

The University of Western Ontario
London, Ontario, Canada
Department of Computer Science

COMPSCI 2034B / DIGIHUM 2144B
DATA ANALYTICS: PRINCIPLES AND TOOLS
Winter 2019 (0.5 Credit Course)

Instructor:	Daniel Servos	Time:	Tuesday 1:30PM – 3:30PM
Email:	dservos5@uwo.ca	Place:	NSC-1
Office:	MC25 (Office hours by appointment)		

1 Course Description

A comprehensive and interdisciplinary introduction to data analytics using modern computing systems, with equal attention to fundamentals and practical aspects. Topics include sources of data, data formats and transformation, usage of spreadsheets and databases, statistical analysis, pattern recognition, data mining, big data, and methods for data presentation and visualization.

2 Learning Outcomes

By the end of this course, students will be able to:

- Describe types, sources, and facets of data.
- Use spreadsheets, macros and VBA to analyze data.
- Utilize programming constructs to process data.
- Explain relevant statistical analysis and machine learning techniques.
- Evaluate different visual artifacts for data presentation.
- Choose data analytics tools appropriate for data problems.

3 Textbook

This course requires all students to subscribe to an electronic zyBook that will be used for assigned readings and pre-class activities. A subscription may be purchased on-line via zybooks.com or through the university book store (bookstore.uwo.ca).

Instructions for Subscribing to the zyBook

1. Sign in or create an account at learn.zybooks.com. Ensure that you use your UWO e-mail for your account so your participation can be properly recorded.
2. Enter zyBook code: `UWOCOMPSCI2034BServosWinter2019`
3. Subscribe.

A subscription costs \$65 USD (approximately \$88.33 CAD at present). Students may begin subscribing on Dec 22, 2018 and the cutoff to subscribe is Apr 10, 2019. Subscriptions will last until May 08, 2019.

Please contact support@zybooks.com for details on refunds (e.g. if you drop the course), options to extend your subscription beyond the end of the course or other help with using the zyBook software.

An alternative format (accessibility mode) is available for students using assistive technologies. Please contact accessibility@zyBooks.com for information about alternative formats or to request access to an accessible version of the zyBook.

4 Instructor

Daniel Servos

E-Mail: dservos5@uwo.ca

Website: <http://CS1.CA>

Office: Middlesex College, Room 25 (MC25)

Office Hours:

- Tuesday 11:00AM to 12:00PM (by appointment)
- Thursday 12:30PM to 2:30PM (by appointment)

Office hour appointments must be requested via the OWL Sign-Up tool at least 24 hours before the desired date. The number of appointments available each day is limited and will be scheduled on a first-come first-served basis. No office hours will be held on the week of February 18th (reading week).

5 Teaching Assistants

Teaching Assistant (TA) contact information and consulting hour details will be posted on OWL when available.

Teaching assistants will hold an open consulting hour each week. No appointment is required to attend a TA's consulting hour. TA consulting hours start January 21st. No consulting hours will be held on the week of February 18th (reading week) or after April 6th.

6 Lectures

There will be one lecture held each week in NSC-1 at the following time:

- Tuesday 1:30PM - 3:30PM

Students are expected to bring blank paper and writing implements to each lecture. A laptop, tablet, phone or other electronic device capable of connecting to the internet and viewing web pages is also strongly recommended (required for participation in some in-class activities).

7 Course Website & E-Mail Communication

This course uses the Online Western's Learning (OWL) system (<https://owl.uwo.ca>).

Announcements, assignments, labs, lecture notes, and other course-related information will be posted on this website. It is the responsibility of the student to ensure their UWO account is operational for both E-Mail and using the OWL course site and routinely check both for updates

Before sending questions to the course instructor, please first check the course syllabus (this document), the OWL course site and the OWL course forums before sending your inquiry. **General questions that may be helpful to other students (and do not contain personal information) should be posted to the OWL course forums so that others may benefit from the answer.** E-mail messages should be sent from your UWO e-mail account and include "CS2034" in the subject line to avoid any spam filters.

You can normally expect a response with-in 48 hours during the week. E-mails sent on weekends and holidays will be responded to the following working day. Please ensure enough time is available for a response when asking questions regarding assignments that are nearing a deadline.

