

INFO-I 425 Web Services in Information Systems

Department of Human-Centered Computing

Indiana University School of Informatics and Computing, Indianapolis

Credit Hours: 3 lecture hours

Instruction Mode: 100% online

Supplemental Website: <https://i425.sitehost.iu.edu>

Instructor: Louie Zhu, Ph.D.

Email: Canvas Inbox

Response time: 24 hrs wkdays and 48 hrs wkends

Course Description

This course examines how cloud computing and service-oriented architecture contribute to solutions for Informatics problems in areas such as business, health care, and life sciences. Students will develop an understanding of why, when, and how organizations utilize Web services to manage data, as well as the skills to design, implement, and deploy Web services applications.

Prerequisites

This course assumes prior knowledge and experience with procedural and object-oriented programming in PHP, designing information systems with the MVC pattern, and developing dynamic, data-driven web applications with server-side technologies and relational databases. Prior to taking this course, students are expected to complete INFO I211 Information Infrastructure II with a C or better grade or have acquired equivalent experiences.

Course Learning Outcomes (CLOs)

Upon successful completion of this course, students will be able to:

1. Explain technologies that support service-oriented architectures
2. Define RESTful and SOAP Web services
3. Design and develop RESTful APIs capable of executing CRUD operations
4. Secure RESTful APIs using Bearer, JSON Web Token, and OAuth2 authentication approaches
5. Use advanced JavaScript techniques to handle HTTP requests and responses
6. Create Single Page Applications to consume RESTful API data
7. Map OOP objects to database data with Eloquent Object-relational Mapping (ORM)

Program-level Learning Outcomes (PLOs)

Please visit <https://soic.iupui.edu/undergraduate/degrees/informatics/learning-outcomes/> to view the complete list of the program-level learning outcomes for B.S. in Informatics. This course is designed to mainly demonstrate the following PLOs:

- B3. Create computer programs in one or more programming languages
- D1. Apply fundamental concepts of software architecture
- D3. Define terms and explain principles essential to the design of IT and computing systems
- D4. Design dynamic and data-driven web applications

- D5. Design large complex multilayered information systems with software design patterns
- D6. Design web service consumers and producers in service-oriented architectures

Alignment Map of Course Outcomes and Assessments

Program-level Learning Outcomes	Course Learning Outcomes	Profiles of Learning for Undergraduate Success (IUPUI+)	Assessments
B3	C5, C6	P3.2. Innovator: Creates/designs	Lab 2
D1	C7	P2.3. Problem Solver: Analyzes, synthesizes, and evaluates	Lab 1
D3	C1, C2	P1.1. Communicator: Evaluates information	Lab 3
D4	C3, C6	P1.4. Communicator: Conveys ideas effectively	Lab 4
D5	C4	P2.1. Innovator: Creates/designs	Lab 5
D6	C3	P3.2. Innovator: Creates/designs	Lab 6

Recommended Textbook

- An introduction to APIs, free eBook: <https://zapier.com/learn/apis/>
- Building Restful Web Services with PHP 7: <https://www.packtpub.com/application-development/building-restful-web-services-php-7>
- PHP Web Services, 2nd Edition: <http://shop.oreilly.com/product/0636920042860.do>

Videos Courses from linkedin.com/learning

There are many API courses on the site. The following video courses are good supplements for the materials we will be studying in class. Based on your background and needs, please choose the courses and topics to watch. Please search the links to the courses at <https://www.linkedin.com/learning>.

- Programming foundations: APIs and Web Services
- Introduction to Web APIs
- Learning REST APIs
- Designing RESTful APIs
- REST API Basics
- HTTP Essential Training
- WordPress REST API

Technical Requirements

- A reliable laptop computer running Windows, Mac OS, or Linux operating system. Please visit <http://soic.iupui.edu/technology/laptop> for information on the Laptop Initiative for Informatics majors.
- Reliable and fast Internet connection for watching videos, accessing Canvas recourse, and attending Zoom meetings.

