CECS 341, COMPUTER ARCHITECTURE AND ORGANIZATION, Sp'21

Instructor: Jelena Trajkovic
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Course: CECS 201, Computer Architecture and Organization

Mode of delivery: Alternative

Term: Spring 2021

Virtual Office Hours: M and W 1:20 – 1: 50 pm	**Office Hours Zoom Link:** Office Hours Zoom
Class Days/Times: M and W 2:00 – 2:50 pm	**Class Zoom Link**: Seminar Zoom
Lab Days/Times: M and W 3:00 – 4:15 pm	**Lab Zoom Link**: Lab Zoom

Course Description:

Review of logic design. Instruction set architecture. Arithmetic logic units. Data path and control. Pipelining and performance. Memory system organization and design. Virtual memory and paging. I/O interfacing. Vector and array processing. Distributed computing and supercomputing. Contemporary computer designs.

Units:

3 units

Prerequisite:

MATH 113 or equivalent all with a grade of "C" or better.

Required or Elective Course: Required

Required Textbook:

ZyBook
1. Sign in or create an account at learn.zybooks.com
2. Enter zyBook code: CSULBCECS341TrajkovicSpring2021
3. Subscribe

Technology Requirements

- **Access:** If you need support with access to the Internet, electronic devices, or any other issue related to remote access to your course, please refer to "WiFi and Technology" subheading on the Reuniting the Beach Webpage

- **System and Software requirements:** Aside of Internet access you will need:
  - A web browser, preferably Google Chrome for BB access
  - Zoom app or web access to Zoom
  - Windows OS, although you may be able to manage with iOS
  - PDF reader
  - Word processing and presentation SW for reports that can be converted to PDF
  - Camera: The students can use **built in camera** or **cell phone** camera to share their work
  - Software for scanning and conversion to PDF (cell phone with apps for scanning and conversion are sufficient)

- **For Lab assignments:**
  - **EDAPlayground.com:** An EDA Tool Suite built into a web site. Used for the design, simulation, and analysis of digital systems relating to concepts presented in lecture. No installation necessary, just login and code.
  - **MARS MIPS simulator:** Can be downloaded from BeachBoard (Requires Java Runtime

Environment)or from http://courses.missouristate.edu/kenvollmar/mars/

ABET Student Outcomes:

The course satisfies the following ABET for Computing student outcomes:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

3. Communicate effectively in a variety of professional contexts.

5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

Course Objectives

Here please add specific objectives related to the material covered in the course:

Upon successful completion of the course, students will be able to:

1. Define computer abstractions, understand technology trends, and understand, compute, and compare performance metrics.
2. Explain concept of Instruction Set Architecture, manipulate, and read assembly code.
3. Express instructions, numbers, and data in binary form. Perform arithmetic and logic operations.
4. Design processor components: simple processor, pipeline datapath and control unit.
5. Define and detect hazards and exceptions. Implement techniques to resolve hazards.
6. Define and design memory hierarchy. Explain operation and design of cache memory.

Course Structure and Delivery Mode

This course is conducted entirely online. You will access the course material and activities on BeachBoard and ZyBooks. **All course materials** provided on BB, including, but not limited to videos, handouts, worksheets are **copyrighted**. They have been compiled from a copyrighted source or originally developed by the course instructor and the team, and therefore property of the CSULB. It is forbidden to post, share, or make the materials available to anyone outside this class. You are **required** to participate in synchronous class meetings via Zoom, where you will be asked to participate in class discussion by **collaboratively solving problems** and **showing your work**. Please note you need to do **all** quizzes, homework and lab assignments, as well as exams **individually.**

If you need technical assistance at any time during the course or need to report a problem with BeachBoard, please contact the Technology Help Desk using their online form, by phone at (562) 985-4959.

