Annex 6

DISCIPLINE DESCRIPTION

1. Information on the study programme

1.1 Academic institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**FACULTY OF ENVIRONMENTAL PROTECTION**
1.3 Department	**ENVIRONMENTAL ENGINEERING**
1.4 Field of study	**ENVIRONMENTAL ENGINEERING**
1.5 Cycle of study	**BACHELOR**
1.6 Study programme/Qualification	**BIOTECHNICAL AND ECOLOGICAL SYSTEMS ENGINEERING / ENGINEER**

2. Information on the discipline

2.1 Name of discipline				COMPUTER AIDED GRAPHICS I			
2.2 Course holder				Prof. PhD. Eng. CURILĂ MIRCEA			
2.3 Seminar/Laboratory/Project holder				Assist.PhD. ŞENDRUŢIU GABRIELA ROXANA			
2.4 Year of study	I	2.5 Semester	II	2.6 Type of evaluation	Exam	2.7 Regime of discipline	C

(C) Compulsory; (O) Optional; (E) Elective

3. Total estimate time (hours per semester of didactic activities)

3.1 Number of hours per week	4	out of which: 3.2 course	2	out of which 3.3 seminar/laboratory/project	2
3.4 Total hours in the curriculum	56	out of which: 3.5 course	28	out of which 3.6 seminar/laboratory/project	28

Time allotment	h
Study assisted by manual, course support, bibliography and notes	5
Additional documentation in the library/ on specialised electronic platforms and in the field	5
Preparation of seminars/laboratories/ topics/reports, portfolios and essays	5
Tutorship	-
Examinations	4
Other activities.....	-
3.7 Total hours of individual study	**19**
3.9 Total hours per semester	**75**
3.10 Number of credits	**3**

4. Pre-requisites (where appropriate)

4.1 curriculum	-
4.2 competences	-

5. Conditions (where appropriate)

5.1. related to course	projector
5.2. related to seminar/laboratory/ project	

6. Specific competences acquired	
Professional competences	C5.1 Definition and use of specific engineering terminology in connection with multidisciplinary terminology specific to the field of environmental engineering C6.2 Optimal interpretation and application of technical specifications
Transversal competences	CT1. Identifying and compliancing the norms of professional ethics and deontology, assuming the responsibilities for the decisions taken and the related risks CT3. Efficient use of information sources and of assisted communication and professional training resources (portals, Internet, specialized software applications, databases, online courses, etc.) both in Romanian and in an international language

7.Objectives of discipline (coming from the specific competencesacquired)

7.1 General objective	The discipline is part of the group of fundamental disciplines and aims to acquire the basic notions of computer aided graphics, knowledge and deepening of the graphical facilities offered by the MATLAB software package for: 2D and 3D graphical representation of data contained in vectors and matrices, predefined functions, creation and adjusting the data used in graphical representations. The discipline presents the fundamental problems of the software systems for computer-assisted graphics, the ways of implementing some algorithms for modeling and graphic representation, emphasizing the aspects related to their analysis and performances.
7.2 Specific objectives	**1. Theoretical knowledge - Knowledge and understanding** Knowledge and use of the main graphical facilities offered by the MATLAB software package for: 2D and 3D graphical representation of data contained in vectors and matrices, as well as spatial objects**2. Acquired skills - Explanation and interpretation** - The possibility of analytical solving of some problems of low-medium complexity - Ability to analyze and compare data contained in vectors or matrices by special graphical representations; adding and customizing the created representations. **3. Acquired abilities - Instrumental-applied** - Know the basics of generating and displaying images on the screen. - Ability to use the graphics library of the MATLAB software package. - Ability to graph functions of a variable or two variables. - Mastering the basics of computer graphics for 2D and 3D objects **4. Attitudinal** - Formation of a positive and responsible behavior both towards the economic importance and for the environment. - Creative capitalization of one's own potential in student scientific activities (participation in scientific symposia, articles in academic publications). - Awareness of the importance of training during the semester to achieve good and lasting results. - Awareness of the importance of search. own documentation and research related to learning. - Team spirit. - Cultivating a discipline that is done correctly and on time

8. Contents*/

8.1 Course	Methods of teaching	No. of hours/Remarks
1.Introduction to Matlab programming The structure of Matlab programs Import and export data files	The course is presented to students in the form of a lecture. The video projector and the laptop are used to present the slides that outline the mentioned course elements. Thus, the lecture allows student intervention for a better understanding of the notions presented by the professor	2
2.Matrice Defining simple matrices, matrix elements, declarations, variables and expressions		2
3.Vectors and scalars Generating vectors and matrices in Matlab Generating a network Complex numbers		2
4. Matlab operators and instructions Arithmetic, relational and logical operators if, for, while, break, return and error instructions		2
5. Matlab functions Mathematical functions Control functions Matrix calculations Statistical calculations		2
6. 2D graphical representations in Matlab Graphical representation in linear, logarithmic, semilogarithmic and polar coordinates		2
7. 2D graphical representations in Matlab Graphical representation of polygons, vectors, with bars, in steps, discrete data, histograms		2
8. 3D graphics in Matlab Representation of contour lines Spatial representations with lines 3D representation of surfaces and contour lines		2
9. 3D graphics in Matlab Representation of space objects Positioning the observer in relation to the object		2
10. Figure control Creating a figure graphic object The properties of the figure object		2
11. Axis control Splitting the graphics window Successive overlapping of graphs Changing the limits of the axes Appearance, grading and labeling of axes		2
12. Display text objects in coordinate spaces Creation, properties, particular types Display and control how the legend is displayed		2
13. Control of the appearance of graphic representations Color control of graphics Lighting control of graphic representations Color model used in graphic representations		2
14. Animation in Matlab Motion and animation of images Recording of graphic representations		2
Bibliography		

