

SCHOOL OF INFORMATICS, COMPUTING, AND CYBER SYSTEMS

INF 502 Course Syllabus

General Information

- Course title: Software Development Methodologies
- Semester/Section: Spring 2019, LEC 4506
- Credit hours: 3
- Meeting time and location: TuTh 12:45PM 2:00PM, 90-223
- Instructor: Patrick Kelley
 - Instructor email: patrick.kelley@nau.edu
 - Office location: 90-204
 - Office hours: (MoW e 1:00PM 3:00PM and TuThu 2:30PM 3:30PM, or by appointment)

Course Prerequisites

Graduate status

Academic Catalog Description

Study of advanced programming techniques, overview of software engineering principles, and study and project-based application of agile software development methods and tools.

Course Purpose

This project-based course is intended for students interested in informatics research with some previous programming experience, including data structures, and software development techniques, but little to no formal computer science or programming coursework. The course centers on the application of practice-oriented programming and software engineering skills in the informatics domain. The course provides an intensive overview of topics related to programming, software testing, developing high-quality software, data structures, object-oriented programming, and algorithmic complexity. By the end of the course, students are prepared to develop high-quality software in a research area of interest.

Intended Course Student Learning Outcomes

Upon successful completion of this course, students will be able to demonstrate the following advanced competencies:

- Select and apply advanced programming and memory management techniques to a variety of software development contexts;
- Select and synthesize algorithms and data structures appropriate to computational complexity requirements;

- Analyze and evaluate the fundamental principles of software engineering and how they inform specific software development practices;
- Select and synthesize programming techniques that promote high code-level quality;
- Select and apply agile software development techniques and tools to software design, development, source control, testing, and documentation.

Course Structure

This course consists of lectures, in-class assignments, reading assignments, homework assignments, and programming assignments.

Textbook and Required Materials

None required

Recommended Materials and Readings

Readings will be provided from various sources, including:

- *Code: The Hidden Language of Computer Hardware and Software*, by Charles Petzold (ISBN: 0735605053)
- *Hands on Data Structures and Algorithms with Python*, by Dr. Basant Agarwal and Benjamin Baka (ISBN: 1788995570)
- Data Structures and Algorithms Using Python, by Rance C. Necaise (ISBN: 0470618299)
- Code Complete: A Practical Handbook of Software Construction, Second Edition, by Steve McConnell (ISBN: 0735619670)
- *The Mythical Man Month*, by Fred Brooks (ISBN: 0201835959)
- Software Engineering: A Practitioner's Approach, Eighth Edition, by Roger Pressman and Bruce Maxim (ISBN: 0078022126)

Course Outline

Programming language foundations and history Python programming techniques; basic data types and structures Source control and tools Implementation-level concerns; memory management Code-level quality Object-oriented programming Computational complexity and basic complexity patterns; fundamental algorithms Linked data structures and strings and associated algorithms Test-driven development and unit testing; debugging Software engineering overview and fundamental principles Recursion

Assessment of Student Learning Outcomes

Methods of assessment include: In- and out-of-class assignments; reading and homework; exams; software project development activities and deliverables in stages throughout the semester.

Grading System

The weight of each course component toward your final grade is:

Assignment	Grade Weight %
Attendance and in-class participation and discussion	10%
Homework assignments	20%
Programming assignments	35%
Midterm exam	15%
Final exam	20%

Grades will be awarded on the following scale:

Percentage Grade	Letter Grade
90% or above	А
80% through 89%	В
70% through 79%	С
60% through 69%	D
59% or below	F

There is no "curve;" your grade is completely up to you and is not affected by the grades of your classmates. Extra credit opportunities may present themselves throughout the semester and be announced during class meetings. If you feel a mistake has been made in grading your assignment, please address your concerns during office hours.

