

# Training L1

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Leadership Through Project Management

# Objectives

Understand:

- ❑ Understand project management language
- ❑ Understand project management process
- ❑ Understand Team 2228 leadership skills

# Most Important Question?

What is the PLAN?

# Project Management Demon - Time

“The difference between a dream and a goal is a deadline”  
attributed to Napoleon Hill

# Why is Project Management Important

## Successful projects:

- Provide high quality results
- Have well-motivated teams
- Projects are done on time

## Poorly Planned Projects:

- Tasks are not done on time
- Confusion on what has to be done
- Deadlines are missed
  - Sub-teams are frustrated and feel unsuccessful.

**The bottom line: A well planned project minimizes frustration, surprises, and extra work**

# Project Management - Definitions

## Project:

"A project is a **sequence of unique and connected tasks** which together lead to one end deliverable which must be **completed according to requirements, within budget and to time**"

(<http://www.my-project-management-expert.com/what-is-a-project.html>)

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# Project Management - Definitions

## Milestones:

- ❑ Milestones are **important checkpoints** or interim goals for a project
- ❑ Use **noun-verb form**; e.g. prototype completed

## Tasks

- ❑ Tasks are **action activities** to meet milestones
- ❑ Use **verb-noun form**; e.g. "create drawings" or "build prototype"
- ❑ Each task has a time duration

## Work Break down Structure(WBS)

- ❑ The **WBS** is a really big "to-do" list that **defines milestones and tasks** required to complete the project.

# Project Management Process Steps

## 1. (Define) the project

- ❑ Define project objectives, constraints

## 2. (Plan) the project

- ❑ Define Major steps (milestones) to accomplish project
- ❑ Develop tasks (work break down structure) within milestones
- ❑ Estimate time to complete tasks
- ❑ Determine resources: material, assign team members

## 3. Execute(Do)-Control(Verify) the project

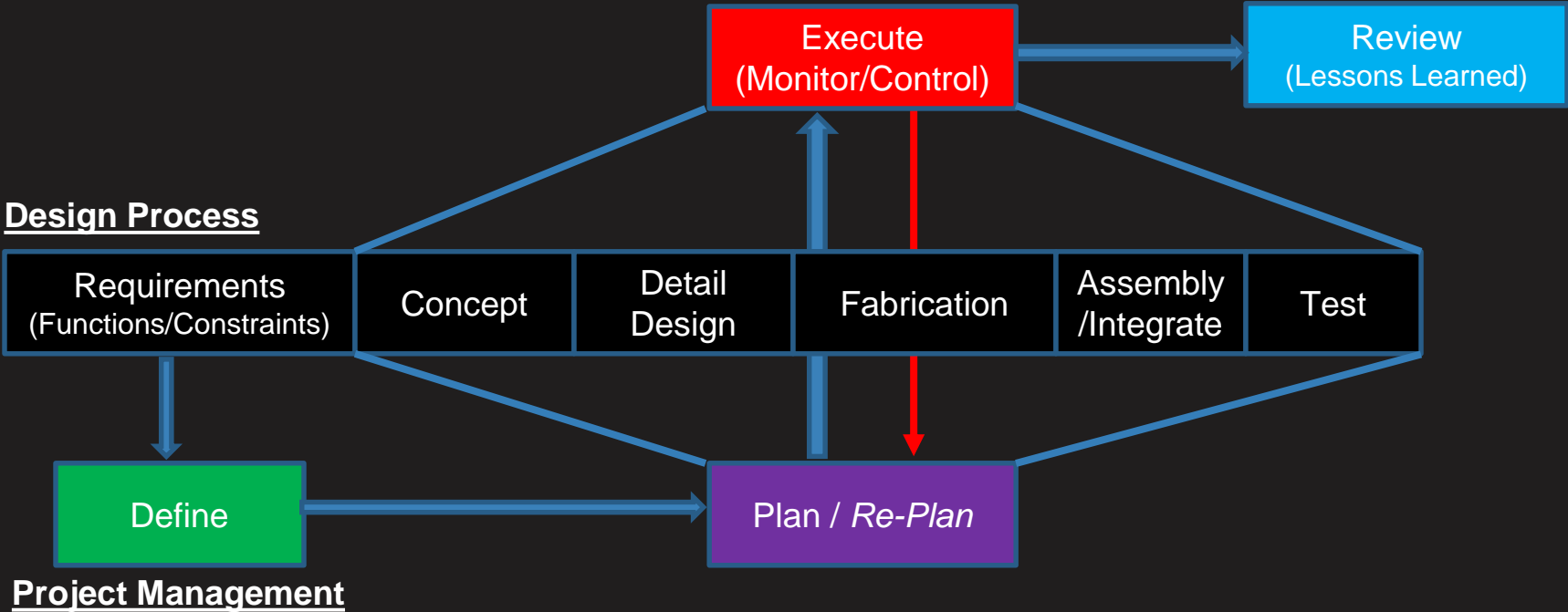
- ❑ Direct work to plan: Accomplish deliverables to team standards
- ❑ Control: Report progress to plan

