SOFTWARE REQUIREMENTS ENGINEERING (SE2001)

Dr. Syed Muazzam Ali Shah
(Assistant Professor)

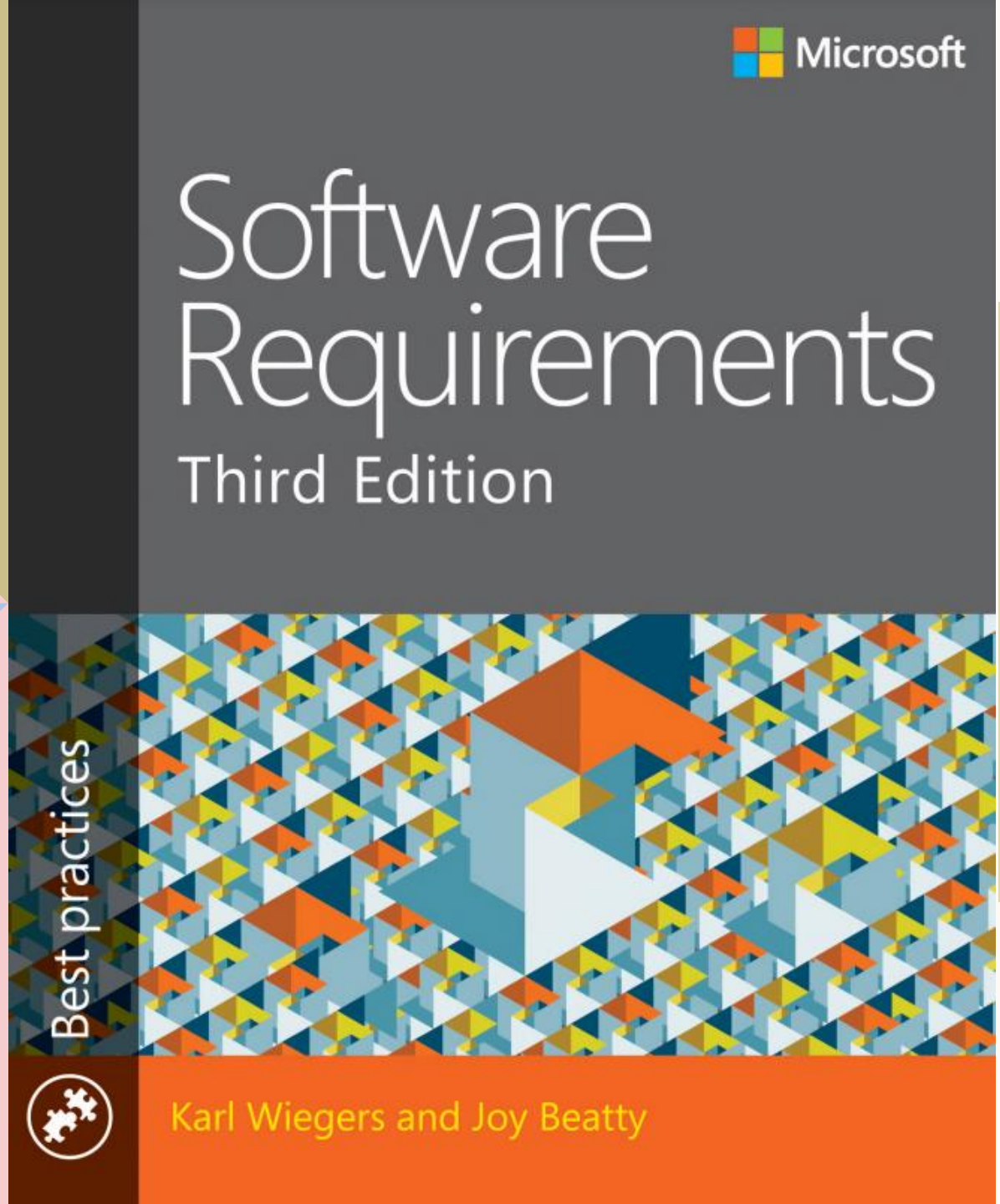
Department of Software Engineering
NUCES-FAST Karachi

