“Traditional” Module 03 Content

# Module Overview and Objectives

## Overview

What is the focus of this Module? What is the challenge? Why does it matter? Relevance to real world?

In this Module, we will discuss the following:

* What is a requirement?
* What are functional and non-functional requirements?
* The Requirements Engineering process
* How do we evaluate requirements?
* Challenges with Requirements Engineering
* The agile approach to Requirements Engineering

The hardest aspect of building any system is determining what to build. With Requirements Engineering, we answer the question “what?”. It can be catastrophic if we gather and implement incorrect requirements. As mentioned previously, we will be learning about the various phases of the Software Development lifecycle. Requirements Engineering is the first phase in the lifecycle

## Objectives

**After completing this Module, you should be able to:**

* Define a requirement, a functional requirement, and a non-functional requirement
* Classify requirements as functional and non-functional
* Understand the importance of non-functional requirements
* Formulate functional and non-functional requirements for a given system
* Explain the Requirements Engineering process
* Evaluate requirements

# Readings and Resources

## Required Readings

List the readings this week from the required source(s):

**Prepare** for this Module’s content by reading the following:

* Hofman and Lehner, “Requirements Engineering as a Success Factor in Software Projects”, IEEE Software, 2001
* Patton, “Ambiguous Business Value Harms Software Products”, IEEE Software, 2008.
* [Fowler, “UML Distilled: A Brief Guide to the Standard Object Modeling Language”, 3rd. Edition [Chapter 9 - Use Cases]](https://learning-oreilly-com.mutex.gmu.edu/library/view/uml-distilled-a/0321193687/ch09.html#ch09lev1sec1)
* [Adolph, et. al, “Patterns for Effective Use Cases” [Chapter 1 – What is a Quality Use Case?”]](https://learning-oreilly-com.mutex.gmu.edu/library/view/patterns-for-effective/0201721848/ch01.html)
* [Video] [Agile Estimation](https://www.youtube.com/watch?v=sCCUEtjCpCs)
* [Video] [Agile Prioritization](https://www.youtube.com/watch?v=zdAiirmT6OI&list=UUi2nY31hV-lnTcDQyazAHUA&feature=c4-overview)
* [Video] [Non-functional requirements specification](https://www.youtube.com/watch?v=NnD7UhnIsNc)
* [Video] [Use Case Introduction](https://www.youtube.com/watch?v=nN7lTDWKP6g)

## Resources

In this area, list any additional, non-textbook (articles, handouts, etc.) students should reference or read.

To enhance your understanding of the topics covered in the readings, review the following resources:

* Slides: Requirements Engineering (See module folder)
* Slides: Agile Requirements Engineering (See module folder)

# Content Topics

## Requirements Engineering – Introduction

[[Related PowerPoint: RE\_Modified](https://wiley.sharepoint.com/:p:/r/teams/GeorgeMason/_layouts/15/Doc.aspx?sourcedoc=%7BB5818F57-1537-4242-9D1A-ED4C3B95AC9C%7D&file=RE_Modified.pptx&action=edit&mobileredirect=true) - Slide 2 – 20?

Related Existing lecture videos = “4.1\_RequirementsEngineering\_Introduction” and “4.2\_Functional\_NonFunctional” ??]

### Introduction

What is a requirement? What is Requirements Engineering? Why is it important? What are the different types of requirements?

### Text-based Content

If some of the information for this topic will be communicated by simple text directly in the course, include that text below. (NOTE: It’s very okay, and often beneficial, to include key informational text directly in the LMS. It keeps the learner from having to go elsewhere putting the information in context with any other media-based content. Further, it is helpful to mix text-based and media-based content. For example, a topic might include the following: text, then an interactive video, then more text, then an inline knowledge check.)

[Add your text-based content here]

### Interactive- or Media-based Content

Include any non-text-based content elements that you would like to include in this topic here. These could be: a regular lecture video, an [interactive lecture video](https://es-george-mason-university.h5p.com/content/1291613023689898888), an [interactive presentation](https://es-george-mason-university.h5p.com/content/1291613038978781698), a [hotspot graphic](https://es-george-mason-university.h5p.com/content/1291595732167429698), an [inline knowledge check](https://es-george-mason-university.h5p.com/content/1291613083524369098), or [regular graphic](https://wiley.sharepoint.com/:i:/r/teams/GeorgeMason/Shared%20Documents/Academic%20Services/CS/3-Course%20Development/SWE-621%20Software%20Design%20and%20Architecture/2-SWE621-Design-Development/3-Media/Graphics%20-%20Goals%20Pyramid.png?csf=1&web=1&e=wnoTpp). (We also have other options we could entertain depending on what you’d like to accomplish.)

[copy and paste information from other template documents here]

OR

* Simply list and reference the information contained and completed in the other template documents

## Requirements engineering process

[[Related PowerPoint: RE\_Modified](https://wiley.sharepoint.com/:p:/r/teams/GeorgeMason/_layouts/15/Doc.aspx?sourcedoc=%7BB5818F57-1537-4242-9D1A-ED4C3B95AC9C%7D&file=RE_Modified.pptx&action=edit&mobileredirect=true) - Slide 22 – 34??

Related Existing lecture videos = “4.3\_RE\_Process” and “4.4\_RequirementsEvaluation” ]

### Introduction

How do we go about eliciting, analyzing, and formulating requirements? How do we evaluate requirements?

