Syllabus: Principles of Computer Architecture

Contents

1 Details

Course & Section:	*Principles of Computer Architecture,* CISC 3310, MY0
Days & Time:	Mondays, Wednesdays (MoWe), 10:35 AM – 12:15 PM
Location:	Ingersoll Hall Extension, Room 525 (IA-525 in short)
Instructor:	Miriam Briskman
E-mail:	miriam.briskman@brooklyn.cuny.edu
Response Time:	Within 24 – 48 hours, between 12 PM to 9:30 PM
Office Hours:	Wednesdays, 07:30 PM – 09:30 PM, online through Zoom. Alternatively, please email me to schedule an appointment.
Course Materials:	[Free] *Computer Architecture*, by Dr Ranjani Parthasarathi. Link: https://www.cs.umd.edu/~meesh/411/CA-online/chapter/computer-architectureintroduction/index.html. [Free] *Computer Organization and Design Fundamentals Series*, by David Tarnoff. Link: https://dc.etsu.edu/etsu-oer/6/. [Free] *Introduction to MARIE, A Basic CPU Simulator*, by Jason Nyugen, Saurabh Joshi, and Eric Jiang. Link: https://marie.js.org/book.pdf. [Free] *NASM - The Netwide Assembler: Manual*, by Tatham et al. Link: https://www.nasm.us/doc/. **Note**: This course uses only free, open-source materials.
Prerequisites:	(CISC 1110 (Introduction to Programming Using C++) or CISC 1115 (Introduction to Programming Using Java) or (both CISC 1113 (Basic Principles of Java Programming with Science Applications I) and CISC 1114 (Basic Principles of Java Programming with Science Applications II)) or CISC 1170 (Java for Programmers) or CISC 1180 (Introduction to C++ for Programmers)) and CISC 2210 (Introduction to Discrete Structures)
Tools/Resources:	Brightspace; Access to a computer (OS doesn't matter); Adobe Acrobat Reader DC

1.1 Course Description

`(4 credits) Introduction to digital logic. Basic digital circuits. Boolean algebra and combinational logic, data representation and transfer, digital arithmetic. Instruction sets. Introduction to assembly languages: ALU and memory reference instructions, flow control, subroutine linkage, arrays and structures. Memory. I/O systems. Performance. Relationship between software and architecture.` (Taken from CUNYFirst.)

1.2 Course Objectives

By the end of this course, you will master the following skills:

- Learning of digital design, Boolean algebra, and logical gates.
- Understanding of computer representation of numbers/characters, and practice with arithmetic computer calculations.
- Familiarity with a simple computer: MARIE's architecture.
- Discussion of computer memory organization and I/O methods.
- Hands-on practice with an assembly language, and recognition of its way of control of computer hardware.
- Introduction to the CISC 3320 (Operating Systems) course.
- Independent searching and verbal expression of answers based on given sources or your opinion.

Please refer to the Required Electronic Tools and Resources section at the end of this syllabus for information about how to obtain the software required for this course (for free, of course.)

2 Grading Components

The course's grade is influenced by the following components:

Attendance	10%
Participation	15%
Homework	20%
Midterm	25%
Final	30%
Extra Credit	5%

Below is a further description of every course component and additional items that might affect your learning experience:

2.1 Attendance:

- **Attendance is mandatory (counted towards the final grade).**
- Arriving at the lecture 10 minutes after its start is equal to being absent from that lecture: If you are late for more than 10 minutes, you will be asked to provide a document that shows that you came late due to an excused reason. Without such a document, you will be considered absent from the lecture, even if you manage to arrive to the lecture before its end.

- **If you do not attend at least 1 lecture during the first 3 weeks, the Registrar will automatically withdraw you from the class, and you will lose your federal and state financial aid** if you are eligible for such, which is a situation into which nobody wants to get.
- If you do not attend sessions regularly, you will loss the ability to take the polls, which represent 15% of your grade (see Participation below,) and you will miss what we learned and will not hear important notices that I give in class.

Note that our class takes place in-person. If during the semester we move to online (at-home) learning, I'll notify you as soon as possible via a Brightspace announcement and via email and will let you know how we'll meet online.