## 4. (Review) the project

- ❑ Do a lessons learned and update handbooks with best practices



# Project Management Process and the Design Process



# Project Management Example:

We will build a house:

1. Step One (Define) - Develop the scope:
  - The house will be a 2 story colonial with a basement and a garage
2. Step two (Plan) - Develop a milestone plan:
  - List the major steps in building a colonial house
3. Step two (Plan) - Develop a work break down structure
  - What are the tasks within each milestone?
4. Step two (Plan) - Estimate the time, and resources
  - How long will it take for each task
  - List what materials you need
  - How many people are needed to do the tasks

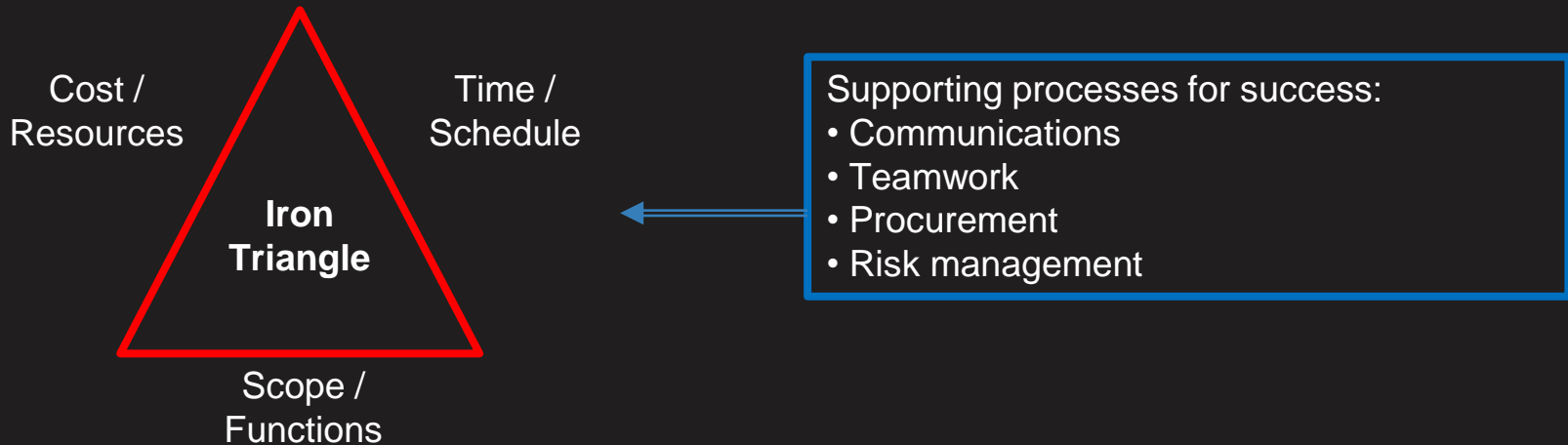
# Project Management Example:

5. Step 3 (Do) - Execute
  - How do you execute?
  
6. Step 3 (Do) - Control
  - How do you know you are on schedule?
  - What do you do if you are not on schedule?
  
7. Step 4 (Review) – Close out project
  - How do you close out the project?
  
8. Step 4 (Review) - Lessons Learned
  - How do you do a lessons learned?

# Execution-Control: The “Iron Triangle”

For every project, independent of size, has only 3 parameters that can be changed

