R·I·T	Rochester Institute of Technology Golisano College of Computing and Information Sciences School of Information

Course Syllabus
ISTE-341
Server Programming

REMINDER: The information presented in this syllabus is subject to expansion, change, or modification during the semester.

Instructor:
Prof. Bryan French
Office: Bldg. 70-2619
email address: bdfvks@rit.edu

Office Hours: M/Tu/W/Th/F **11:00 AM – 1:00 PM**

And by appointment

Course Text and Materials

You will need some method of backing up your work. All software required is free: Visual Studio Code with extensions for PHP and Java, Maven, OpenJava 16+, Wildfly, NodeJs, Postman, SFTP program.

Important RIT Deadlines

- Last day of add/drop is *September 3, 2024.*
- Last day to withdraw with a grade of **"**W" is *November 8, 2024.*

NOTE: iSchool department policy states that a student has one semester to challenge any grade. After that, grades cannot be challenged.

Course Description

This course provides in-depth work in server-side programming. Students will develop dynamic, data centric web pages and systems, and server-side information services that will be available to clients implemented in a variety of software technologies. Topics include JSON parsing, generation, and consumption; web configuration and security; design patterns; web service structures, and application security. Programming projects are required. (prerequisite: ISTE-340, SWEN-383).

Course Goals and Objectives

This course is part of the BS/IT degree program. Specifically, this course covers development and delivery of services in a multi-tier architecture.

Specific objectives (learning outcomes)

At the end of this course, the successful student will be able to:

1. Describe and use web protocols
2. Analyze server language strengths and weaknesses
3. Build a medium-scale dynamic Web sites, applications and systems

4. Use server-side technologies to consume disparate information systems
5. User server-side technologies to create information systems that can be consumed by different clients and servers
6. Use server-side languages to retrieve and update data from files, file structures, and databases.

Topics Covered

- For creating web pages and systems:
  - Server-side programming
  - Database creation, access, and manipulation review
  - Libraries, building and using
  - JSON parsing, generation and consumption
  - Configuration and security
  - GET, POST, PUT, DELETE processing
  - Patterns and architecture
  - Command line scripting
- For serving up data:
  - Basic XMLRPC concepts
  - Basic SOAP service structure and construction
  - Basic RESTful service structure and construction
  - Mid Tier
  - Proxies
  - Business Layer Implementation
  - Service Layer Implementation
  - OOP PHP
  - Application security
  - Microservices
  - Containers

Prerequisites:

In all topics, students must be able to use the basic constructs of programming as taught in the ISTE-120, 121, client application development as taught in ISTE-340, and architecture design as taught in SWEN-383.

Course required for graduation in:

BS/CIT and BS/WMC

Organization

Exams:
There will be two exams, one around mid-semester and the other during finals week.

Missing the exam will result in a grade of zero unless the student contacts the instructor at least 24 hours in advance of that exam. If the student's reason is valid (documentation may be required), the student may be allowed to take a different 'make-up' exam at a later time.

Projects:
There will be several projects throughout the semester. Each project is an individual effort-collaboration is not allowed and will be considered cheating. Failure to submit a project by the due date will result in a grade of zero.

Exercises/Labs:
From time to time there may be exercises or labs to complete in or out of class and are due by the due date on the associated dropbox. There are no makeups.

Extra Credit Work:
No extra credit assignments will be given so plan accordingly.

MyCourses:
All project assignments, lecture notes, and other distributable course materials will be available via MyCourses. Unless otherwise indicated, all student project assignments will be submitted via MyCourses dropboxes.

Grading

The grading scale used along with the grade components follow:

Range	Grade
>= 94%	A
>= 90% & < 94%	A-
>= 87% & < 90%	B+
>= 83.0 % & < 87%	B
>=80% % < 83%	B-
>= 77% & < 80%	C+
>=73% & < 77	C
>=70% % <73%	C-
>= 60.0 % & < 70%	D
< 60.0%	F

Component	Pct
Projects	40%
Exams	40%
Participation	10%
Exercises	10%

Assignments, projects and exams will be graded as soon as possible, usually within 2 weeks of the due date if work is turned in on time. There may be times that this goal may not be met.

