

CST 594 Mobile Computing

1. Course coordinator

Tim Lindquist

2. Catalog Description

Mobile devices, operating systems, languages, and applications; available software stacks; services such as location services, network communications, and orientation; controlling energy demand; application development, run-time, and related issues; cross-platform development; students will research an advanced topic in mobile computing, develop a multi-platform application, create reports, and present results.

3. Credits and contact hours

3 credits, 3 contact hours

4. Prerequisites or co-requisites.

Prior experience developing mobile applications on at least one platform, or CST441/598. Graduate standing in computer science.

5. Course Overview:

Students gain an advanced understanding of mobile computing, and become familiar with current research topics in mobile computing.

6. Course resources

- a. F. Adelstein, S.K.S. Gupta, G.G. Richard III and L. Schwiebert, Fundamentals of Mobile and Pervasive Computing, McGraw Hill, 2005, ISBN: 0-07-141237-9.
- b. Laboratory stations and software – Required Mac OS X, Android development, and/or Windows 7 mobile development SDK's.
- c. Other supplemental materials available via Web references

7. Student learning outcomes

- a. Ability to describe and apply mobile-device operating systems, middleware, API, and programming systems.
- b. Ability to describe and apply programming practices that are specific to software development for mobile devices; native mobile device programming languages, and ability to apply host and target development tools with emulators and simulators.
- c. Knowledge of and experience in developing applications with extensive user-interfaces in the context of limited display, limited input, as well as touch and gesture interfaces.
- d. Describe and utilize mobile devices, applying knowledge of their configurations, and relationships to available software stack.
- e. Knowledge of and ability to use hardware and software for location management and tracking;
- f. Knowledge of and ability to use power management for mobile devices, quantifying component power consumption and techniques to minimize consumption.
- g. Knowledge of and ability to develop mobile client-server and peer-to-peer applications.
- h. Knowledge of and ability to use middleware for mobile applications.
- i. Ability to work effectively on a project team; including software process and artifact skills, communication skills, as well as organizational and leadership skills.

8. Topics

- a. Characterizing mobile devices and their components. Quantifying power and its consumption for mobile devices.
- b. Characterizing mobile device connectivity. Modes, bandwidth, related software and hardware support.
- c. User-interface development technologies for mobile devices; Model, View, Control; input methods; user-interface controls, touch gestures and related programming support
- d. Storage for mobile applications and related issues: database, files, resources, sharing, data integrity, and data communications.
- e. Software stack for mobile devices. Compare and contrast mobile operating systems; system services available to applications and application support; manufacturer and third-party middleware; mobile application programming languages, runtimes and development tools.

9. Assignments:

- a. Individual research project on mobile computing technologies and their evolution.
- b. Team-based distributed mobile application development including heterogeneous mobile platforms and web-based/server-side back-end.
- c. Individual mobile application development that emphasizes utilizing on-board devices, information synchronization, and related on-board applications (control and information sharing).

10. Grading:

The projects in the course involve presentation, teaming and communication skills. Semester long individual project Portions of project grades will be awarded for these aspects. Team and individual projects account for 70% of the course grade (equally split among assignments). The remaining 30% is for two exams.

11. Course Offering Information

1. Desired instructor expertise: background in team formation and dynamics, research writing and oral communications; experience developing mobile applications on multiple platforms including windows mobile, iOS, Android and/or Symbian utilizing multiple high-level programming languages.
2. The course may not be taught effectively online.
3. No articulation information.
4. Spring semester.
5. Preferred for semester schedule.