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| MODULE PROFORMA | | |
| Full module title: Mobile Application Development | | |
| Module code: 5COSC005W | Credit level: 5 | Length: 1 semester |
| UK credit value: 20 | ECTS value: 10 | |
| Faculty and Department: Faculty of Science and Technology, Department of Computer Science | | |
| Module Leader(s): | | |
| Extension: | Email: | |
| Host course and course leader: BSc Computer Science, Dr Philip Trwoga | | |
| Status: Option – BSc Computer Games Development, BSc Computer Science, BSc Multimedia Computing | | |
| Subject Board: UG Computer Science | | |
| Pre-requisites: | Co-requisites: none | |
| Study abroad: | | |
| Special features: | | |
| Access restrictions: | | |
| Are the module learning outcomes delivered, assessed or supported through an arrangement with an organisation(s) other than the University of Westminster: No | | |
| Summary of module content:  The Android mobile programming architecture. Restrictions of using small devices such as mobile phones tablets and wearables. Programming user interfaces, networking, persistent storage and multi-threading. Device profiling, application deployment and installation. | | |

**Learning outcomes**

After the completion of this module the student will be able to:

1. Apply mobile application programming tools and development environments to implement and deploy a mobile application based on a requirements document;
2. Explain in detail how to provide portability over a wide range of devices;
3. Describe and justify the different components which are needed to implement application specific functionality, such as network connectivity, data persistence, and location based services;
4. Discuss in detail the Android mobile application development cycle;
5. Test and validate the functionality of a mobile application.

**Contribution of the Module to Course Learning Outcomes**

In order to relate the Module Learning Outcomes to the Course Learning Outcomes and the Graduate Attributes, this module specification should be read in conjunction with the Course Programme Specification. To understand the notation in the formulation of the course Learning Outcomes consider, for example: **L5-M-LO5-CS:**

**L5** refers to level 5 (second year)

**M** refers to the Maths domain (all domains are given in the table below)

**LO5** learning outcome 5

**CS** the course code i.e. Computer Science (other codes are CG – Computer Games Development, MC – Multimedia Computing, SE – Software Engineering, BIS – Business Information Systems).

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| Code | Domain | Description |
| C | Client-User Focussed | Associated with the user interface and usability of systems. Focussed on the client component of systems. |
| D | Data | Relates to knowledge and application of the processing and storage of information. |
| M | Maths | Relates to mathematical skills and knowledge. |
| O | Operating Environment | Relates to knowledge and understanding of the environment in which users run application software. |
| P | Programming | Relates to programming and development skills. |
| S | Skills | Relates to professional and practical skills. |

Table: Course Level Learning Outcomes Codes

**Course outcomes the module contributes to:**

L5-M-LO5-CS - Demonstrate competency in object-oriented design and algorithmic and mathematical approaches to solve medium scale problems.

L5-M-LO6-CS - Successfully plan and execute a medium-scale software project with appropriate software engineering principles.

L5-M-LO1-SE - Demonstrate competency in object-oriented design and algorithmic and mathematical approaches to solve medium scale problems.

L5-M-LO2-SE - Analyse algorithms and their complexity and apply relevant strategies in designing and re-using algorithms.

L5-M-LO1-MC - Specify, design, develop and test IMPs to solve real-life medium-scale problems with appropriate techniques.

L5-M-LO2-MC - Formally analyse and present experimental / user behaviour results to support high quality decision making using appropriate quantitative and statistical techniques.

**Indicative syllabus content**

* Dimensions of Mobility. Android Architecture and the Android operating system.
* The Android development lifecycle. Activity's lifecycle.
* Creating user interfaces using XML and programmatically. Building dynamic UI with Fragments.
* 2D Graphics.
* Implementing the Business Logic of an example mobile application.
* Working with Databases. SQLite. Other ways of persisting data.
* Threads in Android.
* Connecting to the Network.
* Location-Based Services.
* Building applications that run on wearables.

**Teaching and learning methods**

This module will be delivered in a mixture of presentations and lectures and supervised practical work. The taught material will be delivered in a 2- hour lecture and 2-hour tutorial mode for each teaching week. Outside formal class time there will be online support via Blackboard.

Elements of self-study will also be included in the module. Students will be required to self-study certain additional aspects of Android mobile programming and produce appropriate software solutions related to the material studied.

Extra exercises and tasks will be given to the students during the tutorials and students are expected to work towards their solution outside the formal tutorial slots. The produced solutions of these will be discussed with their module tutor, during the next tutorial.

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| **Activity type** | Category | Student learning and teaching hours\* |
| Lecture | Scheduled | 24 |
| Practical Classes and workshops | Scheduled | 24 |
| **Total Scheduled** |  | **48** |
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| Module and course-based general study | Independent | 42 |
| Preparation for Assessment | Independent | 110 |
| **Total Independent Study** |  | **152** |
|  |  |  |
| **Total student learning and teaching hours** |  | **200** |

\*the hours per activity type are indicative and subject to change.

**Assessment rationale**

The first programming assignment provides for a practical application of the concepts encountered in the lectures and first-hand experience of the full lifecycle applied to a medium scale mobile application development project, including use of the Eclipse development environment or Android Studio (LO1, LO4). The second coursework covers LO2, LO3, and LO5.

**Assessment criteria**

A pass level would be demonstrated by an ability to produce a basic portable mobile application that can handle user input and output, navigate a basic set of menus and dialogues and produces some useful functionality to the user. To gain a pass level the student should also be able to demonstrate an understanding for the development of a basic mobile application. A higher level of ability would be indicated by the student being able to explain and demonstrate how to apply all the programming techniques shown such as persistent storage, network access and security.

**Assessment methods and weightings**

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| **Assessment name** | **Weighting %** | **Qualifying mark %** | **Qualifying set** | **Assessment type (e.g. essay, presentation, open exam or closed exam)** |
| ***Coursework 1***  Preparation for Assessment | *50* | *30* |  | *Code and report*  *55 hours* |
| ***Coursework 2***  Preparation for Assessment | *50* | *30* |  | *Code and report*  *55 hours* |

**Formative assessment**

The current progress of the students will be assessed (no marks towards the final mark of the module) during the tutorial in week 4. The students will be asked to work towards the solution of certain programming tasks. Feedback will be provided in the end of the session of how well they are doing and in which aspects they need to improve.

**Synoptic assessment**

No synoptic assessment.

**Sources**

**Essential reading**

Burnette, E. (2010) *Hello Android*. The Pragmatic Bookshelf.

**Further Reading**

Abelson, W. and Robi, S and King, C. (2011). *Android in Action*, 2nd edition. Manning.

Conder, S, Darcey, L. (2010). *Android Wireless Application Development*, 2nd edition. Addison Wesley.

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| **Date of initial validation:** |  |
| **Dates of approved modifications:** |  |
| **Date of re-validation/review:** |  |