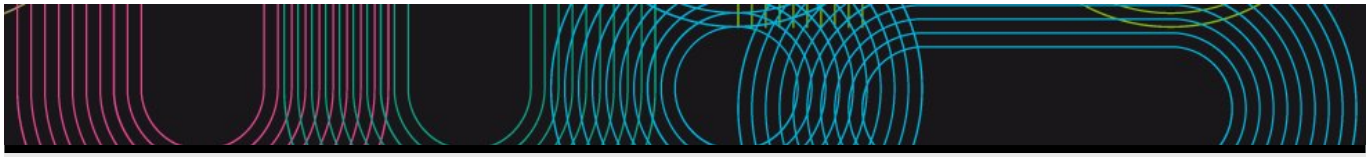

| IDENTIFYING DATA | | | | |
|---|---|---|---|---|
| **Architectures and Services** | | | | |
| Subject | Architectures and Services | | | |
| Code | V05G300V01645 | | | |
| Study programme | (*)Grao en Enxeñaría de Tecnoloxías de Telecomunicación | | | |
| Descriptors | ECTS Credits | Choose | Year | Quadmester |
| | 6 | Optional | 3rd | 2nd |
| Teaching language | Spanish | | | |
| Department | | | | |
| Coordinator | Fernández Vilas, Ana | | | |
| Lecturers | Díaz Redondo, Rebeca Pilar<br>Fernández Vilas, Ana | | | |
| E-mail | avilas@det.uvigo.es | | | |
| Web | http://faitic.uvigo.es | | | |
| General description | This course focuses on the architectonic solutions for the design of distributed systems. More specifically, the course is oriented to sscenarios based on services (service-oriented architectures) and the deploymen SOA solutions by means of Web Services Technologies (WS-*). Taking the WS-* stack as our techonologcal layout, the course lokks through the description, discovery and invocation of services in an SOA. Finally, The course introduces models for services composition in SOA (again using Web Services as deployment technology). | | | |

| Competencies | |
|---|---|
| Code | |
| A3 | CG3: The knowledge of basic subjects and technologies that capacitates the student to learn new methods and technologies, as well as to give him great versatility to confront and update to new situations |
| A4 | CG4: The ability to solve problems with initiative, to make creative decisions and to communicate and transmit knowledge and skills, understanding the ethical and professional responsibility of the Technical Telecommunication Engineer activity. |
| A6 | CG6: The aptitude to manage mandatory specifications, procedures and laws. |
| A38 | CE29/TEL3 The ability to build, operate and manage computer services using planning, sizing and analytical tools |
| A41 | CE32/TEL6 The ability to design networks and service architectures. |

| Learning aims | |
|---|---|
| Expected results from this subject | Training and Learning Results |
| The ability to build, operate and manage computer services using planning, sizing and analytical tools | A38 |
| The ability to design networks and service architectures | A41 |
| The knowledge of basic subjects and technologies that capacitates the student to learn new methods and technologies, as well as to give him great versatility to confront and update to new situations | A3 |
| The ability to solve problems with initiative, to make creative decisions and to communicate and transmit knowledge and skills, understanding the ethical and professional responsibility of the Technical Telecommunication Engineer activity. | A4 |
| The aptitude to manage mandatory specifications, procedures and laws. | A6 |

| Contents |
|---|
| Topic |

| | |
|---|---|
| Introduction | Distributed Systems.<br>Client-server Model: RPC.<br>Message Middlewares.<br>Web Services and SaaS.<br>SOA : Roles, operations, layers. |
| Web Services | Simple SOA with REST.<br>API Styles for Web Services.<br>RPC, messages and resources APIs.<br>Stack of Web Services technologies. |
| Technological Basis | Review of XML.<br>SOAP Protocol & Messages.<br>WSDL: Description of Services.<br>Services Discovery. |
| Designing Services | Design of Web Services.<br>Web Service LifeCycle.<br>Implementation Axis/TomCat. |
| Composing Services | Model of composition<br>Orchestration and choreography<br>Orchestration with WS-BPEL<br>Description of choreography: WS-CDL |

