Application Development in the Real World

XML and Web Services Syllabus

Dr. Steve Caravajal, Ph.D.
513-939-9135
Steve.caravajal@microsoft.com
caravagy@ucmail.uc.edu

Key Corporate Trend

Corporate leaders are facing a mix of traditional and new transformational challenges. "Doing more with less" is expected, along with implementing agility. Digital business needs agility that allows for rapid delivery of new services and business outcomes, all provided in a continuous and iterative fashion. However, most application development portfolios have been built to deliver stable environments for relatively slow-changing applications. The "old" world was relatively simple and the metrics were clear — measured by SLAs and cost. The "new" world introduces uncertainty, and different ways of measuring agility. Leaders must rise to meet this new challenge, not by extending their traditional approaches, which were intended to avoid risk and deliver stable services, or by cranking up their existing capabilities to stretch to the new world; a radically new approach is needed.

Purpose

Applications must communicate with other applications and other services, not natively part of the application. This requirement gives rise to several challenges. The purpose of this class is to introduce the student to these concepts, while further developing their programming skill. The use of XML and Web Services are two approaches involved with cross-application communication. XML has historically been the key protocol but has recently given way to JSON, JavaScript Object Notation, as the lead cross-application communication protocol. There are several different kinds of Web Services, and these different approaches will be
discussed because they continue to be critical to the solution of business problems, and a necessary skill for the professional developer and architect. This course will strengthen the student’s problem solving skills by applying core programming concepts to real world problems, while using XML/JSON and Web Services as the technology vehicle for the learning process.

**Learning Objectives**

- Understand and apply the .NET basic and advanced programming concepts.
- Understand the technical foundation of XML and JSON, as well as its application.
- Understand the various types of Web Services and their practical application.
- Solve problems using XML/JSON and Web Services.
- Effectively design and communicate technical solutions.
- Understand the strengths and limitations of XML/JSON and Web Services.
- Understand the role XML/JSON and Web Services have in Enterprise Architecture.

**Course Expectations**

Students will be given real problems, and expected to solve the problem: 1. using knowledge from previous classes, 2. applying new concepts learned in class, 3. researching any information in the public domain, and 4. demonstrating creativity. The student is expected to actively participate in classroom discussions, and demonstrate application of core concepts. Specifically, the following will be used to evaluate the student’s performance:

1. **Programming Assignments** – there will be at least 3 programming assignments; students will be required to work in teams as instructed.
2. **In-Class Quizzes** – Students will be given study sheets, and then assessed based on their comprehension of the topic(s). These assessments (quizzes) will be given during class, and they will be worked on during class. Quizzes cannot be retaken or made-up if the student misses a class when a quiz has
been given. Students are expected to review the study sheet and come to class prepared to answer the questions related to the topics.

3. **Final Project** – students will be given the details of the final project during week 2 of the course.

**Outline**

The topics below give the student an overview of the material to be covered in class. The Professor may change the content and order of the learning material, as well as add material not in the syllabus. Students are expected to read and comprehend any material assigned and discussed in class. The student may be given in-class quizzes without notification so they should come prepared. Students will be given problems to solve using XML/JSON and Web Services programming concepts. Each assignment will have a minimum number of technical requirements that the student’s solution meet satisfy, but the student is expected to demonstrate creativity beyond what the minimum requirements specify.

**Week 1 – Introduction to Cross-Application Communication**

- Study Guide: Review or Quiz
- How are applications designed?
- Why should we care about cross-application communication?
- .NET and Introduction to Visual Studio
- Assignment 1 Description

**Week 2 – Introduction to XML and JSON**

- Study Guide: Review or Quiz
- Why should we care about XML?
- XPath and Navigation
- Strengths and Limitations
- Real World Applications of XML
- What is GitHub and why do we care?
- Assignment 2 Description

**Week 3 – Advanced XML and JSON**
• Study Guide: Review or Quiz
• What is Application Lifecycle Management?
• XML Schema
• Stylesheet Transformation
• Office XML Schema and Application

Week 4 – Introduction to Web Services
• Study Guide: Review or Quiz
• SOAP
• WCF
• REST
• Strengths and Limitations
• Assignment 3 Discussion

Week 5 – Introduction to Application Development Strategy
• Study Guide: Review or Quiz

Week 6 – Introduction to Cloud Services
• Study Guide: Review or Quiz

Week 7 – Final Project