Course Syllabus
Computing Sciences and Information Technology
CS 200 – Concepts of Programming Algorithms Using C++

Spring 2019

Instructor Information

Name: Jacob Kier
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Campus Office: RC 332E

Office/Open Lab Hours:	
Tuesday – Thursday	11:00 – 12:00, 1:00 – 4:00

Other days/times may be arranged **by appointment. Please contact instructor in advance.**

Department Information

Department of Computing Sciences and Information Technology
Phone: 913-469-8500 x3685 Location: RC 332

Course Information

Credit	**Lecture**	**Lab by Arrangement**	**Instructional Method**
4 hrs	3 hrs	2 hrs	Hybrid
Prerequisite: CS 134 (with a grade of "B" or higher) or CIS 142 (with a grade of "B" or higher) or CS 201 or CS 205 or MATH 241 or an appropriate score on department waiver test or department approval for prior work-related experience.			

Section Information

Section	**CRN**	**Days**	**Time**	**Location**
378	12087	T R	4:30 – 5:45	RC 344

Course Description

This course emphasizes problem solving using a high level programming language and the software development process. Algorithm design and development, programming style, documentation, testing and debugging will be presented. Standard algorithms and data structures will be introduced. Data abstraction and an introduction to object-oriented programming will be studied and used to implement algorithms. 3 hrs. lecture, 2 hrs. lab by arrangement/wk.

Caveats

None.

Required Text

Savitch, Walter. *Problem Solving with C++ (10th Edition)*. Pearson 2018.

Supplies

- Paid access to MyProgrammingLab. Your textbook may have come with an access code or an access code may be purchased separately.
- USB Drive or some other way to store class files. Storage space is also available on the JCCC server. See http://www.jccc.edu/student-resources/technical-support for instructions.
- Visual Studio Community Edition which is available for free from https://visualstudio.microsoft.com/. Visual Studio is also available in the open computing lab (RC 335).

Course Objectives

Upon successful completion of this course, the student should be able to:

1. Describe computer systems and examine ethics.
2. Solve problems using a disciplined approach to software development.
3. Utilize fundamental programming language features.
4. Implement procedures.
5. Employ fundamental data structures and algorithms.
6. Write code using object-oriented techniques.
7. Write code according to commonly accepted programming standards.
8. Utilize a professional software development environment.

Content Outline and Competencies

I. Computer Systems and Ethics
- A. Describe basic hardware components.
  1. Describe primary memory.
  2. Describe the central processing unit.
  3. Describe secondary memory.
  4. Describe peripherals.
- B. Describe basic software components.
  1. Describe operating systems.
  2. Describe high-level and machine languages.
  3. Describe compilers.
- C. Examine ethics
  1. Examine ethics in the context of software development.
  2. Examine the impact of ethics violations on software developers.
  3. Examine the impact of ethics violations on software users.

II. Problem-Solving in Software Development
- A. Define the problem.
- B. Develop a solution.
  1. Utilize top-down design.
  2. Consider previous problems and solutions.
  3. Reuse pertinent algorithms.
  4. Represent algorithms with pseudo-code.
  5. Identify input, output, processing and modules.
- C. Code the solution.
- D. Test the solution.
  1. Perform unit and integration testing.
  2. Select appropriate test data.
  3. Trace code by hand (desk-checking) and with a debugger.
  4. Evaluate code efficiency and simplicity.

III. Fundamental Programming Features
- A. Declare and initialize variables and constants.
- B. Use built-in operators to create expressions and statements.
  1. Write assignment statements.
  2. Create expressions with arithmetic, relational and logical operators.
  3. Use the conditional (ternary) operator.
  4. Evaluate expressions using rules of operator precedence.
  5. Compare strings and numeric types.
  6. Dereference and assign values to pointers.
- C. Perform input and output.
  1. Retrieve data from the keyboard.
  2. Retrieve data from input files.
  3. Write data to the console window.

4. Write data to output files.
D. Call built-in mathematical functions.
E. Implement type-casting.
F. Control program flow.
1. Implement selection statements.
a. Write code with if, else and else-if statements.
b. Use switch statements.
c. Write nested selection statements.
2. Implement repetition statements
a. Write while, for and do loops.
b. Create nested loops.
c. Analyze break and continue semantics.
G. Trap errors using selection or repetition.

IV. Procedures
A. Define and call functions with void and non-void return values.
B. Declare functions (prototyping).
C. Implement pass-by-value and pass-by-reference parameters.
D. Differentiate between actual and formal parameters.
E. Analyze and write elementary recursive code.
F. Analyze variable scope and lifetime.
G. Implement static variables.

