

Washington State University
MAJOR CURRICULAR CHANGE FORM - - NEW/RESTORE COURSE

- ☐ Please attach rationale for your request, a complete syllabus, and explain how this impacts other units in Pullman and other campuses (if applicable).
- ☐ Obtain all required signatures with dates.
- ☐ Provide original stapled packet of signed form/rationale statement/syllabus PLUS 10 stapled copies of complete packet to the Registrar's Office, campus mail code 1035.
- ☐ Submit one electronic copy of complete packet to wsu.curriculum@wsu.edu.

Requested Future Effective Date: Fall 2016 (term/year) Course Typically Offered: _____
DEADLINES: For fall term effective date: **October 1st**; for spring or summer term effective date: **February 1st**. See instructions.
NOTE: Items received after deadlines may be put to the back of the line or forwarded to the following year. Please submit on time.

☒ **New Course** ☐ **Temporary Course** ☐ **Restore Course**

Cpt_S 581 Software Maintenance
course subject/crosslist course no. title
3 (3 0) Graduate standing
Credit hrs lecture hrs lab or studio prerequisite
per week hrs per week

Description for catalog: Software maintenance, refactoring, reengineering, reverse engineering.

Additional Attributes: Check all that apply.

- ☐ Crosslisting (between WSU departments)* ☐ Conjoint listing (400/500): _____
☐ Variable credit: _____ ☐ Repeat credit (cum. max. hrs): _____
Special Grading: ☐ S, F; ☐ A, S, F (PEACT only); ☐ S, M, F (VET MED only); ☐ H, S, F (PHARMACY, PHARDSCI only)
☐ Cooperative with UI ☐ Other (please list request): _____

The following items require prior submission to other committees/depts. (SEE INSTRUCTIONS.)

- ☐ Request to meet Writing in the Major [M] requirement (Must have All-University Writing Committee Approval.)
☐ Request to meet UCORE in _____ (Must have UCORE Committee Approval >> See instructions.)
☐ Special Course Fee _____ (Must submit request to University Receivables.)

Contact: Josh Whiting Phone number: 5-2446 Campus mail code: 2752
Email: joshwhiting@wsu.edu Instructor, if different: _____

Patricia Sh... 9/29/15 128. Sh... 9/29/15
Chair/date Dean/date All-University Writing Com / date

Chair (if crosslisted/interdisciplinary)* Dean (if crosslisted/interdisciplinary)* UCORE Committee Approval Date

Catalog Subcommittee Approval Date GSC or AAC Approval Date Faculty Senate Approval Date

***If the proposed change impacts or involves collaboration with other units, use the additional signature lines provided for each impacted unit and college.**

This new course is required as part of the newly proposed BS SE or MS SE degrees as mandated by the State Legislature and to meet the state industry demand for trained workforce in the computer and software sectors. Full justification and rationale for offering these new degrees and courses are outlined in the corresponding new degree proposals to the Faculty Senate.

Software Maintenance

Course Name: Software Maintenance

Course Number: Cpt S 581

Credits: 3

Lecture Hours: 3

Schedule: Offered online (asynchronously) via Global Campus

Prerequisites: Graduate standing.

Course required/elective: required.

Professors/Coordinators: Venera Arnaoudova, Bolong Zeng, and Evan Olds.

Textbook(s):

[1] P. Grubb and A.A. Takang, Software Maintenance: Concepts and Practice, 2nd ed., World Scientific Publishing, 2003.¹

[2] IEEE Std. 14764-2006 (a.k.a. ISO/IEC 14764:2006) Standard for Software Engineering—Software Life Cycle Processes—Maintenance, IEEE, 2006.²

Additional journal/conference articles:

[3] Keith Brian Gallagher and James R. Lyle. 1991. Using Program Slicing in Software Maintenance. IEEE Transactions on Software Engineering, Vol. 17, Issue 8 (August 1991), 751–761.

[4] H.M. Sneed, “Offering Software Maintenance as an Offshore Service,” Proc. IEEE International Conference on Software Maintenance (ICSM), IEEE, 2008, pp. 1–5.

Course description: Software maintenance, refactoring, reengineering, reverse engineering.

Overview and Course Goals: This course teaches students how to maintain a high quality software. Students will learn the fundamentals and key issues during software maintenance and evolution and will learn about frequently used activities, tools, and techniques.

