Western University
Faculty of Science
Department of Computer Science

Course Syllabus
CS1037 Computer Science Fundamentals II - Fall 2024

Instructor Information
Instructor: Ahmed Ibrahim
Email: afibrah64 at Western University
Weekly drop-in group consulting over Zoom® (office hours):
- Thursdays from 12:00 pm to 1:00 pm

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Course Information
This is a continuation of Engineering Science 1036A/B. It covers data organization and manipulation, abstract data types and their implementations in a higher-level computer language (C), lists, stacks, queues, trees, pointers, recursion, memory allocation, and memory management. It is intended for students in the Faculty of Engineering.
Credit: 0.50

Prerequisite
Engineering Science 1036A/B.
You should have passed the requisites for this course, or you will be removed from the enrolment list, and it will be deleted from your record. This decision may not be appealed.

Antirequisites
Computer Science 1027A/B, Computer Science 2121A/B, Digital Humanities 2221A/B.

Lecture Schedule & Location
⇒ Tuesday: 8:30 AM – 10:30 AM
⇒ Thursday: 8:30 AM – 9:30 AM

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Lab Schedule & Location
Section 002: Thursday (4:30 PM – 6:30 PM)████████████████████████
Section 003: Wednesday (7:30 PM – 9:30 PM)████████████████████████

Course Material
Recommended Textbooks:
- Data Structures Using C, second edition, by Reema Thareja, Oxford University Press, 2014.

Hardware Configuration:
For this course, students should have access to a computer with at least an Intel Core i3 or AMD Ryzen 3 processor (Intel Core i5 or AMD Ryzen 5 or higher recommended), 4 GB of RAM (8 GB or more recommended), and a 128 GB SSD or HDD (256 GB SSD recommended for better performance). The computer should have a display with a resolution of 1920x1080 (Full HD) or higher and integrated graphics, which are sufficient for the course requirements. Additionally, the computer should run on Windows 10/11, macOS 10.15 or later, or a modern Linux distribution. Reliable internet access is necessary for downloading tools, accessing online resources, and participating in class activities. Students should also have a comfortable keyboard and mouse, with an optional external monitor for additional screen space, and a method for backing up projects, such as an external hard drive or cloud storage.

Software Requirements
Students will need a C++ Integrated Development Environment (IDE) such as Visual Studio, CLion (preferred), Code::Blocks, or a text editor like VS Code with a C++ compiler installed. These tools are required for completing coding assignments and projects throughout the course.

Note:
- Students must ensure they meet all technology and software requirements listed above.
- There are exercises during the lecture; thus, having a computing device with the necessary configuration mentioned above is a requirement.

Topics Covered
The following represents the order in which the course topics will be presented. The topics are **tentative**:

UNIT	Lecture Topic
1	Introduction, C basics, program structure, compiling Syntax, style, preprocessor Primary data types, variables, and constants, operators and expression
2	Control statements, functions, Pointers, Arrays
3	Multi-dimensional arrays, Strings, User-defined types: structures
4	User-defined types: union, enumeration, File I/O Memory allocations.
5	Linked lists & Queues
6	Stacks, Stack applications, Trees
7	Binary tree, Binary search trees
8	AVL tree, Red-black tree, Splay tree, m-way search tree, B-trees
9	Hash table, Hash functions, Collision handling by probing chained hash tables, Heaps
10	Graph representations and data structures,
11	Graph operations, Minimum spanning tree problem
12	Shortest path problems and Dijkstra algorithm, Graph data structures and applications, final review

The schedule is subject to change according to the progress of the class.

By the end of this course, the student will comprehend the mechanics of data structures and utilize these concepts in the C computer language.

Learning Outcomes – By the end of this course, students should be able to

- Design and write C programs to solve general computing problems.
- Describe the principles of data structures in data representation, storage and operations, and algorithm designs and implementations.
- Describe and apply the fundamental data structures.
- Design, analyze, and implement application-specific data structures for applications.