2.2 Participation:

Participation is mandatory. During a lecture, I will create topic-based **polls** (multiple-choice questions) on the **Poll System website** https://www.sci.brooklyn.cuny.edu/~briskman/poll_system/studentaccess. When I tell you that there is a poll, you will log into this website using either your classroom computer or your phone and respond to the poll.

You are highly encouraged to view the 15-minute interactive tutorial below to learn how to log into the website, take polls, and view you poll grades: https://www.sci.brooklyn.cuny.edu/~briskman/poll_system/tutorial/.

To fulfill the 'participation' requirement, **you should respond to 40 polls throughout the semester**, but you are NOT required to choose the correct answer to get full grade. That is, **even if you mark the wrong answer choice, you will get a full grade for the poll (Yay!)**

To have a poll considered towards your grade, you should be present in class when the poll is given (this is why attendance is indirectly relevant.) If you must miss a class due to religious observance, an emergency, illness, doctor's appointment, etc., please email me at miriam.briskman@brooklyn.cuny.edu, **explaining the reason and attaching supporting documents** (screenshot of calendar, doctor's note, PCR test results, email printouts, scans, etc.) In such a case, the polls given during the lecture you miss will be counted towards the requirement as though you completed them and no points will be taken off due to absence. Without emailing and attaching proper documents, the missed polls will not be counted.

As mentioned in the Attendance section, **arriving at the lecture 10 minutes after its start is equal to missing that lecture**: If you are late for more than 10 minutes, you will be asked to provide a document that shows that you came late due to an excused reason. Without such a document, you won't receive any points from polls on that day, even if you attempt some of polls after arriving to class.

Using cell phones, laptops, or other non-vital electronic devices during lectures when there are no ongoing polls is prohibited unless you use the device for lecture-related activities (e.g., looking up the lecture slides or taking notes.) If these cases don't

apply, but you still continue using your device after I issue you a warning, all the points you have gained from polls on that day will be forfeited.

The purpose of the polls is to keep you focused on the taught topic and to prepare you for the exams, which will contain questions similar to those discussed during lectures.

2.3 Homework:

Homework is assigned regularly as part of the course. You can always submit an assignment before the due date, if you want. Homework assignments are submitted via Brightspace. Please refer to the Schedule section below for all the homework due dates. You can re-submit a homework assignment ∞-many times until the due date to get full credit, which is always at 11:59 PM EST on the due date. The last attempt will be graded.

If you submit homework after the due date, you will get partial credit of up to 50% percent of the assignment's points. The grade received for a homework is final, and you can't resubmit an assignment for a better grade. I will grade each homework manually within a week or two after the due date and post the grade on Brightspace; please log into Brightspace to view your grades, as I may not always notify you about their submission.

To learn how to view or submit homework assignments, please view the following picture-full 8-min Google Forms guide:
https://forms.gle/WTryNwnvbBmcv4SM7

In the homework assignments, you will usually respond to short answer questions; analyze, edit, or write a program or pseudo code. **Each assignment must be completed individually unless otherwise noted in the assignment itself.**

Comments that I submit while grading a homework assignment are intended to help you understand the aspects in which the assignment aced and those needing more attention. Please take your time to read the comments, which will help you in completing future assignments and exams successfully.

Note that a relatively large percentage of the course grade is given to homework. This is because practice is the most efficient way for you to deeply understand the material taught in our class. It is highly recommended to spend sufficient time for completing those assignments, for this will make your studying for the midterm and final exams much easier!

IMPORTANT: While you are working on an assignment, please press the "Save" button oftenwise. If you don't save your work frequently, a sudden electricity outage or any other incident that could turn your computer off will cause your recent, unsaved work to be erased. To make things even more convenient, you could use the **Ctrl + s** or **Cmnd + s** keyboard shortcut to save your work fast. This will prevent you from searching for the "Save" button every time you need to save your work.

IMPORTANT: When you are working on a computer outside of home (such as in a smart classroom or in the college's library,) you must save your work to either a flash drive you bring from home (what people tend to call 'USB'), Dropbox, Google Drive, or send the files to yourself via e-mail. If you don't save your work to external storage, **all** your added/created

files will be permanently deleted! Later, you could either copy the work to your computer at home or access your work again on a campus computer.

