

Everybody has felt stressed at one point in their lives. It can be due to an impending deadline, or an unexpected event causing stress. However, it is not always a straightforward process to determine if a person is stressed and what may be causing it. This is the problem that this project is aiming to solve.

The objective of this project is to create a device capable of detecting stress in its user, as a team we decided that the best way to achieve this was by monitoring a person's vitals via various sensors. The wearable stress detection device will have 4 primary methods of determining if the user feels stressed: galvanic skin response, heart rate, temperature, and a switch. The switch can be flipped by the user if they feel stressed. All the sensors will be connected to a microcontroller housed in an enclosure the size of a person's wrist. The data collected by the microcontroller is then sent to a website, where the information is graphed and can be exported as a CSV. Currently, we are still working on improving the accuracy of our sensors. They have been fairly close to the true values that we have but they are still fairly off. A revision that we are looking at is creating a different galvanic skin response sensor, as ours has been fairly inaccurate and unreliable.

This project had three main phases, which corresponded to the different terms of ECE 44x. First, the team was focused on setting scope and determining how the requirements we set were going to be met. The next phase was on creating the necessary hardware/software for the project. Lastly, the team is focused on preparing for presenting our finished project via documentation and the engineering expo.

Some key lessons that we learned were that the sensors are highly sensitive, creating a lot of room for error. More research is going to be needed in order to add filters to reduce the amount of introduced noise. We also learned that it is difficult to fit a lot of pre-made modules into such a small amount of space, having a more robust PCB design that incorporates a lot of our sensors would have helped in optimizing the space. Lastly, we learned how important it is to have alternative parts and to order ahead of time. We had many key components that had either been delayed or out of stock, causing us to scramble.

44X GANTT CHART

PROJECT TITLE					Stress Device Project		
RED = On Path					Green = complete		
					44X Design (Fall)	44X Build (Winter)	44X Present (Spring)
WBS NUMBER	TASK TITLE	TASK OWNER	START DATE	DUE DATE			
1 Research and Design							
1.1.1	Block Diagram						
	1.1 Initial Layout	Everyone		10/22/21			
	Block Diagram Revisions	Everyone	10/24/21	10/29/21			
1.2.1	1.2 Research	Everyone	10/31/21	11/5/21			
	Pcb Size and Microcontroller	Hamad A	11/7/21	11/11/21			
1.2.2	Power source(expected output, size design)	Arthur K	11/11/21	11/18/21			
	Measuring Electrical Consumption	Kris H	11/14/21	11/18/21			
1.2.3	Heart sensor	Kris H	11/21/21	11/25/21			
1.2.4	Heart sensor	Kris H	11/21/21	11/25/21			
1.2.5	GSR sensor	Jimmy P	11/28/21	12/2/21			
1.2.6	Temperature Sensor	Hamad A	12/2/21	12/2/21			
1.2.7	Final circuit diagram	Jimmy P	12/5/21	12/9/21			
1.2.8	Simulations	Kris H	12/12/21	12/16/21			
1.2.9	Bill of Materials	Arthur K	12/19/21	12/23/21			
1.3	TBD						
1.4	TBD						
2 Project Management							
2.1	Scope and Goal Setting	Arthur K					
	Group						
2.2	Meetings	Arthur K					
2.3	Communication Plan	Arthur K					
3 System Integration							
3.1	Ordering Parts	Everyone					
	Order Testing(Arduino)						
3.2.1	3.2 Code temp sensor	Everyone		12/23/21			
	Assemble/test Temperature sensor	Jimmy P	12/26/21	12/31/21			
3.2.2	Code heart sensor	Jimmy P	1/1/22	1/6/22			
3.2.3	Code heart sensor	Everyone	1/6/22	1/6/22			
3.2.4	Assemble/test heart sensor	Hamad A	1/9/22	1/13/22			
	Code GRS sensor	Everyone	1/16/22	1/20/22			
3.3	Assemble/test GRS sensor	Arthur K	1/23/22	1/27/22			
4 Project Presentation							
4.1	Project Objectives	Everyone	3/1/22	4/9/22			
	Video Recording	Kris H or Arthur K					
4.2	/Editing		3/1/22	4/9/22			
4.3	Quality Deliverables	Everyone	3/1/22	4/9/22			
4.4	Project Performance	Everyone	3/1/22	4/9/22			