# Course outline

<table>
<thead>
<tr>
<th></th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>7. September</td>
<td>Introduction, RE framework, Elicitation</td>
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<tr>
<td>3</td>
<td>14. September</td>
<td>Requirements specification and negotiation. NF requirements</td>
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<tr>
<td>4</td>
<td>21. September</td>
<td>Homework 1, Workshop 1</td>
</tr>
<tr>
<td>5</td>
<td>28. September</td>
<td>Requirements prioritisation and traceability</td>
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<tr>
<td>6</td>
<td>5. October</td>
<td>Requirements change control, Requirements validation</td>
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<td>12. October</td>
<td>Homework 2, Workshop 2</td>
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<td>8</td>
<td>19. October</td>
<td>Goal modelling</td>
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<tr>
<td>9</td>
<td>26. October</td>
<td>Scenario modelling</td>
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<tr>
<td>10</td>
<td>2. November</td>
<td>Requirements modelling</td>
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<tr>
<td>11</td>
<td>9. November</td>
<td>Homework 3</td>
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<td>12</td>
<td>16. November</td>
<td>Workshop 3</td>
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<tr>
<td>13</td>
<td>23. November</td>
<td>Requirements validation – workshop 4</td>
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<tr>
<td>14</td>
<td>30. November</td>
<td>Requirements prototyping – workshop 5</td>
</tr>
<tr>
<td>15</td>
<td>7. December</td>
<td>Presentation of workshop solutions</td>
</tr>
<tr>
<td>16</td>
<td>14. December</td>
<td>Summary of the course</td>
</tr>
</tbody>
</table>

Changes are possible!
Where are the challenges?
Elicitation Techniques

- **Traditional techniques**
  - Reading existing documents
  - Analyzing hard data
  - Interviews
    - Open-ended
    - Structured
  - Surveys / Questionnaires
  - Meetings

- **Collaborative techniques**
  - Focus Groups
    - Brainstorming
    - JAD/RAD workshops
  - Prototyping
  - Participatory Design

- **Contextual (social) approaches**
  - Ethnographic techniques
    - Participant Observation
    - Ethnomethodology
  - Discourse Analysis
    - Conversation Analysis
    - Speech Act Analysis
  - Sociotechnical Methods
    - Soft Systems Analysis

- **Cognitive techniques**
  - Task analysis
  - Protocol analysis
  - Knowledge Acquisition Techniques
    - Card Sorting
    - Laddering
    - Repertory Grids
    - Proximity Scaling Techniques
1 Introduction
   - Purpose
   - Scope
   - Definitions, acronyms, abbreviations
   - Reference documents
   - Overview

2 Overall Description
   - Product perspective
   - Product functions
   - User characteristics
   - Constraints
   - Assumptions and Dependencies

3 Specific Requirements

Appendices

Index

Identifies the product, & application domain

Describes contents and structure of the remainder of the SRS

Describes all external interfaces: system, user, hardware, software; also operations and site adaptation, and hardware constraints

Summary of major functions, e.g. use cases

Anything that will limit the developer’s options (e.g. regulations, reliability, criticality, hardware limitations, parallelism, etc)

All the requirements go in here (i.e. this is the body of the document). IEEE STD provides 8 different templates for this section
Requirements negotiation

• **The goal of negotiation**
  – Identify conflicts
  – Analyse the causes of each conflict
  – Resolve the conflicts by means of appropriate strategies
  – Document the conflict resolution and the rationale

• **Resolve conflicts at the goal level**
  – Goals document rationale of the solution-oriented requirements
  – Fundamental contradictions can be resolved before the stakeholders go into technical details (of the goals realisation)
NFR

- We have to turn our vague ideas about quality into measurables

The Quality Concepts
(abstract notions of quality properties)

Measurable Quantities
(define some metrics)

Counts taken from Design Representations
(realization of the metrics)

- reliability
  - mean time to failure?
  - run it and count crashes per hour???
- complexity
  - information flow between modules?
  - count procedure calls???
- usability
  - time taken to learn how to use?
  - minutes taken for some user task???
Requirements prioritisation

- **Calculate return on investment**
  - Assess each requirement’s importance to the project as a whole
  - Assess the relative cost of each requirement
  - Compute the cost-value trade-off:
Change Management