**Planning**

| | Class hours | Hours outside the classroom | Total hours |
|---|---|---|---|
| Master Session | 19 | 38 | 57 |
| Practice in computer rooms | 8 | 8 | 16 |
| Troubleshooting and / or exercises | 3 | 6 | 9 |
| Workshops | 2 | 6 | 8 |
| Projects | 2 | 28 | 30 |
| Presentations / exhibitions | 2 | 8 | 10 |
| Practical tests, real task execution and / or simulated. | 4 | 8 | 12 |
| Long answer tests and development | 2 | 6 | 8 |
| *The information in the planning table is for guidance only and does not take into account the heterogeneity of the students. | | | |

**Methodologies**

| | Description |
|---|---|
| Master Session | Classes that will combine the exhibition of the concepts and small exercises. These will be resolved by the teachervor by the students individually and/or in groups. The aim is to boost the debate in the class and reinforce the acquisition of skills.<br>COMPETENCES: A3, A41, A38 |
| Practice in computer rooms | During all the course, the lab sessions will be devoted to the development of small prototypes that allow to materialise the fundamental concepts of the course.<br>COMPETENCES: A4, A6 |
| Troubleshooting and / or exercises | In the laboratory or in the classroom, the professor will pose small challenges that will be resolved collectively so that the students can discuss abouth the underlying concepts and the different options.<br>COMPETENCES: A3, A4. |
| Workshops | The workshops will be devoted to the discussion of real cases and to the follow-up of the project of the course.<br>COMPETENCES: A4, A6 |
| Projects | The students, in groups, will develop a software system whose requirements will be established in the 9th week of the teaching period. The follow-up of the project will be carried out during the workshops.<br>COMPETENCES: A38, A41 |
| Presentations / exhibitions | Each workhroup will justify in a oral presentation the adopted solution for the course project. The presentation will take place the last week of the teaching period.<br>COMPETENCES: A4 |

**Personalized attention**

| Methodologies | Description |
|---|---|
| Projects | During the second part of the course, the students (organised in groups) will tackle the design and implementation of a telematic system using the architectonic and technological principles of Web Services. Each group will be continuously guided (weekly) about the adopted solution (workshops of the course). |

| | |
|---|---|
| Workshops | During the second part of the course, the students (organised in groups) will tackle the design and implementation of a telematic system using the architectonic and technological principles of Web Services. Each group will be continuously guided (weekly) about the adopted solution (workshops of the course). |

## Assessment

| | Description | Qualification |
|---|---|---|
| Projects | Each workgroup will deliver the course project during the penultimate week of the teaching period. The delivery will consist of the design, implementation and documentation. After delivering the project, a practical test will be performed (last week of the course) on the project implemented by each of the groups .<br>COMPETENCES: A4, A5, A41 | 20 |
| Presentations / exhibitions | Each workgroup will justify in an oral presentation the solution adopted in his project. The presentation will take place the last week of the teaching period with the professors of the course.<br>COMPETENCES: A4 | 10 |
| Practical tests, real task execution and / or simulated. | This test will take place the last week of the teaching period. Individually, each student will solve an exercise that show his/her skills in using the main technologies of the course in some practical context.<br>COMPETENCES: A5, A38 | 20 |
| Long answer tests and development | Individual writing test will take place in the date indicated in the official calendar of exams. Books, class notes and other matrial will not be allowed during the exam.<br>COMPETENCES: A38, A41, A3. | 50 |

## Other comments on the Evaluation

The student can follow up an assesment model of continuous evaluation or can do a final exam.

**CONTINUOUS EVALUATION**

The CONTINUOUS EVALUATION consists in the assesment activities mentioned previously. The student can choose to follow up continuous evaluation in week 7, after the first two assessments of the course. After that, workgroups are created in order to tackle the collaborative development the course project. From this moment, the final mark never will be "not taken" (incomplete).

