# SYLLABUS / FIȘA DISCIPLINEI

## 1. Information on the study programme / Date despre programul de studii

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|---|---|
| 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 | MSc / master |
| 1.6. Study programme / Programul de studii / calificarea* | Artificial Intelligence and Distributed Computing |

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

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|---|---|---|---|---|---|---|---|
| 2.1. Title of the course / Denumirea disciplinei | Distributed methods and technologies based on XML | | | | | | |
| 2.2. Teacher in charge of the course / Titularul activităților de curs | Teodor-Florin FORTIȘ | | | | | | |
| 2.3. Teacher in charge of the seminar / Titularul activităților de seminar | Teodor-Florin FORTIȘ | | | | | | |
| 2.4. Study year / Anul de studii | 2 | 2.5. Semester / Semestrul | 1 | 2.6. Examination type / Tipul de evaluare: E(xam)/C(olloquim) | E | 2.7. Course type / Regimul disciplinei: M(andatory)/ E(lective)/ F(acultative) | M |

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

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|---|---|---|---|---|---|
| 3.1. Attendance hours per week / Număr de ore pe săptămână | 3 | out of which din care: 3.2 lecture/ curs | 2 | 3.3. seminar/laborator | 1 |
| 3.4. Attendance hours per semester / Total ore din planul de învățământ | 42 | out of which: 3.5 lecture / curs | 28 | 3.6. seminar/laborator | 14 |

| **Distribution of the allocated amount of time / Distribuția fondului de timp*** | **hours/ ore** |
|---|---|
| Individual study /Studiu după manual, suport de curs, bibliografie și notițe | 23 |
| Supplementary documentation at library or using electronic repositories / Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate | 28 |
| Preparing for laboratories, homework, reports etc. /Pregătire seminarii/laboratoare, teme, referate, portofolii și eseuri | 28 |
| Exams / Examinări | 7 |
| Tutoring / Tutorat | 7 |

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| 3.7. Total number of hours of individual study / Total ore studiu individual | 93 |
| 3.8. Total number of hours per | 135 |

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|---|---|
| semester / Total ore pe semestru | |
| 3.9. Number of credits (ECTS) / Număr de credite | 5 |

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

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|---|---|
| 4.1. curriculum / de curriculum | Distributed Systems, Workflow technologies, Parallel computing |
| 4.2. skills / de competențe | *C1. Programarea în limbaje de nivel înalt*<br>*C2. Dezvoltarea şi întreținerea aplicațiilor informatice.*<br>*C4. Utilizarea bazelor teoretice ale informaticii.*<br>*C5. Utilizarea şi administrarea sistemelor de calcul, bazelor de date şi reţelelor de calculatoare*<br>C1. Programming in high level languages<br>C2. Development and maintenance of computer applications.<br>C4. Use of theoretical basis of computer science.<br>C5. Use and management of computing systems, databases, computer networks. |

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

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| 5.1. for the lecture / de desfășurare a cursului | *Sală de curs, dotată corespunzător: tablă, laptop/proiector, software adecvat.*<br>Lecture room, at least with: laptop/head projector, corresponding software |
| 5.2. for the seminar, laboratory / de desfășurare a seminarului/laboratorului | *Sală de laborator, dotată corespunzător: tablă, laptop/proiector, calculatoare, rețea, legătură internet, software adecvat.*<br>Laboratory room, at least with: whiteboard, laptop/projector, computers with network access to internet, corresponding software. |

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

| | |
|---|---|
| Professional skills / Competențe profesionale | C2. Dezvoltarea şi întreținerea aplicațiilor informatice.<br>C3. Utilizarea instrumentelor informatice in context interdisciplinar<br>C5. Utilizarea şi administrarea sistemelor de calcul, bazelor de date şi reţelelor de calculatoare<br>CE2. Utilizarea conceptelor, tehnicilor şi instrumentelor software specifice pentru proiectarea şi implementarea de aplicații web, interfețe grafice şi sisteme inteligente |
| Transversal skills / Competențe transversale | *Utilizarea unor metode şi tehnici eficiente de învăţare, informare, cercetare şi dezvoltare a capacităţilor de valorificare a cunoştinţelor, de adaptare la cerinţele unei societăţi dinamice şi de comunicare în limba română şi într-o limbă de circulaţie internaţională*<br>The use of effective methods and techniques of learning, information, research and development of the capacity of knowledge exploitation, of adapting to the requirements of a dynamical society, and communication in Romanian and in a foreign language. |