2.4 Midterm Exam and Final Exam:

- The midterm and the final will be held in-person.
- Please view the dates, times, and locations of the exams in the Schedule section below.
- At least a week before an exam, you will be given a preparation guide that will explain what topics the exam includes, how to take the exam, and what aid materials you are allowed/disallowed to use during the exam.
- I will also post sample exams and solutions to them on Brightspace.
- The final exam is NOT cumulative, and it will test you on everything that we cover *after* the midterm exam.
- Both exams will contain extra credit questions at their end. Answering an extra credit question correctly will grant you the points indicated next to that question on the exam sheet as a bonus. The extra credit points will be counted towards the grade of the exam.

2.4.1 Missing an exam or assignment due to an excused reason:

If you must miss an exam, or cannot submit an assignment on time, due to an excused reason, such as an illness, religious observance, family emergency, or having two other exams on that day, please contact me by e-mail at miriam.briskman@brooklyn.cuny.edu as early as you can to schedule a make-up date for an exam, have the due date of a homework extended, or receive full points on a missed quiz. Talking to me in class or during office hours is not enough because I must keep a written note of your request. Please provide documents confirming your situation (a note from a physician in case of an illness, screenshot of the calendar in case of a holiday, etc.) If you do not e-mail me with a reason and proper documents, there will be no other choices but to give a grade of 0 for the exam or take off points for a late assignment submission.

2.4.2 A Few Words on Cheating:

Cheating is the **illegal** act of copying from a classmate, from the internet, or from any other source to which you are not permitted to refer while working on an assignment, and submitting what you copied as your own answer, or letting someone else copy from your answers. If I notice that you cheat on any of the assignments or exams, I am required to report your misbehaving to the college, and you will receive a score of 0 for that exam or assignment. Please view the **Brooklyn College Policy on Academic Integrity** section below for more information about the college's attitude towards this crime.

2.5 Extra Credit:

As part of the Participation requirement, even those polls answered incorrectly are counted towards the participation requirement. Now, for every 8 polls that you answer correctly, **1** extra credit point will be added to your final grade! You can get up to **5** points in this extra credit opportunity alone. This could have a positive impact on your course's letter grade. [Example: If Alice answered 35 poll questions correctly out of the 40 polls to which she responded, and got a final grade of 95, she will get full 15% for the Participation requirement, and will also get 4.375 points added to her final grade, turning it into $95 + 4.375 = 99.375$.]

3 How to Succeed in This Course?

- **Come to Class.** Being present during lectures is highly correlated with doing well in class. A great deal of essential information is available only during lectures, such as information about the imminent exams or some hints on the homework assignments. Moreover, the only way to take a poll is if you are actually present in the lecture. Also, you can ask questions on what you find unclear, which will help in understanding the subject.

- **Visit Office Hours, in-person or online.** Many questions riseoutside of class, such as while studying for an exam or when preparing homework answers.Furthermore, students might want to sharpen some of the topics covered in class. Office hours are best for addressing this! Please refer to the Details section at the top of this syllabus to find the regular office hours scheduled for the semester. I will notify you when additional, non-regular office hours will be held. Likewise, I will notify you if/when particular regular office hours are canceled. There is no need to e-mail before joining an office hours session. If you wish to visit office hours but cannot make it to the regular ones, please e-mail me to schedule an appointment (either in-person or online) at a time convenient to you.

  If you wish to join an online office hours session on Zoom, log into Brightspace, click on our class's link, click on **Content** and then on **Office Hours** on the left-hand side menu. The page that opens will contain a link; click this link to access the office hours session.

  If you notice that I am late for more than 10 minutes after the office hours session began, please send me an email right away to remind me! :)

- **Do the Homework Assignments.** This will give you a great practice of the learned topics and help you prepare for the exams. Homework assignments directly reflect what we learned in class, and you are welcome to ask questions about homework during class, office hours, or by e-mail.

- **Study for Exams.** In the present, exams are the *only way* to assess how well one understands a subject (I have yet heard of super-microwave-telepathic devices that can help with this task.) Therefore, our exams are of a considerable portion of the class's grade.

