

University of the West of Scotland

Module Descriptor

Session: 2012/13

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Title of Module: Advanced Programming for Mobile Devices

Code: COMP09078	SCQF Level: 9 (Scottish Credit and Qualifications Framework)	Credit Points: 20	ECTS: 10 (European Credit Transfer Scheme)
School:	Computing		
Module Co-ordinator:	Alistair McMonnies		

Summary of Module

Advanced Programming for Mobile Devices is degree-level module for the Minor in Mobile Development. It covers the development of object-oriented applications for restricted devices, particularly the iPhone, WinMobile and Android platforms, and includes designing user-interfaces for a range of application types, and a variety of mobile design patterns and APIs for mobile development, including:

- the MVC model of programming as applied to mobile applications c/w Objective C programming with the NextStep core libraries
- event-driven patterns applicable to Java, Android and Win-Mobile, using Java, Android SDK and .NET CE

Mobile Device APIs provide a rich range of functionality, in many cases including location services, web-service interaction, OpenGL for small-screen devices and the use of a range of media types. These will be covered in some detail within a variety of frameworks, incorporating design and development guidelines. Students on this module will already have taken Introduction to Programming for Mobile Devices, and so there will be space to concentrate on:

- A range of device-specific frameworks, e.g. Android SDK, iOS Framework, WinMobile
- Extensions to the core APIs for smartphone functionality (web integration, location services, gesture and orientation user-input etc.
- the use of emulators for development, debugging and first-level user-interface testing
- The business model for App-Store marketing (iOS and Android variants) will be discussed as a paradigm for the development of new start-up companies

In addition to mobile applications, the module will include discussion and limited development of infrastructure to support mobile applications, in particular

- Back-end and middleware subsystems to support mobile apps
- Integration with cloud-based software systems
- Security considerations for mobile applications

Learning Outcomes: (maximum of 5 statements)

At the end of this module the student will be able to:

L1. design MVC and/or event-driven structured applications for implementation in Objective-C and/or Java+Android SDK and/or Win-Mobile/.NET CE

L2. use emulators to develop, test and de-bug a mobile application

L3. describe and discuss the newer development and distribution models implied by online-store forms of marketing and distribution, including economics of development funding

L4. describe, discuss and implement interactions with back-end servers and middleware for mobile application support

Employability Skills and Personal Development Planning (PDP) Skills

SCQF Headings	During completion of this module, there will be an opportunity to achieve core skills in:
Knowledge and Understanding (K and U)	<p>SCQF Level 9.</p> <p>A broad knowledge of the following programming concepts and principles: User-Interface design for business and productivity apps and application of manufacturers guidelines in this; MVC/Event-driven architectures and their impact on application design and development, rich service models for mobile application design, interaction with back-end services</p>
Practice: Applied Knowledge and Understanding	<p>SCQF Level 9.</p> <p>Use of emulators for development and debugging of MVC and Event-Driven applications, creating rich mobile user-interfaces incorporating media, location services and mapping; data access APIs (e.g. SQL Lite, SQL CE) and 3D (OpenGL for mobile); accessing online/cloud-based services for data access and update</p>
Generic Cognitive skills	<p>SCQF Level 9.</p> <p>Programming in mobile frameworks (e.g. ObjectiveC/NextStep, Java/Android, .NET/WinMobile), data-design for small-scale applications, web services and interaction with cloud-based applications services, debugging on emulators and connected devices</p>
Communication, ICT and Numeracy Skills	<p>Use of online services (web services) for interaction with cloud and corporate data-stores and services.</p>
Autonomy, Accountability and Working with others	<p>Working in a project team with clearly identified individual responsibilities to produce a coherent product.</p>

Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	Module Code:	Module Title: Programming for Mobile Devices
	Other:	
Co-requisites	Module Code:	Module Title:

* Indicates that module descriptor is not published.

