

# Integrative Programming and Technology

## Course Description

- Data mapping and exchange: metadata, JSON/XML/RESTful API, encoding schemes, data stream transformations, and data integration and exchange between computer systems
- Integrative programming and technology: design patterns, interfaces, inheritance, reusability, and security practices.
- Computer information systems integration: architectures, socket programming, Web services, message and queuing services.

## Learning Objectives

- Describe how design patterns are useful in integrative programming
- Evaluate the motivation for using each of the following design patterns: MVC, singleton, factory method, facade, proxy, decorator, and observer
- Describe how a programming interface is used in programming, and illustrate with an example when the use of a programming interface simplified the development of a system
- Define the concept of inheritance and describe how it can be applied to encourage code reuse
- Design an abstract class and use inheritance to create a class that extends the abstract class
- Design, develop, and test an application that uses the abstract class.

## Course Information

- Prerequisite: CS 220 or equivalent; or consent of instructor
- Recommended Preparation: Familiarity of a programming language (C++/Java), data structures, and fundamental algorithm analysis
- Class time: 3:00 – 4:15 pm, Tuesday & Thursday
- Lecture format: Pre-recorded videos and online (Zoom)

- Course webpage: Canvas – <https://bradley.instructure.com/>
- Midterm and Final exams: None (This course is project/lab oriented.)

## Instructor Information

- Instructor: Dr. Tachun Lin
- Office hours:
  - 10 am - 12 pm on Wednesdays (by appointment)
  - [Click this link to make an appointment](#)
- Contact info:
  - E-mail: [djlin@fsmail.bradley.edu](mailto:djlin@fsmail.bradley.edu)

## Grade

- Attendance: 10%
- Lab(s): 45%
- Project(s): 45%
- Overall: A (grade  $\geq 90\%$ ); B ( $80\% \leq \text{grade} < 90\%$ ); C ( $70\% \leq \text{grade} < 80\%$ ); D ( $60\% \leq \text{grade} < 70\%$ ); F (grade  $< 60\%$ ).

## Reasonable Accommodations

Any student who feels s/he may need an accommodation based on the impact of a disability should contact the instructor privately to discuss your specific needs. Students requesting accommodations must register with Student Access Services located at 100 Heitz Hall and provide appropriate documentation to verify eligibility. You can reach the SAS at (309) 677-3654 or find more information at the Student Access Services website <http://www.bradley.edu/offices/student/sas/>

## Course/Reading Materials

**Note:** Registration to the ACM Student Membership is required to access some of the reading materials

Table 1: Reading materials

Name	URL
ACM Student Membership	<a href="https://www.acm.org">https://www.acm.org</a>
Git	<a href="https://git-scm.com">https://git-scm.com</a>
GitHub	<a href="https://github.com">https://github.com</a>
Pro Git (book)	<a href="https://git-scm.com/book/en/v2">https://git-scm.com/book/en/v2</a>
(U. Washington) CSE 154: Web Programming	<a href="https://courses.cs.washington.edu/courses/cse154/19su/calendar/index.html">https://courses.cs.washington.edu/courses/cse154/19su/calendar/index.html</a>
Postman	<a href="https://www.getpostman.com">https://www.getpostman.com</a>
Postwoman	<a href="https://postwoman.io">https://postwoman.io</a>
Node.js	<a href="https://nodejs.org/en/">https://nodejs.org/en/</a>
ngrok	<a href="https://ngrok.com">https://ngrok.com</a>
Protocol Buffers	<a href="https://developers.google.com/protocol-buffers/">https://developers.google.com/protocol-buffers/</a>
gRPC	<a href="https://grpc.io">https://grpc.io</a>
Head First Design Patterns	<a href="https://www.safaribooksonline.com/library/view/head-first-design/0596007124/">https://www.safaribooksonline.com/library/view/head-first-design/0596007124/</a>
Software Design Patterns	<a href="https://www.geeksforgeeks.org/software-design-patterns/">https://www.geeksforgeeks.org/software-design-patterns/</a>
(YouTube) Design Patterns Videos	<a href="https://www.youtube.com/playlist?list=PLF206E906175C7E07">https://www.youtube.com/playlist?list=PLF206E906175C7E07</a>