Marks Distribution

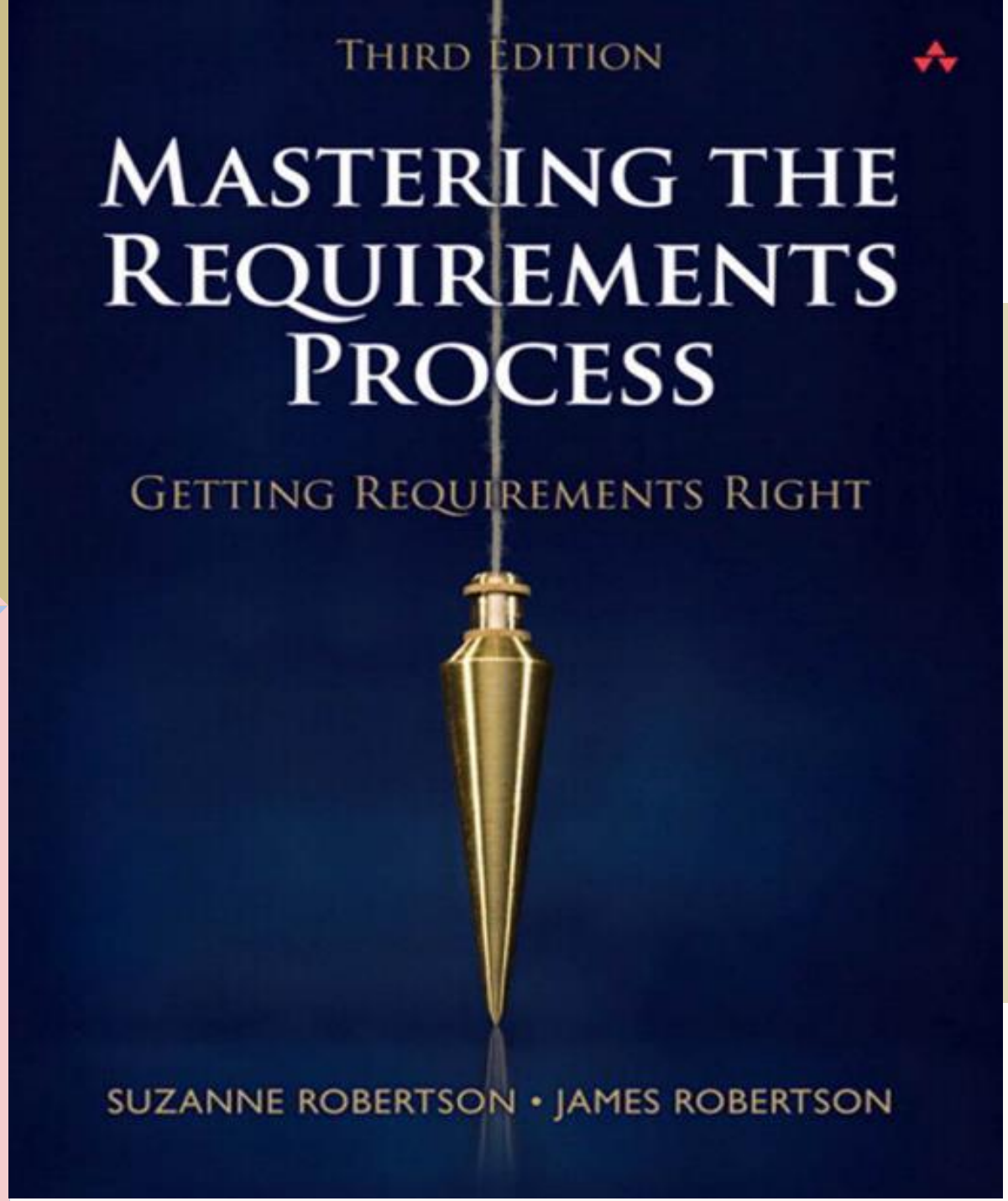
Quizzes, Assignments & Class Participation:	10%
Project:	10%
Midterms:	30%
Final Exam:	50%