The maximum mark for the activities in continuous evaluation is the following:

1. Individual writing test: Official calendar (Maximum 5 points).
2. Intermediate Test I: Practical Test (Maximun 1 point).
3. Intermediate Test II: Practical Test (Maximun 1 point).
4. Project: Design, implementation and deployment (Maximum 3 points) .

The student passes the course if he/she obtains at least 2 points in "Individual Wirting Test"(1); a minimum of two points in the other sections (2, 3 , and 4); and a total score (sum of the assessment activities) equal or upper to 5 points. The maximum score is 10 points.

**FINAL EXAM**

The evaluation by means of a FINAL EXAM will consist of the following parts (Tests will not be recoverable):

1. Writing Test: Maximum of 5 points. A minimum punctuation of 2,5 points will be required.
2. Individual Project: Delivered during the last week of teaching. It will include design, implementation and documentation. The maximum score is 2 points.
3. Practical test: In the lab. The maximum score is 3 points but a minimum of 1.5 points is required.

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In any case, the course is considered passed if the student receives the minimum qualifications in both the written and the practical test and a total score (resulting from the sum of those obtained in sections 1, 2 and 3 ) equal or greater than 5

**EXAMINATION AT THE END OF THE COURSE**

For the examination ath the END OF THE COURSE, all the students will are assesed in the modality of final exam as it has described previously.

## Sources of information

### BASIC BIBLIOGRAPHY


- Web Services & SOA: Principles and Technology. Michael Papazoglou. Pearson Education, 2012 . ISBN-10: 0273732161
- Building Web Services with Java: Making Sense of XML, SOAP, WSDL, and UDDI .By Steve Graham, Doug Davis, Simeon Simeonov, Glen Daniels, Peter Brittenham, Yuichi Nakamura, Paul Fremantle, Dieter Koenig, Claudia Zentner. Sams, 2004. ISBN-10: 0-7686-6348-2.
- Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services. Thomas Erl. Prentice Hall, 2004. *ISBN-10: 0131428985.


### COMPLEMENTARY BIBLIOGRAPHY


- Understanding Web Services: XML, WSDL, SOAP, and UDDI. Eric Newcomer. Addison-Wesley Professional; 1 edition, 2002. ISBN-10: 0201750813.
- SOA Using Java Web Services. Mark D. Hansen. Prentice Hall, 2007. ISBN-10: 0130449687.
- Distributed Systems: Concepts and Design (5th Edition). George F. Coulouris. Addison Wesley, 2011. ISBN-10: 0132143011.
- Web Services: A Technical Introduction. Harvey M. Deitel, Paul J. Deitel, B. DuWaldt, L. K. Trees. Prentice Hall, 2002. ISBN-10: 0130461350.
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- Principles of Transaction Processing, Second Edition. Eric Newcomer. Morgan Kaufman; 2 edition , 2009. ISBN-10: 1558606238.
- Service Oriented Architecture with Java: Using SOA and Web Services to build powerful Java applications. Binildas To. Christudas. Packt Publishing, 2008) . ISBN-10: 1847193218.
- Applied SOA: Service-Oriented Architecture and Design Strategies. Michael Rosen .Wiley; 1 edition , 2008. ISBN-10: 0470223650.
- SOA Principles of Service Design. Thomas Erl. Prentice Hall; 1 edition, 2007. ISBN-10: 0132344823.
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- Programming the World Wide Web (6th Edition). Robert W. Sebesta . Addison Wesley; 6 edition, 2010. ISBN-10: 0132130815.
- Internet & World Wide Web: How to Program (4th Edition)". P.J. Deitel. Prentice Hall; 4 edition, 2007). ISBN-10: 0131752421.


## Recommendations

### Subjects that are recommended to be taken simultaneously

Distributed and Concurrent Programming/V05G300V01641
Information Systems/V05G300V01644

### Subjects that it is recommended to have taken before

Internet Services/V05G300V01501