Classroom Conduct
Students are expected to arrive promptly and remain in class until the end of the lecture and not to disturb others in the class. You can use laptops, tablet computers, or smartphones ONLY to access the course OWL Brightspace site during lectures, labs, or tutorials. No other electronic devices may be used anytime during lectures or tutorials. Any behavior or activity that may impede your or other students' ability to learn will not be tolerated. If the behavior persists, the individual(s) involved will be invited to leave the classroom.

Due to the proprietary nature of some of the materials used in the lectures, **no audio recording** will be allowed during class sessions.

Email Contact
Email messages may be sent to the entire class or to students individually. Email will be sent to your UWO email address as assigned to you by Information Technology Services (ITS). It is your responsibility to read this email regularly.

Email contact with the course instructor is encouraged by sending brief and appropriate messages regarding lecture material or assignments. However, please first check the Forums section in OWL Brightspace to see if the information has already been posted. If you contact the instructor via email or post a question in OWL Brightspace, you can expect a response in a timely fashion, but not necessarily an instantaneous response. Please use proper, appropriate, and respectful English when emailing or posting on the course website.

NOTE: Email messages **must** be sent from your university account and **MUST** include: "**CS 1037 F24**" in the subject line. (spaces/case do not matter ex: cs1037f21 works) Email messages without **CS 1037 F24**" in the subject line will automatically be trapped and deleted by the instructor's SPAM filter and will **NOT** be available, read, or responded to. Your email subject should start with "**Hello, professor**." Last, I check my emails on school days and will reply within 24/48 hours.

Do not use 'respond to' for any email originating from OWL Brightspace (announcements, etc.) – ensure the professor's email is the in the destination and NOT to: postmaster@owl.uwo.ca

[This is very important—please make sure you understand and follow the standards above.]

Student Evaluation (tentative dates)**:**

Element	Weight	Date(s)
4 Assignments	20%	Provided Below

3 Quizzes	15%	Held during lecture time as scheduled below
10 Labs (out of 12)	10%	As scheduled
Project	20%	Due on November 29th at 11:55 PM
Final Exam	35%	Scheduled by the Univ.

Quizzes
The following is the schedule for the quizzes: (tentative dates):

Quiz 1	5%	Sep 26
Quiz 2	5%	Oct 24th
Quiz 3	5%	Nov 21st

The schedule may change depending on the progress of the class.

- A missed quiz will receive a zero mark unless there is a valid documented reason. The quiz weight will be carried over only with verifiable extenuating circumstances. An extenuating circumstance is a rare and severe event for which a student has no control or cannot anticipate (for example, a serious accident or emergency medical condition).

- There will be NO MAKEUP for any quiz. The weight of each quiz will be carried over to the next quiz, except for the final quiz.

- Quizzes will be conducted via OWL Brightspace. Therefore, you must have a computer meeting the specified configuration to complete your quiz.

- If fewer than three quizzes are given or if the instructor must cancel a quiz for any reason, the weight of the canceled quiz will be added to the remaining quizzes.

Final Exam

- I will not be available during the examination period

- The University will schedule the final exam.

- Electronic devices such as iPods, smartwatches, and earplugs are not allowed during the final exam.

- Cell Phones are NOT permitted to be visible or accessible during any part of the examination period.

- The use of a calculator is not allowed.

- Reference notes or Dictionaries of any kind are prohibited.

Assignments
Students are expected to view the lecture materials and complete the exercises to prepare for the assignments. Once the assignment is completed, all parts must be submitted to the OWL Brightspace site. The student must ensure that all parts of each assignment are correctly uploaded and submitted in OWL Brightspace so that the assignment can be marked accordingly.

Note: Assignments emailed to the instructor or teaching assistant **will not be** accepted unless there are extenuating circumstances and prior approval from the instructor.