Find out what is the best strategy for you to prepare for an exam. Do you like writing notes and summaries of the material? Studying in groups or talking about what you learned with friends? Re-doing some of the homework questions for practice? A combination of several strategies?

- **Keep an Eye on the Calendar and Due Dates.** One trait that many successful students have is organization and time management. Keeping notes about all the due dates for homework, days when exams are scheduled, and other important academic information could greatly assist you in planning your studies. To assist you with this task, you should regularly refer to the Important Dates and Schedule sections below.

- **Always Ask Questions!** If you feel thatsomething we discuss is confusing or unclear, or if you think a clarification could make things better, do not hesitate to ask!In fact, there is a high chance that some of your friends in class have the exact same question as yours, so you should never assume that a question is "too stupid" to ask – there are NO stupid questions!

  You can also email me at miriam.briskman@brooklyn.cuny.edu. If I do not respond to you within 24 – 48 hours, between 12 pm to 9:30 pm (Yes! I will reply to your questions on weekends whenever I can,) from the time you sent the email, you might want to re-send your e-mail since it might have reached SPAM or otherwise lost.

  When you write e-mails, please include the class's code (CISC 3310), section (MY0), and a few words on what you are writing about in the e-mail message in the **Subject** line of the e-mail. Otherwise, the e-mail will enter SPAM, and I will not be able to see it and respond to you. Please write your name in the body of the email so that I know who is writing. It might sound funny, but students forget to mention who they are while writing an email, even if they had never wrote to the recipient before! :-D

  Note that if an issue you are emailing me about is too long or difficult to answer via email, I will let you know that this is the case and will ask you to join an office hours session or make an appointment, during which I will gladly answer your question in a complete, clear, and comprehensive manner.

4 Grades

Students will receive a letter grade for the course according to the following score distribution established by CUNY:

<60	**60-62**	**63-66**	**67-69**	**70-72**	**73-76**	**77-79**	**80-82**	**83-86**	**87-89**	**90-92**	**93+**
F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A

A grade of A+ will be granted for numerical grades of 97 or higher after all extra credit points you received are applied to the grade.

5 Important Brooklyn College Policies

5.1 Center for Student Disability Services

The Center for Student Disability Services (CSDS) is committed to ensuring students with disabilities enjoy an equal opportunity to participate at Brooklyn College. In order to receive disability-related academic accommodations students must first be registered with CSDS. Students who have a documented disability or suspect they may have a disability are invited to schedule an interview by calling (718) – 951 – 5538 or emailing Josephine.Patterson@brooklyn.cuny.edu. If you have already registered with CSDS, email Josephine.Patterson@brooklyn.cuny.edu or testingcsds@brooklyn.cuny.edu to ensure the accommodation email is sent to your professor.

5.2 Nonattendance Because of Religious Beliefs

The Brooklyn College undergraduate Bulletin for the years 2024 – 2025 states:

