

problem and the deployment of the Euro gave rise to research and practice of software system reverse engineering and reengineering. Reengineering is "the examination of a subject system to reconstitute it in a new form and the subsequent implementation of the new form." [Chikofsky, and Cross II, 1990]. Part of any reengineering efforts is a reverse engineering process, which is "the process of analyzing a subject system with two goals in mind: (1) to identify the system's components and their interrelationships; and, (2) to create representations of the system in another form or at a higher level of abstraction." [Chikofsky, and Cross II, 1990].

In the Internet era, it is very important to have the skills to deal with legacy systems because it is not always the case that Web applications will be developed from scratch. In many cases it is required to open the available information systems to Web access or integrate them with other Web applications.

This module is an introduction to the main issues related to software systems ageing and evolution. We will examine some of the available methods and technologies for software reverse engineering and reengineering as well as some of the managerial and planning issues specific to software reengineering projects.

Detailed Syllabus This module will cover the following topics.

Software Deterioration: How and why software systems deteriorate.

Software Maintenance and Reengineering: What are the challenges involved in re-engineering a system.

Software Comprehension: Basic skills of manually analysing and comprehending the functionality of a complex, unfamiliar system.

Automated and Semi-Automated Software Analysis: Learning basic static and dynamic program analysis techniques.

Assessing Software Vulnerabilities and Weaknesses: What are the sources of problems in a software system? Which areas need to be re-engineered most urgently?

Regression Testing: Essential testing skills to make sure that re-engineering does not introduce any new bugs.

Restructuring and Migration: Basic strategies to restructure and migrate a software system.

Reading List

[A] Neil Walkinshaw,, *Reverse Engineering Software Behaviour*, Elsevier Advances in Computers, vol 91, 2013.

[A] Oscar Nierstrasz, Stéphane Ducasse, Serge Demeyer,, *Object-Oriented Reengineering Patterns*, Morgan Kaufmann Publishers, 2003.

[A] Elliot Chikofsky and James Cross, *Reverse Engineering and Design Recovery: A Taxonomy*, IEEE Software 7(1):13-17, 1990.

Resources Course notes.

Module Evaluation Course questionnaires, course review.