# CMSC 455: Software as a Service

Fall 2021 Syllabus

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| **Catalog Listing:** | CMSC 455 - Software as a Service |
| **Course Level:** | Undergraduate |
| **Prerequisites:** | CMSC 355 with a grade of C or better |
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| **Instructor:** | Dr. Kosta Damevski (http://damevski.github.io) |
| **Office:** | ERB 2324 |
| **Phone:** | (804) 827-3607 |
| **E-mail:** | kdamevski@vcu.edu |
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| **Office Hours:** | Tue and Thurs 1:30 - 2:30pm (on Zoom) |
| **Classroom:** | Oliver Hall 1024 |
| **Class website:** | Blackboard |

## 1.0 – Overview (Catalog Course Description):

Semester course; 3 lecture hours. 3 credits. Prerequisite: CMSC 355, with a minimum grade of C. Studies the challenges, opportunities and open problems of software-as-a-service, deployed on commodity cloud computing platforms. Covers relevant software architectures, API design principles. Includes concepts of modern software frameworks for software development, cloud computing for software deployment, and software operations. Students participate in projects that use modern tooling to develop, deploy and monitor a software application.

## 2.0 – Course Structure:

- Lecture hours/week – 3
- Lab hours/week – 0

## 3.0 – Course Goals

Upon successful completion of this course, students will be able to:
1. Design and implement full stack Web applications based on several communicating services, following modern principles and using modern frameworks;
2. Demonstrate the principles of designing effective, sustainable APIs to be used to external parties;
3. Discuss the characteristics of software architectures commonly used in service-oriented applications;

4. Deploy applications to cloud platforms that make efficient use of available resources;
5. Apply principles of effective application stress testing;
6. Monitor deployed applications for both functional and non-functional properties;

## 4.0 – ABET Criteria Addressed:

- (1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- (2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

## 5.0 – Major Topics Covered:

- Principles of Software as a Service (SaaS)
- Service-Oriented Architectures (REST)
- Using Modern Software Frameworks
- Object-Relational Mapping and Data Management
- Basic of Interactive Web-based User Interfaces
- Software Architectures for SaaS
- API Design
- Deploying SaaS Applications to the Cloud
- Stress Testing SaaS Applications
- Achieving Scalability and Availability
- Cloud Deployment and Monitoring

## 6.0 – Textbook(s):

- Optional
    - "Engineering Software as a Service" - Fox and Patterson (1st Edition)
    - "Flask Web Development" - Miguel Grinberg

## 7.0 – Grading and Attendance Policy:

General Instructions:

There are several individual assignments in this course. Significant amount of time outside class meetings will likely be required for the successful completion of the assignments, including appropriate communication with the teaching staff. Students will be directed to online resources and tutorials to supplement course lectures.

| Category | Percentage Weight |
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| Final Exam | 25% |
| Midterm Exam | 25% |

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| Assignments + Quizzes | 50% |

Grading scheme:

      A: >= 90%

      B: >= 80% and < 90%

      C: >= 70% and < 80%

      D: >= 60% and < 70%

      F: < 60%

*Important Note: Please consult external resources for VCU policies regarding academic honesty, students with disabilities, student conduct in the classroom, withdrawal from classes, and others.*