8 Evaluation

Element	Weight
Assignments (3)	20%
Labs (11)	15%
Quizzes (4)	5%
Participation	10%
Midterm	20%
Exam	30%

If an assignment, quiz or lab has to be cancelled for any reason, the remaining assignment/quiz/lab weights will be prorated (scaled) to add up to the total weight for that element.

8.1 Assignments

- There will be 3 assignments.
- Tentative assignment schedule (dates subject to change) and weights are as follows:

Assignment #	To Be Posted On	Due On	Weight
1	January 22nd	February 8th	5%
2	February 12th	March 8th	5%
3	March 12th	April 5th	10%

- Assignments are due 5 minutes before midnight (23:55) of the due date.
- All submissions will be submitted electronically. Details will be given in the assignment descriptions.
- Late assignments are strongly discouraged:
 - 15% will be deducted from a late assignment up to 24 hours after the due date/time.
 - 30% will be deducted from a late assignment 24 to 48 hours after the due date/time.
 - After 48 hours from the due date/time, late assignments will receive a zero grade.
- Assignment descriptions will be posted on the course website by the dates listed above.
- Any changes, updates, and clarifications to assignments will also be posted on the website. It is your responsibility to monitor these pages closely.
- A program that produces the correct output is not necessarily a “working” program; it must also satisfy the specifications given in the assignment description.
- Your assignment solutions are expected to be your own individual work, not the products of group effort. **You may not share your assignment solutions** with another student for any reason nor are you to request solutions from another student or make use of solutions available on-line. Such sharing of solutions is considered a scholastic offence and will be penalized as such.

- It is your responsibility to keep up-to-date off-site backups (e.g. on OneDrive or Dropbox) of assignment files. Retain copies of all material handed in, as well as the graded assignment, to guard against the possibility of lost assignments or errors in recording marks. You should keep these materials until you are satisfied that your final mark for the course has been computed properly.
- Assignments will be marked by the TAs, who follow marking schemes provided by the instructor.
- Every effort will be made to have assignments marked and handed back within 3 weeks after the due date, preferably sooner. When assignment marking has been completed, you will be informed via the course website and/or e-mail.
- You should direct any questions or appeals about marking to your TA. If your discussion with the TA is not satisfactory, you may further discuss the issue with the course instructor.
- A request for an adjustment in an assignment mark must be made within 1 week following the date the assignment is returned. All assignment marks are considered to be final after that date.
- The course instructor reserves the right to completely remark an appealed assignment. This may raise or lower the grade compared to that given by the TA.
- Extensions are only granted for approved accommodations from the Dean's Office, Academic Counselling or SSD (see Sections 10.5 and 10.6).

8.2 Labs

- **Labs start the week of January 14th and run to April 6th.**
- There will be 11 equally weighted two-hour labs, worth approximately 1.4% each.
- See the [Western Timetable](#) for location and time information.
- Labs will be run by TAs and act as practical tutorial sessions that may cover new material or review concepts discussed in lectures. Collaboration on lab problems with other students is allowed and encouraged.
- Lab descriptions will be posted on the OWL course site before the dates listed above. Any changes, updates, or clarifications to labs will also be posted on the website. It is your responsibility to monitor these pages closely.
- It is expected that you read over lab materials beforehand and come prepared to lab sessions with any required resources or reference material.
- As seating in labs is limited, **you are required to attend the lab section you are registered in.**
- To obtain full marks for a given lab session, you must attend the lab in person and complete the lab to the TA's satisfaction (see the Lab Rubric at the end of this document for details on how lab marks are evaluated).
- TAs may give a zero or reduced lab mark to students that are late to or do not work on lab material during the lab session. It is expected that students abstain from working on assignments during lab time until they have completed and received a mark for the lab.
- **Labs can not be made up for in future lab sessions or submitted via e-mail.**
- Labs missed as part of an approved accommodation (e.g. medical illness) will result in the student's lab mark being re-weighted to not include the missed lab. Please contact the course instructor as soon as possible if you have an accommodated lab absence.

8.3 Quizzes

Up to four multiple choice "scratch off" **IF-AT** quizzes worth 1.25% each will be given over the course of the semester. These quizzes will act as "pop quizzes" (little or no warning given) that may cover assigned readings, lecture content, or lab content. Partial marks will be awarded for incorrect answers based on the number of attempts (i.e. "scratches") required to reveal the correct answer.

