

CSCI 1370: SOFTWARE DEVELOPMENT WITH JAVA

Spring 2018

Time: **Tuesday & Thursday** 10:00 to 11:20 am

Room: Delta Building, Room 204

Instructor: Dr. Kewei Sha

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Office Hours: Tuesday, Thursday: 11:30 am – 12:30 pm & 1:00 – 3:30 pm
Or by appointment

Phone: 281-283-3874

URL: <http://sceweb.sce.uhcl.edu/sha/>

Teaching Assistant (TA): TBD



UHCL Quality Enhancement Plan (QEP) Motto: Applied Critical Thinking (ACT) for Lifelong Learning and Adaptability

This course is authorized by UHCL as an Applied Critical Thinking (ACT) Course which means that in addition to learning about the specified course content, students will be engaged with some or all of the Elements of Thought and Universal Intellectual Standards of critical thinking. The objective of an ACT course is to develop the student's ability to become skilled at analysis and evaluation by applying a set of intellectual tools that may be effectively used across all disciplines (as well as to the student's personal life). Based on the Foundation for Critical Thinking model (<http://www.criticalthinking.org/>), critical thinking involves thinking for a purpose, asking questions, using information, applying concepts, drawing inferences and conclusions, identifying assumptions, anticipating implications and consequences, and recognizing points of view. The Universal Intellectual Standards that are applied to these Elements of Thought of critical thinking in order to develop Intellectual Traits include clarity, accuracy, precision, relevance, depth, breadth, logic, significance, and fairness.

1. Vocabulary of Critical Thinking

We use the vocabulary of critical thinking described by Drs. Richard Paul and Linda Elder, including the eight elements of thought and nine universal intellectual standards:

Eight elements of Thought of Critical Thinking:

1. *Purpose*
2. *Question at Issue/Problem*
3. *Information*
4. *Interpretation and Inference/Solution*

5. *Concepts*
6. *Assumptions*
7. *Implications and Consequences*
8. *Point of View*

Nine Universal Intellectual Standards for Critical Thinking:

1. **Clarity**
2. **Accuracy**
3. **Precision**
4. **Relevance**
5. **Depth**
6. **Breadth**
7. **Logic**
8. **Significance**
9. **Fairness**

For more details, see:

[1] Paul, R. and Linda Elder, L., *The Miniature Guide to Critical Thinking-Concepts and Tools (Thinker's Guide)*, 7th edition, Foundation for Critical Thinking, 2014.

[2] Paul, R. and Linda Elder, L., *Critical Thinking: Tools for Taking Charge of Your Learning and Your Life*, 3rd Edition, Prentice Hall, 2011.

Critical Thinking in Java and Software Development is concerned with the **accurate** understanding of object-oriented programming *concepts*, and the *applications* of Java and UML language to **logically model and solve** practical problems. In addition, the examination of *assumption* and **precisely** identifying the *requirements of the problem* will be extensively discussed. The **efficiency** of the solution will also be *evaluated* to improve the **depth** of the learning. **Relevance** will be used to help a better understanding of the object-oriented *concepts*.

2. Critical Thinking Tools

There are many CT tools and techniques.

One technique is the identification, refinement, and application of Fundamental and Powerful Concepts (FPC):

- FPC is the core concepts that ground other concepts.
- FPCs provide a context for us to reason through a large number of problems, questions, theories and information.
- New information and concepts can then be viewed and analyzed through their relevance with FPC.

Fundamental and Powerful Concepts (FPC) of the Course

In ACT vocabulary, fundamental and powerful concepts form the foundation that permeates and unites a course. In this course, these concepts are:

1. *Object-oriented programming.*
2. *Problem-solving techniques.*
3. *Java programming language.*

The information contained in this class syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.

Textbook

Deitel & Deitel. Java How to Program (early objects), 10th Edition.

Course Pre-requisite

C, Pascal or Ada (Previous programming experience).

Grading and Evaluation

Participation and discussion	5%
Assignments and Quizzes	50%
Midterm Exam	20%
Final exam	25%

Grading Scale

90+ = A; 87-89 = A-; 84-86 = B+; 81-83 = B; 78-80 = B-; 75-77 = C+;
71-74 = C; 68-70 = C-; 65-67 = D+; 61-64 = D; 58-60 = D-; < 58 = F

Course Description

Software development with the Java programming language and the Java class libraries.
Design of applets and standalone Java applications.

