

# EE614 – Service-Oriented Computing

Fall 2017

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**Instructor:** Prof. Chan-Hyun Youn

**Class Hours:** Every Tue, Thr (10: 30 ~ 11: 45 AM)

**Prerequisites:** Programming skills on C, C++ or Java, Network programming, Distributed System

**Classroom:** E3-2 Bldg, Rm3228

**Office Hours:** Every Tue, Thr (2:00 ~ 3:00 PM)

**Assistant:** Seoung-Hwan Kim

**Assistant's Office Hours:** Every Wed. (2:00 ~ 4:00 PM)

**Text:** Required Textbook

- UNIX Network Programming, Socket Networking API, R. Stevens, Addison Wesley, 2004
- UNIX Network Programming, Interprocess Communication, Richard Stevens, Prentice Hall, 1999
- Distributed Systems Concepts and Design, G. Coulouris, Addison-Wesley, 2001

**Reference:**

- Lecture Notes on Distributed Computing System, KAIST EE
- Middleware for Communication, Edited by Q.H. Mahmoud, John Wiley and Sons(2004)
- T. White. Hadoop: The Definitive Guide. O'Reilly, 2009

**Grading Policy:**

Index	Mid-term	Lab and Reports	Final Exam/ Term Project	Assignments		Attendance	Total
				Homework	Quiz		
Rate	20%	30%	20%	15%	10%	5%	100%

**Objective:**

Service oriented computing became an important platform for web-scale application development. This course introduces key concepts and techniques underlying the design and engineering of service-oriented computing systems, even for the service-oriented framework to build cloud applications. Through this course, students are expected to gain the capability of implementing service-oriented computing system. As for the service-oriented computing, this course also will offer practical labs in the course of lessons.

# Course Schedule

Fall 2017

Week	Contents	Remark
1 <sup>st</sup> week	<ul style="list-style-type: none"> <li>– Introduction to Service-Oriented Computing (SOC)</li> <li>– Review of UNIX Process (Lab 1. Process Control and Signal Handling)</li> <li>– Review of Inter-Process Communication (Lab 2. Inter-Process Communication - PIPE/ FIFO/MQ/Shared Memory)</li> </ul>	– Lab Reports
2 <sup>nd</sup> week	<ul style="list-style-type: none"> <li>– Review of Socket Programming (Lab 3. TCP Socket Programming)</li> <li>– Review of Concurrent Server Programming (Lab 4. Concurrent Server Programming – Muti-Process / Multi-Thread / I/O Multiplexing)</li> </ul>	<ul style="list-style-type: none"> <li>– Lab Reports</li> <li>– HW #1. Performance Analysis under Concurrent Server Environments</li> </ul>
3 <sup>rd</sup> week	<ul style="list-style-type: none"> <li>– Server-Client Model and RPC (Lab 5. JAVA RPC Programming / gRPC Programming)</li> <li>– Introduction to Web Service</li> <li>– Web Service Computing – SOAP (Lab 6. SOAP based Web Service Programming)</li> </ul>	– Lab Reports
4 <sup>th</sup> week	<ul style="list-style-type: none"> <li>– Web Service Computing - RESTful (Lab 7. RESTful based Web Service Programming)</li> <li>– (Lab 8. Performance Analysis on Web Services using Apache Benchmark)</li> </ul>	<ul style="list-style-type: none"> <li>– Lab Reports</li> <li>– HW #2. RPC Packet Analysis using Wireshark</li> </ul>
5 <sup>th</sup> week	<ul style="list-style-type: none"> <li>– Challenges in Building Large Scale Web Services</li> <li>– Build up Media Streaming Service (Lab 9. Build up DASH Server and monitor service quality)</li> <li>– How to Build a Large Scale Web Service (Lab 10. Build up Large Scale DASH Server using Cache and Load-balancer)</li> </ul>	– Lab Reports
6 <sup>th</sup> week	<ul style="list-style-type: none"> <li>– Technical Issues in Distributed Computing and Message Oriented Middleware (Lab 11. MOM-based Image Transfer)</li> <li>– Object Oriented Middleware (Lab 12. Transaction Processing using Java RMI)</li> </ul>	<ul style="list-style-type: none"> <li>– Lab Reports</li> <li>– HW #3. Discussion on Building up Large Scale Web Service (Include Reading Assignment)</li> </ul>
7 <sup>th</sup> week	<b>Midterm Exam</b>	

8 <sup>th</sup> week	<ul style="list-style-type: none"> <li>– HPC: MPI Applications (Lab 13. Problem solving with MPI)</li> <li>– Workflow computing and Service Scheduling</li> <li>– (Lab 14. Scientific Workflow Scheduling)</li> </ul>	– Lab Reports
9 <sup>th</sup> week	<ul style="list-style-type: none"> <li>– Introduction to Cloud Computing (Lab 15. VM Management with KVM Hypervisor)</li> <li>– (Lab 16. Building Cloud with OpenStack)</li> </ul>	<ul style="list-style-type: none"> <li>– Lab Reports</li> <li>– HW #4. OpenStack Management with RESTful API</li> </ul>
10 <sup>th</sup> week	<ul style="list-style-type: none"> <li>– Cloud Broker Engineering and Resource Management</li> <li>– (Lab 17. Study on Cloud Science Gateway)</li> </ul>	– Lab Reports
11 <sup>th</sup> week	<ul style="list-style-type: none"> <li>– BigData Processing: Hadoop MapReduce and Hadoop Distributed File System (Lab 18. Programming with Hadoop)</li> <li>– (Lab 19. Analysis on Distributed File System)</li> </ul>	<ul style="list-style-type: none"> <li>– Lab Reports</li> <li>– HW #5. Resource Management in Cloud Service Broker (e.g. Science Gateway)</li> </ul>
12 <sup>th</sup> week	<ul style="list-style-type: none"> <li>– Media computing and stream services in Cloud</li> <li>– (Lab 20. QoS Management in streaming service)</li> </ul>	– Lab Reports
13 <sup>th</sup> week	– Future of Service-Oriented Computing	
14 <sup>th</sup> week	– Term Project presentation	
15 <sup>th</sup> week	<b>Final Exam</b>	