Quizzes may be given as individual assessment or group activities. Directions will be give at the time of the quiz as to whether or not cooperation is allowed. If fewer than five quizzes are given or a quiz is missed as part of an approved accommodation (e.g. medical illness) the quiz mark will being re-weighted to omit the missed quizzes.

8.4 Participation

As Computer Science is a highly collaborative field, it is important to develop the skills and tools you need to work with others on complex programming and technical problems. For this reason, CS2034/DH2144 makes heavy use of active learning and group work in in-class activities. It is expected that you will be an active participant in all course activities and come prepared by reading the required readings before class each week.

Your participation mark is comprised of the following elements:

1. Preparation & Readings
2. In-Class Activities & Engagement
3. Class Discussion & Answering Questions
4. Use of In-Class Response System

These elements will be evaluated using the participation rubric found at the end of this document. Note that not all elements are required for a full participation mark (rubric adds to 150/100). Participation will be evaluated both midway through and at the end of the course based on the above mentioned elements.

8.5 Midterm & Final Exam

- Tentative exam dates are as follows:

Midterm Exam

Date: Saturday March 2nd (tentative)

Time: 5:00PM to 7:00PM (2 hours) (tentative)

Location: To be determined

Format: Mixed (Multiple Choice, Short Answer & Programs)

Final Exam

Date: During April final exam period (to be determined)

Time: To be determined (3 hours)

Location: To be determined

Format: Mixed (Multiple Choice, Short Answer & Programs)

- Both exams will be comprehensive and may include anything covered in lectures, labs, assignments, and assigned readings up until that point in the course.
- No electronic devices of any kind, including but not limited to calculators, phones, laptops and smart watches, will be allowed during the examinations.
- There will be no make-up midterm exam. Students absent due to an approved accommodation (see Section 10.6) will have their final exam mark reweighed to include the weight of the midterm exam.

9 Scholastic Offences & Academic Dishonesty

To preserve a fair and honest learning environment for all, scholastic offences and any breach of ethical conduct will not be tolerated and punished according to department policy. In addition, to the offences outlined in the department and university policy (see Section 10.1), the following will be considered academic misconduct:

- Sharing assignment solutions with other students or posting them on-line in a manner that is accessible to other students (e.g. Course Hero, in Facebook groups, via Discord, etc.).
- Using any part of another student's assignment solution including but not limited to formatting and templates.
- Sharing your account or using another student's UWO, OWL or zyBook accounts in any way.
- Submitting a Group Work Code for an activity you did not participate in or were absent for.
- Submitting a participation ticket that you did not earn yourself.
- Sharing or giving a Group Work Code or participation ticket to another student.
- Attempting to circumvent or in any way manipulate the systems in place for monitoring participation or attendance (ASKTool, zyBooks, etc.).
- Sharing answers on quizzes that are intended to be completed individually.
- Attempting to circumvent or in any way manipulate IF-AT quizzes (e.g. taking multiple IF-AT sheets for one individual/group).
- Altering a quiz, midterm or exam in any way after it has been graded.
- Misrepresenting work done during labs with the intent to receive a higher lab grade.
- Taking the place of another student in labs sessions, exams, quizzes, etc.
- Any other offences listed in a department or university policy (see Section 10.1).

Assignment will be subject to metadata analysis to detect sharing of files and solutions. For first offences, misconduct on assignments, quizzes and labs will result in a 0% grade for that assignment/lab/quiz in addition to a penalty equal to the weight of the assignment/quiz/lab. First offence relating to misconduct on any participation component will result in a 0% overall participation grade and an additional penalty equal to 10%. Second offences on any course component will result in a 0% overall course grade.

10 University & Department Policies

10.1 Ethical Conduct

Scholastic offences are taken seriously and students are strongly encouraged to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence.

Assignments that are judged to be the result of academic dishonesty will, for the student's first offence, be given a mark of zero with an additional penalty equal to the weight of the assignment also being applied.

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

All required papers and assignments may be subject to submission for textual and metadata similarity review to commercial or custom plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking via Turnitin.com will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of this service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Students are responsible for reading and respecting the Computer Science Department's policy on [Scholastic Offences](#) and [Rules of Ethical Conduct](#).

10.2 Tutoring

The role of tutoring is to help students understand course material. Tutors should not write assignments or tests for the students who hire them. Submitting an assignment that contains material written by a tutor is an academic offence.