The following is the tentative assignment schedule (subject to change):

Assignment	Weight	Topic	Due date (by 11:55 PM)
1	5%	Simple Control Statements	September 23^{ed}, 2024
2	5%	Arrays and Sorting	October 7th, 2024
3	5%	Structures	October 28th, 2024
4	5%	Pointers, and Lists	November 16th, 2024

The due dates of the assignments are shown in the table above. **Please note that all these dates are tentative.** The due dates will be confirmed when the assignments are posted on OWL Brightspace. The dates will coincide with the class progression on subsequent topics.

Where possible, the instructions for each assignment will be posted on the course website at least **two weeks before the due date**.

If, for any reason, the assignment schedule given above cannot be adhered to, the assignment marks will be pro-rated. The five (3) assignments are worth 30% of the overall mark for the course. If the instructor must cancel an assignment for any reason, the remaining assignment weights will be prorated to add up to 30%.

NOTE: All times in this course outline are based on London, Ontario time.

Assignment Marking

- A TA will mark assignments within two weeks of the assignment due date, where possible.
- Once marks are returned, individual marks will be posted on the OWL Brightspace site.
- Questions regarding assignment marking should be directed to the **teaching assistant** who graded your assignment and then to the course instructor assigned to your section if your discussion with the teaching assistant was unsatisfactory.
- Requests for mark adjustments will only be considered if they are made within **one week** of receiving the assignment mark and have been first discussed with the teaching assistant who marked the assignment. Assignment marks will be final after that Date.
- Requests for mark adjustments will only be considered for three marks or greater adjustments.

Passing the course
To be eligible to receive a passing grade in the course, your average on the midterm and final (together) must be at least 50%, and your average on the remaining course load must be at least 50%. Otherwise, your final grade cannot exceed 45% of the total grade.

Late Submission Policy
48 hours late: 15% reduction (percentage is calculated from the maximum possible grade).
72 hours late: 25% reduction
Submissions must be at most 72 hours late to be accepted.

Note:

- No coursework will be accepted after the last day of classes.
- Students can resubmit their assignments until the due date. In this case, only the last version will be marked.
- It is the student's responsibility to ensure that the correct assignment version is submitted to OWL Brightspace. If an incorrect version is submitted instead, **no excuses will be accepted**.
- Every effort will be made to have assignments marked and returned within **two weeks** of the hand-in date.
- **No assignments will be given extensions**. However, in the event of serious medical or compassionate grounds, a student must follow the procedure for Academic Accommodation for Medical Illness as provided in this course syllabus. If the Dean's office approves an academic accommodation, the assignment's weight will be moved to one of the two exams.
- Late assignments will have a penalty of 15% or 25% of the maximum mark for the assignment deducted based on the time of submission as listed in OWL Brightspace.

Assignments will not be accepted if submitted to the professor's email instead of OWL Brightspace and will be deleted immediately and deemed un-submitted.

General information about missed coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs* posted on the Academic Calendar: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult Accessible Education.

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage: https://registrar.uwo.ca/academics/academic_considerations/

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Examinations scheduled during official examination periods (Defined by policy)
- Practical laboratory and performance tests (Defined by policy)
- Midterm/Presentation/Group Project (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration)

A Group Project with multiple milestones due on different dates may still be considered as the one assessment for instructors to declare as "always requiring documentation". On the other hand, a series of group assignments covering different parts of the course content are not 'one assessment'.

When a student *mistakenly* submits their <u>one</u> allowed Academic Consideration request **without supporting documentation** for the assessments listed above, <u>the request cannot be recalled and reapplied</u>. This privilege is forfeited.

Course Web Page
The course website is located within OWL Brightspace. To access it, navigate to http://owl.uwo.ca and log in with your Western University personal computer account (user ID and password). Lecture and tutorial videos, assigned readings, notes, assignments, and class information will be posted on this site. You are responsible for checking it regularly.