Google Classroom Code

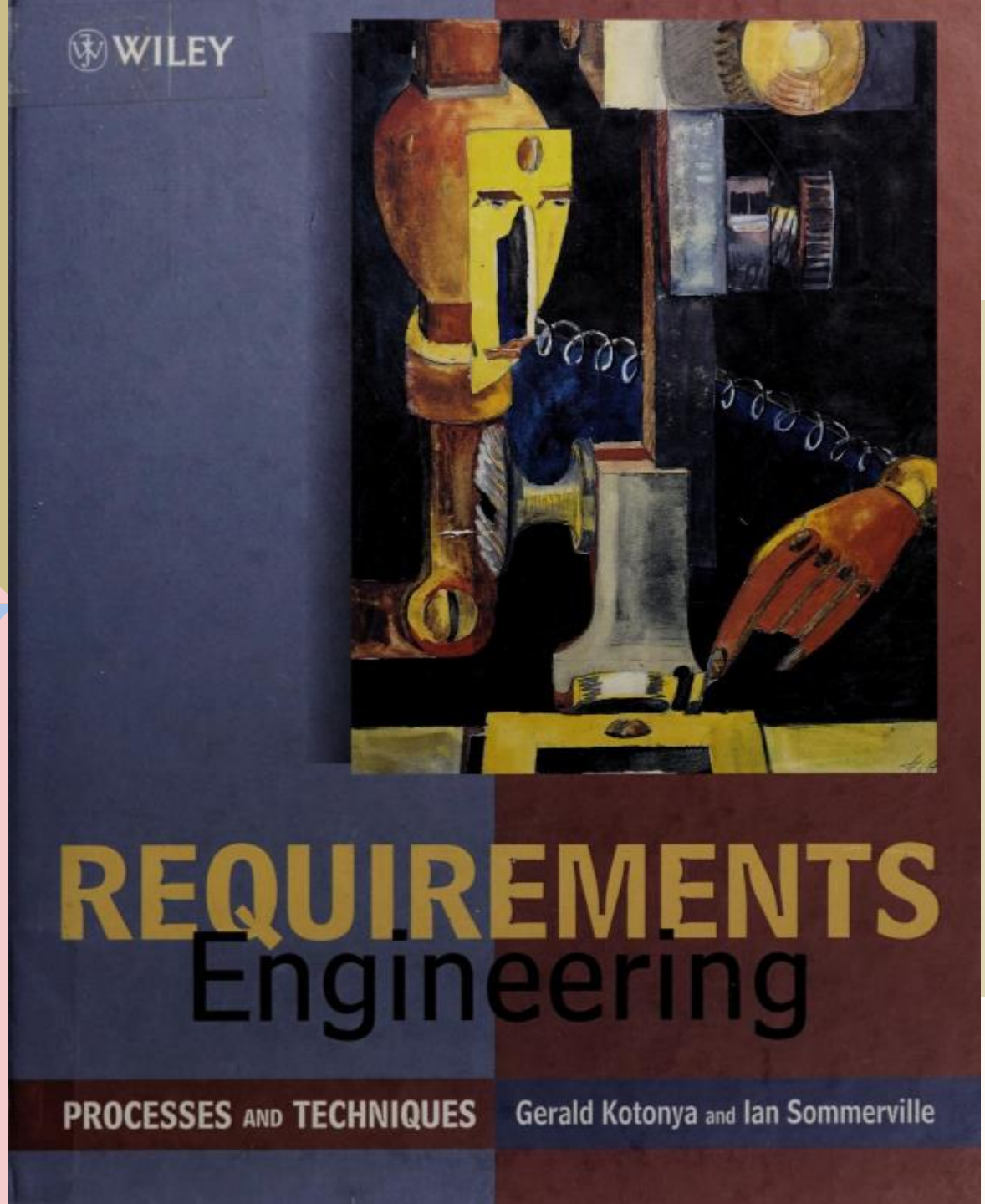
Fall 2023 – SRE (BSE – 3A) : urgfkhe
Fall 2023 – SRE (BSE – 3B) : hmrwwpk



Karl E. Wiegers & Joy Beatty, Software Requirements, Microsoft, Third Edition.



