

**SYLLABUS / FIȘA DISCIPLINEI**
**1. Information on the study programme / Date despre programul de studii**

1.1. Institution / Instituția de învățământ superior	Universitatea de Vest din Timișoara
1.2. Faculty / Facultatea	Matematică și Informatică
1.3. Department / Departamentul	Computer Science (Informatică)
1.4. Study program field	Computer Science (Informatică)
1.5. Study cycle/ Ciclul de studii	Bachelor / licență
1.6. Study programme / Programul de studii / calificarea*	Computer Science : <i>Database administration / Administrator baze de date - 252101; Computer network administration / Administrator de rețea de calculatoare - 252301; Analyst / Analist - 251201; Research assistant in computer science / Asistent de cercetare în informatică - 214918; Teacher in secondary schools / Profesor în învățământul gimnazial - 233002; Programmer / Programator - 251202; Software systems designers / Proiectant sisteme informatice – 251101</i>

**2. Information on the course / Date despre disciplină**

2.1. Title of the course / Denumirea disciplinei		Cloud Computing and Internet of Things					
2.2. Teacher in charge of the course / Titularul activităților de curs		Dr. Marinel IORDAN					
2.3. Teacher in charge of the seminar / Titularul activităților de seminar							
2.4. Study year / Anul de studii	3	2.5. Semester / Semestrul	2	2.6. Examination type / Tipul de evaluare: E(xam)/C(olloquim)	C	2.7. Course type / Regimul disciplinei: M(andatory)/ E(lective)/ F(acultative)	E

**3. Estimated study time (number of hours per semester) /Timpul total estimat (ore pe semestru al activităților didactice)**

3.1. Attendance hours per week / Număr de ore pe săptămână	4	out of which din care: 3.2 lecture/ curs	2	3.3. seminar/laborator	2
3.4. Attendance hours per semester / Total ore din planul de învățământ	56	out of which: 3.5 lecture / curs	28	3.6. seminar/laborator	28
<b>Distribution of the allocated amount of time / Distribuția fondului de timp*</b>					<b>hours/ore</b>
Individual study /Studiu după manual, suport de curs, bibliografie și notițe					14
Supplementary documentation at library or using electronic repositories / Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate					7
Preparing for laboratories, homework, reports etc. /Pregătire seminarii/laboratoare, teme, referate, portofolii și eseuri					28
Exams / Examinări					7
Tutoring / Tutorat					14

3.7. Total number of hours of individual study / Total ore studiu individual	70
3.8. Total number of hours per semester / Total ore pe semestru	126
3.9. Number of credits (ECTS) / Număr de credite	5

#### 4. Prerequisites (if it is the case) / Precondiții (acolo unde e cazul)

4.1. curriculum / de curriculum	Cloud Computing and Internet of Things
4.2. skills / de competențe	

#### 5. Requirements (if it is the case) / Condiții (acolo unde e cazul)

5.1. for the lecture / de desfășurare a cursului	Lecture room with a video-projector
5.2. for the seminar, laboratory / de desfășurare a seminarului/laboratorului	C development environment installed on the workstations, internet connection

#### 6. Acquired skills / Competențe specifice acumulate

Professional skills / Competențe profesionale	<ul style="list-style-type: none"> <li>• Cloud technologies</li> <li>• Computer programming</li> <li>• Information security strategy</li> <li>• Mobile operating systems</li> </ul>
Transversal skills / Competențe transversale	<ul style="list-style-type: none"> <li>• Thinking- intern, mental capacity for:                             <ul style="list-style-type: none"> <li>○ solving problems,</li> <li>○ creativity</li> <li>○ critical thinking,</li> <li>○ ability to learn</li> </ul> </li> </ul>

#### 7. Objectives of the course / Obiectivele disciplinei (reieșind din grila competențelor specifice acumulate)

7.1. General objective / Obiectivul general al disciplinei	Getting to know and use cloud computing and Internet of Things concept: <ul style="list-style-type: none"> <li>• the virtual infrastructure for practical mobile computing and interfacing wich includes integrating applications, storage devices, monitoring devices, visualization platforms, analytics tools and client delivery;</li> <li>• the internet-connected devices used to perform the processes and services that support the current activities of life.</li> </ul>
7.2. Specific objectives / Obiectivele specifice	<p><i>Knowledge objectives (KO):</i> (1) Good understanding of the concepts: IaaS, PaaS, SaaS; (2) Knowing the main cloud deployment models; (3) Understanding the connectivity is driven by policies in the cloud management system.</p> <p><i>Ability objectives (AO):</i> (1) Ability to forecast future ICT network needs; (2) Ability to analyse software specifications</p> <p><i>Skills wise objectives (SO):</i> (1) Using software design patterns; (2) Ability to apply information security policies.</p>

