

University of Idaho

College of Engineering



MASSPOINT SNAPSHOT

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PROJECT REQUIREMENTS

Create a device which:

- Calculates the center of gravity for complex objects in 3 dimensions
- Can measure objects approximately 20" cube down to the size of a cellphone
- Is completely automatic after the sample is inserted
- Displays a result within 3 seconds of measurement concluding
- Has an accuracy within 1% or 0.1 inches
- Hold a static load of 50 pounds
- Operate 1 year without maintenance
- Operate from a standard 120VAC outlet

PROJECT SCHEDULE

	Phase 1 Planning		a	8-Sep-20	13-Oct-20	36				Phase 3 System Level Design		5-Dec-20	5-Feb-21	63	
1	Team Contract	TEAM		8-Sep-20	10-Sep-20	3	9-Sep-20	•	38	Design Expo Registration		27-Jan-21	28-Jan-21	2	
2	Past Project Review	TEAM	-	9-Sep-20	15-Sep-20	7	15-Sep-20	-	39	Uncertainty analysis load cells		13-Jan-21	19-Jan-21	7	
3	Budget Draft	KS	MJ	11-Sep-20	17-Sep-20	7	16-Sep-20	16-Sep-20	40	Final sensor selection		19-Jan-21	20-Jan-21	2	
4	Client Visit & Interview	JC	-	11-Sep-20	22-Sep-20	12	16-Sep-20	-	41	Order load cells (8 wk lead)		21-Jan-21	21-Jan-21	1	
5	Product Requirements	PB	CE	16-Sep-20	24-Sep-20	9	16-Sep-20	16-Sep-20	42	Uncertainty analysis angle sensor		19-Jan-21	5-Feb-21	18	
6	Project Schedule	JC	MJ	22-Sep-20	6-Oct-20	15	6-Oct-20		43	Automate code		13-Jan-21	5-Feb-21	24	
7	Logbook	IND	-	7-Oct-20	8-Oct-20	2	8-Oct-20	-	44					-	
8	Portfolio	-	-	6-Oct-20	8-Oct-20	3	8-Oct-20			Phase 4 Detail Design		16-Jan-21	6-Mar-21	50	
9	Measurement Device options	KS	CE	17-Sep-20	22-Sep-20	6	22-Sep-20	22-Sep-20	45	Engineering Release Review		19-Feb-21	21-Feb-21	3	
10	CG measurement Research	IND	-	17-Sep-20	22-Sep-20	6	22-Sep-20	-	46	Logbook	IND	20-Feb-21	21-Feb-21	2	4
11	Design Suite table	PB	CE	22-Sep-20	24-Sep-20	3	22-Sep-20	22-Sep-20	47	Team Member Citizenship	IND	25-Feb-21	26-Feb-21	2	
12	Get old team prototype	CE	JC	24-Sep-20	29-Sep-20	6	28-Sep-20	29-Sep-20	48	Load cell connection design		16-Jan-21	5-Feb-21	21	
13	Measurement of CG (Tension)	KS	CE JC	23-Sep-20	5-Oct-20	13			49	Material Selection (1)		16-Jan-21	25-Jan-21	10	0
14	Measurement of CG (Compression)	MJ	PB JC	23-Sep-20	5-Oct-20	13	7-Oct-20	7-Oct-20	50	Material Selection (2)		16-Jan-21	25-Jan-21	10	
15	Recalculate Z cg equation	MJ		6-Oct-20	8-Oct-20	3	8-Oct-20		51	Material Selection (3)		25-Jan-21	5-Feb-21	12	
16	Matlab code plotting error	JC		6-Oct-20	8-Oct-20	3	7-Oct-20		52	Bearing selection (1)		16-Jan-21	21-Jan-21	6	1 T
17	Small cube measurements	PB		6-Oct-20	8-Oct-20	3	8-Oct-20		53	Fasterner Selection (1)		17-Jan-21	23-Jan-21	7	
18	Prototype brainstorm/review			6-Oct-20	13-Oct-20	8			54	Motor/Actuator selection		13-Jan-21	20-Jan-21	8	
19	Prototype Selection			8-Oct-20	13-Oct-20	6			55	Order Materials (~2 week lead)		25-Jan-21	25-Jan-21	1	
20	Snapshot Presentation			7-Oct-20	9-Oct-20	3			56	Assemble Prototype		11-Feb-21	1-Mar-21	19	10
21	Presentation Practice			9-Oct-20	12-Oct-20	4			57	Machine Part (1)		8-Feb-21	15-Feb-21	8	
22	Snapshot 1	TEAM		13-Oct-20	13-Oct-20	1			58	Machine Part (2)		8-Feb-21	15-Feb-21	8	11
	Phase 2 Concept Development			14-Oct-20	11-Dec-20	59			59	Machine Part (3)		15-Feb-21	22-Feb-21	8	
23	Design Validation Plan			14-Oct-20	22-Oct-20	9			60	Install sensors		15-Feb-21	20-Feb-21	6	rin
24	Value Proposition			22-Oct-20	29-Oct-20	8			61	Snapshot Presentation		1-Mar-21	5-Mar-21	5	
25	Wikipage Draft			27-Oct-20	5-Nov-20	10			62	Snapshot 3		6-Mar-21	6-Mar-21	1	
26	Logbook	IND		11-Nov-20	12-Nov-20	2				Phase 5 Testing/Refinement		7-Mar-21	8-May-21	63	
27	Portfolio			10-Nov-20	12-Nov-20	3			63	Portfolio & Wikipage		8-Mar-21	10-Mar-21	3	
28	Concept Design Review			12-Nov-20	13-Nov-20	2			64	Logbook	IND	16-Apr-21	17-Apr-21	2	
29	Assemble previous prototype			14-Oct-20	28-Oct-20	15			65	Fix bugs from snapshot		7-Mar-21	14-Mar-21	8	
30	Design solidworks			20-Oct-20	3-Nov-20	15			66	Reliability Testing		7-Mar-21	12-Mar-21	6	
31	Build new design			27-Oct-20	20-Nov-20	25			67	dMFEA analysis		7-Mar-21	14-Mar-21	8	
32	Lifting Mechanism design			31-Oct-20	8-Nov-20	9			68	Implement dMFEA		14-Mar-21	5-Apr-21	23	
33	Update control code			18-Oct-20	3-Nov-20	17			69	Nice Finish (SEL shop ~2 wk lead)		5-Apr-21	15-Apr-21	11	
34	Arduino and sensors circuit			25-Oct-20	10-Nov-20	17			70	Reassamble		16-Apr-21	23-Apr-21	8	
35	Snapshot Presentation			30-Nov-20	3-Dec-20	4			71	Expo scramble		23-Apr-21	1-May-21	9	
36	Snapshot 2			4-Dec-20	4-Dec-20	1			72	Technical Presentation		15-Apr-21	1-May-21	17	
37	Logbook & Portfolio/Wiki			9-Dec-20	11-Dec-20	3			73	Display Poster		15-Apr-21	1-May-21	17	
									74	Design Expo		1-May-21	1-May-21	1	
									75	Final Course Deliverables		1-May-21	8-May-21	8	