University Policy Statements

• Safe Environment Policy

NAU's Safe Working and Learning Environment Policy prohibits sexual harassment and assault, and discrimination and harassment on the basis of sex, race, color, age, national origin, religion, sexual orientation, gender identity, disability, or veteran status by anyone at this university. Retaliation of any kind as a result of making a complaint under the policy or participating in an investigation is also prohibited. The Director of the Office of Affirmative Action & Equal Opportunity (AA/EO) serves as the university's compliance officer for affirmative action, civil rights, and Title IX, and is the ADA/504 Coordinator. AA/EO also assists with religious accommodations. You may obtain a copy of this policy from the college dean's office or from the NAU's Affirmative Action website nau.edu/diversity/. If you have questions or concerns about this policy, it is important that you contact the departmental chair, dean's office, the Office of Student Life (928-523-5181), or NAU's Office of Affirmative Action (928) 523-3312 (voice), (928) 523-9977 (fax), (928) 523-1006 (TTD) or aaeo@nau.edu.

• Students With Disabilities

If you have a documented disability, you can arrange for accommodations by contacting Disability Resources (DR) at 523-8773 (voice) or 523-6906 (TTY), dr@nau.edu (e-mail) or 928-523-8747 (fax). Students needing academic accommodations are required to register with DR and provide required disability related documentation. Although you may request an accommodation at any time, in order for DR to best meet your individual needs, you are urged to register and submit necessary documentation (http://www.nau.edu/dr) 8 weeks prior to the time you wish to receive accommodations. DR is strongly committed to the needs of student with disabilities and the promotion of Universal Design. Concerns or questions related to the accessibility of programs and facilities at NAU may be brought to the attention of DR or the Office of Affirmative Action and Equal Opportunity (523-3312).

• Academic Contact Hour Policy

Based on the Arizona Board of Regents Academic Contact Hour Policy (ABOR Handbook, 2-224), for every unit of credit, a student should expect, on average, to do a minimum of three hours of work per week, including but not limited to class time, preparation, homework, studying.

Academic Integrity

Integrity is expected of every member of the NAU community in all academic undertakings. Integrity entails a firm adherence to a set of values, and the values most essential to an academic community are grounded in honesty with respect to all intellectual efforts of oneself and others. Academic integrity is expected not only in formal coursework situations, but in all University relationships and interactions connected to the educational process, including the use of University resources. An NAU student's submission of work is an implicit declaration that the work is the student's own. All outside assistance should be acknowledged, and the student's academic contribution truthfully reported at all times. In addition, NAU students have a right to expect academic integrity from each of their peers. Individual students and faculty members are responsible for identifying potential violations of the university's academic integrity policy. Instances of potential violations are adjudicated using the process found in the university Academic Integrity Policy.

• Research Integrity

The Responsible Conduct of Research policy is intended to ensure that NAU personnel including NAU students engaged in research are adequately trained in the basic principles of ethics in research. Additionally, this policy assists NAU in meeting the RCR training and compliance requirements of the National Science Foundation (NSF)-The America COMPETES Act (Creating Opportunities to Meaningfully Promote Excellence in Technology, Education and Science); 42 U.S.C 18620-1, Section 7009, and the National Institutes of Health (NIH) policy on the instruction of the RCR (NOT-OD-10-019; "Update on the Requirement for Instruction in the Responsible Conduct of Research"). For more information on the policy and the training activities required for personnel and students conducting research, at NAU, visit: http://nau.edu/Research/Compliance/Research-Integrity/

• Sensitive Course Materials

University education aims to expand student understanding and awareness. Thus, it necessarily involves engagement with a wide range of information, ideas, and creative representations. In the course of college studies, students can expect to encounter—and critically appraise—materials that may differ from and perhaps challenge familiar understandings, ideas, and beliefs. Students are encouraged to discuss these matters with faculty.

Classroom Disruption Policy

Membership in the academic community places a special obligation on all participants to preserve an atmosphere conducive to a safe and positive learning environment. Part of that obligation implies the responsibility of each member of the NAU community to maintain an environment in which the behavior of any individual is not disruptive. Instructors have the authority and the responsibility to manage their classes in accordance with University regulations. Instructors have the right and obligation to confront disruptive behavior thereby promoting and enforcing standards of behavior necessary for maintaining an atmosphere conducive to teaching and learning. Instructors are responsible for establishing, communicating, and enforcing reasonable expectations and rules of classroom behavior. These expectations are to be communicated to students in the syllabus and in class discussions and activities at the outset of the course. Each student is responsible for behaving in a manner that supports a positive learning environment and that does not interrupt nor disrupt the delivery of education by instructors or receipt of education by students, within or outside a class. The complete classroom disruption policy is in Appendices of NAU's Student Handbook.