Having employed the same tutor as another student is not a legitimate defence against an accusation of collusion, should two students hand in assignments judged similar beyond the possibility of coincidence.

10.3 Email Contact

We occasionally need to send email messages to the class or to students individually. Such emails are sent to the UWO email address as assigned to you by Information Technology Services (ITS), i.e. your email address @uwo.ca. It is your responsibility to read your email account on a frequent and regular basis, or to have it forwarded to an alternative email address if preferred. See the ITS website for directions on forwarding email.

However, note that the email at ITS (your UWO account) and other email providers may have quotas or limits on the amount of space they dedicate to each account. Unchecked emails may accumulate beyond those limits and you may be unable to retrieve important messages from your instructors. Losing emails is not an acceptable excuse for not knowing about the information that was sent.

Students are encouraged to contact their course instructor via e-mail with brief, e-mail appropriate questions regarding lecture materials or clarification of assignments. However, before sending email to the instructor, the student should check the course website to see if the requested information is already there and post on the OWL forums if appropriate. Students must send emails from their UWO ITS account and include “CS2034” in the subject line of the email.

10.4 Computing Facilities & OWL Forums

Each student will be given an account on the Computer Science Department undergraduate computing facility, GAUL. In accepting the GAUL account, a student agrees to abide by the department’s [Rules of Ethical Conduct](#).

Students are expected to act professionally when making posts to the OWL course forums. All submissions should be relevant to the course, made in the correct subforum and not contain any content that would violate department or university policies including the Student Code of Conduct. Assignment solutions (including partial or incomplete answers) should never be posted to the OWL Forums. When seeking help with an assignment or answering questions, only small code segments or specific technical questions should be posted.

10.5 Accessibility Statement

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x82147 for any specific question regarding an accommodation.

The policy on Accommodation for Students with Disabilities can be found here: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

10.6 Academic Accommodation for Medical Illness

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to your Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's office immediately. For further information, please see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's office) for visits to Student Health Services. The form can be found here:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

10.7 Support Services

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health at Western (<http://www.uwo.ca/uwocom/mentalhealth>) for a complete list of options about how to obtain help.

The policy on Accommodation for Religious Holidays can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Students may refer to <https://westernusc.ca/your-services> for services provided by the USC.

Students may refer to <http://www.registrar.uwo.ca> for the Registrarial Services.

11 Tentative Course Outline (Subject to Change)

Week of	Lecture Topics	Assigned Readings	Lab Topic	Important Dates
Week 1 January 7 th	<ul style="list-style-type: none"> • Introduction & Syllabus • Computing History • Data 	<ul style="list-style-type: none"> • Course Syllabus (this document) • CH1: Computing History • CH2: Data 	No Labs This Week	Lectures start this week
Week 2 January 14 th	<ul style="list-style-type: none"> • Hardware Basics • Spread Sheet Basics 	<ul style="list-style-type: none"> • CH3: The Basics: Hardware and Software • CH7: Spreadsheet Basics • Optional Readings on the History of Spreadsheets: http://www.dssresources.com/history/sshistory.html & http://www.dssresources.com/history/mattessichspreadsheet.htm 	Lab 1: Spreadsheet Basics	<ul style="list-style-type: none"> • Labs start this week • Jan. 15: Last day to add a course
Week 3 January 21 st	<ul style="list-style-type: none"> • Statistics: Basics • Data Prep & Transformation • Regular Expressions (RegEx) 	<ul style="list-style-type: none"> • CH10: Statistics: Basics • RegexOne: https://regexone.com 	Lab 2: Correlating Data Sources	Assignment 1 Posted: January 22 nd
Week 4 January 28 th	<ul style="list-style-type: none"> • Introduction to Computation • Getting Started With VBA • Excel Macros 	<ul style="list-style-type: none"> • CH4: Computation, Algorithms and Programming • Home & Learn: Getting Started (http://www.homeandlearn.org) 	Lab 3: Rank Analysis	
Week 5 February 4 th	<ul style="list-style-type: none"> • VBA Programming Part 1 	<ul style="list-style-type: none"> • CH5: Advanced Algorithms • Home & Learn: VBA Programming Variables • Home & Learn: Conditional Logic • Home & Learn: Strings and String Functions 	Lab 4: Benford's Law	Assignment 1 Due: February 8 th
Week 6 February 11 th	<ul style="list-style-type: none"> • VBA Programming Part 2 • Debugging 	<ul style="list-style-type: none"> • CH6: Troubleshooting and Debugging • Home & Learn: Programming Loops • Home & Learn: Programming Arrays • Home & Learn: Subs and Functions 	Lab 5: Debugging	Assignment 2 Posted: February 12 th

