WBCS017-10 Software Engineering

This document presents the Deliverables (Ds) based on Learning Outcomes (LOs) to be delivered in each of the Assessment Blocks (ABs). Marking criteria for each D are presented below.

The WBCS017-10 Software Engineering course has the following Learning Outcomes:

Learning Outcomes (LO)	
ID	**Description**
LO1	have an in-depth knowledge of the initial phases of the software engineering lifecycle, i.e. requirements engineering and be able to apply them in a large-scale industrial setting
LO2	have an in-depth knowledge of the software design phase and be able to apply them in a large-scale industrial setting
LO3	comprehend the needs of an external client taking into account their cultural and professional background
LO4	communicate and negotiate effectively possibilities and limitations of a product taking into account the broader socio-ethical context of the problem.
LO5	have knowledge about collaborative software development and its implications in time management, and project management (e.g. task sharing, agile practices)
LO6	have knowledge about the basic required technologies in a collaborative environment (e.g. distributed version control, continuous integration)
LO7	have knowledge about how to maintain a high level of quality of the software even when the project becomes large, by writing clean code and good documentation

The following are the Deliverables of the WBCS017-10 Software Engineering course, and linked to Learning Outcomes

Deliverables (D)		
ID	**Description**	**Learning Outcomes**
D1	Describe, justify and contextualise the requirements of the system	LO1, LO3, LO4
D2	Produce the design documentation for the system	LO2, LO4
D3	Source code for Minimum Viable Product (MVP) and demo (block I)	LO1, LO5, LO6
D4	Final demo of the system and presentation of work (block II)	LO4, LO6
D5	Source code for release candidate	LO5, LO6, LO7
D6	Traceability Matrix	LO3, LO4, LO7

Assessment Blocks (AB)			
ID	**When**	**Deliverables**	**Grade**
AB1	End of block I	D1, D2, D3	(D1+D2+D3)/3
AB2	End of block II	D1, D2, D4, D5, D6	(D1 + D2 + D4 + D5 + D6)/5
FG*		Final Grade	(AB1 + AB2)/2

* Pass threshold for course: **FG >= 5.5** (no pass threshold for either AB1 or AB2)

Marking Criteria	
D1: Describe, justify and contextualise the requirements of the system *Covering Learning Outcomes LO1, LO3 and LO4*	**Mark and Mark Descriptor**

