

3460:489/589 T: DevOps Spring 2019

Section 001 15807 Monday and Wednesday 10:15 - 11:30 am Arts & Sciences (CAS) 134

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Office Hours: Posted on the instructor's homepage. Also available by appointment.

Course Description A comprehensive overview of the culture and practice of DevOps; the automated continuous integration of version control, software testing, packaging, configuration management, and containers.

“DevOps”, a compound of “development” and “operations”, is an approach to build and deploy software. Leveraging automation, it ties together version control, software testing, packaging, configuration management, and containers for continuous integration to distribute software updates frequently and with high quality. DevOps combines version control (e.g., git), containers (e.g., Docker), continuous integration tools, systems administrations, ssh and ssh keys, program build tools, and installers, combined with software validation and testing.

The course will include the following (but not be limited to or necessarily covered in this order):

- Version control, e.g., *git*
- SSH and SSH keys
- Basic UNIX system administration
- Program build tools, e.g., Make, Cmake
- Containers, e.g., Docker
- CI (Continuous Integration) tools
- Program installers
- Software validation and testing (strong focus on)

Learning Objectives Students successfully completing the course will be able to:

- Demonstrate the ability to perform standard code workflows using the Git version-control system, including branching, tagging, and pull requests
- Understand the different requirements of development, staging, and production
- Build software systems using build tools, such as GNU Make and CMake
- Create a system of Continuous Integration to build and test software releases in a container platform, e.g., Docker
- Create and perform software validation and testing for all parts of a software release, including distribution and installation
- Create and maintain Docker containers remotely via command line
- Understanding of ssh keys
- Fully explain the interaction of software process with emphasis on the need to create value for the business

Students enrolled in 3460:589-001 will have additional requirements on projects and exams.

Prerequisite: 3460:480 Software Engineering or Graduate Standing **Credits:** 3

Textbook: Len Bass, Liming Zhu, Ingo M. Weber, *DevOps: A Software Architect's Perspective*
ISBN-13: 978-0134049847

Grading	Exercises	10%	A	≥ 93%	C	≥ 73%
	Projects	40%	A-	≥ 90%	C-	≥ 70%
	Midterm	25%	B+	≥ 87%	D+	≥ 67%
	Final	25%	B	≥ 83%	D	≥ 63%
		100%	B-	≥ 80%	D-	≥ 60%
			C+	≥ 77%	F	

Exercises To provide immediate practice of material presented in class, exercises will be assigned periodically throughout the semester and will count for 10% of your overall grade. They may be integrated into the lecture, i.e., assigned and completed during a class period, or be assigned as homework.

Projects Each student will “adopt” an open-source project. Over multiple projects over the course of the semester the student will create for the adopted project (exact tools subject to change):

- Fork adopted project on *GitHub*
- Create build files using *cmake*
- Create unit tests using *ctest*
- Containers for building, running tests, etc. using Docker and Docker Compose
- Continuous integration using *Jenkins*
- Deployment management using *Chef*
- Create program installers using *cpack*

Besides writing in the declaration languages of the above tools (e.g., *Docker*, *Docker Compose*, *Chef*, etc.), students will use Python for any scripting needs. All of this will be installed on a Linux VM accessible to the instructor.

Project grades will depend on the correctness, readability, style, quality, and application of the concepts presented in the course. Collectively, the projects are worth 40% of the overall grade, with each project worth an equal amount.

Midterm The midterm counts for 25% of your overall grade, and will be given after the 8th week of the course . The specific date will be announced at least one week prior.

Final Exam The final exam is comprehensive and is worth 25% of your overall grade. It will be held in the regular classroom on the day/time determined by the University. Consult ZipLine for exact day/time.

Policies The class will be taught using a variety of sources. Notes will be from web sources, the instructors own web pages, and written on the board. Examples may be entered by the instructor and discussed during class. On-time attendance is necessary for complete understanding of the material, and therefore expected.

In order that work can be graded and returned promptly, late assignments will not be accepted without a valid excuse. It is up to the student to make up any missed material. Make-ups of any work for this class will only be given in the case of an excused absence or a documented, valid emergency. I encourage you to contact me if an emergency arises.

Academic Honesty Any work that you do for this class is to be your own. This includes all material submitted for this course including, but not limited to, writings, programs, designs, and data. Any collaboration or group work will be strictly controlled. Any violation means that the work will not be accepted and further action will be taken. Submission of work that is even partly not yours will be reported to the *Office of Student Conduct and Community Standards*.

Special Notice Any student who feels she/he may need an accommodation based on the impact of a disability should contact the Office of Accessibility at 330-972-7928. The office is located in Simmons Hall, 105.

The University of Akron is committed to providing an environment free of all forms of discrimination, including sexual violence and sexual harassment. This includes instances of attempted and/or completed sexual assault, domestic and dating violence, gender-based stalking, and sexual harassment. Additional information, resources, support and the University of Akron protocols for responding to sexual violence are available at uakron.edu/Title-IX