

## ECE 448/528 – Application Software Design Spring 2022

**Instructor:** Professor Jia Wang (jwang34@iit.edu)

**Prerequisites:** Computer programming. If you haven't been writing programs for a while, please refer to the following book for introductory Java programming.

- “Head First Java”, 2nd Ed., K. Sierra et al., O'Reilly Media, 2005. 978-0596009205

**Class Time and Location:** Mon./Wed. 11:25 AM – 12:40 PM. Lectures will be streamed first and then held in John T. Rettaliata Engg Center 242 after 1/24.

**Class Home Page:** <http://www.ece.iit.edu/~jwang/ece448-2022s/>

**Required Textbook:**

- “Java Network Programming”, 4th, E. R. Harold, O'Reilly Media, 2013. 978-1449357672

**Recommended Textbooks:**

- “Core Java Volume I–Fundamentals”, 10th or later, C. S. Horstmann, Prentice Hall.
- “Core Java Volume II–Advanced Features”, 10th or later, C. S. Horstmann, Prentice Hall.
- “Head First Design Patterns”, E. Freeman et al., O'Reilly Media, 2004. 978-0596007126

**Computer Requirement:** A computer desktop or laptop that is able to run VirtualBox is required for this course. Computers with solid-state drives, at least 16GB of memory, and at least 4 physical processor cores are recommended.

**Course Summary:** This course provides introduction to languages and environments for application software development utilizing Software as a Service (SaaS) for electrical and computer engineers. Student will develop a data-rich web application with server back-end that connects mobile devices and Internet of Things using Agile software engineering practices.

**Topics Covered:**

- The Java ecosystem.
- Client-server architectures and RESTful services.
- Pub/Sub middleware.
- Web user interface design.
- Security; database; data visualization.
- Software engineering and Agile development.

**ECE 448 Grading:** Homeworks 10% / Projects: 110% (20% extra).  
A:  $\geq 90\%$  / B:  $\geq 80\%$  / C:  $\geq 60\%$  / D (undergraduate only):  $\geq 55\%$ .

**ECE 528 Grading:** Homeworks 10% / Projects: 95% (5% extra).  
A:  $\geq 90\%$  / B:  $\geq 80\%$  / C:  $\geq 60\%$ .

**Homework and Project Policy:** Late homeworks and projects will not be graded. Homeworks will be graded based on general approach and completion. Discussions on homeworks/projects are encouraged, but copying will call for disciplinary action.

**Lecture Schedule (tentative):**

No.	Date	Topic	Chapters	HW Out	Project Due
1, 2	1/10, 1/12	Introduction		HW #1	
3	1/17, 1/19	Software Engineering and Java			
4, 5	1/24, 1/26	TCP/IP Networking	1,4-6		Project 1
6, 7	1/31, 2/2	TCP Server Design	3,8,9	HW #2	
8, 9	2/7, 2/9	HTTP			
10,11	2/14, 2/16	Observer and Pub/Sub		HW #3	Project 2
12,13	2/21, 2/23	MQTT			
14,15	2/28, 3/2	Web Application			Project 3
16,17	3/7, 3/9	RESTful Service			
	3/14–3/19	<b>Spring Break</b>			
18,19	3/21, 3/23	JavaScript and DOM		HW #4	Project 4
20,21	3/28, 3/30	Model-View-Controller (MVC)			
22,23	4/4, 4/6	Web UI Design			Project 5
24,25	4/11, 4/13	Data Visualization		HW #5	
26,27	4/18, 4/20	Security			
28,29	4/25, 4/27	Database Integration			Project 6
	5/2–5/6	<b>No Final Exam</b>			Project 7

**Course Objectives (ABET)**

After completing this course, the student should be able to do the following:

1. Understand application software architectures and application software development processes.
2. Utilize event-driven programming to support networking and graphical user interface in application software.
3. Design and implement testable class types. Document and validate functionality via unit testing.
4. Reuse existing class libraries to improve code quality and productivity.
5. Construct reusable class libraries using polymorphism.
6. Utilize design patterns when designing and reusing class libraries.
7. Be familiar with advanced topics including security, database, and data visualization.
8. Design and implement a networked application software with graphical user interface following test-driven and iterative/incremental software engineering practices.

**ADA Statement:** Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources and make an appointment to speak with me as soon as possible. The Center for Disability Resources is located in the Life Sciences Building, room 218, 312-567-5744 or [disabilities@iit.edu](mailto:disabilities@iit.edu).

**Sexual Harassment and Discrimination Information:** Illinois Tech prohibits all sexual harassment, sexual misconduct, and gender discrimination by any member of our community. This includes harassment among students, staff, or faculty. Sexual harassment of a student by a faculty member or sexual harassment of an employee by a supervisor is particularly serious. Such conduct may easily create an intimidating, hostile, or offensive environment. Illinois Tech encourages anyone experiencing sexual harassment or sexual misconduct to speak with the Office of Title IX Compliance for information on support options and the resolution process. You can report sexual harassment electronically at [iit.edu/incidentreport](https://iit.edu/incidentreport), which may be completed anonymously. You may additionally report by contacting the Title IX Coordinator, Virginia Foster at [foster@iit.edu](mailto:foster@iit.edu) or the Deputy Title IX Coordinator at [eespeland@iit.edu](mailto:eespeland@iit.edu). For confidential support, you may reach Illinois Tech's Confidential Advisor at (773) 907-1062. You can also contact a licensed practitioner in Illinois Tech's Student Health and Wellness Center at [student.health@iit.edu](mailto:student.health@iit.edu) or (312)567-7550. For a comprehensive list of resources regarding counseling services, medical assistance, legal assistance and visa and immigration services, you can visit the Office of Title IX Compliance website at <https://www.iit.edu/title-ix/resources>.

**Campus Reopening:** Please refer to <https://www.iit.edu/reopening> for the most recent information regarding campus reopening.

Currently, as recently announced, the university is requiring all students, faculty, and staff to receive a COVID-19 vaccination. Full details may be found in Vaccine Requirement and Reopening Policy at [https://web.iit.edu/sites/web/files/departments/general-counsel/policies/procedure\\_c7\\_COVID-19\\_Vaccination\\_Requirement\\_and\\_Reopening\\_Policy\\_Policy-C.7.pdf](https://web.iit.edu/sites/web/files/departments/general-counsel/policies/procedure_c7_COVID-19_Vaccination_Requirement_and_Reopening_Policy_Policy-C.7.pdf)

Moreover, consistent with Centers for Disease Control and Prevention and Chicago Department of Public Health recommendations, all students, faculty, staff, and campus visitors must now wear face coverings in all shared indoor settings, regardless of vaccination status.