In addition to the criteria indicated for 'unsatisfactory', this part of the report demonstrates a very poor attempt at approaching the requirements report. Symptomatic of this can be, for example, the absence of requirement unique identifiers, their priority levels or a clear rationale	**1-2** Unacceptable
Conceptually weak, revealing insufficient grasp of the requirements of the client. Overall a poor analysis of the system and its requirements. Recognisable but limited awareness of the rationale of the requirements specific to the system under investigation.	**3-4** Unsatisfactory
Threshold requirements: The requirement document provides a satisfactory analysis of the current requirements of the system. The requirements have been uniquely identified, prioritised and discussed with the client.	**5** Acceptable
The criteria for an 'Acceptable' grade are met. In addition, the requirements report provides a sound analysis and is well organised/ structured with no major or obvious omissions or inconsistencies in the coverage provided. If relevant, the literature regarding "Requirements elicitation and analysis" has been analysed and discussed in the context of the system under development.	**6-7** Good/Very Good
The requirements for a 'Good' or 'Very Good' grade are met. In addition, this part of the report demonstrates an excellent commentary and interpretation of the identified Requirements. The requirements have been successfully linked to the design, code and tests via the traceability matrix. Higher grades will be awarded for reports that achieve these standards to an exceptional degree, such that this part of the report could lead to a publishable article.	**8-9-10** Excellent/ Exceptional
D2: Produce the design documentation for the system *Covering Learning Outcomes LO2 and LO4*	**Grade and Grade Descriptors**
In addition to the criteria indicated for 'unsatisfactory', the design document demonstrates a very poor attempt at establishing the architecture of the system to be built. Symptomatic of this can be, for example, the absence of one or more *diagrams, components or connectors* that can help identify the main building blocks of the application, and their interactions.	**1-2** Unacceptable
This part of the report is conceptually weak, and there is an overall poor **analysis** of the architectural **layers** and architectural **style** of the system. The components are identified but without a clear understanding of where they should be placed in the overall architecture. The diagrams shown do not help to describe the components and the connectors in a meaningful way.	**3-4** Unsatisfactory
Threshold requirements: This part of the report provides a satisfactory identification of the architectural components and connectors, together with their description within the design diagrams of choice. Each of the architectural diagrams is based on a precise requirement. Each of the chosen architectural diagrams is linked directly to one or several of the requirements.	**5** Acceptable
The requirements for an 'Acceptable' grade are met. In addition, this part of the report provides a *complete* analysis and is well organised/ structured with no major or obvious omissions or inconsistencies in the coverage provided. If relevant, relevant literature has been discussed to document past attempts of the chosen architectural decisions, patterns and style, and in a similar domain.	**6-7** Good/Very Good
The requirements for a 'Good' or 'Very Good' grade are met. In addition, this part of the report demonstrates a *complete* and *correct* commentary on the topic. The storyline of this part of the report flows well integrating and commenting on possible **alternatives** in the realm of architectural decisions. Higher grades will be awarded for reports that achieve these standards to an exceptional degree such that this part of the report could lead to a publishable article.	**8-9-10** Excellent/ Exceptional
D3: Source code for Minimum Viable Product (MVP) *Covering Learning Outcomes LO1, LO5 and LO6*	**Grade and Grade Descriptors**
In addition to the criteria indicated for 'unsatisfactory', the MVP demonstrates a very poor attempt at implementing the minimal features that are discussed as ***high priority*** in the requirements document. Symptomatic of this can be, for example, the lack of runnable code, the presence of bugs that do not allow the program to run, or the feedback of the client lamenting the lack of basic functionalities.	**1-2** Unacceptable
This deliverable is structurally weak, and there is an overall poor quality of the code presented during the demo. The group is unable to define the scope of the missing features, and it is unable to show ownership of the code, in terms of features implemented.	**3-4** Unsatisfactory
Threshold requirements: The MVP shown at the demo, and the code developed during the first part of the course, shows that the features connected with high priority requirements have been attempted with acceptable results. The group shows ownership of the code, and knows where	**5** Acceptable

