Stony Brook University

Syllabus

1. Course Staff and Office Hours

Instructor: Sangjin Hong
Sangjin.hong@stonybrook.edu
Light Engineering Building 201

Office Hours: Tuesday and Thursday, 10:00am to 12:00pm

Instruction Location: Tuesday and Thursday 1:15pm to 2:35pm
E4310 Library

Instruction Delivery: The lecture materials will be available on Blackboard immediately following the lectures.

TAs: TBD

Please check Blackboard for most up-to-date information.

2. Course Description

This course covers various aspects of architectures in digital signal processing and multimedia data processing. The topics include iteration bound analysis, retiming the circuits, unfolding and folding the architectures, algorithmic and numerical strength reduction for low power and low complexity design, introduction to array processor architectures and CORDIC implementation. **Spring.**

Prerequisites: ESE 305, ESE 280

Credits: 3

3. Textbook

"VLSI Digital Signal Processing Systems: Design and Implementation," K. K. Parhi. Wiley and Sons, 1999.

4. Course Learning Objectives

Upon completion of the course, students will have

- ability to apply knowledge of mathematics, science and engineering;
- an ability to identify, formulate, and solve engineering problems;
- an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

5. Student Learning Outcomes

	Student Outcomes	% contribution
1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	3
2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	2
3	an ability to communicate effectively with a range of audiences.	
4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	1
6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.	1
7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	

3 – Strongly Supported, 2 – Supported, 1 – Minimally Supported

6. Topics Covered

Week 1	Course Overview Dataflow Representation of Algorithm
Week 2	Pipelining and Parallel Processing Iteration Bound Analysis
Week 3	Iteration Bound Computation Retiming
Week 4	Retiming Algorithm
Week 5	Unfolding
Week 6	Folding
Week 7	CSD Representation
Week 8	Numerical Strength Reduction

Week 9	1-D Systolic Array
Week 10	2-D Systolic Array
Week 11	Fundamental Operations
Week 12	Elementary Functions
Week 13	Scaling and Round-off
Week 14	Reconfigurable Architecture for DSP

7. Assignments

7.1. Homework Assignments

Homework Assignments will be issued roughly weekly. A full schedule is available on Blackboard. (This schedule will be updated as needed.) All assignments will be due at the *beginning* of class on the assigned day. Please see the Late Homework Policy, below.

All homework assignments must be turned in on paper. Writing or typing your solutions electronically is great, but you must print them out and submit the paper copy.

7.2. Collaboration Policy

Homework assignments are to be completed individually.

8. Grading

Your grade will be based on labs, homework assignments, two midterm examinations, and one final examination.

Homework Assignments	20%
Projects	20%
Midterms	60%

9. Academic Honesty

Any academic dishonesty on a written homework will result in a zero grade for the assignment for all parties involved.

All exam work must be entirely your own with no collaboration or outside materials/information. Any academic dishonesty on the midterm exams or the final exam will result in failing the course. The case will be submitted to the College of Engineering's Committee on Academic Standing and Appeals.

10. Electronic Communication Statement

Email and especially email sent via Blackboard (http://blackboard.stonybrook.edu) is one of the ways the faculty officially communicates with you for this course. It is your responsibility to make sure that you read your email in your official University email account. For most students that is Google Apps for Education (http://www.stonybrook.edu/mycloud), but you may verify your official Electronic Post Office (EPO) address at http://it.stonybrook.edu/help/kb/checking-or-changing-your-mail-forwarding-address-in-the-epo.

If you choose to forward your official University email to another off-campus account, faculty are not responsible for any undeliverable messages to your alternative personal accounts. You can set up Google Mail forwarding using these DoIT-provided instructions found at http://it.stonybrook.edu/help/kb/setting-up-mail-forwarding-in-google-mail.

If you need technical assistance, please contact Client Support at (631) 632-9800 or supportteam@stonybrook.edu.

11. Student Accessibility Support Statement

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, 128 ECC Building, (631) 632-6748, or at sasc@Stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

12. Academic Integrity Statement

Each student must pursue their academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

13. Critical Incident Management Statement

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.