Course Communication

We will use BeachBoard to **make announcements (using News widget),** communicate information, post assignments and corresponding due dates, and discuss course-related topics. **Please note, it is your responsibility to check** BeachBoard's dashboard **regularly,** as it will contain **important information**

about upcoming class assignments, activities, or concerns.

We will, also, use the **course book** on ZyBooks platform, where all **homework assignments and due dates** will be posted. I'll do my best to announce homework assignments on BeachBoard as well, but it is ultimately your responsibility to check **both platforms** and note due dates on either of those.

Tentative Course Schedule

Weekly schedule is posted on the BeachBoard

- Weeks 1-7: Computer Abstractions and Technology. Instructions: Language of the Computer.
- Week 8: Review and Midterm (tentative 3/11)
- Weeks 9-15: The Processor. Large and Fast: Exploiting Memory Hierarchy. Review.
- Extra Credit: Arithmetic for Computers.
- Final Exam

Course Policies

Grading Policy

Distribution of letter grades will be done using a grading curve. Please make yourself familiar with this method and understand that grade assignment is at the instructor's discretion. Also, you must return the FPGA board to get your grade submitted.

Evaluation Components and their Percentages

Evaluation Components	Weight
Laboratory*	33%
Homework Assignments	22%
Midterm Exam	15%
Final Exam	30%
Total	100%
Attendance: 3 unexcused absences	-5%

Evaluation Components

Laboratory

There are total of 11 lab assignments: 3 in MARS and 8 in EDAPlayground. Assignments and the due dates will be posted on the course web site on BeachBoard (you may also refer to weekly schedule posted on the BeachBoard). For each lab you need to upload your files to BeachBoard/DropBox before the due date/time. You need to submit (see details in each lab assignment file):

1. Lab report: please see BeachBoard for the "LabReportTemplate"
2. Required lab files, as specified in each lab assignment

Lab assignment will need to be demonstrated to the lab instructor during the lab session on the specified due date. Lab time will be used to solve problems, prep for the new lab assignment, and take demos: please

note that you **will need to dedicate additional time outside lab hours** to develop the solutions for your labs and test them out. Lab experiments should be performed, and the reports should be written **individually**. Each lab report needs to include the following sentence: "*I certify that this submission is my original work*" and your signature.

Lab Grading: The lab assignments will be graded based on submission of all required files, content of the lab report, lab demo that may include questions about theoretical concept that the lab covers, modeling (for Verilog labs), simulation, implementation, and testing skills. Late submission will give you 0 credit on all aspects. A lab assignment needs to be demoed during the **assigned time** slot within 1.5 weeks of the due date. For example, if the lab is due on 02/01, you can demo on 02/01, 02/03 and 02/08.

* To be able to pass the course a student needs to secure at least 50% of the total lab grade, i.e. 16.5% out of 30% for the lab.

Homework Assignments

There will be (14 + one extra credit) **weekly** homework assignments and 1 recommended (not graded) homework assignment. Assignments and the due dates are posted on **ZyBook** and listed in the weekly schedule posted on the BechBoard. The purpose of the homework is not only to earn you some credit, but also to help you keep up with the course work. The Homework assignments will consist of problems from ZyBook, and the students will solve them online, and get instantaneous feedback. Assignments need to be done **individually**. Submitting the assignment in ZyBook will be equivalent to signing the following sentence: "I certify that this submission is my original work"!

Homework Grading: The homework assignments will be automatically graded by ZyBooks.

Midterm and Final Exam

There will be one midterm and one final exam. The questions may be a mix of Multiple-Choice Questions in the form of a quiz and Free Response Questions (FRQ). FRQ will need to be submitted to the Gradescope within BB before the posted deadline for each exam. The **instructions** for FRQ will be posted on BB; make sure to **follow** them to ensure **full credit**. The exams are **online synchronous** exams: they will be administered during the class time, and students are expected to take it during that time. Students are expected to log onto Zoom during the exam, so that the instructor can answer the questions and communicate any announcements in timely manner. There will be **no make-up midterm exam**. Students that are absent from a midterm exam for any reasons will receive 0% for their midterm grade and will write the final exam for 45% of their total grade, if a midterm is missed.