Learning and Teaching	
Lectures will be used for exposition of topics, provide context and suggest appropriate background material. Lab sessions, using pair programming, will provide practical experience in developing small software systems.	
Learning Activities/Categories: During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	Student Learning Hours (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Series of 10 lectures, each on a specific programming topic	20
Practical programming lab exercises (supervised)	10
Practical programming exercises (unsupervised)	10
Supervised tutorial sessions	10
Self-directed study	98
Project work (teams) (including 18 hours supervised assessment)	50
Formal Written Examination (2 hours)	2
(eg. Lectures / tutorials / practicals / laboratory / seminars / project work (individual) / project work (group) / placements / e-learning / flexible learning / problem-based learning / blended learning / field trips / distance learning / other approaches)	200 Hours Total

Assessment: (also refer to Assessment Outcomes Grids at end of document)
Final examination (50%)
Coursework (50%). Stage 1 (20%, mid-trimester) will be design and prototype development of a mobile app; mainly user-interface at this stage. Stage 2 (30%, end of trimester) will be the full app, including full UI, user-input validation, use of online services/data sources, offline operation and local data storage. Both parts of the coursework will be team work involving 2 or 3 students.
(N.B. (i) Assessment Outcomes Grids for the module (one for each main assessment category) can be found at the end of this descriptor which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An indicative schedule listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Handbook.)

Equality and Diversity
This module is suitable for any student. The assessment regime will be applied flexibly so that a student who can attain the practical outcomes of the module will not be disadvantaged. When a student discloses a disability, or if a tutor is concerned about a student, the tutor in consultation with the School Enabling Support co-ordinator will

agree the appropriate adjustments to be made.

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

****Indicative Resources: (eg. Core text, journals, internet access)**

The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

Core text book:

iPhone Programming: The Big Nerd Ranch Guide – Joe Conway & Aaron Hillegass, ISBN-10: 0321706242, £18.49

Core text book:

Hello, Android: Introducing Google's Mobile Development Platform (Pragmatic Programmers): Ed Burnette, ISBN-10: 1934356565, £15.41

Lab Materials:

Android SDK and Eclipse or iPhone/iPad SDK and XCode. Access to a web or cloud server (e.g. Google App Engine) and development kit would be very useful.

(**N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance Requirements

It is expected that students will attend all scheduled classes or participate with all delivered elements as part of their engagement with their programme of study. Please refer to UWS Regulation 5.7.

Campus(es) for Module Delivery

The module will **normally** be offered on the following campuses / or by Distance Learning (D/L) (ie.Virtual Campus): (Provided viable student numbers permit)

Paisley:	Ayr:	Dumfries:	Hamilton:	D/L Virtual Campus:	Other:
✓	✓		✓		

Course Reference Numbers (CRNs) (if known)

Paisley:	Ayr:	Dumfries:	Hamilton:	D/L Virtual Campus:	Other:
8454	unknown		unknown		

Trimester(s) for Module Delivery

(Provided viable student numbers permit).

Trimester 1		Trimester 2		Trimester 3	
			✓		

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Subject Development Group (SDG)	Creative Technologies
Assessment Results (Pass/Fail)	No
Subject Panel	Computer Games
Moderator	Dr John Nixon
External Examiner	Dr Paul Chapman
Accreditation Details	
Changes/Version Number	2.0 Learning outcomes, module summary, PDP/Employability and indicative resources all revised to maintain currency with rapidly changing technologies. Examination reduced to 50% and practical examination replaced with a written assignment.

Assessment Outcome Grids (Footnote A.)

Assessment Category 1						
Learning Outcome (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Formal Written Examination	✓		✓	✓	50	2

Assessment Category 2						
Learning Outcome (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Written Assignment	✓			✓	20	4
Other : Development project	✓	✓	✓	✓	30	12
Combined Total For All Assignment Categories					100%	18 hours

Footnotes

A. Referred to within Assessment Section above

B. Identified in the Learning Outcome Section above

Note(s):

1. More than one assessment method can be used to assess individual learning outcomes.
2. Schools are responsible for determining student contact hours. Please refer to University Policy on contact hours (extract contained within section 10 of the Module Descriptor guidance note). This will normally be variable across Schools, dependent on Programmes &/or Professional requirements.