## Course Policies

1. **Assignment Submission:** All assignments (labs, projects, etc.) are given on Canvas/GitHub. Only electronic copies will be accepted for all assignments. If you prefer to do the assignments on papers, you may scan and/or take photos of your work and submit them.
2. **Communication:** Please communicate with me via email (with the following code). Emails should adhere to a few simple rules:
  - Please send email through your Bradley email account.
  - Include your course section (CS 220 01/02) in the subject field.
  - Please include your name.
  - Please include an applicable subject in the subject line (e.g., ICE or Project X)
  - If you are asking a question about a program or debugging, please make an appointment.
  - I will need to see your source code and how you program.
  - You need to show me previous workable version and the current version with problem with newly added code, and show me your efforts in trouble-shooting.
  - Debugging is part of a programming assignment
3. **Late submission policy:** Late work will be deducted 25% per twenty-four hour period that elapses after the due date. If foreseen or unforeseen circumstances prevent you from completing an assignment on time, you may request an extension. Extensions must be requested in advance of the due date (min: 48 hours). If the situation warrants an extension, we will determine a new due date for the assignment based on your individual circumstances.
4. **Citations:** If you consult with any source (including the textbook and the instructor) to complete an assignment, you should credit that source with a citation. Sources that should be cited include friends, classmates, tutors, websites, and any books. A friend or tutor should never complete an assignment for you. You should never copy and paste large segments of code from a website. It is sometimes acceptable to copy small segments of code from a website (3 lines or fewer), but the website should be cited.

## Academic Honesty

The instructor takes academic integrity very seriously. Any submitted materials deemed to be plagiarism or fail to meet academic integrity standards will be given a zero. It is

the responsibility of each student to be honest in all of his or her work. Plagiarism is considered dishonest.

Refer to [Breach of Academic Integrity](#) for more detail information.

## Lecture Delivery Information

Join Zoom Meeting through this [Zoom Link](#)

Meeting ID: 779 612 7590

Passcode: BUCSISOHRS

One tap mobile

+13126266799,,7796127590#,,,,,0#,,8467396295# US (Chicago)

+13017158592,,7796127590#,,,,,0#,,8467396295# US (Germantown)

Dial by your location

+1 312 626 6799 US (Chicago)

+1 301 715 8592 US (Germantown)

+1 929 436 2866 US (New York)

+1 346 248 7799 US (Houston)

+1 669 900 6833 US (San Jose)

+1 253 215 8782 US (Tacoma)

Meeting ID: 779 612 7590

Passcode: 8467396295

Find your local number: <https://Bradley.zoom.us/j/ab5bqmwT1j>

## Bradley University's Statements for Course Syllabi

Bradley University *empowers students for immediate and sustained success in their personal and professional endeavors by combining professional preparation and co-curricular experiences*. Integrating knowledge, skills, and dispositions while developing your professional attitudes are important to learning at our university. Learning is an active, engaging process. Professionalism, collegial sharing, and mutual respect are expected during this course in all aspects of learning and interactions with others. Regular attendance, participation in class discussions, ethical technology use, and completion of required readings and assignments will position you for success in this course and in the future.

### Student Assistance and Services

#### Academic Success Center

<https://www.bradley.edu/offices/student/asc/support/>

The Academic Success Center provides tutoring, mentoring, and student success workshops on a variety of issues, such as time management, goal setting, note-taking, and preparing for exams. It is located on the third floor of Cullom-Davis Library. The phone number is (309) 677-2416. The email address is [success@bradley.edu](mailto:success@bradley.edu).

- Math Success Center

<https://www.bradley.edu/offices/student/asc/support/math/>

The Math Success Center provides tutoring, review sessions, and other learning resources to help students master mathematical content. It is located on the third floor of Cullom-Davis Library. The phone number is (309) 677-2416. The email address is [success@bradley.edu](mailto:success@bradley.edu).

- Writing Center

<https://www.bradley.edu/academic/departments/eng/resources/center/>

The Writing Center is located on the third floor of Cullom-Davis Library. The phone number is (309) 677-3254. The email address is [bradleywritingcenter@bradley.edu](mailto:bradleywritingcenter@bradley.edu). It is possible to call or email to schedule an appointment. Walk-ins are also accepted. In addition, the Writing Center offers virtual appointments via Zoom.

