CP5HA75E Systems Analysis and Design

20 Credits

Academic Year 2023-24

Table of contents

1   Key team contact details

Module Leader	Nasser Matoorianpour
Email	Nasser.matoorianpour@uwl.ac.uk
External Examiner	Professor Nada Philip
Apprenticeship Support Link Tutor (ASLT)	Dr Malte Ressin

2   Module content

This module will allow the student to practice systems analysis and design techniques in order to provide a design solution to a specific problem.

In the process of analysing the current problem and designing a system solution, students will learn and apply:

- Elicitation methods
- Task and data analysis
- Establishment and management of requirements
- Analysis and design documentation, e.g. use cases, sequence diagrams, conceptual models
- Risk management

Please refer to the Course Handbook for a detailed outline of how this module forms part of your course.

3   Learning materials

The reading list for this module is available on Blackboard in the module area and online by searching readinglists. This shows real-time availability of books in the library and provides direct links to digital items, recommended by your lecturer.

Remember to log into Blackboard daily to receive all the latest news and support available at your module sites!

Subject guides (libraryguides) are also available to help you find relevant information for assignments, with contact details of the Subject Librarian for your School.

Recommended texts:

Ian Sommerville, Software Engineering (https://software-engineering-book.com/)

4   Apprenticeship

An apprentice is in a real job during which you will learn new knowledge, skills, and behaviours

(KSBs). The training aspect of the apprenticeship is delivered in partnership with the employer, by an approved **training organisation** such as the University. Typically, much of the "knowledge" is delivered via a higher education qualification or a non-qualification course, while skills and behaviours are developed in the workplace.

Attendance Monitoring and Off The Job (OTJ) Learning

As an apprentice you will carry out the majority of your OTJ time on your apprenticeship course, you are required to engage in 20% of your learning outside of your employment by attending on campus classes and engaging with timetabled classes or online in timetabled sessions. Your attendance will be monitored every week and any Authorised Absence Applications must be signed off by the Course Leader.

Review Meetings

As part of the funding requirements every apprentice must have a Tripartite Review Meeting every 12 weeks. These meetings include you, your Apprenticeship Support Link-Tutor (ASLT), and your Workplace Mentor or Practice Supervisor. Review meetings are your opportunity to monitor and discuss your progress both on the apprenticeship and in the workplace, and to agree and set your targets for the future. Please refer to the section on Studying a degree apprenticeship of the Student Handbook for more information.

5   Maintaining Academic Honesty and Integrity

Academic Integrity means avoiding plagiarism and cheating and owning your own work, the use of essay mills and AI content is also considered academic misconduct. This is when you submit a piece of work which is not completely your own, but which you are presenting as your own without acknowledging the author or properly referencing the original source. All your work must demonstrate Academic Integrity; it must be an honest and fair submission, complying with all the requirements of the assessment. Failure to meet these standards of behaviour and practice is academic misconduct, which can result in penalties being applied under the Academic Offences Regulations. You can get support with your academic writing by speaking to our Study support team.

6   Meeting Deadlines

You should always try your best to submit your work on time. You can submit coursework up to 10 calendar days late without penalty if you request an extension before the submission deadline. Without an extension, the maximum mark you will be able to get for that work will be the pass mark.

7   Getting Support

There may be times when you experience circumstances outside of your control and talking to your Module Leader and other support services available to you in the university will help keep you on track with your studies. You can access information on support services and further guidance at our Support for current students page.

If your circumstances mean that you are not able to submit at all or are unable to attend an in-person assessment like an exam or in-class test, then you can request mitigation for the assessment. Approved mitigation means that you can have another attempt without penalty if you fail an assessment or do not submit.

If you request an extension or mitigation before the deadline you can choose to self-certify, without providing evidence, so long as you have a valid reason. You can only self-certify three assessments per academic year. If you have used all your self-certification opportunities, or requested mitigation after the deadline, you will need to provide evidence of your exceptional circumstances for your request to be granted.

Your Students' Union Advice Team will be able to support you through the process.

8   Preparing for your Assessment

A key part of your learning will be preparation for your formative and summative assessments. You will be provided feedback on your formative assessments, and this will help you to better understand what is required of you when you submit your summative assessment. Please see below guidance on your formative assessment and how to access your feedback.