V. Fundamental Data Structures and Algorithms
A. Implement single dimensional arrays.
1. Implement an array of integers.
2. Implement null-terminated strings.
B. Implement two-dimensional arrays.
C. Implement dynamic arrays.
1. Use new and delete to manage memory.
2. Declare pointers.
D. Search arrays.
1. Implement sequential search.
2. Implement binary search.
E. Sort arrays.
1. Sort data using bubble sort.
2. Sort data using selection sort.
3. Sort data using insertion sort.
F. Implement structures.
G. Implement an array of structures.

VI. Object-oriented Programming
A. Write code using the built-in string class and associated methods.
B. Write code using the built-in vector class and associated methods.
C. Implement encapsulation and data abstraction by writing user-defined classes.
D. Differentiate between private and public access modifiers.
E. Hide member data.
F. Write accessors, mutators and other member functions that process member data.
G. Write code that utilizes objects.
H. Implement an array of objects.

VII. Code Standards
A. Create descriptive identifiers according to language naming conventions.
B. Write structured and readable code.
C. Create documentation.

VIII. Professional Development Environment

A. Write code using a professional, integrated development environment (IDE)
B. Utilize key editor features.
C. Debug code using the integrated debugger.
D. Include and use standard libraries.

COURSE REQUIREMENTS

Exams/Quizzes:

- There will be a minimum of 3 exams. Exams may use paper/pencil and/or computer. Exams may be given during class time or outside class.
- Students will be given the opportunity to review exams after they are graded, but students will not be allowed to keep exams.
- The final exam must be taken on the university assigned date (see the Important Dates section in this syllabus).
- Quizzes may be given at the instructor's discretion. Points for quizzes will be placed into the "Exams" category.

Projects:

- Students will complete 6-8 substantial programming projects.

Labs:

- Labs will consist primarily of mini-programming problems in the online MyProgrammingLab environment and "program along" videos that walk students through the creation of a working program.
- The lowest lab score for the semester will be dropped from the calculation of the student's final grade.

Exercises:

- There will be graded assignments that are not included in a lab. They may involve programming, reading and/or writing. They will typically be made available in Canvas.
- The lowest exercise score for the semester will be dropped from the calculation of the student's final grade.

Late Policy:

- No late labs, projects, exercise, assignments, exams, or quizzes are accepted. If your work is not finished I recommend you submit what you have completed.
- You should make every effort not to miss an exam. You may make up <u>one</u> missed exam during final exam week <u>with an automatic 10% reduction of the exam score</u>. It is the student's responsibility to schedule with the instructor the make-up exam they wish to take during finals week not less than <u>2 weeks</u> before the first day of finals week. <u>Documented</u> proof of an emergency or severe illness may be required by instructor before allowing a make-up exam.
- All extenuating circumstances will be evaluated and make-up work *may* be provided at the discretion of the instructor.

Extra Credit:

- No extra credit is available for this course.

COLLEGE WORK LOAD EXPECTATION

- Out-of-class work: Students should spend an average of 2 – 3 hours <u>outside</u> of class for each credit hour. (4 credit class → 8 – 12 hours out-of-class time per week)

EVALUATION AND GRADING SCALE

Assessment Category	Weight
Exams	40%

Percentage	Grade
90 – 100%	A

Projects	20%
Labs	20%
Exercises	20%
Total	**100.00%**

80 – 89%	B
70 – 79%	C
60 – 69%	D
< 60%	F

Score Discrepancies

If you believe there was an error in the scoring of your work, you have **up to two weeks** after the initial posting of the score to discuss the issue with me.

Attendance

Attendance is very important in this course. Material is presented and explained which is not in any handout. If you must be absent, you are expected to obtain explanations of assignments and demonstrations from your fellow classmates. Attendance is taken each class either via course roster or completion of an activity (such as a quiz). If a student is not present when attendance is taken (due to late arrival, for example) the student is considered absent for that class period.

The JCCC Attendance Policy is found at: http://www.jccc.edu/about/leadership-governance/policies/students/academic/attendance.html

The instructor reserves the right (but not the obligation) to use Faculty-Initiated Withdrawal for students who have excessive course absences. Excessive course absences are defined as any consecutive 4-week period where the student does not attend class and submits no graded work. For Faculty-Initiated Withdrawal, accessing the course via Canvas *does not* constitute attendance.

