**Modern concepts of distributed software systems engineering**

**Course title:**

| **Modern concepts of distributed software systems engineering** |
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| **Course timing:** | **May 16, 2017** |
| **Mode of study:** | **Lectures: 6 hours, Practice: 4 hours, Total: 10 hours** |
| **Study materials:** | **Announced May 5th on http://edu.susu.ru** |

**Prerequisites for entering the course:**

| Students should know basic principlesof software development lifecycle, principles of service-oriented architecture, web-services, have a knowledge of REST approach. |
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**Course summary:**

| This courseis devoted to methods and organizational principles of engineering of modern distributed software systems using microservices architecture on a basis of containerized cloud platforms.<br>Course is lectured by *Assoc. Prof. Gleb Radchenko* (South Ural State University (SUSU), Chelyabinsk, Russia). Gleb Radchenko is Dean of School of Electrical Engineering and Computer Science of SUSU. His research interests include distributed computing systems, cloud and grid computing, service-oriented architecture. |
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**Course outline:**

| # | Title | Duration | Summary |
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| **Lectures** | | | |
| 1 | Introduction to distributed systems and cloud computing. | 2 hours | Definitions and types of distributed systems. Classification of distributed computing systems. Centralization and decentralization.Issues of distributed computing systems. Basic algorithms. Modern trends in distributed systems and cloud platforms. |
| 2 | Microservices | 2 hours | Microservices architecture. Comparing monolith and microservice architecture approach. Patterns of microservice applications engineering. Distributed data management in microservice systems. |
| 3 | Containerization and DevOps | 2 hours | Containerization VS Virtualization. Docker – implementation of containerization approach. Stand-alone containers and container clusters. |
| Practice | | | |
| 4 | Working with distributed computing systems | 4 hours | Implementation and deployment of standalone container application. Cloud deployment of containerized applications. Scalability of multi-container applications. |

**Reading:**


1. Sam Newman Building Microservices: Designing Fine-Grained Systems. O'Reilly, 2015. 280 p.
2. Robert Daigneau. Service Design Patterns: Fundamental Design Solutions for SOAP/WSDL and RESTful Web Services. Addison-Wesley, 2011. 352 p.
3. James Turnbull. The Docker Book: Containerization is the new virtualization. 2014. 345 p,
4. Docker Engine user guide. https://docs.docker.com/engine/userguide/
5. Mikito Takada. Distributed systems: for fun and profit.http://book.mixu.net/distsys/

**Software:**

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| **Docker; Amazon Web Services; IBM Bluemix** |

**Course timetable:**

| Date | Time | Classes |
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| **May 16th** | **9:00-13:00** | **Lectures** |
| | **14:00-17:00** | **Practice** |