Suzanne and James Robertson, Mastering the Requirements Process, Third Edition



Gerald Kotonya & Ian Sommerville, Requirements Engineering processes and techniques.

Learning Objectives

- Understand the principles of requirements engineering.
- Identify and understand different stakeholders for the project and their responsibilities in the requirement engineering process.
- Systematically establish, define, and manage the requirements for a large, complex, changing, software- intensive system.
- Understand the central issues in requirement engineering, elicitation, validation and management.
- Identify and effectively use modeling techniques to establish requirement specification for the requirements.

Introduction – What are Requirements

- Requirements define **what the system is required to do** and the **circumstances under which it operates**.
  - The requirements define the **services that the system should provide**.
  - They set out **constraints** on the **system's operation**.

Introduction – What are Requirements

- Requirements are defined during the early stages of a system development.
- As a specification of what should be implemented.
- They are descriptions of:
  - How the system should behave.
  - Application domain information
  - Constraints on the system’s operation.
  - Specifications of a system property or attribute.

Introduction – What are Requirements

Sometimes they are constraints on the development process of the system.

Introduction – What are Requirements

A requirement might describe:

- A user-level facility (*e.g. the word processor must include a spell checking and correction command*)
- A very general system property (*e.g. the system must ensure that personal information is never made available without authorization*).
- A specific constraint on the system (*e.g. the sensor must be polled 10 times per second*).

Introduction – What are Requirements

A requirement might describe:

- How to carry out some computation (the overall mark is computed by adding the student examination, project, and coursework marks based on the formula “exam_marks + 2 x project_mark + 2/3 x coursework_mark).
- A constraint on the operation of the system (e.g. the system must be implement Dot Net Framework).

Importance of Requirements

- The hardest single part of building a software system is **deciding what to build**.
- No other part of the work so cripples the resulting system if done wrong.
- No other part is difficult to rectify later.
  - **(Fred Brooks)**

Common Requirements Problems

- The requirements don’t reflect the **real needs of the customer** for the system.
- Requirements are **inconsistent and/or incomplete**.
- It is **expensive to make changes to the requirements** after they have been agreed.
- There are **misunderstanding between customers**.

Common Requirements Problems - Example

The system shall allow users to search for an item by title, author, or by ISBN.

- What if the item that the user is searching for is a CD-ROM.
  - It will certainly have a title.
  - But may not have an author and ISBN.
- This requirement has been written so that it only applies to books and not to other items in the library.

Common Requirements Problems

- The problems of writing requirements are universal and there will never be a complete solution to these problems.
- However, good requirements engineering practices can:
  - **Reduce the number the problems**
  - **Minimize their impact on the final system.**

Requirements - FAQs

Question	Answer
What are requirements?	A statement of a system service or constraint
What is requirements engineering?	The processes involved in developing system requirements.
How much does requirements engineering cost?	About 15% of system development costs
What is a requirements engineering process?	The structured set of activities involved in developing system requirements
What happens when the requirements are wrong?	Systems are late, unreliable and don't meet customers' expectations
Is there an ideal requirements engineering process?	No – processes must be tailored to organisational needs
What is a requirements document?	The formal statement of the system requirements
What are system stakeholders?	Anyone who is affected in some way by the system
What is the relationship between requirements and design?	Requirements and design are inter-leaved. They should, ideally, be separate processes but in practice this is impossible
What is requirements management?	The processes involved in managing changes to requirements

What is requirements engineering

- Requirements Engineering is relatively new term which has invented to cover all of the activities involved in:
  - Discovering
  - Documenting
  - And Managing
- A set of requirements for a computer based system.

What is requirements engineering

- The use of term “Engineering” implies that **systematic** and **repeatable techniques** should be used to ensure that the requirements are **complete**, **consistent**, and **relevant**.

What happens when requirements are wrong

- The system may be delivered late and cost more than originally expected.
- The customer and end-users are not satisfied with the system.
- The system may be unreliable in use.
- The costs of maintaining and developing the system are usually high.

THANK YOU

Dr. Syed Muazzam Ali Shah
muazzam.ali@nu.edu.pk