Information on Faculty-Initiated Withdrawal is found at: http://www.jccc.edu/about/leadership-governance/policies/students/academic/procedure-attendance.html

Important Dates

Important dates and deadlines are located here: http://www.jccc.edu/calendars/fall-2019/academic-calendar.html

The final exam schedule is located here: https://www.jccc.edu/academics/files/spring-final-exam-schedule.pdf

Tentative Course Schedule

Week	Topics
1	Chapter 1: Introduction to Computers and C++ Programming
2	Chapter 2: C++ Basics
3	Chapter 3: More Flow of Control
4	Chapter 4: Procedural Abstraction and Functions that Return a Value
5	Chapter 5: Functions for All Subtasks
6	Chapter 6: I/O Streams as an Introduction to Objects and Classes Exam - (Chapters 1 - 5)
7	Chapt 6 Cont Chapter 7: Arrays
8	Chapter 7 cont Chapter 8: Strings and Vectors
9	SPRING BREAK

10	Chapter 8 Cont Chapter 9: Pointers and Dynamic Arrays
11	Chapter 9 Cont Chapter 10: Defining Classes
12	Chapter 10 Cont Chapter 11: Friends, Overloaded Operators, and Arrays in Classes
13	Chapter 11 Cont Exam - (Chapters 6 - 10)
14	Chapter 12: Separate Compilation and Namespaces
15	Chapter 14: Recursion
16	Chapter 15: Inheritance (just 15.1 and 15.2)
17	Final Project
18	**Final Exam** http://www.jccc.edu/academics/files/fall-final-exam-schedule.pdf

Email/Canvas Conversations

- You may use email or the Canvas messaging system (called Conversations) to correspond with me.
- If you email me it must be from your official JCCC student email address. Please include your full name and the course name.
- You should not email/Conversation me with last minute or urgent questions!
- If you are sending me an email/Conversation during normal business hours (Monday through Friday, 8:00am – 5:00pm) assume it will take a minimum of 24 hours for me to respond.
- If you are sending me an email/Conversation on the weekend (from 5:00 pm Friday through Sunday) assume you will not receive a response until 24 hours from Monday at 8:00am.
- I will always respond to your email/Conversation, even if nothing more thank "Thanks!" My response is your confirmation that I've seen your message. Until you receive a response you should assume I have not seen your message.

Degree Check

Be sure to verify your selected degree and/or certificate and monitor degree progress via Degree Check. For more information, including how to access Degree Check, please visit http://www.jccc.edu/academics/degree-check.html.

Course Format

I. Online. In addition to email, Canvas will be used for many things including:

- Accessing in-class and weekly agendas, grades, and review guides.
- Accessing and submitting most assigned work. Some in-class assigned work may not appear in Canvas.
- Watching any posted lectures/demonstrations and completing associated notes in detail.
- Posting of course updates and announcements.

II. Face to Face. Classroom time is used for

- Lecture.
- Discussing the agenda for the day and the upcoming week.
- Reviewing assigned work.
- Completing exams.
- Working on other collaborative and individual tasks.

ADA Compliance

JCCC provides a range of services to allow persons with disabilities to participate in educational programs and activities. If you are a student with a disability and if you are in need of accommodations or services, it is your responsibility to contact Access Services and make a formal request. To schedule an appointment with an Access Advisor or for additional information, you can contact Access Services at (913) 469-3521 or accessservices@jccc.edu. Access Services is located on the 2nd floor of the Student Center (SC202).

Academic Dishonesty

No student shall engage in behavior that, in the judgment of the instructor of the class, may be construed as cheating. This may include, but is not limited to, plagiarism or other forms of academic dishonesty such as the acquisition without permission of tests or other academic materials and/or distribution of these materials. This includes students who aid and abet, as well as those who attempt such behavior. Refer to the "Student Code of Conduct" in the College Catalog for more details.

Note: All work is individual unless otherwise stated. Submitted work must reflect your thought and not that of someone else. Cheating minimally results in a 0 for all parties involved. The VP of student services will be notified, and other disciplinary action may also take place.

Student Handbook

http://www.jccc.edu/student-handbook/

How do I Study in This Course?

Review and **understand** all assignments, projects, notes, and readings. Further, **practice programming** by doing additional problems in the book or by making up your own problems to solve and explore. This is not a course where memorization or understanding of concepts is enough; it requires deeper levels of understanding that can only be obtained with multiple, varied and consistent practice.

How do I Increase My Chance for Success?