#### Office of Student Access Services

<https://www.bradley.edu/offices/student/sas/>

The Office of Student Access Services (SAS) helps students with documented disabilities by facilitating accommodations that remove barrier to academic success. Students seeking such accommodations must register with SAS, which is located in 100 Heitz Hall. The

phone number is (309) 677-3654. For additional related resources, go to: <https://www.bradley.edu/offices/student/sas/studentresources/>

### Student Counseling Services

<https://www.bradley.edu/campuslife/healthservices/counseling/>

The Counseling Center provides short term mental health counseling and related services to help students identify barriers, improve coping, and achieve personal and academic goals. It is located in the Markin Center, Room 52. The phone number is (309) 677-2700. The “after hours” phone number is (309) 677-3200. The email address is [bradleyhealthservices@bradley.edu](mailto:bradleyhealthservices@bradley.edu)

### Health Services

<https://www.bradley.edu/campuslife/healthservices/>

The Health Services Office provides care of general physical health and illness problems, as well as minor injuries, allergy issues, and medication management. It is located in the Markin Center, Room 101. The phone number is (309) 677-2700. The email address is [bradleyhealthservices@bradley.edu](mailto:bradleyhealthservices@bradley.edu)

### Student Support Services

<https://www.bradley.edu/offices/student/support/>

Student Support Services is designed to offer guidance to students in times of need. Its mission is to provide personal attention and resources to students as they work to achieve their academic and personal goals. Student Support Services serves as a major link between Academic Affairs and Student Affairs striving to improve student retention through positive communication and relationships with students, faculty, staff and families. It is located in Sisson Hall, Room 101 and 103. The phone number is (309) 677-3910.

### Title IX

Bradley University seeks to provide an environment that is free of bias, discrimination and harassment. Under Title IX, discrimination based on sex or gender is prohibited. If you have been impacted by sex discrimination including sexual assault, sexual harassment, dating violence, domestic violence or stalking, we encourage you to report it to the Executive Director of Student Support Services. While you may talk to a faculty member, faculty are required to share such reports with the University’s Title IX Coordinator or Executive Director of Student Support Services. Please refer to the Bradley University Statement on Sexual Harassment and Sexual Misconduct Policy and Procedures at: <http://www.bradley.edu/campuslife/studenthandbook/policies/misconduct/index.dot>

## Office of Diversity and Inclusion

<https://www.bradley.edu/campuslife/odi>

The Office of Diversity and Inclusion (ODI) supports historically underrepresented communities – Asian, African American, Hispanic/Latinx, Multiracial, or students who are first in their families to attend college – as they transition to Bradley. The office also handles incidents of bias or discrimination based on race or ethnicity. The office offers services for lesbian, bisexual, transgender or questioning students. The office is located in the Garrett Center. The phone number is (309) 677-2646. The email address is [diversity@bradley.edu](mailto:diversity@bradley.edu)

## Student Academic Integrity And Standards Of Conduct

### Academic Integrity

Plagiarism is a serious offense and all instances of it will be dealt with according to [Bradley University's policies and procedures](#). Students who submit plagiarized work, in whole or part, will receive a failing grade for that assignment and students who plagiarize also risk failing the course. Plagiarism is generally defined as using the ideas of another as your own. Plagiarism is not avoided by simply changing a few words or by paraphrasing the work of others. [Click here to learn about the differences between paraphrasing and summarizing](#), or copy this link: <http://www.lib.usm.edu/legacy/plag/paraphrasing.php>. All borrowed material—not just quotes—must be attributed through proper and clear citation of sources, (i.e., in Footnotes or Endnotes). When in doubt, reference it and ask your instructor! Click here or copy this link for an overview of Bradley University's academic misconduct policies related to "Cheating and Plagiarism": <https://www.bradley.edu/campuslife/studenthandbook/policies/policies/cheating/>

### Important Information

[Click here](#) or copy this link for the Student Handbook, which provides information on the Academic Calendar, Conduct and University Policies, Services for Students, and University Observed Holidays: <https://www.bradley.edu/campuslife/studenthandbook/>

### Standards of Conduct

Bradley University is dedicated to a safe, supportive and non-discriminatory learning environment. It is the responsibility of all students to familiarize themselves with Bradley University policies regarding Standards of Conduct: <https://bradley.edu/campuslife/studenthandbook/policies/conduct/> and other University Policies: [Click here](#) or copy this link for direct access to Bradley University's Standards of Conduct & University's Policies (in the Student Handbook): <https://www.bradley.edu/campuslife/studenthandbook/policies/>



### In-Class Discussion Guidelines

We will have many discussions in this class. It is imperative that everyone be actively engaged in making our discussion space a safe one where all students feel comfortable sharing their thoughts. One of the best ways to do this is to remember that this is a scholarly discussion. All of our comments should be focused on the issues we are studying in class and we should rely on evidence from our course materials to support our arguments. All of us bring different backgrounds and experiences to the discussion. When we are exposed to a new perspective or idea, it enriches our learning. We will be respectful of others and strive to make our discussions inclusive of all voices.