DISCIPLINE ACADEMIC SHEET

ACADEMIC YEAR 2020 - 2021

1. PROGRAMME DATA

1.1 Higher Education Institution	*UNIVERSITY OF CRAIOVA*
1.2 School	*Automation, Computers and Electronics*
1.3 Department	*Computers and Information Technology*
1.4 Field of Study	*Computers and Information Technology*
1.5 Study Level[1]	*L (licence/ undergraduate)*
1.6 Study Program (name/code)[2] /Calification	*Computers* / L206010101010

2. DISCIPLINE DATA

2.1 Discipline Name				**Mathematical Analysis**				
2.2 Course Activities Holder				Associate Professor Cristian VLADIMIRESCU				
2.3 Practical Activities Holder				Assistant Professor Laurenţiu TEMEREANCĂ				
2.4 Study Year	**I**	2.5 Semester	**I**	2.6 Discipline Type (content)[3]	**DF**	2.7 Discipline Conditions (mandatory)[4]	**DI**	2.8 Evaluation Type	**E**

3. ESTIMATED TOTAL TIME (hours per semester of teaching activities)

3.1 Number of hours per week	**5**	in which: 3.2 couse	**3**	3.3 seminar/laboratory/project	**2**
3.4 Total hours of curriculum	**70**	in which: 3.5 course	**42**	3.6 seminar/laboratory/project	**28**

3.7 Time distribution	hours
▪ Study after manual, course support, bibliography and notes	**53**
▪ Additional documentation in library, on specialized electronic platforms and field	**14**
▪ Training seminars / labs, homework, portfolios and essays	**14**
▪ Tutoring	**-**
▪ Examinations	**2**
▪ Other activities: consultations, student meetings	**2**

Total hours per individual activities	**85**
3.8 Total hours per semester[5]	**125**
3.9 Number of credits[6]	**5**

4. PRECONDITIONS (where appropiate)

4.1 of curriculum	The students should have mathematical notions learned during the college.
4.2 of competence	There are not necessary.

5. CONDITION (where appropiate)

5.1. of the course	The course is taught explanatory and interactive on-line, both on the Google Meet platform, in audio-video conferencing system, and on the Google Classroom platform. Course support is provided in electronic format on the Evidenţa Studenţilor and Google Classroom platforms, and access to updated documentation is ensured. The teaching process has the following structure: ▪ 80% theoretical presentation, based on the couse support; ▪ 20% interactive activity with the students.
5.2. of seminar	The seminar is taught interactively on-line with students both on the Google Meet platform, in audio-video conferencing system, and on the Google Classroom platform. Seminar support is provided in electronic format on the Evidenţa Studenţilor and Google Classroom platforms.

6. SPECIFIC LEARNED SKILLS [7]

Professional competences	Through the notions introduced at the course, the examples and the applications from the seminar, the Mathematical Analysis course contributes to the following:
	- professional competences:
	  ▪ Proper use in professional communication of the eigen concepts of calculability, complexity, programming paradigms and modeling of computer and communications systems.
	  ▪ Theoretical foundation of the features for the designed systems.
	  ▪ Identification of a class of problems and solving methods specific for computer systems.
	  ▪ Using interdisciplinary knowledge, solution patterns and tools to conduct experiments and interpret their results.
	  ▪ Applying solution by means of engineering tools and methods.

Transversal Competences	

7. DISCIPLINE OBJECTIVES (based on the specific learned competences)

7.1 General objective of the discipline	▪ Fundamental discipline, necessary to each special approach. One presents the fundamental notions of numerical sequences and series, functions, differential calculus for vector functions, and different types of integrals: improper integrals, integrals with parameter, curvilinear integrals, double and triple integrals, surface integrals. ▪ Teaching the students to be able to apply differential and integral calculus to solving practical problems. ▪ The aim of the seminar is to fix the theoretical knowledges and to create calculus abilities through practical applications, exercises, and problems.
7.2 Specific objectives	The achivement of some necessary abilities, as • the study of the convergence of numerical series; • Taylor exapnsion of a given function; • the estimate of first order and upper order differentials of vector functions; • the study of the extrema to vector functions, conditional extrema, and their applications; • the differential of composite and implicit functions; • the estimate of different types of integrals (improper integrals, integrals with parameter, curvilinear integrals, double and triple integrals, surface integrals) and their applications.

8. CONTENT

8.1 COURSE (content units)	No hours	Teaching methods
Introduction to differential calculus		**Exposition**
Fundamental sequences; complete metric spaces; Banach contraction principle	3	The teaching is explanatory and interactive at the blackboard. One ensures electronic course support and acces to updated documentation. The teaching process has the following structure: - 70% theoretical presentation, based on the couse support. - 30% interactive activity with the students.
Numerical series	3	
Power series, series expansions	3	
Limits and continuity to vector functions	3	
Partial derivatives and differentiability	3	
Local extrema to vector functions	3	
Implicit functions	3	
Conditional extrema	3	
Introduction to integral calculus		
Riemann integral on the real line	3	
Improper integrals	3	
Integrals with parameter	3	
Curvilinear integrals of first and second kind	3	
Double and triple integrals	3	
Surface integrals of first and second kind	3	
Total	**42**	

Bibliography [8]
1. C. Avramescu, C. Vladimirescu, Curs de Calcul Ştiinţific, Repr. Univ. din Craiova, 2002 (in Romanian).
2. C. Vladimirescu, Mathematical Analysis - Theory and Applications (electronic support), 2020.