- Microphone and webcam (optional if you prefer audio or chat only in Zoom meetings)
- Access to Canvas using a [supported web browser](#).
- Tools: Canvas, Zoom, and Kaltura
- Cloud storage: OneDrive for Business or Google Drive. Please note Box is being retired at IU.

Software Requirements

You need the following software programs. Detailed instructions for installing and configuring these programs are available in Modules 1 and 2.

- XAMPP (not XAMPP-VM): <https://www.apachefriends.org/index.html>. Important note for Mac OS X: do not install XAMPP-VM.
- PhpStorm: <https://www.jetbrains.com/phpstorm/>. To apply for a free license for students, please go to <https://www.jetbrains.com/community/education/#students>.
- Postman: <https://www.postman.com/>
- Composer: <https://getcomposer.org/download/>
- Slim framework: <https://www.slimframework.com/>
- REACT javascript library: <https://reactjs.org/>

Choose one between the following two programs. They are required for the group project. All team members must use the same kind.

- OneDrive for Business sync application: <https://www.microsoft.com/en-us/microsoft-365/onedrive/download>
- Google Drive file sync application: <https://www.google.com/drive/download/>

Class Schedule

Module	Unit and Topic	Lab	Quiz
Module 1	<ul style="list-style-type: none"> • Unit 1: Introducing Web services 	Lab 1	Quiz 1
Module 2	<ul style="list-style-type: none"> • Unit 2: Providing Web services, part 1 	Lab 2	Quiz 2
Module 3	<ul style="list-style-type: none"> • Unit 2: Providing Web services, part 2 	Lab 3	Quiz 3
Module 4	<ul style="list-style-type: none"> • Unit 3: Securing Web services 	Lab 4	Quiz 4
Module 5	<ul style="list-style-type: none"> • Unit 4: Consuming Web services, part 1 	Lab 5	Quiz 5
Module 6	<ul style="list-style-type: none"> • Unit 4: Consuming Web services, part 2 	Lab 6	

Grading Plan and Policies

Activity	% of Total
Participation	10
Hands-on practices	10

Quizzes	20
Course project/labs	60
Total	100

The table below shows the minimum percentage for each letter grade. Please note percentages will not be rounded up when grades are determined.

Letter Grade	Minimum %	Interpretation
A+	97.0	Professional level work, showing highest level of achievement
A	93.0	Extraordinarily high achievement, quality of work; shows command of the subject matter
A-	90.0	Excellent and thorough knowledge of the subject matter
B+	87.0	Above average understanding of material and quality of work
B	83.0	Mastery and fulfillment of all course requirements; good, acceptable work
B-	80.0	Satisfactory quality of work
C+	77.0	Modestly acceptable performance and quality of work
C	73.0	Minimally acceptable performance and quality of work
C-	70.0	Unacceptable work (course must be repeated for credit)
D+	67.0	Unacceptable work (course must be repeated for credit)
D	63.0	Unacceptable work
D-	60.0	Unacceptable work
F	0	Unacceptable work

Grades will be posted in Canvas within one week of the due date. Since Canvas keeps track of all your grades, you should always be able to calculate your current grade in the course. If you need assistance, please contact me.

Expectations, Guidelines, and Policies

Meet deadlines

Modules will be made available as scheduled. Each module is available for one week from Wednesday at 12 am to next Tuesday at 11:59 pm. You need to complete all the learning activities. You must turn in all the assignments before a module is closed to receive credits. Once a module is closed, homework and quiz solutions are made available automatically. A closed module cannot be re-opened, and no submission of any work can be accepted.

There won't be any make-up quiz or homework. If you don't turn in an assignment or miss a quiz, you will get zero for that.

