ID	Activity	Description	Deliverables/ Checkpoints	Duration (days)	People	Resources	Predecessors
1	**Create Solidworks Model**	Create a computer model the is accurate to the real world prototype	A working, accurate 3D computer model, by the end of SD1	**31**	Casey, Andrew	SolidWorks Software Package	
1.1	**Compile list of specifications**	Get specification from the customers and past senior design teams so that the design can be integrated.		**1**	Casey, Andrew		
1.2	**Concept Development**	Ideas for solving design challenges, included air muscle size, motion imitation and scalability		**10**	Casey, Andrew		1.1
1.3	**Initial Designs**	Sketches and drawings of the parts	Design must meet the customer needs and be approved by the customer.	**8**	Casey, Andrew		1.2
1.3.1	*Find Air muscle components*	Use knowledge gained in past groups		*1*	Casey, Andrew		
1.3.2	*Find parts already available*	Need the CAD drawings of parts not going to be made.		*2*	Casey, Andrew		
1.3.3	*Sketches of developed concepts implemented*			*5*			
1.4	**Solid Works Model**	A CAD model of all the parts for the prototype, included past generation designs, that is exactly accurate to the real prototype to model the motion and control systems.		**8**	Casey, Andrew		1.3
1.4.1	*Make each part*			*3*	Casey, Andrew		
1.4.2	*Create part assemblies*			*3*	Casey, Andrew		
1.4.3	*Import other teams parts into overall model*			*2*	Casey, Andrew		
1.5	**High Fidelity Model**	The computer model must have the same material properties as the real prototype so that the mechanics can be test in the computer.	Final model must demonstrate the same characteristics as if it were made by real materials, including failure.	**4**	Casey, Andrew		1.4
1.5.1	*Add material properties to the model*			*2*	Casey, Andrew		
1.5.2	*Add boundary conditions to the model*			*2*	Casey, Andrew		
2	**Build Arm Prototype**	A simple prototype that demonstrates the designs for wrist, forearm and elbow motion.	A built, but untested, version of the arm by 3 weeks before Imagine RIT.	**30**		Money for parts and materials, machine shop time	1
2.1	**Purchase Parts**			**1**	Casey		2
2.2	**Purchase Materials**			**1**	Casey		
2.3	**Machine Parts**			**15**	Casey, Andrew		2.2
2.4	**Assemble and Test Mechanical Parts**			**8**	Casey, Andrew		2.3
2.4.1	*Assemble joints and test degrees of freedom*			*3*			
2.4.2	*Assemble, separately, the air muscles*	The air muscles should be tested and have the characteristics understood.		*3*			
2.4.3	*Assemble all mechanical parts*			*2*			2.4.1, 2.4.2
2.5	**Integrate and Test Circuitry**			**5**	Team		2.4
3	**Create Control Systems**		Develop a fully-functional control system for Solidworks model	**34**	Arthur	LabVIEW Software Package	
3.1	**Develop possible solutions to Control Systems needs**	Brainstorm solutions for viable control system	Design must accurately control arm movement	**12**	Arthur		
3.1.1	*Concept development*	Generate potentially feasible control systems		8	Arthur		
3.1.2	*Reference Controls professor for help*	Meet with professor to discuss developed control systems		2	Arthur	Dr. E.E. Brown	
3.1.3	*Potentially implement parts of previous generation's controls*	Reference previously developed control system for ideas		2	Arthur	Second Generation's LabVIEW files	
3.2	**Familiarization with LabVIEW**	New program to user, needs introduction	LabVIEW samples will be fully understood	**6**	Arthur		
3.2.1	*Receive Tutorial from Colleague (Also member of second generation project)*	Meet with colleague for a preliminary introduction to program		3	Arthur	Thomas Keane	
3.2.2	*Implement Sample Files*	LabVIEW come with samples, will use those to develop understanding of the software		3	Arthur		
3.3	**Develop LabVIEW Model using Derived Control System**	Designed control systems will be made in LabVIEW	Initial design will be developed	**12**	Arthur		3.1, 3.2
3.4	**Debug developed designs using LabVIEW**	LabVIEW model will be tested and modified	Final design choice will be debugged via LabVIEW	**4**	Arthur		3.3
4	**Interface Solidworks with LabVIEW**	Use LabVIEW's normal control system, but output to a Solidworks model instead of the physical hardware.	Have the Solidworks model interface working exactly like the real works model my Imagine RIT.	**15**		LabVIEW, interface package	1, 2
4.1	**Learn to use Mechatronics Toolkit**			**2**	Team		
4.2	**Basic Implementation of Toolkit**			**5**	Team		
4.3	**Implement Toolkit for Wrist/Forearm/Elbow**			**4**	Team		3
4.4	**Implement Toolkit for Entire Arm**			**4**	Team		
5	**Test and Debug Prototype**	Time given to deal with challenges not seen in the design phase.	A working prototype by Imagine RIT Festival	**13**			1, 2, 3
5.1	**Test Basic Functions**	Test that arm can move		**10**	Team		
5.1.1	*Test Wrist Motion*			*3.3*			
5.1.2	*Test Forearm Motion*			*3.3*			
5.1.3	*Test Elbow Motion*			*3.3*			
5.2	**Test Accuracy to Human Motion**	Test the arm movement is accurate		**3**	Team		5.1