<table>
<tr><td colspan="3">1. Mircea Curilă: Computer Aided Graphics I, University of Oradea Publishing House, 2015.
2. Etter D. M .: Engineering Problem Solving with Matlab, Prentince Hall Publishing, New Jersey, 1993.
3. Ghinea M., Fireţeanu V .: Matlab-numerical calculation, graphics, applications, Teora Publishing House, Bucharest, 2004.
4. Curteanu S .: Initiation in Matlab, Polirom Publishing House, 2008
5. Marcus M .: Matrices and Matlab: a Tutorial, Prentince Hall Publishing, New Jersey, 1993.</td></tr>
<tr><td>8.3 Laboratory</td><td>Methods of teaching</td><td>No. of hours/ Remarks</td></tr>
<tr><td>1. Labor protection and presentation of the computer calculation system in the laboratory. The structure of Matlab programs.</td><td rowspan="14">In the first part there is a short professor-student debate followed by practical demonstrations of the notions corresponding to the theme of the work practice. Then the students perform practical exercises similar to those presented, being assisted during this time.</td><td>2</td></tr>
<tr><td>2. Defining simple matrices, matrix elements, declarations, variables and expressions. Generation of vectors, matrices and a network.</td><td>2</td></tr>
<tr><td>3. Generating a mesh. Complex numbers.</td><td>2</td></tr>
<tr><td>4. Arithmetic, relational and logical operators. Matlab instructions.</td><td>2</td></tr>
<tr><td>5. Mathematical and control functions. Matrix and statistical calculations.</td><td>2</td></tr>
<tr><td>6. Graphical representation in linear, logarithmic, semi-logarithmic and polar coordinates. Graphical representation of polygons, vectors, with bars, in steps, discrete data, histograms.</td><td>2</td></tr>
<tr><td>7. Representation of contour lines. Spatial representations with lines. 3D representation of surfaces and contour lines.</td><td>2</td></tr>
<tr><td>8. Representation of spatial objects. Positioning the observer in relation to the object.</td><td>2</td></tr>
<tr><td>9. Figure control in Matlab.</td><td>2</td></tr>
<tr><td>10. Axis control in Matlab.</td><td>2</td></tr>
<tr><td>11. Display Text objects in the coordinate axis space.</td><td>2</td></tr>
<tr><td>12. Control of the appearance of graphic representations. Color patterns.</td><td>2</td></tr>
<tr><td>13. Motion and animation of images.</td><td>2</td></tr>
<tr><td>14. Recoveries.</td><td>2</td></tr>
<tr><td colspan="3">Bibliography
1. Mircea Curilă: Computer Aided Graphics I, University of Oradea Publishing House, 2015.
2. Etter D. M .: Engineering Problem Solving with Matlab, Prentince Hall Publishing, New Jersey, 1993.
3. Ghinea M., Fireţeanu V .: Matlab-numerical calculation, graphics, applications, Teora Publishing House, Bucharest, 2004.
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5. Marcus M .: Matrices and Matlab: a Tutorial, Prentince Hall Publishing, New Jersey, 1993.</td></tr>
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* The content, respectively the number of hours allocated to each course / seminar / laboratory / project will be detailed during the 14 weeks of each semester of the academic year.

9. Corroboration of discipline content with the expectationsof the epistemic community, professional associations and representative employers from the field corresponding to the study programme

The content of the discipline is found in the curriculum of the specialization of Environmental Engineering and from other university centers that have accredited this specialization.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	In order to obtain grade 5, the following conditions must be met: - obtaining at least a grade of 5 in the laboratory test; - knowledge of the basic notions presented in the course. In order to obtain grades 6, 7, 8 or 9, the students will present two subjects extracted from the package prepared with subjects that contain notions of course. Depending on the ability to understand and describe the respective notions, they receive the corresponding grade. In order to obtain a grade of 10, the following conditions must be met: - obtaining a grade of 10 in the laboratory test; - knowledge of all the topics presented in the course.	Oral	70%
10.5 Seminar			
10.6 Laboratory		Practically	30%
10.7 Project			
10.8 Minimum standard of performance			
Knowledge and understanding of courses at the level of essential principles and results			

Date of completion

10.09.2020

Signature of course holder**

Prof.PhD.Eng. CURILĂ MIRCEA
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Signature of seminar laboratory/project holder **

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Date of approval in the department

17.09.2020

Signature of the Head of Department

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