- **Product (artefact) dimension**
  - Concrete goals, scenarios, and solution-oriented requirements

- **Version dimension**
  - Manages different change states of the artefact of the product dimension
Validation Goal

- Check whether the outputs of activities fulfill defined quality criteria
- Check whether the execution of activities adheres to process definitions and activity guidelines
- Check whether the inputs of activities fulfill defined quality criteria
Goal Modelling

- **Relationships between goals:**
  - One goal **helps** achieve another (+)
  - One goal **hurts** achievement of another (-)
  - One goal **makes** another (++)
    - Achievement of goal A guarantees achievement of goal B
  - One goal **breaks** another (--) 
    - Achievement of goal A prevents achievement of goal B

- **Goal Elaboration:**
  - “**Why**” questions explore higher goals (context)
  - “**How**” questions explore lower goals (operations)
  - “**How else**” questions explore alternatives
## Scenario modelling

| Use Case ID: |  |
| Use Case Name: |  |
| Created By: | Last Updated |
| Date Created: | Date Last Updated |

| Actors: |  |
| Description: |  |
| Trigger: |  |
| Preconditions: | 1 |
| Postconditions: | 1 |
| Normal Flow: | 1 |
| Alternative Flows: |  |
| Exceptions: |  |
| Includes: |  |
| Priority: |  |
| Frequency of Use: |  |
| Business Rules: |  |
| Special Requirements: |  |
| Assumptions: |  |
| Notes and Issues: |  |

- Add new staff member
- Add new staff grade
- Change rate for the client
- Change grade for the staff member
- Calculate staff bonuses
Requirements Modelling

- **Data model**: Requirement (natural language): If a glass break detector attached to the entrance door detects that the entrance door has been damaged, the system shall enter the alarm state and inform the security company.
- **Behavioral model**: Transition diagram: State: alarm state, Event: alarm state, Event: inform security company.
- **Functional model**: Transition diagram.
- **Data flow diagram**: Function: inform security company.
Modalities and Assessment

- **Homework:** 1<sup>st</sup> - 5 points, 2<sup>nd</sup> - 5 points, 3<sup>rd</sup> - 10 points
- **Workshops** – 10 points each
- **Presentation** – 10 points

Max for practical assignments **70 points**. These points will be converted to 55 course points. For example:

<table>
<thead>
<tr>
<th>Practical assignment points</th>
<th>Course grade points</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>55</td>
</tr>
<tr>
<td>65</td>
<td>51</td>
</tr>
<tr>
<td>60</td>
<td>47</td>
</tr>
<tr>
<td>55</td>
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<td>45</td>
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<td>40</td>
<td>31</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
Modalities and Assessment

- Practical assignments – max 55 course points

- Examination – 50 points

Exam times:
(1) 04. January, 2021, 14:00-18:00, room 1019
(2) 11. January, 2021, 14:00-18:00, room 1019
Resit – 18. January, 2021, 14:00-18:00

To be admitted to the exam, at least 35 points of the course grade from the practical assignments need to be collected during the semester
Modalities and Assessment

• Practical assignments – **max 55 course points**

• Examination – **50 points**

<table>
<thead>
<tr>
<th>Points Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>91 and more</td>
<td>A</td>
</tr>
<tr>
<td>81-90</td>
<td>B</td>
</tr>
<tr>
<td>71-80</td>
<td>C</td>
</tr>
<tr>
<td>61-70</td>
<td>D</td>
</tr>
<tr>
<td>51-60</td>
<td>E</td>
</tr>
<tr>
<td>6-50</td>
<td>F</td>
</tr>
<tr>
<td>0-5</td>
<td>Not attended</td>
</tr>
</tbody>
</table>

**If you passed the course:**
- There will be no extra assignments
- You will not be allowed to retake the exam
Examination – 50 course points

• Phishing Questionnaire – 5 points
  
  [https://drive.google.com/file/d/1sTaRDrn2-a7l3SOrPk1ClrXdPpj6E8G1/view?usp=sharing](https://drive.google.com/file/d/1sTaRDrn2-a7l3SOrPk1ClrXdPpj6E8G1/view?usp=sharing)

  More about project:
  

• Multiple choice questionnaire – 15 points

• Exam tasks, case analysis – 30 points

• In Zoom:
  – Write your full name
  – During exam cameras open

• Submission of solutions using course Website
  – Submit function