Week of	Lecture Topics	Assigned Readings	Lab Topic	Important Dates
February 18 th	Reading Week			
Week 7 February 25 th	<ul style="list-style-type: none"> Textual and Social Media Analytics VBA String Functions Midterm Review 	<ul style="list-style-type: none"> VBA Functions StrComp, Split and Replace from https://www.excelfunctions.net CH17.3 and CH17.8 (only if you are unfamiliar with these concepts) Midterm Overview Midterm Tutorial 	Lab 6: Course Calendar Search Engine	Midterm: Saturday March 2 nd 9:30AM to 11:30AM (tentative)
Week 8 March 4 th	<ul style="list-style-type: none"> Visualization 	<ul style="list-style-type: none"> CH9: Data Visualization The Data Visualization Catalogue (https://datavizcatalogue.com/) Interaction Design Foundation: What are Gestalt Principles? (https://www.interaction-design.org/literature/topics/gestalt-principles) 	Lab 7: Visualization	<ul style="list-style-type: none"> Assignment 2 Due: March 8th March 7: Last day to drop.
Week 9 March 11 th	<ul style="list-style-type: none"> Artificial Intelligence Machine Learning Data Mining 	<ul style="list-style-type: none"> CH13: Data Mining and Machine Learning Turing Test: https://www.youtube.com/watch?v=sXx-PpEBR7k A Brief History of AI: https://www.youtube.com/watch?v=056v40xKw1I Machine Learning & AI: https://www.youtube.com/watch?v=z-EtmaFJieY 	Lab 8: Entropy and Decision Trees	Assignment 3 Posted: March 12 th
Week 10 March 18 th	<ul style="list-style-type: none"> Privacy & Ethics Machine Learning: Problems & Issues 	<ul style="list-style-type: none"> CH16: Privacy and Ethics 	Lab 9	
Week 11 March 25 th	<ul style="list-style-type: none"> Modeling and Simulation 	<ul style="list-style-type: none"> CH12: Modeling and Simulation 	Lab 10: Hotel Simulation	

Week of	Lecture Topics	Assigned Readings	Lab Topic	Important Dates
Week 12 April 1 st	<ul style="list-style-type: none"> • Big Data • Cloud Computing • Other Data Analytics Tools 	<ul style="list-style-type: none"> • CH14: Big Data • CH15: Cloud Computing • CH18: Python (optional reading) 	Lab 11	<ul style="list-style-type: none"> • Assignment 3 Due: April 5th • Last lab this week!
Week 13 April 8 th	<ul style="list-style-type: none"> • Final Exam Review 	<ul style="list-style-type: none"> • Final Exam Overview • Final Tutorial 	No labs this week	Last lecture this week!
Final Exam (Date, time and location to be announced)				