- **Do not** procrastinate (and then attempt to contact me just before the assigned work is due).
- **Do** turn off your digital devices at the beginning of class. Do not text / check phone / surf the net / listen to mp3 device / play digital games / answer email / etc. during class. This is considered rude and inattentive behavior. To help you focus, I display course material related to the discussion on your screens. Using a laptop during lecture is not permitted.
- **Do** take responsibility for your own learning and attend/participate in class.
- **Do** come to every class period. If you miss a class, check the online agenda and determine from others exactly what was missed.
- **Do** arrive before class begins.
- **Do** all of your assigned work and spend enough time preparing for class according to college level expectations.
- **Do** use video capabilities to pause, backup, and/or review lectures and demonstrations that may be posted online. Take **detailed** notes and seek to **understand** them. Your notes may sometimes be used on all or a portion of tests and quizzes.
- **Do** speak and act professionally in the classroom (and in life!). There is no need to offend others within the classroom – even if you don't accept their worldview.

- **Do** help others when class is in session.
- **Do** make use of my office hours.

DROPPING CLASSES

To view the deadline dates for dropping this course, please refer to the schedule on the JCCC web page, under Admissions > Enrollment Dates > Dropping Credit Classes. After the 100% refund date, you will be financially responsible for the tuition charges; for details, search on Student Financial Responsibility on the JCCC web page. Changing your schedule may reduce eligibility for financial aid and other third party funding. Courses not dropped will be graded. For questions about dropping courses, contact the Student Success Center at 913-469-3803.

CAMPUS SAFETY

Campus Safety: Information regarding student safety can be found at http://www.jccc.edu/student-resources/police-safety/.
Classroom and campus safety are of paramount importance at Johnson County Community College, and are the shared responsibility of the entire campus population. Please review the following:

- **Report Emergencies**: to Campus Police (available 24 hours a day)
  - In person at the Carlsen Center (CC115)
  - Call 913-469-2500 (direct line) – *Tip: program in your cell phone*
  - Phone app - download JCCC Guardian (the free campus safety app: www.jccc.edu/guardian)
    - instant panic button and texting capability to Campus Police
  - Anonymous reports to KOPS-Watch http://www.jccc.edu/student-resources/police-safety/kops-watch-reporting-site.html or 888-258-3230
- **Be Alert:**
  - You are an extra set of eyes and ears to help maintain campus safety
  - Trust your instincts
  - Report suspicious or unusual behavior/circumstances to Campus Police (see above)
- **Be Prepared:**
  - Identify the red/white stripe Building Emergency Response posters throughout campus and online that show egress routes, shelter, and equipment
  - View A.L.I.C.E. training (armed intruder response training - Alert, Lockdown, Inform, Counter and/or Evacuate) – Student training video: https://www.youtube.com/watch?v=kMcT4-nWSq0
  - Familiarize yourself with the College Emergency Response Plan
- **During an Emergency:** Notifications/Alerts (emergencies and inclement weather) are sent to all employees and students using email and text messaging
  - students are automatically enrolled, see JCCC Alert - Emergency Notification
- **Weapons Policy:** Effective July 1, 2017, concealed carry handguns are permitted in JCCC buildings subject to the restrictions set forth in the Weapons Policy. Handgun safety training is encouraged of all who choose to conceal carry. Suspected violations should be reported to JCCC Police Department 913-469-2500 or if an emergency, you can also call 911.

INSTRUCTOR RIGHT

The instructor reserves the right to modify the syllabus. Modifications will be announced in class. The instructor reserves the right to modify office hours. Temporary changes may be posted outside instructor's office. Permanent changes will be announced in advance.

Cell Phone/Laptop Policy

Unless the instructor specifically indicates otherwise during class:

- Cell phones must be silenced and stowed in a purse, backpack, pocket, etc during class.
- Laptops may only be used during designated work times such as when class time is used to complete individual or group work. **Laptops should be stowed during lecture.**
- In general, all electronic devices should be silenced and stowed during class unless otherwise indicated by the instructor.

Other Information

- **Audio/Video Taping:** There should be NO audio or video taping of the class, nor taking photographs in class without gaining permission from the instructor!
- **Instructor late policy:** If it is 15 minutes after class was to begin, and I'm not in class, you can assume I am not coming. But, you must give me 15 minutes.
- **Class Distractions:** I cannot list (or even comprehend) all the things someone could do, with their cellphone, side conversations, or perhaps even personal hygiene to distract the classroom. Please respect others and be aware that your actions impact the community.