Course Outline

- Introduction / overview / Review from Web II
  - Overview of course
  - PHP Review
- Web Server Side
  - Maintaining State: stateless & stateful (session & cookies, sockets)
- Object Oriented PHP
  - PHP classes
  - Attribute references and method calls
  - Inheritance
  - MySQLi
- Application Architectures
  - Layers vs. Tiers
  - Design Considerations
  - Application Servers
- Web Services
  - Background and purpose
  - XMLRPC
  - SOAP
  - WSDL
  - UDDI
- REST
  - Background and purpose
  - Naming conventions
  - GET, POST, PUT, DELETE actions
  - Implementation
- Node.js
  - Introduction
  - Installing modules
  - REPL
  - WebSockets
  - Express
  - Sessions
- Docker
  - Introduction
  - Dockerfiles
  - Docker Compose
- Authentication
  - 2FA
  - Passport
  - Intro to MongoDB
  - JSON Web Tokens

- Microservices
- Serverless Computing

Course Schedule

The estimated course schedule is below. All dates, lecture topics, and assignments are subject to reasonable change at the discretion of your instructor. Any changes will be announced.

Week	Lectures	Assignments
1	Course Overview PHP Intro	**Lab 1**
2	State and PHP	**Lab 2**
3	Object Oriented PHP	**Lab 3**
4	PHP and MySQL	
5		**Lab 4, Project 1 Assigned**
6	JSON, Namespaces	**Exam**
7	SOA, Java and JSON, Web Services	**Web Services Lab**
8	REST, Node	**REST Lab, PROJECT 2 Assigned**
9-10	Node: Express, Node: WebSockets, Sessions,	
11-12	Docker	**Docker Lab, Project 3 Assigned**
13-14	Based on Time: Node: 2FA, JWT, Microservices, Serverless Computing, Review	
15		**EXAM**

- You may use generative AI to help you write SMALL bits of code, **EXCEPT ON EXAMS**. But beware that those tools make errors. I recommend you consider this aspect a first draft that you must check. We will assume that you have mastered coding fundamental; so, you might consider any generative AI tool to be an error-prone partner whose work you need to check! **I retain the right before assigning a grade to ask to you explain the code that you submit if I think generative AI was used to write major parts or the entirety of the program**. You need to understand the code that you are writing/submitting. You are also required to give credit when you use generative AI to write bits of code: https://apastyle.apa.org/blog/how-to-cite-chatgpt

Success in this course depends heavily on your personal health and wellbeing. Recognize that stress is an expected part of the college experience, and it often can be compounded by unexpected setbacks or life changes outside the classroom. Moreover, those with marginalized identities may be faced with additional social stressors. I strongly encourage you to reframe

challenges as an unavoidable pathway to success. Reflect on your role in taking care of yourself throughout the term, before the demands of exams and projects reach their peak. Please feel free to reach out to me about any difficulty you may be having that may impact your performance in this course as soon as it occurs and before it becomes unmanageable. In addition to your academic advisor, I strongly encourage you to contact the many other support services on campus that stand ready to assist you.

Cheating Policy: Please review the institute policy on cheating as described at http://www.rit.edu/studentaffairs/studentconduct/rr_academicdishonesty.php.

Cell Phones/Pagers: Out of courtesy to the instructor and other students, all cell phones/pagers ringers should be turned off in class.

Notices of Accommodations: If you have a "Notice of Accommodation", you must provide your instructor with a copy of it within 1 week of starting this course.

Academic Honesty Policy: Please review the departmental policy on cheating as described at http://www.it.rit.edu/dishonesty.php

Student Responsibilities: Please review the general student responsibilities as outlined at http://www.rit.edu/~301www/rr.php3

RIT is committed to providing a safe learning environment, free of harassment and discrimination as articulated in our university policies located on our governance website. RIT's policies require faculty to share information about incidents of gender based discrimination and harassment with RIT's Title IX coordinator or deputy coordinators, regardless whether the incidents are stated to them in person or shared by students as part of their coursework. If you have a concern related to gender-based discrimination and/or
harassment and prefer to have a confidential discussion, assistance is available from one of RIT's confidential resources on campus (listed below).

1. The Center for Women & Gender: Campus Center Room 1760; 585-475-7464;
CARES **(available 24 hours/7 days a week)** Call or text 585-295-3533.

2. RIT Student Health Center – August Health Center/1st floor; 585-475-2255.

3. RIT Counseling Center - August Health Center /2nd floor - 2100; 585-475-2261.

4. The Ombuds Office – Student Auxiliary Union/Room 1114; 585-475-7200 or 585-475-2876.

5. The Center for Religious Life – Schmitt Interfaith Center/Rm1400; 585-475-2137.

6. NTID Counseling & Academic Advising Services – 2nd Floor Lynden B.Johnson;

585-475-6468 (v), 585-286-4070 (vp).

Finally...
Any or all of the previous information is subject to change or modification during the quarter.