Name: _____

CS2034/DH2144 Participation Rubric

Total: ____ / 100 marks*

	Exemplary (50 - 40 marks)	Above Average (40 - 35 marks)	Satisfactory (35 - 25 marks)	Needs Improvement (25 - 0 marks)
Preparation & Readings Primary Assessment: zyBook Activities	<ul style="list-style-type: none"> All zyBook activities completed. All required on-line activities completed (OWL based weekly activities, polls, etc.). Arrives to class prepared to participate with required resources (blank paper, writing implements, etc.) and having read assigned readings. 	<ul style="list-style-type: none"> Most zyBook activities completed. Most required on-line activities completed. Rarely arrives to class unprepared to participate. 	<ul style="list-style-type: none"> At least 70% of zyBook activities completed. At least 70% of on-line activities completed. Occasionally arrives to class unprepared to participate. 	<ul style="list-style-type: none"> Most or all zyBook activities incomplete. No or few required on-line activities completed. Consistently arrives late to class or unprepared to participate. Evident that assigned readings have not been completed.
In-class Activities & Engagement Primary Assessment: Group Work Codes	<ul style="list-style-type: none"> Completed all in-class activities and group work. Group work codes are submitted with high quality summaries of the completed work. On-going, supportive, active engagement with classmates. Consistently works to draw out the participation of others. Behaviour is always respectful of the instructor and others. 	<ul style="list-style-type: none"> Nearly all in-class activities and group work completed. Group work codes are submitted with above average summaries. On-going engagement with classmates. Always completes group work with others. Behaviour is respectful of the instructor and others. 	<ul style="list-style-type: none"> At least 70% of in-class activities and group work completed. Group work codes are submitted with average summaries. Sometimes engages with classmates in a meaningful way. Sometimes completes group work alone. Behaviour is seldom disruptive. 	<ul style="list-style-type: none"> Absent from most in-class activities and group work. Group work summaries are empty or of substantially low quality. Attempts to circumvent or "cheat" the group work code system. Little interaction with classmates. Behaviour is disruptive (e.g. talking during lecturing, disruptive computer or phone use, etc.).
Class Discussion & Answering Questions Primary Assessment: Participation Tickets	<ul style="list-style-type: none"> Frequently answers questions and engages in discussions. Received a large number of ducks (participation tickets). Actively manages themselves to allow others space to participate. 	<ul style="list-style-type: none"> Regularly answers questions and engages in discussions. Received an above average number of ducks (participation tickets). Allow others space to participate. 	<ul style="list-style-type: none"> Answers questions and engages in discussions when prompted. Received an average number of ducks (participation tickets). Infrequently or never dominates discussions in such a way that others can not contribute. 	<ul style="list-style-type: none"> Infrequently answers questions or engages in discussions. No participation tickets received. Attempts to circumvent or "cheat" the participation ticket system. Dominates classes in such a way that other classmates can not meaningfully contribute.
In-Class Response System Primary Assessment: Use of ASK Tool	<ul style="list-style-type: none"> Makes frequent use of the in-class response systems (ASK Tool, Kahoot, etc.) to ask questions, provide comments, answer questions, and otherwise engage with the lecture. Quality of responses is exemplary and advances the level and depth of classroom dialogue. 	<ul style="list-style-type: none"> Regularly uses the in-class response systems (ASK Tool, Kahoot, etc.). Quality of responses is above average and advances the depth of classroom dialogue. Questions aid others learning in addition to your own. 	<ul style="list-style-type: none"> Occasionally uses the in-class response systems (ASK Tool, Kahoot, etc.). Quality of responses is average and the content of responses is appropriate. Questions aid your own learning and understanding of course material. 	<ul style="list-style-type: none"> Rarely uses response systems. Quality of responses is very low or frequently asks questions that have been answered. Responses are inappropriate. Attempts to compromise or break the in-class response systems. Evident that responses are made in bulk solely for participation marks.

* Participation grades over 100 will be recorded as 100/100 (full participation mark).

CS2034/DH2144 Lab Rubric

Name: _____

Total: ____ / 10 marks*

	Exemplary (10 marks)	Above Average (9 - 8 marks)	Satisfactory (7 - 6 marks)	Needs Improvement (5 - 0 marks[†])
	<ul style="list-style-type: none"> • All required components of lab completed and correct. • Demonstrates understanding of lab content and correctly answers questions about their work. • Arrives on time and prepared for the lab with all required prelab readings and activities completed. 	<ul style="list-style-type: none"> • Most required components of lab completed. • Few or insignificant errors in work. • Likely that lab could be completed correctly if more time was given. • Demonstrates understanding of completed lab content and correctly answers questions about their work. • Arrives on time and prepared for the lab with all required prelab readings and activities completed. 	<ul style="list-style-type: none"> • At least half of lab content is completed. • Several or significant errors in work. • Likely that errors could be corrected if more time was given. • Likely that most of lab could be completed with more time. • Demonstrates some understanding of completed lab content and able to explain most completed work. • Arrives on time and with most prelab readings and activities completed. 	<ul style="list-style-type: none"> • Majority of lab tasks are incomplete. • Many significant errors in work. • Unlikely that errors could be corrected if more time was given. • Unlikely that most of lab could be completed with more time. • Fails to demonstrate understanding of lab content. • Arrives late, without prelab readings and activities completed.

* Some labs may have a bonus/optional part that will allow for a grade over 10. Bonus marks can make up for labs with less than a 10/10 mark but not raise the overall lab grade above 15% of your final grade.

† Lab absences will result in a grade of 0/10 for the missed lab.