Kombolcha Institute of Technology

College of Informatics

Department of Software Engineering

Course Title		Advanced Software Engineering
Course Code		SEng2054
CP		6 (3hr Lecture, 3hr Tutorial)
Module Title:		Software Engineering and Management
Module Number		05
Pre-requisites		SEng2051
Target Group: Second (2nd) Year Software Engineering - Semester II		**Ac.Year: 2012 E. C**
Instructor's Information	**Name:** Yohannes S. **Email**: *johnaldsefane@gmail.com* **Cell Phone:**_____ **Consultation Hours:** within available working days (Monday - Friday)	

Course Description

This course provides advanced concepts to the problems of software development and maintenance. Software Testing and Maintenance phases of the software development life cycle will be introduced in addition to advanced topics like Software Process Improvement, Software Reuse, and Component-based Software Engineering, Service-oriented architecture, embedded software, Aspect-oriented software and Emerging Trends in software Engineering.

Course Goals or Learning Outcomes (Competency)

At the end of the course, the student should be able to:

- Verify and validate a Software system practice effective communication skill.
- Understand the role of maintenance in software development
- understand the benefits and problems of reusing software as well as the concept of an application framework
- Understand software product lines and learned how systems can be developed by configuring and composing off-the-shelf application software systems.
- know what component-based software engineering is and the principal activities in the CBSE
- know the key issues that have to be considered when designing and implementing distributed software systems

- understand the basic notions of a web service, web service standards, service-oriented architecture, the service engineering process and how business process models may be used as a basis for the design of service-oriented systems
- understand the concept of embedded software, three architectural patterns that are commonly used in embedded real-time systems design and organization of real-time operating systems
- have been introduced to the fundamental ideas underlying aspects and aspect-oriented software development;
- Understand emerging trends in software Engineering

Week	Course Contents (i.e. Lecture Topics)	At the end of the chapter students able to (rationale)
1-2	**Chapter 1: Software Testing** Testing Fundamentals Black-Box and White-Box testing Testing and Debugging Software Quality Assurance	• Know about what software testing is and identify different types of testing and levels of testing • Generate test cases based on specific criteria • Distinguish testing from debugging • Assure software quality with testing
3	**Chapter 2: Software Maintenance** Introduction Types of Software Maintenance Maintenance Process Maintenance Models Legacy System Re-engineering Reverse Engineering	• Identify different categories of software maintenance • Know maintenance models and supporting processes of maintenance • Know the difference between re-engineering and reverse engineering • Identify legacy systems and know their importance to the current software development
4	**Chapter 3: Software Process** Improvement What Is SPI? The SPI Process The CMMI The People CMM Other SPI Frameworks SPI Return on Investment SPI Trends	• Get knowledge on software processes and improvement and how to improve them • Apply the CMM to the development arena • Know process improvement standards and frameworks
Mid Examination		
5	**Chapter 4: Software Reuse** The reuse landscape Application Frameworks Software product lines COTS product reuse	• Identify different types of reuse landscapes • Distinguish application frameworks from software product lines • Know the importance of software reuse • know how and what is being reused
6	**Chapter 5: Component-based Software Engineering** Components and component models CBSE processes Component composition	• Identify types of software components • Identify component models • Know component interactions • Know component interfaces
7	**Chapter 6: Service-oriented architecture** Services as reusable components Service engineering	What are services and how they can be reused • Identify service engineering principles • Software development with services

8-9	**Chapter 7: Embedded software** Embedded systems design Architectural patterns Timing analysis Real-time operating systems	• Mature enough to design embedded type of software system • Identify the architectural patterns and artifacts
10	**Chapter 8: Aspect-oriented software Engineering** Separation of concerns Aspects, join points and pointcuts Software engineering with aspect	• Identify types of concerns • Know different terminologies of aspect-oriented software engineering and apply them to software development
11	**Chapter 9: Emerging Trends in software** Engineering Technology Evolution Identifying 'Soft Trends' Technology Directions Tools-Related Trends	• Identify recent software technologies • Know how tool-oriented technology directions • Know what are soft and hard trends

N.B. Final exam will be conducted according to the schedules of the university

Summary of Teaching Learning Methods

The teaching-learning methodology will be student-centered with appropriate guidance of instructor/s during the students' activities. There will be Lecture, Demonstrations, Tutorials, Reading assignments and Group Discussions

Assessment Methods: The assessment methods for the course are (but we may amend it if necessary)

- Assignments, Tests and Quizzes (15%)
- Mid Examination (25%)
- Project (20%)
- Final examination (40%)

References

- Ian Sommerville (2011), Software Engineering 8th (9th) or later edition. Pearson Education Ltd.
- Software Engineering: A Practitioner's Approach, Seventh Edition (2010) 7th Edition by Pressman, Roger S, McGraw-Hill Companies, Inc.
- Ian Sommerville (2011), Software Engineering 8th or later edition. Pearson Education Ltd.
- Fundamental Software Engineering by Rajib Mall 2nd ed, Prentice Hall, india,2004
- Software Engineering: A Practitioner's Approach, Seventh Edition (2010) 7th Edition by Pressman, Roger S, McGraw-Hill Companies, Inc.

Prepared by

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QA Focal person

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