### Text-based Content

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[Add your text-based content here]

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[copy and paste information from other template documents here]

OR

* Simply list and reference the information contained and completed in the other template documents

## Agile requirements engineering process

[[Related PowerPoint: AgileRE - All slides](https://wiley.sharepoint.com/:p:/r/teams/GeorgeMason/_layouts/15/Doc.aspx?sourcedoc=%7BCB2F34BB-16FD-4632-8164-CB1F9CC0FEDE%7D&file=AgileRE.pptx&action=edit&mobileredirect=true"﷟HYPERLINK "https://wiley.sharepoint.com/:p:/r/teams/GeorgeMason/_layouts/15/Doc.aspx?sourcedoc=%7BCB2F34BB-16FD-4632-8164-CB1F9CC0FEDE%7D&file=AgileRE.pptx&action=edit&mobileredirect=true)

Related Existing lecture videos = 4.5\_Agile\_RE]

### Introduction

What does the Requirements Engineering process look like when you follow an agile method?

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[Add your text-based content here]

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[copy and paste information from other template documents here]

OR

* Simply list and reference the information contained and completed in the other template documents

# Practice Activity / Knowledge Check

## [Knowledge Check Name]

**Type**: H5P (lower stakes, maybe not graded) or BB Quiz (higher stakes, graded)

### Instructions

Introduce the Knowledge Check, it’s purpose and its parameters (graded or not, how many attempts, etc.) so that students have the correct expectations.

[Will be incorporated into the content – see [this document](https://wiley.sharepoint.com/:w:/r/teams/GeorgeMason/Shared%20Documents/Academic%20Services/CS/3-Course%20Development/SWE-621%20Software%20Design%20and%20Architecture/2-SWE621-Design-Development/2-Module%20Design%20Docs/Module%2003%20Files/Module3_KnowledgeCheck.docx?d=wadb857f1c4b049078c810ec48a6bc143&csf=1&web=1&e=OIaH5O)]

# Assignments / Assessments

Use the Purpose, Instructions, Due, and Grading sections below to fully describe to students how to complete each assignment(s).

## Use Case Description

### Instructions

For the system described below, identify two use cases and develop a use case description for each. Each use case description must include a description of the main sequence of interactions between the actor(s) and the system, as well as a description of the alternative sequences. (A use case description template and example are provided [here](https://wiley.sharepoint.com/:w:/r/teams/GeorgeMason/Shared%20Documents/Academic%20Services/CS/3-Course%20Development/SWE-621%20Software%20Design%20and%20Architecture/2-SWE621-Design-Development/2-Module%20Design%20Docs/Module%2003%20Files/UseCaseTemplate.docx?d=w0d0b26fe05dc490b9748adcd6e1af474&csf=1&web=1&e=c2ewQy)).

The website shall allow users to view all of their bills with Fairfax county (such as trash bills, water bills, property taxes due, and parking tickets). A bill is expected to be paid on time, but there should be a mechanism to pay a late bill as well. To pay a bill, the user can choose the method (card, online check, or bank draft), the payment date, and the amount of the bill to pay. The user can view their current and past bills. Each evening, the system will interact with an external database that is able to process the daily payment transactions. This database interacts with the credit card companies and banks directly to process the payments.

Before viewing or paying any bills, the user must authenticate with the system by providing their username and password. If they don't have these credentials, there will be an option on the home page to create an account. Otherwise, once the user successfully logs in, they are able to view all of their bills and select to pay one or more bills.

### Due

To complete this assignment, you must complete the aforementioned steps then upload your completed assignment to this assignment item by **Sunday at 11:55 PM, ET.**

### Grading

This activity will be graded for *completion only*. (i.e., you earn all the points if you submit it – none if you don’t.)

## Mini paper

### Purpose

This assignment is intended to encourage you to reflect on the importance of Requirements Management and explore some tools used for Requirements Management.

### Instructions

Include a clear description of the assignment to the students. Follow it with bulleted items for the tasks the students should perform. Indicate all formatting, file and submission requirements.

Write a mini paper (at least 500 words, no more than 650) addressing the following:

* What is Requirements Management? Why do we need it?
* What are some (at least 3) tools used for Requirements Management? Briefly discuss the various capabilities of those tools.
* Provide a comparison of the capabilities offered by the tools you described previously (*Suggestion: Include a table to show the comparison.)*

You are required to include at least 3 citations formatted using the IEEE/ACM formats.

### Due

To complete this assignment, you must complete the aforementioned steps then upload your completed assignment to this assignment item by **Wednesday** at **11:55 PM ET** of **Module 04.**

### Grading

This assignment is worth 100 points. It will be graded according to the following rubric:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CRITERIA** | **Beginning** | **Progressing** | **Proficient** | **Accomplished** | **Max Points: 100** |
| **Depth of content** | *0 to 50* | *51 to 75* | *76 to 95* | *95 to 100* | *100* |
| Submission lacks critical thinking. Superficial connections are made with key course concepts and course materials, activities, and/or assignments | Submission demonstrates limited critical thinking in applying, analyzing, and/or evaluating key course concepts and theories from readings, lectures, media, discussions, activities, and/or assignments Minimal connections made through explanations, inferences, and/or examples. | Submission demonstrates some degree of critical thinking in applying, analyzing, and/or evaluating key course concepts and theories from readings, lectures, media, discussions activities, and/or assignments. Connections made through explanations, inferences, and/or examples. | Submission demonstrates a high degree of critical thinking in applying, analyzing, and evaluating key course concepts and theories from readings, lectures, media, discussions activities, and/or assignments. Insightful and relevant connections made through contextual explanations, inferences, and examples. |