Course Goals

Upon successful completion of this class, students will be equipped with **accurate** understanding of the Java programming language and object-oriented programming *concepts*, and have experiences in **logically modeling, designing and implementing** object-oriented programs to **efficiently solve** computer-based problems.

Student Learning Outcomes (SLO)

After completing this class, students will be able to:

- SLO#1: **Accurately** and Efficiently develop programs *solutions* using basic Java constructs such as iteration, conditional statements, recursion, and exception handling under different *assumptions*
- SLO#2: **Accurately** understand the *fundamental concepts* of object-oriented modeling and **relevance** to real world
- SLO#3: Develop programs *solutions* with basic data structures in Java (like arrays) and *analyze* the **significance** of the program in terms of efficiency
- SLO#4: Utilize basic file and stream I/O in Java programs
- SLO#5: **Clearly** understand the *fundamentals of object-oriented programming* in Java including classes, members, interfaces, inheritance, and polymorphism
- SLO#6: Understand the *purpose* of UML including *class diagrams* to model objects and the **relevance** among objects

This course will also focus on strengthening students' *problem modeling and solving skills*.

For ACT assessment, SLOs #1, #2, #3, #6 will be used. Please see later description for more details

Critical Thinking Process (CTP)

According to the ACT vocabulary we used, there are four major aspects of the Applied Critical Thinking Process, termed as the 4 C's: *curiosity, connection, creativity and communication*. In this course, the C in the student learning objectives is **connection and creativity**. 1) making connections

to virtual world by object-oriented programming and the real world. 2) creatively designing solutions for problems and optimizing the design. Connection will be the primary objective.

Critical Thinking Activities and Assessment

Critical thinking activities are integrated in the course. Lectures and demonstrations will include examples to highlight critical thinking elements and intellectual standards, and their applications. This includes the uses of the critical thinking techniques. The instructor will highlight the relevant elements of thought in classroom examples. Homework and programming assignments contain various ACT components. Both the mid-term and final examinations include ACT-oriented questions.

In particular, data of three assessment activities (AA) on ACT will be collected to assess how well critical thinking is incorporated into the course. These assessments will be used as input to the UHCL Critical Thinking database for internal assessment of Critical Thinking, and will not directly affect your grade of the course.

1. *Homework on UML: Students will construct UML models to define virtual objects that represent real-world objects. This assignment tests fundamental concepts in object-oriented programming, including classes, members, interfaces, inheritance, and polymorphism.*
2. *Homework on assumptions: Student will examine the needs of different solutions under various assumptions. Changes in assumptions will result in changes in solutions. This assignment tests the importance of assumption in problem-solving techniques.*
3. *Homework on efficiency of solutions: Students will develop Java programs as solutions of real-world problems using different data structures. Different program designs will have different efficiency. This assignment tests how to efficiently develop applications using Java programming language.*

The course assesses connections and creativity out of the four C's. The related Student Learning Outcomes (SLO) and Fundamental and Powerful Concepts (FPC):

ACT Assessment Activity	ACT SLO	FPC
Homework on UML	2, 6	1
Homework on assumptions	1	2
Homework on efficiency of solutions	3	3

The assessment criteria for the AA:

ACT Assessment Activity	Assessment Outcome		
	Unacceptable	Acceptable	Excellent
Homework on UML	<80	[80 - 92]	[92-100]
Homework on assumptions	<80	[80 - 92]	[92-100]
Homework on efficiency of solutions	<80	[80 - 92]	[92-100]

Overall, if 70% or above of students are evaluated to be acceptable or excellent in each activity, as well as the average of all activities, the outcomes will be deemed acceptable. To close the loop of assessment, the instructor will evaluate the ACT content, activities, and assessment of the course, and make necessary adjustment.