Exam Grading: Quiz graded automatically by BB. For FRQ, please **show all the steps** in your solution, as merely writing the answer will not get you full credit. You **can** also get **partial** credit for the FRQ problems.

Late work/Make-up policy

There will be **no credit** for late submission of your HW assignment or Lab report/files. Providing there is sufficient time, you might be able to get *feedback* for your late Lab demo. Exception will be made for the extraordinary circumstances with appropriate proof. In case of **foreseeable** events, such as personal, community, religious events, or appointments made ahead of time, the instructor will be happy to arrange for submission and demo **before** the due date.

How to Contact the Instructor:

Questions

In an online course it is normal to have many questions about things that relate to the course, such as clarification about assignments, course materials, or assessments. If your questions are general, please post these in the QUESTION FORUM. If the question is specific to Topic X, please post them in the DISCUSSION FORUM for Topic X. This is an open forum, and you are encouraged to reply to the questions and help each other – this is a great way to create community and learn from each other. Peer mentoring is a much-needed transferable skill that any employer appreciates.

If a question is regarding individual circumstances or needs to include your student ID, please email it directly to me.

E-mail

The announcements will be posted on News Widget in BeachBoard. The course BB page is set to send everyone an email when a News item is posted. Please check News on BB and your email regularly.

Please feel free to email your questions directly to me (Jelena.Trajkovic@csulb.edu) or by using the email feature of BeachBoard. Expect to receive the response within the 24- 48h (excluding weekends or holidays) in "First In First Served" (FIFS) order. Make sure to send your emails in a timely manner. If you email **just** before the assignment due date or exam, I may not be able to respond before the due date.

Make sure to include **in your email**:

- **"CECS 341"** in the **subject**!
- Your name and section (if applicable).
- If you do not receive my reply (or an announcement to all replying to your question) within 48h, please re-send, as I might have not received it.

Online café: Slack

In case the students are interested, we will create an Online Café on Slack.
This will be an unofficial communication channel with a goal for the students to create community and facilitate exchange of ideas. The instructor will be moderator: you can assume a name that is respectful and in general follow Netiquette rules, both for naming and for communication. You are NOT allowed to use this (or any other) form of communication during the exams.

Virtual Office Hours

Please join Virtual office hours (date and link provided on page1) or send email to the instructor for the appointment.

Plagiarism/Academic Integrity Policy

There is **zero tolerance** for cheating, plagiarism, or any other act of violation of Academic Integrity policy. Work that you submit is assumed to be original unless your source material is documented appropriately, using proper citation. Using the ideas or words of another person, even a peer, or a web site, as if it were your own, is plagiarism. Any individual or group caught cheating on homework, lab assignments, or any exam/quiz will be subjected to full extent of academic actions allowed under University regulations. At a minimum, any student caught violating Academic Integrity Policy will be reported to the University and receive no credit for the work concerned and one grade lower letter grade. To learn more about the University policy on Cheating and Plagiarism, visit: Academic Information and Regulations-Cheating and Plagiarism

University Withdrawal Policy

Class withdrawals during the final 3 weeks of instruction are not permitted except for a very serious and compelling reason such as accident or serious injury that is clearly beyond the student's control and the assignment of an Incomplete grade is inappropriate (see Grades). Application for withdrawal from CSULB or from a class must be filed by the student online whether the student has ever attended the class or not; otherwise, the student will receive a grade of "WU" (unauthorized withdrawal) in the course. More information regarding the University guidelines on Dropping and Withdrawing at:
Dropping and Withdrawal

Attendance and Participation Policy

Attendance (joining the online class) and Participation (being alert and available to answer questions) are essential to your success in this class. In distance education courses you are required to attend and participate just as if you were in a face-to-face course. Therefore, **attendance** will be taken randomly (based on participation in the Zoom meetings), and the **participation** will be checked randomly during class, lab, or both (based on Q&A or pools during lecture/lab time). Please use your full name (as in the class roster) and your CSULB email address to log into Zoom session. Set up a profile picture and consider showing your face during class discussion.
Three or more unexcused absences will cause -5% of the total grade.