- ❑ Cost/Resources – labor cost, team members(skills) and hardware
- ❑ Time/Schedule – calendar time
- ❑ Scope/Functions – work to be done and deliverables to be provided



**Changing one side effects the other sides**

# Planning Tools

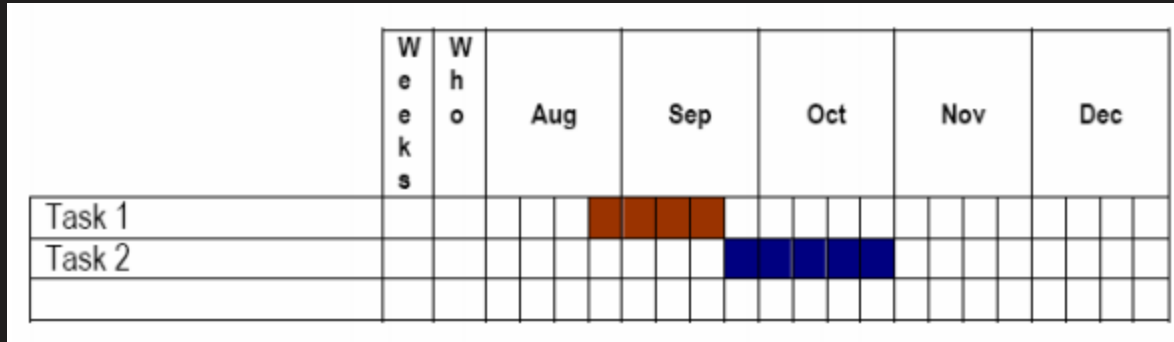
There are two common graphical tools for project Planning:

- ❑ **Gantt Chart** (Developed in early 1900's by Gantt)
- ❑ **PERT Chart** (Program Evaluation and Review Technique)

## **A Gantt chart (Most Common):.**

- ❑ **Tasks are individually listed** and tracked by percent complete
- ❑ **Easy to see the steps** required to complete a project
- ❑ This allows project to see and track tasks separately
- ❑ For a large project the chart can become difficult to read
- ❑ Works well for Milestone charting, large task charting