**8. Content / Conținuturi\***

8.1. Lecture / Curs	Teaching strategies / Metode de predare	Remarks, details / Observații
01 – Introduction to Cloud Computer	Lecture, class discussion, informal debate	Online communication and teaching
02 – Infrastructures for Cloud Computing	Lecture, class discussion, student presentation, questioning	
03 – Properties and Characteristics for Cloud Computing	Student presentations, questioning, informal discussion	
04 – Cloud Virtualization	Student presentations, questioning, informal discussion	
05 - Delivering services from the cloud and vendor cloud products: Amazon, Google, Microsoft and others	Lecture on number theory, Student presentation, questioning, informal discussion	
06 - Evaluating barriers to cloud computing: handling sensitive data and cloud security	Student presentations, questioning, informal discussion	
07 - Exploiting Software as a Service (SaaS)	Student presentations, questioning, informal discussion	
08 - Exploring the technical foundation for Platform as a Service (PaaS)	Student presentations, questioning, informal discussion	
09 - Managing cloud storage: <ul style="list-style-type: none"> <li>• Controlling unstructured data in the cloud</li> <li>• Deploying relational databases in the cloud</li> <li>• Improving data availability</li> </ul>	Student presentations, questioning, informal discussion	
10 - Employing support services <ul style="list-style-type: none"> <li>• Testing in the cloud</li> <li>• Monitoring cloud-based services</li> <li>• Analyzing portability across platforms</li> </ul>	Student presentations, questioning, informal discussion	
11 - Deploying Infrastructure as a Service (IaaS): <ul style="list-style-type: none"> <li>• Scalable server clusters</li> <li>• Achieving transparency with platform virtualization</li> <li>• Elastic storage devices</li> </ul>	Student presentations, questioning, informal discussion	
12 - Accessing IaaS <ul style="list-style-type: none"> <li>• Provisioning servers on demand</li> <li>• Handling dynamic and static IP addresses</li> <li>• Tools and support for management and monitoring</li> </ul>	Student presentations, questioning, informal discussion	
13 – Internet of Things - concepts and standards	Student presentations, questioning, informal discussion	

14 – Relevance of IOT for the future. Applications	Lecturer presentation, justification, critical discussion	
<b>Recommended bibliography / Bibliografie</b> 1. <b>Jaydip Sen</b> - Cloud Computing - Architecture and Applications, InTech (June 14, 2017) 2. <b>Fox R., Hao W.</b> -Internet Infrastructure - Networking, Web Services, and Cloud Computing, CRC Press 2018		
<b>8.2. Seminar, lab / Seminar, laborator</b>	<b>Teaching/learning strategies / Metode de predare/ învățare</b>	<b>Remarks, details / Observații</b>
1 - Project / Git / Js intro - Make a git/ svn repository (GitHub selected) - My first commit / push / pull - Project description	Exposure and communication Case study	Online communication and teaching
2 - Specifications and Javascript introduction - Define specification - Hello world in JS - Javascript objects - JQuery selectors and how to use them - Javascript events	Exposure and communication Case study	
3 - Node JS - Connect to Arduino - Basic functions for arduino board - Set up a node Js server - Generating jsons (RESTfull APIs)	Project Discovery learning	
4 – C++	Exposure and communication Case study	
5 – C++	Case study	
6 – Backend C++ on Rasberry PI – data aquisition	Exposure and communication	
7 - Backend C++ on Rasberry PI – data processing	Exposure and communication Case study	
8 – C++ 11	Exposure and communication	
9 – C++ 11	Project Discovery learning	
10 – Boost libraries	Case study	
11 – Memory management	Case study	
12 – Visiting Nokia. Examples and Good practices	Exposure and communication	
13 – Assessment		
14 – Assessment		

**Recommended bibliography / Bibliografie:**

1. **Richard L. Halterman** - Fundamentals of Programming C++, Southern Adventist University, February 5, 2019
2. **Iuliana Cosmina** - Java for Absolute Beginners: Learn to Program the Fundamentals the Java 9+ Way, <https://link.springer.com/book/10.1007%2F978-1-4842-3778-6>

**9. Correlations between the content of the course and the requirements of the IT field / Coroborarea conținuturilor disciplinei cu așteptările reprezentanților comunității epistemice, asociațiilor profesionale și angajatorilor reprezentativi din domeniul aferent programului**

Course content is typical for teaching Cloud Computing and Internet of Things in colleges at undergraduate level. Ubiquity of cloud technologies and information security strategy concerns make skilled professionals in this area in high demand.

**10. Evaluation / Evaluare\***

Activity / Tip de activitate	10.1. Evaluation criteria / Criterii de evaluare**	10.2. Evaluation methods / Metode de evaluare***	10.3. Weight in the final mark / Pondere din nota finală
10.4. Lecture / Curs	Knowledge levels in all course areas, quality of course presentations	Colloquium in written form or course presentation	50%
10.5. Seminar/ lab	Proper implementation, knowledge	Project execution, questioning	20%
	Proper implementation, knowledge	Project execution, questioning	30%
10.6. Minimal knowledge for passing / Standard minim de performanță			
Acquiring a passing grade as a combination of the colloquium/presentation and lab projects.			

Date/ Data completării

 Signature (lecture) /  
 Semnătura titularului de curs

 Signature (seminar)  
 Semnătura titularului de seminar

 Signature (director of the department)  
 Semnătura directorului de departament  
 Lect. Dr. Flavia MICOTA