

1. Course Number and Course Title:

COE 531 Advanced Software Engineering

2. Credits Hours:

3 – 0 –3

3. Prerequisites and/or Co-Requisites:

Prerequisite: Admission to MSCoE Program

Co-requisites: None

4. Name and Contact Information of Instructor:

Dr. Khaled El-Fakih

Office: EB1-201

Email: kelfakih@aus.edu

Phone: 06-515-2492

Office Hours: Posted at ilearn and by appointment

5. Course Description (Catalog Description):

Covers fundamental principles of software engineering with emphasis on methodologies for requirements engineering, design, and verification and validation. Explores recent research trends in software engineering.

6. Textbook and other Supplemental Material:

Textbook:

- Pressman R. S., Software Engineering: A Practitioner's Approach, McGraw Hill, 7th edition, 2009

Other supplemental material:

- Kotonya G, Sommerville I. Requirements Engineering: Processes and Techniques, Wiley, 1st edition, 1998
- Budgen D., Software Design, Addison Wesley, 2nd edition, 2003
- Mathur, A., Foundations of Software Testing, Addison Wesley, 1st edition, 2008
- Villa, T., Yevtushenko, N., Brayton, K.R., Mishchenko, A., Petrenko, A., Sangiovanni-Vincentelli, A. The Unknown Component Problem: Theory and Applications. Springer, 2012.
- Selected papers and books chapters

7. Learning Outcomes:

Upon completion of the course, students will be able to:

1. Apply a variety of requirements engineering methods to develop a requirements specification
2. Evaluate and apply software design methods
3. Apply testing methods to improve reliability of systems
4. Critically evaluate contemporary research in software engineering
5. Conduct and present independent research on software engineering methods and tools

8. Teaching and Learning Methodologies:

Methods include lectures; problem solving; and project (assignments, class presentation, survey report, exams and research project) and class discussions and presentations.

9. Course Topics and Schedule:

| Topic | Weeks) |
|---|-----------|
| Software Engineering Principles | 2 |
| Requirements Engineering | 3 |
| Design Methods | 3 |
| Verification and Validation | 3 |
| Research Trends in Software Engineering | 3 |
| Review and Evaluation | 2 |
| Total | 16 |

10. Schedule of Laboratory and other Non-Lecture Sessions:

11. Out-of-Class Assignments with Due Dates:

| Assignment | Due Date (tentative) |
|--|----------------------|
| Homework-1 | |
| Homework-2 | |
| Homework-3 | |
| Homework-4 | |
| Homework-5 | |
| Homework-6 | |
| Research paper (proposal, proposal defense, midterm-report, final report, final defense) | |

12. Student Evaluation:

| | Percentage |
|---|------------|
| Attendance and class participation | 3 % |
| Homeworks | 5 % |
| Midterm Exam | 22 % |
| Research paper/project (including related reports) | 30 % |
| Final Exam | 25 % |
| Class presentations (including project presentations) | 15 % |

13. Contribution of Course to Program Outcomes

This course contributes to the accomplishment of the following program outcomes:

| Program Outcome | Extent of Contribution |
|--|------------------------|
| 1. Perform research emphasizing creativity, independent learning and scientific methods in a chosen area of computer engineering | ● |
| 2. Apply advanced mathematics and engineering knowledge in identifying, formulating and solving engineering problems | ○ |
| 4 .Communicate effectively | ● |
| 5. Recognize the need for, and engage in, lifelong learning | ○ |

Extent of contribution: ● high; ◐ medium; ○ low