teaching methods	Notes
Presentation of the laboratory and of the equipment, health and safety isues, 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
Mathcad – user interface, simple exercises (solving equations, integral and differential expressions). Issues concerning errors, accuracy and measuring units.		
Mathcad – symbolic calculus in linear algebra. Solving linear equations, direct methods. Solving triangular systems, the Gauss method. Graphics.		
Mathcad – approximate solving of algebric equations: Newton method, chord method, succesive approximations method. Solving nonlinear systems.		
Mathcad – matrix calculus (addition / subtraction, multiplications, invert, calculation of the determinant of a matrix).		
Office applications, creating an electronic document, settings, processing and formatting issues. Embedded objects, links and		

interconnectivity. Expressions, charts, drawings, images and references included in a document. Conversion between common electronic formats.		
Use of spreadsheets, layouts, calculus, charts, embedded objects and links, references.		
Use of conditions (IF) in spreadsheat expressions. Conditional formatting. Editing an electronic document containg table and chart (software connectivity).		
AutoCAD – user interface. Simple commands to create and modify entities. Selection types. Managing layers. Assisting tools (GRID, OSNAP, ORTHO etc. Viewing and modifying system variables.		
AutoCAD – exercise using skew, scale, mirror, multiply, distribute, align etc. Computing the geometrical-mechanical characteristics of areas.		
AutoCAD – setting and use of viewing panes. 3D modeling exercise. Hatches. Dimensioning styles and commands.		
AutoCAD – blocks and attributes. Creation and decomposition of complex entities. Saving blocks as files, inserting in the model. Definining and extracting attributes.		
AutoCAD – development of an AutoLISP routine for solving a 2nd grade equation and drawing it.		
Practical test. Portfolio rating and discussion of the work done during the semester.		

Bibliography

1. Class notes and handouts.
2. Máthé, A. – Nedelcu, M.: Aplicaţii AutoCAD şi AutoLISP. Îndrumător de laborator. Editura U.T.PRESS, Cluj-Napoca, 2009.
3. Petrina, M. – Bâlc, R. – Máthé, A. et alii: Programarea calculatoarelor în construcţii. Aplicaţii în FORTRAN, EXCEL şi MATHCAD, Editura U.T.PRESS, Cluj-Napoca, 2007.
4. Petrina, M. - Bâlc, R. - Máthé, A. – Petrina, B. et alii: Utilizarea mediului grafic AutoCAD şi Programare în AutoLISP. Aplicaţii în construcţii, Editura U.T.Pres, Cluj-Napoca, 2006.
5. www.autodesk.com
6. http://buildingsmart.org (Open BIM, IFC)
7. https://www.ptc.com/en/products/mathcad
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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	Theory (9 questions from theory, against time)	Written test	40%
10.5 Applications	Activity during the semester (portfolio with solved problems) +	Assessment of each labwork	20%

	Solving 3 problems in a given time	Practical exam on computer	40%

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 three assessment criteria.

Date of filling in: 25.09.2019		Title Surname Name	Signature
	Lecturer	Assoc.prof. F.-Zsongor GOBESZ	
	Teachers in charge of application	Assist.prof. Ioana M. TOMASCU	

Date of approval in the department of Structural Mechanics   Head of department
                                                                     Prof. Cosmin G. CHIOREAN

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Date of approval in the faculty of Vicil Engineering   Dean
                                                              Assoc.prof. Nicolae CHIRA

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