As an Apprentice, please note that different regulations may apply to assessments which form part of your End Point Assessment. Please ensure you familiarise yourself with the regulations that apply to your Apprenticeship course in your Course Handbook.

9   Summative Assessments

Summative Assessment (Assignment 1)

Assessment title	Systems Modelling and Design
Submission date and time	25 July 2024
Word Count (or equivalent)	n/a
Where to submit	Blackboard
Feedback date	Within 15 days
Assessment Weighting	100%
PSRB requirements (if applicable)	N/A

Submitting, feedback & grades online using Blackboard

Main objectives of the Assessment

Assignment

Given the case study, you are required to deliver a system proposal document and to structure the data storage requirements using the appropriate data modelling techniques. More specifically, you are required to complete the following tasks:

Task 1 - Select an appropriate system development methodology
In your report specify your role as a system analyst and the required skills throughout the SDLC. Given current data process, select a suitable system development methodology (waterfall, prototyping, RAD and etc.) to implement an information system. Justify your answer by comparing your selected methodologies with more than two other methodologies.

Task 2 – Select one/two Data gathering technique

Choose one or two data gathering technique to ascertain user needs for the new system. Examples of data gathering techniques: interview, questionnaire, survey, observation or JAD.

Task 3 - Create a list of functional and non-functional requirements

Task 4 – Create Use cases
Draw a use case diagram for case study. Selecting two use cases, create use case description for them.

Task 5 – Create Data Flow Diagram
Draw the context diagram, Level 0 DFD and Level 1 DFD for one identified use case in task 4.

Task 6 – Create Entity Relationship Diagram
Identify a list of entities and their attribute. Draw the corresponding ERD and the cardinality and optionality which reflect the system requirements. Each relationship must have name, cardinality and modality. Identify primary and foreign keys for each entity. Each primary key should be underlined and each foreign key must be prefixed with an asterisk.
You should use an appropriate CASE tool to produce the diagram e.g. Microsoft Visio, Draw.io, StarUML

Task 7 – Project Risk Management
Identify at least 1 risk which may occur during the completion of the system by using the Risk-Register template.

The diagrams must be completed using a CASE tool such as StarUML.

Case Study

LH Medical Company (LHM)

LHM is a London based privately owned hospital which provides healthcare to its patients. The hospital uses in-house software to manage and service its patients which they refer to as clients. It is an expanding venture and needs to accommodate for processing its information globally.

The proposed practice management system would be web enabled and multi-platform for connectivity via web services, with connectivity to existing legacy systems. An enterprise document management system would ensure patient documents are replicated globally and available per demand.

In addition to medical treatments, medicine and drugs, consultation and vaccinations are offered to its patients (with a variable additional fee) the company offers medical instruments to other companies either to purchase or to lease.

LHM records the details of its clients with possibly their full medical history in their computer system. When a new patient requests an appointment (walk-in or on-line) a treatment course begins and a practitioner is allocated to the patient. A full history and previous medical records are printed showing different categories of Treatments during different time intervals. Analyses are drawn in terms of any possible allergies and previous histories. Treatments may involve many surgeons and consultants depending on its complexity.

The contact practitioner is responsible for estimating the costs of treatments that is agreed by the client at the start of the treatment. The duration of the treatment may be set at any time duration

and may also be changed during the treatment depending on the complexity of possible operations. The final cost and completion date are recorded at the end of the treatment.

During a treatment process, notifications may be sent to patients and other practitioners.

Repeat prescriptions may automatically be produced by the system if appropriate and are available for collection at any surgery by the patient. At any time, a practitioner may suspend or cancel the prescriptions.

The cost for a treatment is paid for by the client or an insurance policy provided by a number of insurers. Insurance policies may have additional surcharges and costing depending on treatment types and medicines.   Long term treatment courses may be edited or cancelled by practitioners or clients. To re-start an existing treatment an additional fee is applied.

LHM may receive requests for specialise treatments from other hospitals or they may refer clients to other medical centres.