Contingency plan for an in-person class pivoting to 100% online learning
In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, asynchronously (e.g., posted on OWL Brightspace for students to view at their convenience). The grading scheme will not change. Any remaining assessments will also be conducted online as determined by the course instructor.

Key Sessional Dates
- Classes begin: September 5th, 2024
- Last day to add a full course or a first-term half course or drop a course without showing
- WDN: September 13th, 2024
  Canadian Thanksgiving weekend: Oct 14, 2024 (Western closed)
- National Day for Truth and Reconciliation (No classes): September 30, 2024
- Reading Week: Oct 12, 2024 – Oct 20, 2024
- Last day to withdraw from a first-term half course or full-year course without academic penalty (extended from Sat. Nov. 30): December 2nd, 2024
- Classes end: December 6, 2024
- Exam period: December 9 – 22, 2024

More important dates can be found here:
https://registrar.uwo.ca/resources/important_dates_and_deadlines.html.

Student Absences
Academic Consideration for Student Absences
Students who experience an extenuating circumstance (illness, injury, or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:
- For medical absences, students must submit a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to the Academic Advising office of their Faculty of Registration.
- Submitting appropriate documentation for non-medical absences to the Academic Advising office in their Faculty of Registration.

Please note that students are expected to contact their instructor within 24 hours of the end of the period. In exceptional cases where this is not possible, students should reach out at the earliest opportunity to explain the situation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds or for other reasons. **All documentation required for absences must be submitted to the Academic Advising office of a student's Home Faculty**.

For the policy on Academic Consideration for Student Absences – Undergraduate Students, see:

https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf

The Student Medical Certificate is available at

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

Religious Accommodation
When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing at least two weeks before the holiday to the course instructor and/or the Academic Advising office of their Faculty of Registration. Please consult the University's list of recognized religious holidays (updated annually) at

https://multiculturalcalendar.com/ecal/index.php?s=c-univwo.

Absences from Final Examinations
If you miss the Final Exam, please get in touch with the **Academic Advising** office of your Faculty of Registration as soon as possible. They will assess your eligibility to write the Special Examination (the name the University gives to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (e.g., more than two exams in a 23-hour period, more than three exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the following Special Examination (if granted) usually will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under Special Examinations).

Note: missed work can only be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is not sufficient on its own.

Accommodation and Accessibility

Accommodation Policies
Students with disabilities work with Accessible Education (formerly SSD), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf

Academic Policies

The website for Registration Services is http://www.registrar.uwo.ca. Under the policy, https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf, the centrally administered email account provided to students will be considered the individual's official university email address. It is the account holder's responsibility to ensure that email received from the University at their official university address is attended to in a timely manner.

Scholastic offenses are taken seriously, and students are directed 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.

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

Tests and examinations in this course may be conducted using a remote proctoring service. By taking this course, you consent to use this software and acknowledge that you will be required to provide personal information (including some biometric data) and that the session will be **recorded**.

To complete this course, you will need a reliable internet connection and a device that meets the technical requirements for this service. Western's Remote Proctoring website has more information about this service, including technical requirements, at https://remoteproctoring.uwo.ca.

Ethical Conduct

Scholastic offenses are taken seriously, and students are directed 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

Plagiarism

All required course components (assignments and examinations) may be subject to submission for textual and metadata similarity review to plagiarism detection software. All assignments and exams submitted for such checking may be included as source documents in the reference database to detect plagiarism of papers subsequently submitted to the system. Use of such services are subject to the licensing agreement with The University of Western Ontario. These services and software may include but are not limited to Turnitin (http://www.turnitin.com), MOSS, SCANEX, and custom plagiarism detection software developed for the course.

Computer-marked multiple-choice examinations may be subject to remote proctoring software and submission for similarity review by software to check for unusual coincidences in answer patterns that may indicate cheating. For details on remote proctoring, contact the course instructor.