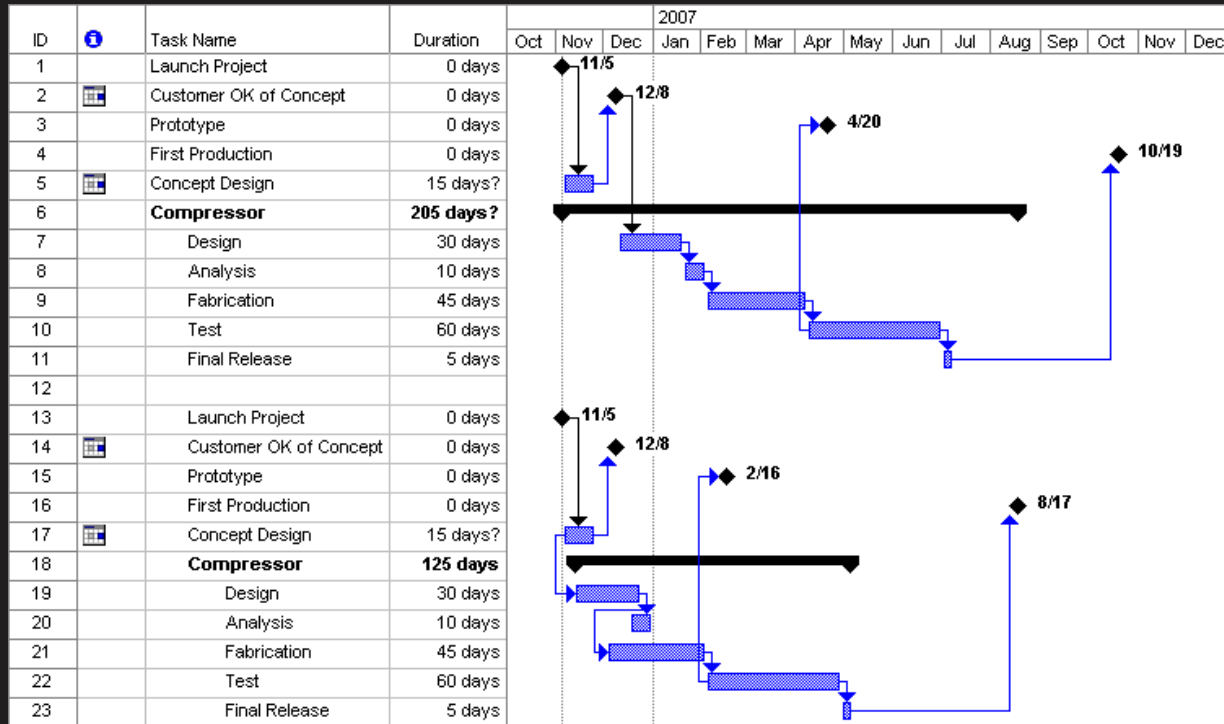
# Gantt Chart Development



## GANTT Chart Creation:

- List all events or milestones in an ordered list, whenever possible.
- Estimate the time required to establish each Task, sub-task
- List the starting time and end time for each task, sub-task
- Represent the information in a bar chart

# Gantt Chart Example



Software tools: Microsoft Project, Open source: ProjectLibre, OpenProject(web)

# FRC Planning Guideline

*This is nice, however, the best practices from other teams and FIRST have established much of this for us.*

- ❑ ***We have the game*** rules, constraints, and a time limit
- ❑ ***We have the design process*** steps and design standards for deliverables
- ❑ ***We have sub-Team Handbooks***
- ❑ ***We have the best practices*** from other teams for milestones
- ❑ ***We have the robot structure*** model for requirements / constraints organization
- ❑ ***FIRST has provided a Robot structure for electrical and software design***



# FRC Milestone Plan

**Kickoff weekend:** Learn game, analyze scoring, develop game play strategy, develop functions robot has to do

**Week 1: (Define)** Define modules from functions, develop module concepts, controls and software architecture, – Saturday: build chassis, start prototype builds

**Week 2: (Concept-Prelim Design)** Complete prototypes, Choose Robot Concept, Start prelim design, complete drive train software

**Week 3: (Detail Design)** Start Detailed Design, develop BOM, Start fabrication of parts, driver training starts

**Week 4: (Assembly)** Start assembly, complete detailed design, electrical sub panel and software programming

**Week 5: (Integration)** Complete robot Integration (electrical, software) and functional testing

**Week 6: (Robot Testing-Evaluation)** Complete operational Testing, Tweak, Improve, & Practice

# FRC Milestone – WBS by Sub-Team

Process Step	Description	Mechanical	CAD	Electrical	Software
1) Requirements Capture	-Kickoff game video -Game/Robot Manuals -Development of "WHAT"	Support robot strategy/functional spec	Support robot strategy/functiona l spec	Support robot strategy/functiona l spec	Support robot strategy/functiona l spec
-Design Review	Review/Release to develop robot concept	Robot functional spec per decision process detailed in "Requirements Instructions"			
2) Robot Concept	Development of "HOW"	Develop robot mechanisms prototypes	Develop mobility module CAD; start robot module CAD	-Support prototypes -Define sensors, actuators	-Support prototypes
3) Preliminary Design	Engineering calculations	Perform engineering calculations	Complete mobility module CAD	Develop electrical architecture	-Develop software architecture -Develop mobility module software
-Design Review	Review/Release to design robot	Final Robot concept per decision process detailed in "Concept Instructions"			
4) Detailed Design	Engineering Documentation of "HOW"	-Build mobility module -Start fabrication where possible	Complete CAD/ Fab part dwgs	Complete Electronic docs: Schematics; I/O definition; fuse map; panel layouts	Complete module logic description
-Design Review	Review/Release of fab parts/electrical assemblies	Design "Walk Through" for mechanical, electrical and software designs("Mistake Proofing")			
5) Fabrication	Material machining	Build modules	Update CAD to fab part changes	Build electrical panels	Test drive station and mobility module
6) Integration	Mechanism integration	Assembly robot modules	Update CAD to assembly changes	Assembly electrical panels to robot	Test I/O functionality
7) Test / Evaluation	Robot module testing, performance testing	Support mechanical mechanisms	Update CAD to changes	Support robot electrical	Lead module testing /performance eval
9) Lessons Learned	Design/Build/Competitio n review	Review/Update handbooks	Review/Update handbooks	Review/Update handbooks	Review/Update handbooks