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The New York State Education Law provides that no student shall be expelled or
refused admission to an institution of higher education because he or she is unable
to attend classes or participate in examinations or study or work requirements
on any particular day or days because of religious beliefs.  Students who are
unable to attend classes on a particular day or days because of religious beliefs
will be excused from any examination or study or work requirements.  Faculty must
make good-faith efforts to provide students absent from class because of religious
beliefs equivalent opportunities to make up the work missed; no additional fees
may be charged for this consideration.
```

Based on the description above, if you are incapable of attending a class because of religious observance, you should e-mail me at least 48 hours before that class so that proper accommodations could be made. If this is an exam day, we will schedule a make-up exam when it is convenient to you, and if an assignment is due, the due date will be extended, and I will tell you when the new due date is.

5.3 Brooklyn College Policy on Academic Integrity

The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both.

The complete text of the CUNY Academic Integrity Policy can be found at this site:

https://www.cuny.edu/about/administration/offices/legal-affairs/policies-resources/academic-integrity-policy/

If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member MUST report the violation. Students should be aware that faculty may use plagiarism detection software.

This means that if you cheat on a test or assignment, I MUST file a report which will initiate academic penalties. Additionally, the assignment in which you cheat will get an unfortunate score of 0.

5.4 Brooklyn College Bereavement Policy

Students who experience the death of a loved one should refer to:

https://www.brooklyn.edu/policies/bereavement/

5.5 Brooklyn College Library

New student? Returning to campus? Looking for materials for your class or research? Check out the plethora of resources that the Brooklyn College Library is providing to you:

https://library.brooklyn.cuny.edu/resources/

You will certainly find something useful there!

5.6 More Information: Bulletin

For more information about the policies of Brooklyn College and other essential information, please refer to the Bulletin, which you can find on the following web-page:

https://www.brooklyn.edu/registrar/bulletins/

6 Required Electronic Tools and Resources

6.1 Downloading Adobe Reader DC

For some assignments, you will submit a PDF form along with the submission. The form should be filled and signed using **Adobe Reader DC**, a free program.

Please download Adobe Reader DC to you computer through the link below:

https://www.adobe.com/acrobat/pdf-reader.html

Avoid using Adobe Fill & Sign, or a browser, to fill the form since these lack some functionalities that the form requires. A blank form will be provided along with an assignment's information.

6.2 Brightspace

You will be using **Brightspace** (https://brightspace.cuny.edu) where you will find assignments, sample exams, answers to exams, and other helpful resources such as YouTube videos or websites. You will submit your homework assignments directly on Brightspace.

If you have any trouble with your Brightspace account, please refer to the following Brooklyn College Library page, where you can find contact information for technical help on Brightspace (and other helpful resources:)

https://libguides.brooklyn.cuny.edu/accounts/brightspace

Brooklyn College created a Student User Guide on Brightspace here:

https://libguides.brooklyn.cuny.edu/brightspace/home

and City College compiled some helpful Brightspace guides here:

https://www.ccny.cuny.edu/it/brightspaceguides

Brightspace is the chosen tool for this class since all the necessary materials will be provided there, in one place. Moreover, each time you submit an assignment, Brightspace sends you an automatic e-mail notification stating that the work was successfully submitted. If you receive no such e-mail notification, something in the submission process went wrong, and you MUST resubmit your assignment. Emails, on the other hand, may not be delivered at all, unless the instructor replies to you. **So, don't submit assignments by email!**

6.3 Accessing Your Brooklyn College Student Email Address

You will regularly receive Brightspace Notifications and emails to your `bcmail` college email address. View the 3-min Google Forms guide at

https://forms.gle/4SUd4aVcht7fzoVV6

to find our how to access this `bcmail` address.

