Advanced Programming

1401105-3 - Advanced Programming (3 credits)

Catalog Description

Students will experience programming-in-the-large issues such as version control, team development, formal testing, and compiling for different target machines. Students will also advance their programming skills by exploring good design principles (e.g., patterns), understanding bad design methods (e.g., anti-patterns), and gain early experience in software engineering issues such as design, specification, and implementation

Prerequisites

1401104-3 - Structured Programming

Major Topics Covered in the Course (14 week semester)

Topic	Week
Linux OS, and manipulating files and strings through the command line Utilities (e.g., find, awk, sed, grep), Shell scripts	1-3
Advanced programming concepts Emphasis on pointers and memory management, garbage collection Design patterns and anti-patterns	4-7
Software development tools Build tools, debuggers, version control systems, profilers	8-9
Basic software engineering concepts Specifications, interfaces, and testing. Multi-person programming	10-12
Introduction to secure and defensive programming Re-emphasize information hiding, interfaces Array bounds checking, buffer overflow attacks, cast checking	13-14

Weekly Hours

2 x 50 mins lectures, 2 x 50 mins labs

Textbook/References

1. Design Patterns: Elements of Reusable Object-Oriented Software

Gamma et al., Addison Wesley, 1994, ISBN 0201633612

1. Code Complete: A Practical Handbook of Software Construction

McConnell, Microsoft Press, 2004, ISBN 0735619670

Assessment Methods

Some medium-size projects

One larger team project

Final exam

Course Learning Outcomes (CLOs)

1. Students will know about the issues related to large-scale software development
2. Students will become better developers through knowledge of design patterns and anti-patterns
3. Students will gain early experience in software engineering issues such as design, specification and implementation