Course topics and the corresponding program learning outcomes³:

- Fundamentals of Software maintenance and evolution [1,3,4,5,6,7,8,9]
- Regression testing [1,2,3,4,5,6,7,8,9]
- Program comprehension [1,2,3,4,5,6,7,8,9]
- Reengineering [1,2,3,4,5,6,7,8,9]
- Refactoring [1,2,3,4,5,6,7,8,9]
- Reverse engineering [1,2,3,4,5,6,7,8,9]
- Tools for software maintenance and evolution [1,2,3,4,5,6,7,8,9]

Learning outcomes and evaluation:

Students that successfully complete the course will be able to:

¹ Available on Amazon; ISBN-13: 978-9812384263.

² Available on the IEEE Xplore Digital Library; access provided by WSU Libraries.

³ The student learning outcomes for the MSSE program are labeled from ‘1’ to ‘9’.

1. Work with a project team to add/modify features of existing software systems.
2. Apply the corrective, perfective, adaptive and preventive types of software changes and maintenance types.
3. Apply regression testing techniques and verify that a change has not introduced new bugs.
4. Determine the initial and estimated impact sets of a change.
5. Apply techniques and tools to facilitate the understanding of an existing software system.
6. Apply appropriate refactoring techniques to improve the quality of the software.
7. Determine actions that need to be accomplished to perform software migration.

Mapping student learning outcomes, course topics, and evaluations:

Student Learning Outcomes	Course topics/dates	Evaluation of Outcome
1	Software maintenance activities (weeks 9, 10, 12)	Project
2	Software maintenance categories (week 1, 6)	Project
3	Regression testing (week 2)	Mid-term 1, project
4	Change impact analysis (week 3, 4)	Mid-term 1
5	Program comprehension and reverse engineering (week 10, 13)	Final exam, project
6	Quality measurement and improvement (week 7, 8, 11, 12)	Mid-term 2, project
7	Software migration (week 14)	Final exam

Week-by-week schedule:

Week	Topics	Evaluation
1	Fundamentals of software maintenance and evolution. Maintenance categories categories.	
2	Regression testing.	
3	Change impact analysis.	
4	Program slicing.	
5	Specifying, reviewing, and controlling software maintainability.	Mid-term 1
6	Management issues during software maintenance (e.g., organizational objectives, outsourcing).	
7	Maintenance cost estimation.	

8	Software maintenance measurement.	Project deliverable 1
9	Software maintenance process. Software maintenance activities.	
10	Program comprehension.	
11	Reengineering.	Mid-term 2
12	Refactoring.	
13	Reverse engineering.	
14	Migration.	
15	Retirement.	Project deliverable 2
16		Final exam

Grading framework: Course grades are based on 3 exams (two mid-terms and one final) totaling 50% of the final grade and a project totaling 50% of the final grade.

The project consists of maintaining an existing software system. Students will work with a real world open source system. For the first deliverable, they will be asked to handle a set of change requests such as bug fixing and addition of new features and to perform appropriate regression testing activities. For the second deliverable students will evaluate the quality of the open source system using measures that are specific to software maintenance, e.g., changeability, testability, stability, etc. They will apply appropriate modernization techniques such as refactoring to improve the quality of the existing system. The choice of techniques and the justification of the undertaken activities are will be given high importance.

Final grades will be awarded on the following scale:

Interval	Grade
[90,100]	A
[87,90)	A-
[83,87)	B+
[80,83)	B
[77,80)	B-
[73,77)	C+
[70,73)	C
[67,70)	C-
[63,67)	D+
[60,63)	D
[0,60)	F

Course rules:

You must take exam during the assigned test period. Failure to do so will result in a score of zero. However, in extraordinary circumstances and at the discretion of the instructor, a make-up exam may be offered. An advanced notice must be given to the instructor beforehand.

Unless posted otherwise, assignment documents shall be submitted electronically.

Late penalty is a flat 10% deduction per day. Late assignments may be turned up to one week after the original due date, and an advanced notice must be given to the instructor beforehand for the late submission.

No homework will be accepted after its due day without advanced notice or special permission from the instructor.

Bonus points will be added to your total class score for attendance as follows: 0 absence = 5% of the final grade, 1 absence = 4 %, 2 absences = 3%, and 3 or more absences = 0% bonus.

Reasonable Accommodation:

Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

Academic Integrity:

I encourage you to work with classmates on assignments. However, each student must turn in original work. No copying will be accepted. Students who violate WSU's Standards of Conduct for Students will receive an F as a final grade in this course, will not have the option to withdraw from the course and will be reported to the Office Student Conduct. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions. (Read more: <http://apps.leg.wa.gov/wac/default.aspx?cite=504-26-010>)

Safety:

Washington State University is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, <http://safetyplan.wsu.edu>. It is highly recommended that you visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/> to become familiar with the information provided.