Students must write their assignments in their own words. Whenever students take an idea or a passage from another author or software (like ChatGPT or similar AI tools), they must acknowledge their debt by using quotation marks where appropriate and by proper referencing, such as footnotes or citations. This adoption must be limited to at most 15% of the overall submitted content. Plagiarism is a major academic offense (see Scholastic Offence Policy in the Western Academic Calendar).

All assignments are individual assignments. You may discuss approaches to problems among yourselves; however, the actual details of the work (assignment coding, answers to concept questions, etc.) must be an individual effort. All assignments will be subject to both content and metadata plagiarism analysis.

All exams are to be written individually, the content and questions not shared, and provided rules followed.

Tutors and Outside 'Help' on assignments.
Students may receive tutoring help on assignments so long as the tutor only identifies errors or demonstrates sample problems that are not part of the assignment. If the content of your assignment is significantly different from that of your assignment without help, then this is an indication that you may have crossed the line into cheating. Again, ask your instructor if you are unsure how much help is too much.

The role of tutoring is to help students understand course material. Tutors should not write any part or all of an assignment for the students who hire them. Tutors should not 'advise' or 'suggest' what is to be entered into an assignment or the solutions to any portion of the assignments. Any aid beyond what you would have received directly from the instructor will be considered an academic offense. Employing the same tutor as another student is not a legitimate defense against an accusation of collusion, should two students' hand-in assignments be judged similar beyond the possibility of coincidence.

Academic dishonesty in assignments includes (but is not limited to):
- Unacceptable collaboration
- What is unacceptable? There is a difference between discussing assignments and solutions with fellow students and working together on the solutions to the point where the work submitted is clearly not individual work. If in doubt, ask your instructor.
- Copying of another student's assignment
- Allowing another student to copy your work is also an Academic Offense for both you and the other student.
- Sharing your assignment with another student(s), electronically or otherwise, is also an Academic Offense.
- Using another student's assignment or work as a "template" or "starting point" for your work is an Academic Offense for both students.
- Using sites dedicated to sharing assignment solutions or aiding cheating, such as Course Hero, OneClass, and Chegg.
- Using code from an external source (text, instructor, course website) where a student's own code is expected (if in doubt, ask your instructor)

Academic dishonesty in exams includes (but is not limited to):
- Writing an exam with the aid of another person is an Academic Offense for both students.
- Sharing exam questions/answers or using ones sent to/obtained by you.
- Have another person write an exam for you.
- Failing to follow the specific rules given in the exam.
- Sharing your screen or virtually taking an exam with others (e.g., being in an online chat of any kind while taking an exam).

The penalty for academic dishonesty in any course component is receiving 0% for that component **AND** the possibility of additional penalties as deemed appropriate by the course instructor, department, or University, including but not limited to an additional penalty equal to the course component or a failing overall grade being entered for the course. Note that receiving 0% on an assignment may make you ineligible for a passing grade due to the 49% requirement given in the Student Evaluation section.

Receiving 0% on the final exam will make you ineligible for a passing grade in this course.

You are responsible for reading and respecting the Computer Science Department's policy on Scholastic Offences:
https://www.csd.uwo.ca/undergraduate/current/policies/scholastic_offenses.html
and Rules of Ethical Conduct:
https://www.csd.uwo.ca/undergraduate/current/policies/ethical_conduct.html

Support Services
Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and other academic-related matters: https://www.uwo.ca/sci/counselling/.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible. You may also wish to contact Accessible Education at (519) 661-2147 if you have any questions regarding accommodations.

Western University is committed to a thriving campus. We might deliver our courses in a mixed model of virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: https://www.uwo.ca/se/digital/.

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 and Winter terms in the drop-in Learning Help Centre and year-round through individual counseling.

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

Additional student-run support services are offered by the USC, http://westernusc.ca/services

Misc. Items:
- Do not share codes!!!; the program/written assignment submitted must be written independently.
- Please ensure to communicate promptly and professionally if you face any genuine difficulties.
- No extra work in the next semester is given to improve your grade. The given grades are final.

Good Luck ☺