

# TEAMWORK

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**“Good fences make good neighbours”**

**... or do they, mused Robert Frost**

## Teamwork Basics

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This chapter offers a very brief introduction to teamwork, one of the essential ingredients of modern engineering practice.

When you participate in group projects, you will experience many of the same opportunities and challenges as those that arise in the real world, and your student and career success will depend to a certain extent on the degree to which you learn good teamwork skills.

### Complementary Strengths

Most engineering projects have wide scope and involve multiple disciplines. A typical major building project will typically involve the owner, an architect, a landscape architect, city planners, civil, geological, environmental, electrical and mechanical engineers, as well as interior designers, contractors and bankers. Each of them brings a particular expertise that is crucial to success of the project, and each brings a different mindset.

The same is true in a group project. Individual group members may be good at math, graphics, writing or management, and your job is to capitalize on those strengths and avoid undue conflict.

## Disparate Goals

While the different mindsets brought by team members are the basis of its strength, they can also be the source misunderstanding and conflict. In order to reduce and manage conflict and improve the quality of the final result, it is useful to understand the source of conflict. Disagreements often have real and objective bases; they are not just a consequence of personality conflicts.

Different goals in a real-world project might include

- environmental impact,
- project cost,
- time to completion,
- appearance, and
- sustainability,
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and typically these goals will be in at least partial conflict with each other.

In a student group, different goals might influence

- the mark sought (this could be different for different team members),
- the amount of time given to the work, and
- report appearance,
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and these may well be conflict with each other.

Learning to identify, understand and work with disparities like these is good training for the real world.

# Tools for Team Success

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In this section you will learn some of the keys to successful teamwork.

## Planning

Lack of planning is one of the greatest indicators of impending failure. As a minimum, you should lay out a plan that includes the elements shown below. Your team “Contracts,” included at the end of this chapter, will provide you with a format for doing each of these tasks.

- 1) As a group, select a team leader and an official recorder. A good leader helps to bring order, unity and a common sense of purpose. Putting decisions in writing avoids unnecessary misunderstandings.
- 2) Make a list of the required project sub-components (for purposes of this course, that will typically be no more than 3-8 items, such as data collection, data recording, report preparation, project supervision).
- 3) Assign the tasks to group members. Try to assign each task so that it capitalizes on the skills that each person brings and so overall workload is balanced.
- 4) Develop a time line (perhaps using a Gantt chart, as outlined later in this chapter) so that the timing of each step is well defined.

Many real-world projects, such as a major new airport, require years of planning, and follow exactly these steps.

For your course Activities, you should know in general terms what you will need to accomplish, and you can obtain this information by reading the printed instructions for your assigned Activity. Then take 5-10 minutes to discuss how, as a group, you will carry out the required tasks.

## Project Scheduling

Scheduling is very important to the success of real-world and student projects, and it deserves special attention. While many tools, including sophisticated software packages, exist to facilitate the timing aspect of project planning, here you will use just one simple tool, the Gantt chart. In the version of the chart shown on the next page, Day 0 is the date on which the Activity takes place.

In this chart, all you need indicate is the major steps of the project and the dates during which each will be done. Some tasks must be substantially complete before others that depend on them can begin in earnest, while others may overlap.

Project step (Assignee)	Day in Project Timeline											
	-1	0	1	2	3	4	5	6	7	8	9	10
Team leadership (Sahil)												
Read Activity instructions (All)	■											
Collect data (Amit)		■										
Record data (Xiaoguang)		■										
Take photographs of Activity (John)		■										
Do calculations (Olivia)			■	■								
Write report (Amit and Sahil)				■	■	■	■	■				
Prepare figures (John and Olivia)						■	■	■				
Circulate for proofreading (All)									■	■	■	
Submit report (Xiaoguang)												■

## Contracts

A good way to formalize the planning steps and ensure that everyone understands their role is to collectively write and sign a “contract.” Like real-world contracts, yours should address the following questions:

- 1) What tasks need to be done?
- 2) Who will do each task?
- 3) How will the team maintain ongoing communications?
- 4) By what date will each sub-component of the project will be substantially complete?
- 5) What happens if one or more group member fail to carry out their tasks in a complete and timely manner?

Sample contracts have been tailored your Beam Activity and for the other Activities you will do, and they are provided on subsequent pages of this chapter.

# Block Stacking Submission

Your submission should have this general form:

## Block Stacking Activity – CIVE 104

Date: \_\_\_\_\_

**Team members:** (put a star beside the name of the official “recorder”)

Names	IDs
_____	_____
_____	_____
_____*	_____
_____	_____

### **Step 8:**

The force(s) that act on the blocks are ...

The source(s) of these forces are ...

### **Step 9:**

Here are our 3 proposed designs:

- A) SKETCH 1
- B) SKETCH 2
- C) SKETCH 3

### **Step 10:**

We [could or could not] feel the forces in the blocks.

Design [give letter from Step 8] produced the largest overhang, and the reason it worked so well was that ...

### **Step 11:**

The greatest overhang we could produce was \_\_\_\_\_cm.

# Beam Activity Contract

This contract is to be used for the Beam Activity, only.

- 1) Who is the team leader? \_\_\_\_\_
- 2) Who is the official recorder of decisions made? \_\_\_\_\_
- 3) The main tasks are listed below. Try to identify the strengths and interests of each group member relative to these tasks. Then assign the tasks by writing one or more names against each task. You can switch roles (e.g., operating the equipment and recording the measurements) part way through the activity if you wish.

Task	Assignee(s)
Operate the Activity equipment	
Record measurements and take notes	
Take photos (Step T in Activity) and print them	
Finalize and submit report	

- 4) Figure out the number of days from the date the Activity will be done until the due date. Fill in the Gantt chart shown below. You may not need all of its columns.

Project step (Assignee)	Day in Project Timeline												
	-1	0	1	2	3	4	5	6	7	8	9	10	
Read Activity instructions (All)													
Operate the Activity equipment													
Record measurements and notes													
Take photos and print them													
Finalize and submit report													

- 5) Indicate below how you plan to ensure that communication will be maintained, noting the primary means and expected times.

- 6) Sign and date the agreement by the date the Activity is carried out.  
I hereby agree to the terms of this contract. Date \_\_\_\_\_

Names of group members	IDs	Signatures

## General Activity Contract

This contract is to be used for all Activities except the Beam Activity.

- 1) Who is the team leader? \_\_\_\_\_
- 2) Who is the official recorder of decisions made? \_\_\_\_\_
- 3) List the main tasks to be performed. Try to identify the strengths and interests of each group member relative to these tasks. Then assign the tasks by writing the names of one or more group members against each task.

Task	Assignee(s)

- 4) Figure out the number of days from the date the Activity will be done until the due date. Fill in the Gantt chart shown below. You may not need all of its rows and columns.

Project step (Assignee)	Day in Project Timeline											
	-1	0	1	2	3	4	5	6	7	8	9	10
Read Activity instructions (All)												
Submit deliverable												

- 5) Report below how you plan to ensure that communication will be maintained, noting the primary means and expected times.

6) What will you do if one or more group members do not carry out their work and do so in a professional and timely manner? For purposes of this Activity, you have been granted the right to impose academic penalties on group members for non-performance. Assume the project is worth “10 points” maximum for each person.

7) Sign and date the agreement by the date the Activity is carried out.

I hereby agree to the terms of this contract. Date \_\_\_\_\_

Group members (names)	Signatures	

8) Just before the deliverable is submitted, indicate below any mark adjustments made by your group consistent with the performance terms (Clause #6) of your contract.