### Software Service Engineering\(^1\) - Syllabus - a.y. 2015/2016

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<th>Introduction to the course. Objectives, tentative syllabus, organization and motivations of the course. A first gentle introduction to Web services.</th>
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### I. Web Services

1. **Introduction to Web services**
   - Definition of service and of service-oriented computing, properties and characteristics of services. Introduction to SOA, WS technology stack, QoS, SLAs and REST.
   - Ch.1 of [Pap12]

2. **Core standards of Web services**
   - Ch.3 of [Pap12]
   - **SOAP**: Structure of messages, communication model, fault handling, SOAP over HTTP.
   - Ch.4 of [Pap12]
   - **WSDL**: WSDL abstract interfaces, concrete interfaces, message exchange patterns.
   - Ch.5 of [Pap12]

3. **Service composition**
   - Sect.9.7 of [Pap12], Sect.11.6,12.7,15 of [BPEL], [TN1] [S1]
   - [Aal98] (but 4.5,4.6,5.4,6) [S2]

4. **Enhanced service descriptions**
   - **Service policies**: Types of service policies, WS-Policy. Predicting the QoS of service orchestrations.
   - Ch.12 of [Pap12] [S3]
   - **Including behaviour information in service descriptions**: Motivations, potential impact of behaviour analysis, need of suitable abstractions, relation between abstraction and analysis, examples of formalisms for expressing service behaviour.
   - [Bro11], [S4]

5. **RESTful services**
   - **RESTful services**: Motivations, principles, strengths and weaknesses of REST, WS-* vs. REST.
   - Sect.1.12 of [Pap12], [S5]

### II. Cloud Computing

6. **Introduction to cloud computing**
   - Motivations, business model, service models, deployment models, obstacles to cloud adoption, datacenters and green concerns. Lock-in issues.
   - Sec. 18.1 of [Pap12], [Arm10] [S6]

7. **Emerging cloud standards**
   - **OASIS CAMP**: OASIS TOSCA. Seamless adaptive multi-cloud management of service-based applications.
   - [S7], [Lip13], [S8] [TOSCA],[S9]

8. **Dockers**
   - Hands-on introduction to Docker.
   - [TN2] [LAB*]

### III. Lab

#### Programming Web services with Java
   - Introduction to JAX. Hands-on keyboard development and orchestration of Web services with JAX.

#### Developing WS-BPEL processes
   - Introduction to developing services with GlassFish. Hands-on keyboard development of WS-BPEL processes with GlassFish.

#### Specifying cloud applications in TOSCA
   - Analysing and modifying TOSCA yaml specs.

### References\(^2\)

- [TOSCA] TOSCA Simple Profile in YAML Version 1.0.

### Teaching notes and slides

- [S0] A. Brogi, J. Soldani. Programming Web Services with JAX-WS.
- [S1] A. Brogi. Orchestrating services: From Java to WS-BPEL.
- [S3] A. Brogi. Including behaviour information in service contracts.
- [S4] A. Brogi. RESTful services.
- [S7] A. Brogi. CAMP.
- [S8] A. Brogi, J. Soldani. TOSCA.
- [LAB*] A. Brogi, J. Soldani. <All slides used in the lab.>

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1. The syllabus of the Software Services course does not include the lab topics.
2. A copy of [Pap12] is available in the library of Mathematics, Computer Science and Physics. Students can get a copy of the other references, as well as of the other material distributed during the course, by sending an email to the Instructor from their *unipi* account.