Course Outline

1. Document Information

Degree Program	Computer Science
Course Number	CS 412
Course Title	Programming Distributed Applications
Semester Hours	3
Course Coordinator	Chun Hsi-Huang
Revision Term	Spring 2020
Latest Revision	Fall 2020

2. Catalog Description

This course uses advanced features of the Java programming language to develop networked, distributed, and web-based applications. Topics covered include, but are not limited to, sockets, datagrams, the Java security model, threads, multi-tier architectures, Java RMI, Java database connectivity, and Java-based mobile agents.

3. Textbooks

- Deitel, P. & Deitel, H. (2018). Java: How to Program. Pearson/Prentice Hall, 11th Edition. ISBN: 9780134743356.

4. References

- Malleswara, R.& Pattamsetii, R. (2017). Distributed Computing in Java 9: Leverage the Latest Features of Java 9 for Distributed Computing, Packt Publishing. ISBN: 9781787126992.
- Pierfederici, F. (2016). Distributed Computing with Python, Packt Publishing. ISBN: 9781785889691.

5. Course Learning Outcomes

- To learn to develop network and distributed applications and network components.
- To learn advanced topics in Java.

6. Assessment of the Contribution to Student Outcomes

Outcome	1	2	3	4	5	6	7
Assessed		X	X	X	X	X	

7. Prerequisites by Topic

CS 306 with a grade of C or better or graduate standing..

8. Major Topics Covered in the Course

1. Introduction to networking concepts: computer networks and the internet, overview of OSI reference model, overview of TCP and UDP, hosts, ports, sockets and datagram's, client/server architecture {3 classes}
2. Java review: review of object-oriented programming concepts, objects, classes and interfaces in Java, applications vs. applets, programming with Java class libraries {5 classes}
3. Stream based I/O in Java: overview of I/O streams, Java's stream classes, object serialization exception handling {5 classes}
4. Network programming in Java: the java.net package, sockets, data grams, URLs, introduction to Java security model, introduction to threads and concurrent servers {5 classes}
5. Introduction to distributed computing: distributed systems, multi-tier architectures, basic RPC mechanisms, distributed objects {5 classes}
6. Distributed computing with Java RMI: remote interfaces, objects and methods, passing object arguments via serialization, generating stubs and skeletons, registering remote objects, locating and using remote objects {5 classes}
7. Java database connectivity: structured query language, transaction processing {4 classes}
8. Java-based mobile agents: software agent technology, agent platforms {5 classes}
9. Server-side programming: servlets and java server pages {3 classes}

NOTE: When course is taken as 500-level credit (CS 591 "Special Topics"), there will be additional requirements such as a research project.