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

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|---|---|
| 7.1. General objective / Obiectivul general al disciplinei | *Capacitatea de a înțelege și utiliza noțiunile de bază legate de utilizarea tehnologiilor XML pentru realizarea aplicațiilor distribuite*<br>*Capacitatea de a rezolva probleme în contextul aplicațiilor distribute și concurente bazate pe XML*<br>The capacity to understand and use of basic knowledge related with XML technologies, for the development of distributed applications.<br>The capacity to solve problems in the context of XML-based distributed and concurrent application. |
| 7.2. Specific objectives / Obiectivele specifice | *Ob.1. Să înțeleagă și utilizeze noțiunile de bază XML; 2. Să identifice mecanisme de construcție a aplicațiilor bazate pe XML; 3. Să identifice mecanisme de comunicare bazate pe XML; 4. Să înțeleagă noțiunile legate de comunicare bazată pe XML;*<br>*Ob.5. Să identifice tehnologiile XML; 6. Să identifice mecanisme și șabloane specifice; 7. Să stabilească oportunitatea utilizării mecanismelor și șabloanelor specifice.*<br>*Ob. 8. Să argumenteze necesitatea utilizării mecanismelor de specifice; 9. Să argumenteze importanța utilizării XML în aplicații concurente și distribuite.*<br>Ob.1. To understand and use basic XML notions; 2. To identify building mechanisms for XML-based applications; 3. To identify XML-based communication means; 4. To understand the notions related with XML-based communication<br>Ob.5. To identify XML technologies; 6. To identify specific mechanisms and technologies; 7. To establish the opportunity of using specific mechanisms and technologies;<br>Ob.8 To argue the necessity of using specific mechanisms; to argue the relevance of using XML in the context of distributed applications |

**8. Content / Conținuturi***

| **8.1. Lecture / Curs** | **Teaching strategies / Metode de predare** | **Remarks, details / Observații** |
|---|---|---|
| 1. Introduction. XML structures, XML technologies, XML-based web services. Basic concepts. (Ob.1,2) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 2. The XML language. Basics of the XML language. (Ob.1,2) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 3. XSD. Technologies for data type specification. Simple data types. Complex data types. | Interactive exposure, problem solving, heuristic conversation, | 1 week, 2 hours<br>All materials are available via the e-uvt.ro |

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| (Ob.1,2,5) | documentation on the web, exemplification. | facilities |
| 4. Remote procedure calls. XML-RPC. Use of XML-RPC for the development of client-server web applications. (Ob.1,2,3,6) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 5. Processing instructions. XML expath. XPath and XQuery (Ob.1,2,3,6) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 6. SOAP and WSDL. SOAP messages, SOAP requests. (Ob.1,2,3,5) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 7. Web Services Description Language. SOAP and WSDL usage. Describing and using web services (Ob.1,2,4,5) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 8. Synchronous and asynchronous web services. Endpoints. (Ob.1,2,4,5) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 9. XSLT transformations. Sablotron and Xalan libraries. Using XSLT for XML transformations. (Ob.1,2,3,5) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 10. SOA architecture. SOA concepts. SOA components. (Ob.1,2,4,5) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 11. Developing graphical interfaces: XForms, XML Pipelines, page flows. Integration of graphical interface (Ob.1,2,3,6) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 12. Languages for business processes: BPEL. Specific WSDL extensions. (Ob.1,2,3,4,5,6) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |

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| | exemplification. | |
| 13. Description of BPEL processes. BPEL activities. Process execution. Installing and configuring services. (Ob.1,2,3,4,5,6) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 14. Testing WEB Services: BPEL UNIT, SOAP UI, other specific tools. (Ob.1,2,5,6) | Interactive exposure, problem solving, heuristic conversation, documentation on the web, exemplification. | 1 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |

**References/Bibliografie**

[1] http://www.openwddx.org, The OpenWDDX white paper
[2] Adam Freeman, Allen Jones, Microsoft .NET XML Web Services Step by Step, Microsoft Press; 1 edition, 2002, ISBN: 0735617201
[3] Brian Benz, John Durant, XML Programming Bible (2nd edition), John Wiley & Sons, 2003, ISBN: 0764538292
[4] Scott Short, Building XML Web Services for the Microsoft .NET Platform, Microsoft Press, 2002, ISBN: 0735614067
[5] Michael C. Daconta, Leo J. Obrst, Kevin T. Smith, The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management, Wiley, 2003, ISBN: 0471432571
[6] Lucinda Dykes, Ed Tittel, Chelsea Valentine, XML Schemas, Sybex Inc, 2002, ISBN: 0782140459
[7] R. Allen Wyke, Sultan Rehman, Brad Leupen, XML Programming, Microsoft Press, 2002, ISBN: 0735611858
[8] Eric Newcomer, Understanding Web Services: XML, WSDL, SOAP, and UDDI, Addison-Wesley Professional, 2002, ISBN: 0201750813
[9] James Snell, Doug Tidwell, Pavel Kulchenko, Programming Web Services with SOAP, O'Reilly, 2001, ISBN: 0596000952
[10] Harvey M. Deitel, Paul J. Deitel, B. DuWaldt, L. K. Trees, Web Services: A Technical Introduction, Prentice Hall PTR, 2002, ISBN: 0130461350

| **8.2. Seminar, lab / Seminar, laborator** | **Teaching/learning strategies / Metode de predare/ invățare** | **Remarks, details / Observații** |
|---|---|---|
| 1. The XML language. General information. XML libraries (Ob.1,2,8) | Excercise, conversation and debate, modelling, project, working in organized groups. | 2 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 2. Developing XML language. SAX and DOM. Parsing XML files (Ob.1,2,8) | Excercise, conversation and debate, modelling, project, working in organized groups. | 2 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 3. Developing XML files. XML validation. DTD and XSD validation. (Ob.1,2,8) | Excercise, conversation and debate, modelling, project, working in organized groups. | 2 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |

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| 4. Querying XML files: pointing technologies. Xpath and XQuery (Ob.1,2,8,9) | Excercise, conversation and debate, modelling, project, working in organized groups. | 2 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 5. Transforming XML files: XSLT and XSL-FO (Ob.1,2,8,9) | Excercise, conversation and debate, modelling, project, working in organized groups. | 2 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 6. Developing intelligent interfaces: XHTML and XForms (Ob.1,2,5,6) | Excercise, conversation and debate, modelling, project, working in organized groups. | 2 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |
| 7. Case study: integration of XML technologies (Ob.5,6,7,8) | Excercise, conversation and debate, modelling, project, working in organized groups. | 2 week, 2 hours<br>All materials are available via the e-uvt.ro facilities |

**References/Bibliografie**

[1] http://www.openwddx.org, The OpenWDDX white paper
[2] Adam Freeman, Allen Jones, Microsoft .NET XML Web Services Step by Step, Microsoft Press; 1 edition, 2002, ISBN: 0735617201
[3] Brian Benz, John Durant, XML Programming Bible (2nd edition), John Wiley & Sons, 2003, ISBN: 0764538292
[4] Scott Short, Building XML Web Services for the Microsoft .NET Platform, Microsoft Press, 2002, ISBN: 0735614067
[5] Michael C. Daconta, Leo J. Obrst, Kevin T. Smith, The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management, Wiley, 2003, ISBN: 0471432571
[6] Lucinda Dykes, Ed Tittel, Chelsea Valentine, XML Schemas, Sybex Inc, 2002, ISBN: 0782140459
[7] R. Allen Wyke, Sultan Rehman, Brad Leupen, XML Programming, Microsoft Press, 2002, ISBN: 0735611858
[8] Eric Newcomer, Understanding Web Services: XML, WSDL, SOAP, and UDDI, Addison-Wesley Professional, 2002, ISBN: 0201750813
[9] James Snell, Doug Tidwell, Pavel Kulchenko, Programming Web Services with SOAP, O'Reilly, 2001, ISBN: 0596000952
[10] Harvey M. Deitel, Paul J. Deitel, B. DuWaldt, L. K. Trees, Web Services: A Technical Introduction, Prentice Hall PTR, 2002, ISBN: 0130461350

**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**

The content of the course corresponds with curricula of other universities in Romania or the European Union. The contents of practical work (labs) meet the requirements of the local labor market.

**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 averaged mark / Pondere din nota finală |
|---|---|---|---|
| 10.4. Lecture / Curs | The evaluation is based on the following items:<br>• General knowledge, use of XML applications, use of XML supporting technologies (like XSD, XPath, WSDL, etc.)<br>• Detailed knowledge, use of XML technologies for the development of applications of medium complexity, in an heterogeneous environment.<br>• Advanced knowledge, applying acquired mechanisms for complex problems, eventually by using different communication means. | Written examination; active participation in course activities. | 40 |
| 10.5. Seminar/ lab | The evaluation is based on the following items:<br>• General knowledge, use of XML applications, use of XML supporting technologies (like XSD, XPath, WSDL, etc.)<br>• Detailed knowledge, use of XML technologies for the development of applications of medium complexity, in an heterogeneous environment.<br>• Advanced knowledge, applying acquired mechanisms for complex problems, eventually by using different communication means. | Homework evaluation, additional activities; homework evaluation, active participation in laboratory activities | 40 |
| | Homeworks and project activities cover specific parts, as they were exposed during the semester, and their solution is based on laboratory activity | Individual or group project. | 20 |
| 10.6. Minimal knowledge for passing / Standard minim de performanță | | | |
| Written exam:<br>• For the minimum grade the student is expected to show an average level of understanding (at least 60%) for the general knowledge, and a minimal level of understanding for the detailed knowledge, as presented before, eventually via the description of an average proof concept project.<br>• For the maximum grade (10) the student is required to show a superior level of understanding (at least 80%) for the advanced knowledge.<br>Practical and laboratory activities :<br>• For the minimum grade the student is expected to show an average level of understanding (at least 60%) for | | | |

the general knowledge, and a minimal level of understanding for the detailed knowledge, as presented before, eventually via the description of an average proof concept project.

- For the maximum grade (10) the student is required to show a superior level of understanding (at least 80%) for the advanced knowledge.

The final grade is based on an average of the two grades (written and practical exams). The minimal grade can be achieved only if an average of at least 50% of the maximum result was achieved and at least 45% of the maximum result for each of the two components was realized.

All the results can be considered for any future examination during the same university year, provided they represent at least 50% of the maximum grade for the corresponding component.

| Date/ Data completării | Signature (lecture) / Semnătura titularului de curs | Signature (seminar) Semnătura titularului de seminar |
|---|---|---|
| 07/10/2016 | Conf.dr. Teodor-Florin FORTIŞ | Conf.dr. Teodor-Florin FORTIŞ |

Signature (director of the department)
Semnătura directorului de departament
Conf.dr. Victoria Iordan