

## **750783, Software Maintenance**

3 hours per week, 3 credit hours, prerequisite: **none**

**Teaching Method:** 37 hours Lectures (2-3 hours per week), 8 hours Seminars (1 per 2 weeks)

**Aims:** The Software Maintenance is a most large and expensive task (75%) in the life cycle of software. The practical importance of this task has attracted great attention these last years, at both academic and industrial levels. This module aims to present theoretical and a practical techniques, tools, and methodologies that help software developers to achieve this unavoidable task with a maximum of success.

### **Learning Outcomes:**

On completion of this module, the student should:

- Have knowledge on theoretical and a practical techniques, tools, and methodologies of software maintenance.
- Understand the importance of software maintenance.
- Be able to use Reverse Engineering Tools.
- Be able to design error free software.

### **Textbooks and Supporting Materials:**

1- R. S. Arnold, Software Reengineering, IEEE , 1993

2- T. M. Pigoski, Practical Software Maintenance: Best Practices for Managing Your Software Investment, Wiley, 1997.

### **Research Papers:**

1- J. Estublier, S. Ghoul. Preliminary Experience with a Configuration Control System for Modular Programs, ACM SIGSOFT (USA), Vol.9, No.3, May 84. pp. 149 - 156.

2- R. Conardi and B. Westfechtel, Versions Models for Software Configuration Management, ACM Computing Surveys, Vol.30, Issue 2, 1998.

3- T. Khammaci, ZE. Bouras, S. Ghoul, Program Slicing: Precise Shops Extraction Approaches, Hand

book of Software Engineering and Knowledge Engineering, Vol. 1, Fundamentals, S. K. Chang (editor), Word Scientific Publishing, 2001.

4- MS Bendelloul, S. Ghoul, T. Khammaci, An object-based Decomposition for Assistance to Software Maintenance, Proc. of the 5th Magrebian Conf. on Software Engineering and Artificial Intelligence, MCSEAI'98, Tunis, Tunisia, 1998.

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5- MS Bendelloul, S.Ghoul, An Object System for Software Maintenance, Proc. of the 4th African Conference on Computer Science, CARI'98, Dakar, Senegal, 1998.

**Website(s):** [www.suite101.com/subjectheadings/contents.cfm/671](http://www.suite101.com/subjectheadings/contents.cfm/671)

**Synopsis:**

- 1- Introduction: Software maintenance methods; Software maintenance tools.
- 2- Configurations Management: Configuration Database; Configurations Dependencies; Evolution Constraints, Automatic Evolution; Applications: Automatic Software Versions Generation
- 3- Restructuring tools: Error avoidance tools; Architectural tools; Application: Pretty-Print.
- 4- Reverse Engineering Tools: Reverse Engineering Tools [Knowledge-based]: Errors Diagnosis, application; Reverse Engineering Tools [Static Analysis]: Dependency Graph, Slicing, Shopping; Reverse Engineering Tools [Static Analysis]: Call Shopping, Application: Modification effects and damage assessment; Reverse Engineering Tools [Object-oriented Programming]: Behavior-Based decomposition; Object behavior and maintenance, Application: Automatic Program Understanding.

**Assessment:** Two 1-hour midterm exams (15% each); Assignments (10%); Seminars (10%); 2-hours

Final Exam (50%)