features are lacking refinement, and what other features are missing. A good understanding of the remaining work, with a likely timeline of work and responsibilities, is described during the demo.	
The requirements for an 'Acceptable' grade are met. In addition, the MVP provides a *complete* list of features either complete, work-in-progress or still to be implemented. The group shows clear ownership of the code, responsibilities of coding and features are clearly identified: the group can show a credible timeline of work to be performed in the second block.	**6-7** Good/Very Good
The requirements for a 'Good' or 'Very Good' grade are met. In addition the MVP shows a *complete* and *correct* set of features (completed, work-in-progress or still to be implemented) that are directly traceable to the design document. Higher grades will be awarded for exceptional presentations during the demo sessions.	**8-9-10** Excellent/ Exceptional
D4: Final demo of the system and presentation of work (block II) *Covering Learning Outcomes LO4 and LO6*	**Grade and Grade Descriptors**
In addition to the criteria indicated for 'unsatisfactory', the final demo demonstrates a very poor attempt at implementing the features that are discussed in the requirements document. Symptomatic of this can be, for example, the lack of runnable code, the presence of bugs that do not allow the program to run, or the feedback of the client lamenting the lack of the functionalities at the end of the development cycle.	**1-2** Unacceptable
This deliverable is structurally weak, and there is an overall poor quality of the code presented during the demo. The group is unable to define the scope of the missing features and why that happened during the course of two blocks: the group is also unable to show ownership of the code, in terms of features implemented.	**3-4** Unsatisfactory
Threshold requirements: The product shown at the demo, and the code developed during the second part of the course, shows that the features connected with each requirement have been attempted with acceptable results. The group shows an overall good level of ownership of the code, and knows where features are lacking refinement and why. Clear responsibilities have been identified and group members are credited with the work that they implemented .	**5** Acceptable
The requirements for an 'Acceptable' grade are met. In addition, the final demo provides a complete list of the complete features. Work-in-progress or still to be implemented features have been either reduced to a minimum, or discussed with the client. The group shows clear ownership of the code, responsibilities of coding and features are clearly identified. The group can show a credible timeline of work that has been completed in the second term.	**6-7** Good/Very Good
The requirements for a 'Good' or 'Very Good' grade are met. In addition the final demo shows a *complete* and *correct* set of features that are directly traceable to the design document. Higher grades will be awarded for exceptional presentations during the demo sessions.	**8-9-10** Excellent/ Exceptional
D5: Source code for release candidate *Covering Learning Outcomes LO5, LO6 and LO7*	**Grade and Grade Descriptors**
In addition to the criteria indicated for 'unsatisfactory', this deliverable demonstrates a very poor attempt at implementing the desired features. Symptomatic of this can be, for example, lack of coding standards or documentation, incomplete features or incomplete traceability. The trace of development logs is incomplete, especially in the definition of the development activities.	**1-2** Unacceptable
This deliverable only partially adheres to coding standards and does not provide sufficient documentation. The features are incomplete and there are issues in running the code outside of the environment used by the group. The trace of development logs is only partially complete, especially in the definition of the development activities.	**3-4** Unsatisfactory
Threshold requirements: The code provided as release candidate is *complete*, as referred to in the final version of the requirements and design documents. The features are linked to the development of one or multiple members of the group, and the trace of development logs is complete, especially in the definition of the development activities.	**5** Acceptable
The requirements for an 'Acceptable' grade are met. In addition, the source code has been delivered regularly to the TA, as part of the sprints that the group worked through. Coding standards have been consistently adhered to, and documentation provided at high standards. A report of the development activities by the members of the group has been provided, and the trace of development logs is complete and correct, especially in the definition and attribution of the development activities.	**6-7** Good/Very Good

The requirements for a 'Good' or 'Very Good' grade are met. In addition the TA responsible for the group reports an excellent level of performance of the coding activities during the sprints of the two terms.	**8-9-10** Excellent/ Exceptional
D6: Traceability Matrix *Covering Learning Outcomes LO3, LO4 and LO7*	**Grade and Grade Descriptors**
In addition to the criteria indicated for 'unsatisfactory', this deliverable demonstrates a very poor attempt at linking the development activities, tests and requirements in a single document. Symptomatic of this can be, for example, lack of unique identifiers, wrong, incomplete or insufficient links between artifacts.	**1-2** Unacceptable
The testing of the features is attempted, but its coverage is not complete. The testing is not linked directly to the final version of the requirements, or the final version of the design document. The traceability matrix is incomplete or generally not correct.	**3-4** Unsatisfactory
Threshold requirements: The testing of the developed features is *complete*, and most of its tests are passed. For the most part, the testing of the features is directly related to the requirements, the architecture. and the feedback received from the TA during the sprints. The traceability document is present and complete.	**5** Acceptable
The requirements for an 'Acceptable' grade are met. In addition, the deliverable provides a complete testing suite of the development activities. Coding standards have been mostly adhered to, and documentation provided. A report of the testing activities by the members of the group is being provided, with evidence of the testing activity by each member.	**6-7** Good/Very Good
The requirements for a 'Good' or 'Very Good' grade are met. In addition this part of the report demonstrates a *complete* and *correct* suite of tests, from the verification and validation points of view. This must be demonstrated (a) during the live demo that will correctly link the tests to the implemented features, and (b) via a traceability matrix.	**8-9-10** Excellent/ Exceptional