Each treatment course or service may include one or more of the following items:

- Operations and vaccinations
- Consultations and check-up
- Medicine and different types of tablets
- Clinical reports and attached documents and history
- Prescriptions and repeat Prescriptions

Payments by clients may be in full or part payments to cover a range of medical and non-medical services offered by the company. Payments may include possible applied surcharges for late payments and or special discounts for long term treatments. Tax allocations may also vary from one treatment item to another. Payments have to accommodate for price changes for medicines and medical services and track price changes for drugs purchased from pharmaceutical companies.

A treatment course comprising services from other hospitals carry additional changes set by the medical service providers. A full list of Treatment courses with corresponding payments may be requested by the site manager at any time. Clients' outstanding balances may be retrieved at any time for current treatment and services indicating the payments for the treatment course.

-    End of Case Study -

No.	Learning Outcome	Marking Criteria
1	Select and apply appropriate elicitation methods in order to establish requirements	Assignment 1
2	Specify both functional and non-functional requirements	Assignment 1
3	Produce analysis documentation to support a software solution	Assignment 1
4	Produce design documentation to support a software solution	Assignment 1

5	Identify risks for a given software project	Assignment 1
6	Explain how changes to a software project can be managed	Assignment 1

Marking Scheme:

GRADE	(20) SYSTEMS DEVELOPMENT METHODOLOGY& DATA GATHERING TECHNIQUE	(20) USE CASES	(20) DFD	(20) ERD	(10) REQUIREMENT	(10) RISK MANAGEMENT
93-100%	Exceptional breadth and depth of knowledge and understanding of data gathering technique; use cases; DFD, ERD and requirements; produced an exceptional report. Work may achieve or be close to publishable or commercial standard.					
70-92%	Shows a critical understanding of development methodologies with a concise and accurate evaluation of development methodologies (some of which were beyond those taught) predicated on current academic research/understanding. Uses authoritative understanding to offer personal insight into most suitable methodology for the given business case. Use of an excellent technique design principles including an excellent rating scales for all measurements. Provided an excellent rational for the chosen technique.	Excellent knowledge and understanding of use case description and use case diagram. The student has demonstrated a deep understanding of use case modelling. Completed list of use cases and their precise description. One/two relationships between use cases identified and are all correct. Correct naming of use cases provided for each use case. This is also evidenced in the text.	Excellent knowledge and understanding of DFD including context diagram; Level 0 and level 1. The student has demonstrated a deep understanding of Data Flow Diagrams (DFD). All processes, data store, external entities and data flows are correct. Context diagram, Level 0 DFD and Level 1 DFD are balanced.	The student has demonstrated a deep understanding of the effect normalisation has on entities and entity relationships. Any m:n relationships have been removed. Any double binary relationships and/or unary relationships have also been identified. The student is able to clearly and accurately articulate the transformations that have occurred at each normalisation stage e.g. why and how tables are being linked or separated. Cardinality and optionality have also been accurately specified for both ends of each relationship. One direction for each relationship has been appropriately labelled as required. All primary and foreign key	Excellent knowledge and understanding of: System Requirement. Complete lists of all functional and non-functional requirements have been given as well as their various types.	Excellent knowledge and understanding of the risk management techniques; possible risks have been identified with suggestions on how to manage changes.