Milestones

Sub-Teams

Tasks

See: Design Process Handbook

(Tribus – Diagram)

# Team Resources-Organization Chart

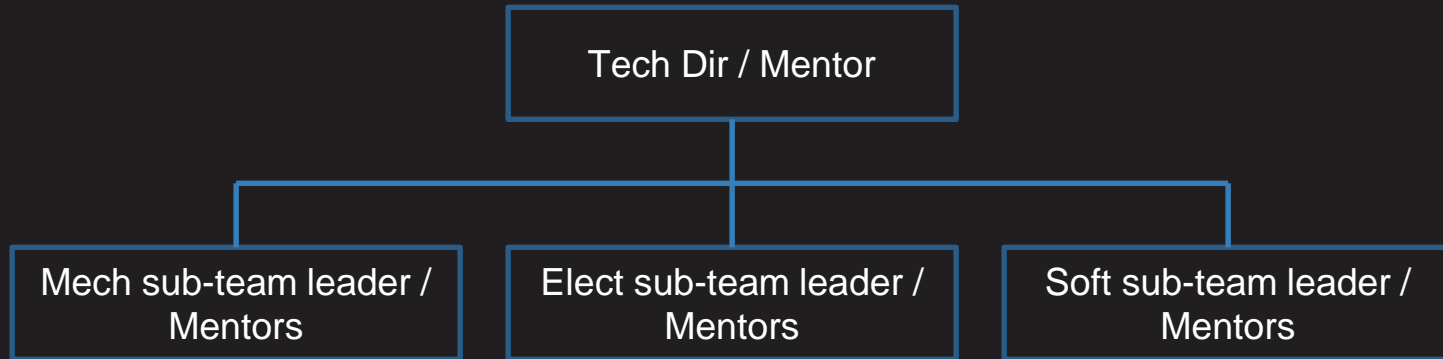
Team 2228 Organization Chart									
<b>OFFICERS</b>									
LEAD	XXXX								
MENTORS									
CAPTAIN	XXXX								
CO-CAPTAIN	XXXX								
<b>Technical Director</b>									
<b>Marketing &amp; Operations Director</b>									
MENTORS	XXXX								
TEAMLEADS	XXXX								
<b>TECHNICAL</b>									
<b>Mechanical Design</b>			<b>Controls</b>			<b>Strategy</b>			
<b>Mechanical</b>	<b>CAD</b>	<b>Electrical</b>	<b>Software</b>	<b>Safety</b>	<b>GAME-Rqmts</b>	<b>Scouting</b>	<b>Pit Team</b>	<b>Drive Team</b>	
MENTORS	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
TEAMLEADS	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
	XXXX		XXXX	XXXX	XXXX	XXXX			
<b>MARKETING &amp; OPERATIONS</b>									
<b>Finance</b>	<b>Media&amp;Design</b>	<b>Website</b>	<b>Supplementary</b>	<b>Commun &amp; Outreach</b>					
MENTORS	XXXX	XXXX	XXXX	XXXX					
TEAMLEADS	XXXX	XXXX	XXXX	XXXX	XXXX				
	XXXX	XXXX		XXXX					

# Execution-Control: Management Team

## Project Management Team

1. Monitors the design process progress against the project plan
2. Is responsible for detecting variances from the plan
3. Makes corrective action to put the project on schedule.

## Technical Project Management Team



# Execution-Control: Team Leader Meeting

## Key roles of the Team Leader meeting:

- ❑ Managing the **scope** (what is going to be done)
- ❑ Managing the **schedule** (is work getting done when needed)
- ❑ Managing **risk** (what to do if things did not work as expected)

## Responsibilities:

- ❑ The Technical Director is responsible for running this meeting.
- ❑ Team leaders provide status on sub-team members assigned tasks and work progress.

## Results of the team meeting:

- ❑ **Clearly communicate** the goals that need to be achieved that day
- ❑ Provides a **common understanding** of progress and issues
- ❑ Forum to prevent scope creep.

