IPDV.X401 - Designing, Building, and Integrating RESTful API - 2.0 units

Instructor: Min Wu, Ph.D.

Course Description

Databases, websites, and business applications need to exchange data. This is accomplished by defining standard data formats such as Extensible Markup Language (XML) or JavaScript Object Notation (JSON),as well as transfer protocols or Web services such as the Standard Object Access Protocol (SOAP) or the more popular Representational State Transfer (REST). Developers often have to design their own Application Programing Interfaces (APIs) to make applications work while integrating specific business logic around operating systems, languages or servers.

This course introduces these concepts with a focus on theRESTful API.The course introduces the data exchange mechanism and common data formats. For Web exchange, you will learn the HTTP protocol, including how to use SOAP with XML. The course compares SOAP and REST, then covers the concepts of stateless transfer. It introduces software API design and best design practices.The second half of the course focuses on RESTful API design and implementations using Python Django, the most popular web development framework. You will learn how to build and consume RESTful services using JSON and XML, and integrate RESTful API with different data sources through hands-on coding projects. Through four coding assignments, which form the course project, you will apply what you have learned to implement a Single-Page Application (SPA) with both the front-end (provided by the instructor) and the Django-based backend with REST web service.

This course is intended for software developers who use data in projects. It is also useful for data professionals who need to understand the methods of data exchange and how to interact with business applications. Python programming experience is required for the exercises and the project.

Prerequisite Skills

Python programming experience is required for the exercises and the project.  
(CMPR.X415 - Python Programming for Beginners)

Notes

None

Learning Outcomes

At the conclusion of the course, you should be able to:

* Understanding and hands on experience about how to develop RESTful services and their clients using Python Django
* Know how to apply RESTful API design best practices to real-world software solution including integration
* API design skills using real-world use cases and review of APIs

Course Outline

Here’s an outline of what I plan to cover in class. But, it may be changed to meet your class’s needs.

|  |  |  |
| --- | --- | --- |
| **Week** | **Topics** | **Assignments** |
| 1 | * Environment setup * History of Web Services * Comparison between SOAP and REST * REST API review |  |
| 2 | * Implement Django dev server * Data model, migration, serialization, and deserialization * API views to process diverse HTTP requests | Assignment 1 on basic RESTful API implementation |
| 3 | * Complex RESTful web services with advanced relationships | Assignment 2 on advanced relationships |
| 4 | * Filtering, Searching, Ordering, Pagination | Assignment 3 on filtering, ordering, and pagination |
| 5 | * Secure RESTful API with authentication and permissions | Assignment 4 on authentication |
| 6 | Advanced Topics   * Versioning Management * RESTful API consumption at the front end |  |
| 7 | * RESTful API Testing |  |

Required Tools and Materials

* None

Recommended Tools and Materials

* None

Performance Evaluation

|  |  |  |
| --- | --- | --- |
| **Activity** | **Percentage** | **Description** |
| Assignments | 100% |  |
| **Total:** | **100%** |  |

Grading

Letter grades (A through F) are the default options.  However, students have until the day before the course end date to change their grading preference to a Credit/No Credit Option.

Grading scale

|  |  |
| --- | --- |
| **Grade options** | **%** |
| **A** | ≥ 93 |
| **A-** | 90-92 |
| **B+** | 88-89 |
| **B** | 83-87 |
| **B-** | 80-82 |
| **C+** | 78-79 |
| **C** | 73-77 |
| **C-** | 70-72 |
| **D+** | 68-69 |
| **D** | 63-67 |
| **D-** | 60-62 |
| **F** | 59 and below |
| **Credit** | 60 and above |
| **No Credit** | 59 and below |

**\*For alternative grading options, students MUST** **contact**[**extensiongrades@ucsc.edu**](mailto:extensiongrades@ucsc.edu)**with the Alternative Grade Form.**

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