				attributes have been entered in the entity boxes as required. Correct notation has been used throughout.		
60-69%	Very good knowledge and understanding of: Software development methodologies and systems analysis and design concept. Detailed description of each systems development lifecycles phase provided with clear explanation of each system development methodology and their differentiations Use of a good technique design principles including some rating scales for all measurements. The justification for the chosen technique is giving but avoiding an in depth evaluation of other techniques.	The student has demonstrated a strong understanding of use case modelling. Major use cases identified in the diagram using correct syntax. Major steps identified with few missed or inaccurately described in the description.	The student demonstrated a strong understanding of DFD (context diagram, Level 0 and Level 1) with few errors in the models including data store, external entities and data flows. Level 0 DFD and Level 1 DFD are balanced.	The student has demonstrated a strong understanding of entities and entity relationships. The student is able to explain the transformations that have occurred at each normalisation stage. However, the discussion may lack some clarity. Cardinality and optionality are mainly accurate for both ends of each relationship. One direction for each relationship has been appropriately labelled as required. Most if not all primary and foreign key attributes have been entered in the entity boxes as required. Correct notation has been used throughout.	The student has demonstrated a strong understanding the requirement elicitation techniques and requirement analysis strategies have been addressed covering some aspects (problem analysis, root cause analysis, duration analysis, activity-based costing, informal benchmarking, outcome analysis, technology analysis, and activity elimination) but not all.	The student has demonstrated a strong understanding of the risk management techniques; possible risks have been identified with suggestions on how to manage changes.
50-59%	Sufficient knowledge and understanding of: Software development methodologies and systems analysis and design concept. Detailed description of each systems development lifecycles phase provided with	Sufficient knowledge and understanding of use case description and use case diagram. The student has	Sufficient knowledge and understanding of DFD. The student has demonstrated a good understanding	The student is able to explain the transformations that have occurred at each normalisation stage. However, the	The student has demonstrated a good understanding of the requirement elicitation techniques and requirement analysis strategies have	The student has demonstrated a good understanding of the risk management techniques; possible risks have been identified with

	some explanation of each system development methodology and their differentiations. An appropriate choice of data gathering techniques principles without any rating scales for measurement. Insufficient justification for the chosen technique.	demonstrated a good understanding of use case modelling. Some use cases provided in the diagram with few mistakes in the syntax. Some steps identified in the use case description and are correct.	of DFD (context diagram, Level 0 and Level 1) with some syntax errors in the models. Some errors found at all levels.	discussion lacks clarity and depth. Cardinality and optionality are accurate in places. Most relationships have been labelled as required. However, there may be slight inaccuracies for more than two relationships. Most relationships have been labelled, however, direction indicators may be missing. Labels are generally vague but relate to the requirements. Although correct notation has frequently been used, there may be numerous notational	been addressed covering few aspects (problem analysis, root cause analysis, duration analysis, activity-based costing, informal benchmarking, outcome analysis, technology analysis, and activity elimination) but not all.	suggestions on how to manage changes.
40%	Although literature is used to describe development methodologies, the level of understanding is unclear. Further justification for the selected methodology is needed before it could be fully appreciated. Most of the information has perhaps come from a textbook or the lecture notes. A poor choice of a data gathering technique with no justification for the chosen method.	The student has demonstrated a use case diagram and few use case descriptions but there are major mistakes in the syntax and use case steps.	The student has demonstrated a use case diagram and few use case descriptions but there are major mistakes in the syntax and use case steps.	The student has demonstrated some understanding of the effect normalisation has on entities and entity relationships. For at least one of the normalisation stages, an ERD has been constructed that appears consistent with the corresponding tables and table relationships (a major inconsistency may exist). Cardinality and optionality may be frequently inaccurate. However, the model represents	The student has demonstrated some understanding of the requirement elicitation techniques and requirement analysis strategies have been addressed.	The student has demonstrated some understanding of the risk management techniques; possible risks have been identified with suggestions on how to manage changes.

				some of the requirements accurately. Many relationship labels may be missing or inadequately describe the relationship. Some correct notation has been used in places.		
1-39%	An inadequate understanding of development methodologies is apparent with little or no ability to suggest an appropriate methodology. The methodology suggested may be just a single statement with no sensible justification. At best, some useful/relevant information may be present but further coherence, structure and academic study is required for it to be adequate. An inadequate understanding of data gathering techniques.	The student has been unable to demonstrate use case descriptions and a use case diagram.	The student has been unable to demonstrate a DFD.	The student has been unable to demonstrate a reasonable ability to identify and articulate how an ERD is affected during normalisation. The ERDs constructed may be very inconsistent with the corresponding tables. No reasonable attempt appears to have been made to ensure the correct cardinality and optionality. It may even appear unclear as to how the model relates to the requirements. Most if not all relationship labels may be missing or inadequately describe the relationship.	The student has been unable to address the requirement elicitation techniques and requirement analysis strategies.	The student has been unable to address risk management techniques.

For guidance on online submission of assignments, including how to submit and how to access online feedback, please refer to the UWL Blackboard student-help pages at:

10   Glossary and Acronyms

Terms and definitions

11   Appendix – Research ethics and integrity