# Part II

## Team 2228 Leadership

# Some Leadership Principles

“The only **things that distinguish every leader** from non-leaders are **motivation and action!**” ~Leadership – Getting it Done

“A **leader is** someone **who can get things done** through other people” ~Warren Buffet

“One of the most effective methods of leadership is "empowering" people to accomplish a desired goal” . ~Leadership – Getting it Done

**Leadership is doing** - **Managing** is making sure that **things are done to plan correctly**. A sub-team leader is responsible for both leadership and managing.

# Sub-Team Leader - Project Management Skills

## Planning:

- Setting Goals (Have the END in mind)
- Developing milestones (Start at the end and work backwards)
- Developing a work break down structure
- Time management – Task/Sub-Task time estimation

## Execution:

- Sub-Team control (coordinate),
- Project controls(status reporting)

## Risk management – problem solving

- Re-planning to work around project obstacles



# Sub-Team Leader - Personal Skills

## Responsibility:

- ❑ Responsible for both the **successes and failures** of sub-team
- ❑ Responsible for **producing project deliverables** per sub-team standards listed in handbooks (drawings, schematics, BOM, Software)

## Commitment:

- ❑ It is important you follow through with what you agreed to do.
- ❑ **You need to lead by example: dress, behavior, work ethic, SAFETY**

## Trustworthy:

- ❑ Sub-team members will only **trust you if you are open and honest**. You should also encourage the same from sub-team members

# Sub-Team Leader - Interpersonal Skills

## Delegation:

- Delegate work with **accurate instructions** – convey task deliverable expectations
- Empower sub-team members

**REMEMBER: There is more than one way to approach a task or problem!**

## Motivation:

- Provide **Clear goals** - Conveying expectations for performance
- Provide tools, resources, training
- Seek sub-team member's opinions** and let them be part of decisions
- You will be more effective at directing the team toward your goal if you pull **(lead by example)** rather than push
- Providing feedback** regarding progress
- Have a **positive attitude** in solving problems that limit sub-team success

# Sub-Team Leader - Interpersonal Skills

## Sub-team Feedback:

### Positive:

- Always look for positive actions
- Give feedback right away
- Make a big deal about it
- Do it often

### Negative:

- Find a private place –

**NEVER Provide Negative Feedback In Front Of Other Team Members**

- Be calm – be specific
- Focus on actions not individual
- Define positive steps
- Listen to individual
- If situation cannot be resolved – raise to mentor level

# Listening Skills – Being a Good Listener

Tips on being a good listener:

- ❑ **Good Eye contact**
- ❑ **Good body language** – don't cross arms, sit properly
- ❑ **Minimize distractions** (looking out the window, fidgeting, side conversations)
- ❑ **HEAR** what **the other person** is saying, Put yourself in their shoes
- ❑ **Only speak to note that you are hearing them**
- ❑ **Only ask questions for clarification** - avoid yes/no questions
- ❑ **Summarize and restate** in different words
  - What I think I hear you saying is..."
  - "In other words, you think that..."
  - "I hear you saying...Is that right?"

# Listening Skills – Blocks & Filters

## Listening Blocks

- I must defend my position
- I'm looking for an entrance into the conversation
- I don't have time to listen to you
- I already know what you have to say
- I know what you should do

## Listening Filters

- We are brought up not to listen
- Research has shown in general:
  - Women interested in reasons and feelings
  - Men interested in facts and results(solve problems)

# Listening Skills - Response

## Tips on Listening Response:

- Start in a friendly way
- Try to honestly see things from the other person's point of view
- Show Respect for the other person's opinions – only they can change their opinion
- Never say "You're Wrong."**
- If you are wrong, admit it quickly and emphatically
- Be sympathetic with the other person's ideas and desires
- Do not give advice unless asked for
- Appeal to the Nobler motives (team standards, team expectations)

# Presentation Skills

## Presentation Content:

- Know your audience
- Information should be presented in a logical flow
- Use Graphics

## Delivery:

- NEVER Apologize - Be confident in your presentation
- Project your voice at the audience not at the screen
- Avoid pause words (e.g. “Ah”) – silence is ok
- Avoid starting each idea with the same phrase – (e.g. “You Know”, “Like”)
- Use Eye Contact & Gestures
- Appropriate Q&A
  - All questions are good questions
  - Treat all questions as being important
  - If a question is not relevant put it on a parking lot list to address later

# Revisions

V160811 – RJV; updated from 2015 lessons learned  
V151110 – RJV; Original