



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Service-Oriented Architectures

### Course

Field of study

Year/Semester

Computing

1/2

Area of study (specialization)

Profile of study

Distributed Systems

general academic

Level of study

Course offered in

Long-cycle studies

Form of study

Requirements

full-time

elective

### Number of hours

Lecture

Laboratory classes

Projects/seminars

30

30

0

### Number of credit points

5

### Lecturers

Responsible for the course/lecturer:

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wydział:

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Responsible for the course/lecturer:

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### Prerequisites

#### Course objective

1. Learn the fundamentals of designing enterprise application according to the Service Oriented Architecture.
2. Understand how to solve performance, availability and security problems of enterprise applications.
3. Learn teamwork skills.

#### Course-related learning outcomes

Knowledge



## Skills

### Social competences

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

- reports and assignments; includes teamwork
- final project presentation
- final test of choice - 30 single-choice questions, 15 correct answers required to pass

#### Programme content

##### Lectures:

Introduction to SOA: motivation, basic concepts, use cases. Service classification: business services, proxy services, process services, orchestration services, helper services. Overview of development technologies for SOAP Web Services. Review of the basic XML technologies: XML Schema, XPath, XSLT. Basic standards and protocols: SOAP, WSDL, UDDI. Security standards: WS-Security, WS-SecurityPolicy, SAML. Java Enterprise Edition application server security features. Binary data transmission to/from Web Services: SOAP with Attachments, MTOM/XOP. Web Service Reliable Messaging (WSRM). Conversational Web Services. Development approaches for SOAP Web Services: Top-down, Bottom-up. Microservice Architecture concepts. RESTful Web Service concepts and implementation. Introduction to process and orchestration services. Business process modeling using BPEL. Implementing process services: business service invocation, security, transactions, adapters, business rules. Introduction to proxy services: ESB – Enterprise Service Bus, interaction models, security, SLA rules, monitoring. SOA deployment strategies, design patterns. Service-oriented analysis. SOA Governance.

##### Labs:

SOAP/RESTful Web Service modeling, design and development using Java Spring Boot, following the Top-down and Bottom-up approaches. Developing SOAP/RESTful Web Service clients. Using Apache Camel to orchestrate SOAP/RESTful Web Service invocations. Developing GUI for process services. Using message brokers for the Microservice Architecture. Deployment on containers. Database integration. Advanced final software projects.

#### Teaching methods

Lecture: multimedia presentation, illustrated with examples given on the board.

Laboratory exercises: a multimedia presentation, a presentation illustrated with examples given on the board and tasks given by the lecturer, practical exercises.



## Bibliography

### Basic

1. Enterprise SOA: Service-Oriented Architecture Best Practices, Dirk Krafzig, Karl Banke, Dirk Slama, Prentice Hall PTR, 2004
2. Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services, Thomas Erl, Prentice Hall PTR, 2004
3. BPEL Cookbook: Best Practices for SOA-based Integration and Applications Development, editors: Harish Gaur, Markus Zirn, PACKT Publishing, 2006
4. Service-Oriented Architectures: Concepts, Technology, and Design, Thomas Erl, Prentice Hall PTR, 2005

### Additional

## Breakdown of average student's workload

	Hours	ECTS
Total workload	120	5,0
Classes requiring direct contact with the teacher		