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BUDGET

Total: \$2,500

Remaining : \$2,439.21

Purchases so far:

- 3 Kitchen Scales for \$32.97
- 3 Luggage Scales for \$17.82

MASSPOINT Project B	udget 20	20-21										
Project:	SEL - Mass	Property N	leasureme	nt Device								
Last Updated	10/12/20	0					<u> </u>					
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Expense Items	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Tot	tal		
Equipment/Tools:												
Arduino		\$ 25							5	25		
Fasteners					\$ 10							
Adhesive					S 10							
Kitchen Scales	\$ 32.97											
Spring Scales	\$ 17.82											
Travel:	10 C											
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	1											
Supplies / Parts / Services:	1								1			
Force Sensors	1	\$ 95							\$			
Amplifiers	i.		S 70						S	70		
DC Converter	1	S 10							5	10		
Aluminum	1			\$ 50					S	50		
3D Print	1	\$ 5		5 5		\$ 5			S	15		
Laser Cut	1	-	S 10		S 10		S 10		S	30		
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								Totals	5	210	\$ 2,500	\$ 2,290
											Budget	Excess
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COMPLETED WORK

TITLE Cob Calculations	PROJECT	BOOK PAGE
Communed from Mage 30 5	reptember 2020	
	P. 5	
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*	2 Fa : (F1+F2) + F3 - W= 0	
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F. F. F2	N/co.	
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- Derived CG equations for X, Y, and Z axis
- Built two different rough prototypes, tension and compression

TWO DESIGNS



Compression Method

Positives

Negatives

Stable

 Ambiguity with Force Direction

Single Item Structure







QUESTIONS



ISSUES

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