8.2 Practical activities (topics/homework)	No hours	Teaching methods
Introduction to differential calculus		**Solving practical applications**
Fundamental sequences; complete metric spaces; Banach contraction principle	2	
Serii numericeNumerical series	2	The seminar is developed interactively with the sudents, by ensuring also electronic support.
Power series, series expansions	2	
Limits and continuity to vector functions	2	
Partial derivatives and differentiability	2	
Local extrema to vector functions	2	
Implicit functions	2	
Conditional extrema	2	
Introduction to integral calculus		
Riemann integral on the real line	2	
Improper integrals	2	
Integrals with parameter	2	
Curvilinear integrals of first and second kind	2	
Double and triple integrals	2	
Surface integrals of first and second kind	2	
Total	28	

Bibliography [8]
1. C. Avramescu, C. Vladimirescu, Curs de Calcul Ştiinţific, Repr. Univ. din Craiova, 2002 (in Romanian).
2. C. Vladimirescu, Mathematical Analysis - Theory and Applications (electronic support), 2020.

9. COURSE CONTENT CONJUNCTION WITH EXPECTATIONS OF THE EPISTEMIC COMMUNITY REPRESENTATIVES, PROFESSIONAL ASSOCIATIONS AND EMPLOYEE REPRESENTATIVES IN THE PROGRAM DOMAIN

Developement and and acquiring of notions, methods, and actual mathematical techniques,used to the mathematical modelling of engineering problems.

10. EVALUATION

Activity Type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight in the final score
10.4 Course	- The understanding the problem - The mathematical statement - The solving of the problem	**Exam:** written test **Exam assiatance: 2 internal examiners** **Evaluations**: The written test has 4 applicative problems; each problem is mandatory and is worth a score from 1 (for free) to 10. The score at the written test is the arithmetic mean of the scores at the 4 problems. The weight of the score at the written test in the final score is 80%.	80%
		Evaluations of continuous assessments is made during the semester, based on: - **a written mid-semester test, upon the students' request**, with 2 applicative problems; each problem is mandatory and is worth a score from 1 (for free) to 10. The score at the mid-semester test is the arithmetic mean of the scores at the 2 problems. The weight of the score at the mid-semester test in the writen test is 50%.	40%
		- **a set of homeworks**, whose weight in the final score is 10%.	10%
10.5 Seminar	- the degree of development of practical skills and the ability to operate with the fundamental notions, techniques, and methods introduced	**The activity of the students at the seminar**, whose weight in the final score is 10%. The final score is deduced by using the formula:	10%

		$S_{final} = 0.8 \times SWT + 0.1 \times SHW + 0.1 \times SS,$ where **SWT** is the score obtained at the final written test **SHW** is the score at the homeworks, **SS** is the score at for the activity at the seminar.	

10.6 Minimum standard of performance (the minimum knowledge necessary to promote discipline and how to check the knowledge acquiring)
- Minimum standards to promote: the understanding of the notions and basic terminology.   - The obtaining of a minimum 50 % from the continuous assessments and the written exam.   - The the final score is made by rounding up to integer number.

Date of completion: 01.10.2020

Course Holder

Assoc. Prof. Cristian VLADIMIRESCU, Ph. D.
(signature)

Applicative activities holder

Assist. Prof. Laurenţiu TEMEREANCĂ. Ph. D.
(signature)

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Date of approval:

Head of Department
Prof. Marius BREZOVAN, Ph. D.
(signature)

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Note:

1)   Study level – select one of the possible choices: L (licence or undergraduate)/ M (master)/ D (doctoral).
2)   Choose the code as defined by HG nr. 493/17.07.2013.
3)   Type (content) - select one of the possible choices:
   - for the licence or undergraduate level: DF (fundamental discipline)/ DD (domain discipline)/ DS (specialty discipline)/ DC (complementary discipline);
   - for the master level: DA (thoroughgoing study discipline)/ DS (synthesis discipline)/ DCA (advanced knowledge discipline).
4)   Condition of discipline (compulsoriness) - select one of the possible choices: DI (compulsory discipline)/ DO (optional discipline)/ FC (facultative discipline).
5)   Obtained by means of adding the number of hours from 3.4 and 3.7.
6)   A credit is equivalent with 25 – 30 hours of study (didactical activities and individual study).
7)   The aspect of professional and transversal competences will be considered according to the OMECTS Methodology no 5703/18.12.2011. Competences are those listed in RNCIS (http://www.rncis.ro/portal/page?_pageid=117,70218&_dad=portal&_schema=PORTAL) for the field of study from 1.4 and the study program from 1.6 in which the discipline is enrolled, in this academic sheet.
8)   At least one title is recommended to belong to the collective co-ordinating discipline, and at least 2-3 titles to refer relevant papers for the discipline from the national and international circuit, from the library of UCv.