General Course Outline (subject to change)

1. Introduction Computers and Java and Problem Solving (Ch. 1)
2. Java Applications (Ch. 2)

3. Problem-solving procedures
4. Object Oriented Programming: Classes, Objects, Methods and Strings (Ch. 3)
5. Selection, and Decision-Making Constructs. (Ch. 4)
6. Iteration and Looping (Ch. 5)
7. More on Methods (Ch 6)
8. Arrays and ArrayLists (Ch. 7)
9. Midterm Exam
10. More on Classes, and Class Members (Ch. 8)
11. Inheritance (Ch. 9) / Polymorphism (Ch. 10)
12. Exception Handling (Ch. 11)
13. Strings, Characters, and Reg. Expressions (Ch. 14) / Files and Streams (Ch. 15)
14. Recursion (Ch. 18)
15. Searching, Sorting, and Big O (Ch. 19)
16. Final Exam (Comprehensive)

Important dates:

Midterm:	March 7 & March 9, 2017
Final:	May 4, 2017 Thursday, 10:00 am - 12:50 pm

Other important dates: (You must confirm on the University Website)

17 JanuaryFirst Class Day for Regular Session
 7 & 9 March Midterm
 13-19 March University Holiday – Spring Break
 1 May.....Final Class Day
 4 May..... Final Exams

Other course policies

- The Blackboard site will be the official site for this course.
- Must use UHCL-mail. Please note course (CSCI 1370) in Subject Line. Should check your mail at least once per day. Be respectful in email correspondence.
- Respect your TA. The TA is your first line of defense/offense.
- This is a face-to-face course conducted as lectures and presentations. The material will be posted on the course Blackboard before class time. Students are expected to read class material from the book before coming to class. Other notes and material are accessible from Blackboard during class.
- All submissions and deliverables of assignments are due according to Blackboard-posted times and dates.
- Class attendance is expected. It is the student’s responsibility to get the material discussed, announcements, handouts, or anything conducted during a missed class meeting. Class attendance is part of the Participation Grade.
- Participation and discussion from students are highly encouraged.
- I **WILL NOT** accept assignments handed in after the deadline UNLESS (a) you have made prior arrangements with me OR (b) you have a reason such as illness or injury, which is substantiated by the dean of students.

- Makeup of exams and quiz will be very restricted, and is allowed only under a documented (appropriate documents) legitimate excuse that is to the discretion of the instructor.
- Students with special needs and disability should contact the instructor as soon as possible and contact Disability Services Office at 281-283-2627 website: www.uhcl.edu/disability
- Regrading work policy: If you believe that the TA or myself have made a mistake in grading you have two class periods after I return the assignment/exam to submit a regrade request. On a separate sheet of paper attached to the front of the assignment/exam you must give a clearly written logical argument as to why you believe that you should have received a different score. I will then regrade the entire problem. On occasion this may result in a lower score. After the deadline has passed I will not regrade assignments.
- Incomplete course policy: The university's incomplete course policy is contained in both the undergraduate and graduate catalogues which are available on the university website (www.uhcl.edu).
- **6 Drop Rule:** Students who entered college for the first time in Fall 2007 or later should be aware of the course drop limitation imposed by the Texas Legislature. Dropping this or any other course between the first day of class and the census date for the semester/session does not affect your 6 drop rule count. Dropping a course between the census date and the last day to drop a class for the semester/session will count as one of your 6 permitted drops. You should take this into consideration before dropping this or any other course. Visit www.uhcl.edu/records for more information on the 6 drop rule and the census date information for the semester/session.
- Academic Honesty: HONESTY CODE of UHCL states: **I will be honest in all my academic activities and will not tolerate dishonesty.** Students and Faculty are bound to the honor code; therefore, academic dishonesty will not be tolerated in this class! See the UHCL catalog for more details. You are encouraged to become familiar with the policy of academic dishonesty found in the UHCL official student handbook. All submissions are considered completely 100% your own work. Copying the work of others and allowing others to copy your own work is not acceptable and is considered academic dishonesty. Also, sharing the course material after finishing this course is not allowed. Any violation of the dishonesty rules will result in filing *Academic Dishonesty Form* and subtracting 10% of total course grade for each incident and for all students involved in the incident.

Academic Honesty Code: see section 2.1.4 in the Students Life Policies handbook for the UHCL Academic Honesty Code:

http://prtl.uhcl.edu/portal/page/portal/PRV/FORMS_POLICY_PROCEDURES/STUDENT_POLICIES/Academic_Honesty_Policy .