Being aware of this address will prevent skipping important college emails and notifications that are sent to you from other classes you are taking.

6.4 What If You Don't Have a Computer / Internet at Home?

See the following guide about getting free internet service and visiting and using the computers of the Computer Lab on the Brooklyn College campus that recently re-opened:

https://www.sci.brooklyn.cuny.edu/~briskman/guides/Computer_Internet_Services.pdf

7 Important Dates

August 26 (Tu): Start of Fall 2025 Term
August 27 (We): First lecture of CISC 3310, section MY0
August 30 – 31 (Sa – Su): No classes scheduled
September 01 (Mo): Labor Day: College Closed
September 01 (Mo): Registrar drops everyone waitlisted for Fall 2025 courses
September 01 (Mo): Last day to add a course
September 16 (Tu): Grade of W is assigned for officially withdrawing from a course

September 22 – 24 (Mo – We): No classes scheduled
October 01 – 02 (We – Th): No classes scheduled
October 07 – 08 (Tu – We): Holiday: **No CISC 3310, MY0 lecture!** [Our section only!]
October 13 (Mo): Columbus Day: College Closed
October 14 – 15 (Tu – We): Holiday: **No CISC 3310, MY0 lecture!** [Our section only!]
October 14 (Tu): Conversion Day: Classes follow Monday schedule
October 20 (Mo): No classes scheduled
October 24 (Fr): Conversion Day: Classes follow Monday schedule
November 06 (Th): Last day to withdraw from a course with a grade of W
November 27 – 28 (Th – Fr): Thanksgiving: No classes scheduled
November 29 – 30 (Sa – Su): Thanksgiving: No classes scheduled
December 15 (Mo): Last day of classes!
December 16 – 22 (Tu – Mo): Week of Final Examinations for the Fall 2025 Term

Please refer to the Brooklyn College Academic Calendar for the Fall 2025 semester to view other important dates not mentioned above:

https://www.brooklyn.edu/events/tag/Fall-2025-main-academic-calendar/list/?tribe_organizers%5B0%5D=8878

8 Schedule

Note that the schedule below is tentative; if changes are made, I will notify you and will post the updated syllabus/schedule on Brightspace.

All assignments, excluding the exams, are due at 11:59 PM EST, on Brightspace.

Week	Date	Topics, Exams, and Assignment Deadlines
1	08/27 (We)	**Welcome!** Syllabus Review
2	09/01 (Mo)	College Closed: **No CISC 3310, MY0 lecture!**
	09/03 (We)	Topic 1: Intro to Computer Architecture
3	09/08 (Mo)	Topic 1: Intro to Computer Architecture – Cont'
	09/10 (We)	Topic 1: Intro to Computer Architecture – Cont'
4	09/15 (Mo)	Topic 1: Intro to Computer Architecture – Cont'
	09/17 (We)	Topic 2: Data Representation
5	09/22 (Mo)	No classes scheduled: **No CISC 3310, MY0 lecture!**
	09/24 (We)	No classes scheduled: **No CISC 3310, MY0 lecture!**
6	09/29 (Mo)	Topic 2: Data Representation – Cont'
	10/01 (We)	No classes scheduled: **No CISC 3310, MY0 lecture!**

Week	Date	Topics, Exams, and Assignment Deadlines
7	10/06 (Mo)	Topic 2: Data Representation – Cont' • Homework 1 on Topic 1 due
	10/08 (We)	Holiday: **No CISC 3310, MY0 lecture!** [Our section only!] • You aren't required to cover any material on your own today.
8	10/13 (Mo)	College Closed: **No CISC 3310, MY0 lecture!**
	10/14 (Tu)	Conversion Day: We should've had a lecture today, but: Holiday: **No CISC 3310, MY0 lecture!** [Our section only!] • You aren't required to cover any material on your own today.
9	10/15 (We)	Holiday: **No CISC 3310, MY0 lecture!** [Our section only!] • You aren't required to cover any material on your own today.
10	10/20 (Mo)	No classes scheduled: **No CISC 3310, MY0 lecture!**
	10/22 (We)	Topic 2: Data Representation – Cont'
	10/24 (Fr)	Conversion Day: **We have a lecture today!** Topic 2: Data Representation – Cont'
11	10/27 (Mo)	Topic 3: Boolean Algebra & Logic Gates
	10/29 (We)	Topic 3: Boolean Algebra & Logic Gates – Cont'
12	11/03 (Mo)	Topic 3: Boolean Algebra & Logic Gates – Cont' • Homework 2 on Topic 2 due
	11/05 (We)	Topic 3: Boolean Algebra & Logic Gates – Cont'
13	11/10 (Mo)	Topic 4: Circuits
	11/12 (We)	Topic 4: Circuits – Cont'
14	11/17 (Mo)	Topic 4: Circuits – Cont' • Homework 3 on Topic 3 and 1st Half of Topic 4 due
	11/19 (We)	**Midterm Exam: 10:35 AM – 12:15 PM, at the West End Building (WEB), 1st floor, computers M123 – M189**
15	11/24 (Mo)	Topic 5: Computer Instructions
	11/26 (We)	Topic 5: Computer Instructions – Cont'
16	12/01 (Mo)	Topic 6: MARIE: Architecture Example
	12/03 (We)	Topic 7: Memory
17	12/08 (Mo)	Topic 7: Memory – Cont' • Homework 4 on Topics 5 and 6 due
	12/10 (We)	Topic 8: I/O
18	12/15 (Mo)	Topic 8: I/O – Cont' • Homework 5 on Topic 7 due
Finals	12/22 (Mo)	**Final Exam: 10:30 AM – 12:30 PM, at the West End Building (WEB), 1st floor, computers M123 – M189**

– End of CISC 3310 Syllabus –