Participate in discussion and interact with your instructor, TA (if available), and other students

The course will be taught at 100% online. We will conduct all learning activities online through Canvas, Zoom, CourseNetworking, and other online tools. While this course assumes that students can work independently, participating in discussions and connecting with the course instructor, TA and tutor (if available), and other students are critical to your success in this class. Office hours will be held online via Zoom meetings. You are encouraged to attend these meetings. You don't have to have a webcam to attend the meetings. They can be audio or text (via chat) only.

Correcting Errors in Scores

If a score is incorrectly recorded in Canvas, correction must be made within a week of the item posted. One week after an item is posted, it will not be changed. Requests for correcting such errors must be submitted in writing (e.g. emails) and must be accompanied with proper proofs. If your request gets approved, the correction will be made; if the request does not get approved, you will receive an explanation of why the request cannot be approved.

Honor Code

You may discuss your homework and projects with classmates. However, all submitted work must be your own. In the case of a group assignment, you must document whom you worked with and describe the nature of your collaboration. Presenting other people's work as your own without properly crediting the actual source constitutes fraud.

Plagiarism undermines the academic integrity of Indiana University. Plagiarism will not be tolerated. Anyone detected as having been plagiarizing will be disciplined according to the IUPUI Student Code of Conduct. Multiple incidences of plagiarism may result in an F of the course grade. Academic misconduct will be reported to the school or campus academic officer. Please refer to the Code of Student Rights, Responsibilities, and Conduct for procedures related to academic misconduct at <http://go.iu.edu/24Ix>.

Course Communications

Communication for this course will be administered via Canvas. All announcements, assignments, grades, emails, etc. will take place in that medium. Please refrain from relying on direct email for course-related questions to the instructor if avoidable. The instructor should respond to emails within 48 hours, excluding weekends and holidays, and announce periods of extended absence in advance.

Incomplete

The instructor may assign an Incomplete (I) grade only if at least 75% of the required coursework has been completed at passing quality and holding you to previously established time limits would result in unjust hardship to you. All unfinished work must be completed by the date set by the instructor. Left unchanged, an Incomplete automatically becomes an F after one year. For more information, please visit <https://studentcentral.iupui.edu/grades-progress/incompletes.html>.

Right to Revise

The instructor reserves the right to make changes as necessary to this syllabus. If changes are necessitated during the term of the course, the instructor will immediately notify students of such changes and nature of change(s) on Canvas Announcements.

Other Policies

IUPUI Course Policies: A number of campus policies governing IUPUI courses may be found at the following link: <https://studentcentral.iupui.edu/register/index.html>.

Classroom Civility: To maintain an effective and inclusive learning environment, it is important to be an attentive and respectful participant in lectures, discussions, group work, and other classroom exercises. Thus, unnecessary disruptions should be avoided, such as ringing cell phones, engagement in private conversations and other unrelated activities. Cell phones, media players, or any noisy devices should be turned off during a class. Texting, surfing the Internet, and posting to Facebook or Twitter during class are not permitted. Laptop use may be permitted if it is used for taking notes or conducting class activities. Students should check with the instructor about permissible devices in class. IUPUI nurtures and promotes "a campus climate that seeks, values, and cultivates diversity in all of its forms and that provides conditions necessary for all campus community members to feel welcomed, supported, included, and valued" (IUPUI Strategic Initiative 9). IUPUI prohibits "discrimination against anyone for reasons of race, color, religion, national origin, sex,

sexual orientation, marital status, age, disability, or [veteran] status” (Office of Equal Opportunity). Profanity or derogatory comments about the instructor, fellow students, invited speakers or other classroom visitors, or any members of the campus community shall not be tolerated. A violation of this rule shall result in a warning and, if the offense continues, possible disciplinary action.

Administrative Withdrawal Policy: A basic requirement of this course is that students participate in all class discussions and conscientiously complete all required course activities and/or assignments. If a student is unable to attend, participate in, or complete an assignment on time, it is the student’s responsibility to inform the instructor. If a student misses more than half of the required activities within the first 25% of the course without contacting the instructor, the student may be administratively withdrawn from this course. Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal will take place after the full refund period, and a student who has been administratively withdrawn from a course is ineligible for a tuition refund. Contact the instructor with questions concerning administrative withdrawal. For more information, please visit <https://studentcentral.iupui.edu/register/administrative-withdrawal.html>.