Policy on Camera Use

The use of cameras during exams is not mandatory in this class. Declining to use the camera during the exam will not affect your grade in this class.

This course requires use of cameras only for the purpose of sharing your work during the seminar, and to assess class participation, if necessary. Please note that instructions given during the seminar or lab will be recorded and uploaded on BB: turn off your camera if you do not want your face to be visible in the recording. You will be requested to share your work (screen share, share a picture or use cell phone as a "document camera"), but you are not required to show your face. Webcam, built-in camera, or cell phone camera will work well for this purpose. If you have a computer camera and you choose to use ZOOM, but do not feel comfortable with your background, you can (1) use a Zoom virtual background, (2) find a blank wall, or (3) put up a sheet behind you.

Grading: While students' name and ID might have to be provided by the presenter of the video for the instructor to be able to assign a grade, no other personal information or recording of faces will be required. The instructor may save the video if the video contains material that will be used to assess the grade. Videos will be considered confidential material and will not be distributed.

Netiquette

You are training to be a professional. Consequently, we expect you to behave like a professional. A professional engineer is polite, considerate, and respectful of others. When posting on the discussion boards and chat rooms it is important to understand how to interact with one another online, ***netiquette.*** Please read more about the rules of netiquette.

Student Grievance Policy

Please check CSULB grievance policy and procedure at: Student Grievance Procedures

Special Needs Accommodations

Online courses are required to meet ADA accessibility guidelines. Students with a disability or medical

restriction who are requesting a classroom accommodation should contact the Bob Murphy Access Center (BMAC) and also notify the instructor. BMAC personnel will work with the student to identify a reasonable accommodation in partnership with appropriate academic offices and medical providers. Only approved BMAC petitions will be accommodated.

Any student who is facing academic or personal challenges due to difficulty in affording groceries/food and/or lacking a safe and stable living environment is urged to contact the CSULB Student Emergency Intervention & Wellness Program. Additional resources are available via Basic Needs Program. The students can also email supportingstudents@csulb.edu, call (562)985-2038, or if comfortable, reach out to the instructors as they may be able to identify additional resources. For mental health assistance please check out CSULB Counseling and Psychological Services (CAPS).

http://web.csulb.edu/divisions/students/caps/

Student Feedback about the Course

Student Feedback is highly encouraged. Please feel free to contact the instructor to share any concern or opinion about the course throughout the semester and participate in the **anonymous survey** (via BeachBoard). Early Feedback will provide the instructor the opportunity to address your concern and implement required modifications in a timely manner.

Tutoring

Take advantage of free peer tutoring (virtual) provided by Engineering Student Success Center (ESSC): Engineering Tutoring

Personal Assistance

Any student who is facing academic or personal challenges due to difficulty in affording groceries/food and/or lacking a safe and stable living environment is urged to contact the CSULB Student Emergency Intervention & Wellness Program. Additional resources are available via Basic Needs Program. The students can also email supportingstudents@csulb.edu, call (562)985-2038, or if comfortable, reach out to the instructors as they may be able to identify additional resources.

Additional University Resources for Students

There are many services on campus to help you achieve success in your courses. Links to the following services are also available in BeachBoard course homepage under "CSULB Student Resources":

- Counseling and Phychological (CAPS)
- Disabled Student Services
- Enrollment Services
- Financial Aid
- Learning Assistance Center
- Student Health Services
- Tutoring at CSULB
- University Library
- Writers Resource Lab

Disclaimer

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.