Code of Conduct: All students should aspire to the highest standards of academic integrity. Using another student’s work on an assignment, cheating on a test, not quoting or citing references correctly, or any other form of dishonesty or plagiarism shall result in a grade of zero on the item and possibly an F in the course. Incidences of academic misconduct shall be referred to the Department Chair and repeated violations shall result in dismissal from the program. The Code of Student Rights, Responsibilities, & Conduct is available at <http://studentcode.iu.edu/>.

Accommodation Statement: Every attempt will be made to accommodate qualified students with disabilities (e.g. mental health, learning, chronic health, physical, hearing, vision neurological, etc.) Students needing accommodations because of a disability need to register with Adaptive Educational Services (AES) office and complete appropriate forms issued by AES before accommodations will be given. The AES office is located in Taylor Hall, UC 100. You can also reach the office by calling 274-3241.

If you need any special accommodation, please talk to the instructor in the first or second week of the semester. Requests for post-event accommodations will not be approved. In other words, if you do not request accommodations prior to a test or the deadline of an assignment, you may not after the fact get accommodations such as changing a grade, dropping a test, retaking the test, or extending the deadline of the assignment. In addition, only the accommodations listed on the AES forms will be provided. The instructor will not approve requests for any accommodations that are not listed on the AES forms. For more information, please visit IUPUI Adaptive Educational Services website at <http://aes.iupui.edu/>. For ADA resources, visit <http://ada.iu.edu/students/IUPUI/>, and for ADA policies, visit <https://policies.iu.edu/policies/ua-02-americans-disability-act/>.

Religious Observation: IUPUI respects the right of all students to observe their religious holidays and will make reasonable accommodation, upon request, for such observances. Students seeking accommodation for religious observances MUST submit a request in writing to the course instructor by the end of the second week of the semester and should use the Request for Course Accommodation Due to Religious Observance Form. More information on the IUPUI Policy on Religious Holidays is available here: <https://studentcentral.iupui.edu/calendars/holidays/course-accommodation-form.html>. Failure to comply with the university policy will result in no accommodations given later in the semester.

Emergency Preparedness: Safety on campus is everyone’s responsibility. Know what to do in an emergency so that you can protect yourself and others. For specific information, visit the emergency management website at <http://protect.iu.edu/emergency>.

Bringing children to class: To ensure an effective learning environment, children are not permitted to attend class with their parents, guardians, or childcare providers.

Mission Statement

The Mission of IUPUI is to provide for its constituents excellence in

- Teaching and Learning;
- Research, Scholarship, and Creative Activity; and
- Civic Engagement.

With each of these core activities characterized by

- Collaboration within and across disciplines and with the community;
- A commitment to ensuring diversity; and
- Pursuit of best practices.

IUPUI's mission is derived from and aligned with the principal components—Communities of Learning, Responsibilities of Excellence, Accountability and Best Practices—of Indiana University's Strategic Directions Charter.

Statement of Values

IUPUI values the commitment of students to learning; of faculty to the highest standards of teaching, scholarship, and service; and of staff to the highest standards of service. IUPUI recognizes students as partners in learning. IUPUI values the opportunities afforded by its location in Indiana's capital city and is committed to serving the needs of its community. Thus, IUPUI students, faculty, and staff are involved in the community, both to provide educational programs and patient care and to apply learning to community needs through service. As a leader in fostering collaborative relationships, IUPUI values collegiality, cooperation, creativity, innovation, and entrepreneurship as well as honesty, integrity, and support for open inquiry and dissemination of findings. IUPUI is committed to the personal and professional development of its students, faculty, and staff and to continuous improvement of its programs and services.