EGR 2600 Introduction to Industrial and Systems Engineering
CRN 10819
Winter 2018 (Syllabus)

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Prerequisite: MTH 155
Class Time/Location: T or Th 3:30 – 5:17 PM, Macomb University Center. (See schedule below.) First in-class meeting is Thursday, Jan 4. The lecture is Room B232 UC2

Office Hours: I'm generally in class half an hour before any in-class session, waiting around for your questions.
Lab Time/Locations: Varied. There are 7 lab sessions altogether during the semester. The labs will begin the week of Jan 22. The EGR 2600 lab will be available for students from 8am – 9pm. The Macomb office hours are 8am – 7pm, so any student wanting access will have to be at the office before 7pm.

Moodle Materials

EGR 2600 uses a "flipped" classroom teaching technique, so classes will meet only one day a week. Check the precise schedule below, noting that some weeks may classes on Tuesday, while other weeks can have classes on Tuesday. The class lectures are posted as videos online in Moodle. With these videos, you can stop your professor and replay what she is saying as much as you like. The in-class sessions are mandatory ACTIVE learning sessions where you work with the professor and your classmates in asking questions and solving problems. At the end of most active sessions, there will be a test covering the materials you have most recently covered since the last test.

You are expected to watch the online videos on Moodle, and take the accompanying brief Moodle quizzes by the posted due dates. These videos will help prepare you for the active in-class sessions. I'm putting some of the videos online on Professor Oakley's YouTube channel, https://www.youtube.com/channel/UCCyeYZAT7tGFLZrhOIodAkA in case they might be helpful for your friends in other sections. You are expected to watch the videos in small snippets (20 minutes or so at a time), a little every day, rather than trying to watch them all the evening before coming to class (would you strength train at the gym by cramming your weight training into one evening a week?) Taking responsibility for your own learning is a critical skill for any engineer.

Here is an equation that will allow you to roughly estimate how well you will do in this course on a 0 to 100 scale:

[20 points] + [number of hours you study (outside class or videos) over the semester] = [final score]

The course is graded on a curve. In general, cutoff for a 4.0 is around a 98/100, and a 2.0 is 70/100, with linear scaling in between, which means a 92/100 is around a 3.7. But it all depends on where the curve mean is set. Students in this class generally do pretty well.

Required Texts:

- *Applied Statistics and Probability for Engineers*, D.C. Montgomery and G.C. Runger, 6th edition, Wiley, 2013 (ISBN-13: 978-1118539712). Please note that the 5th edition will also work all right for our course.

Ancillary texts for interested readers (not required):

- *The Lady Tasting Tea: How Statistics Revolutionized Science in the Twentieth Century*, David Salsburg, Publisher: Holt Paperbacks, 2002), ISBN: 978-0805071344
- *Super Crunchers: Why Thinking-by-Numbers Is the New Way to Be Smart*, Ian Ayres, Bantam, 2007. ISBN 9780553805

- *The Theory that Would Not Die: How Bayes' Rule Cracked the Enigma Code, Hunted Down Russian Submarines & Emerged Triumphant from Two Centuries of Controversy*, Yale University Press, 2011. ISBN 978-0-300-16969-0.

Technology Etiquette Policy: In class, turn off and put your cell phones completely away—do not pull them out or use them while in the class unless your instructor might tell you to do so. Similarly, put your laptop away. This is an active course, so all sessions need you to be actively, and intensively, involved.

Website: The course Moodle website contains reading assignments, homework assignments with solutions, laboratory assignments, handouts, videos with course materials, PowerPoint presentations from the videos, etc.

In class quizzes: The in-class quizzes are closed book—you are allowed to use one 8.5 x 11 inch paper on which you have *handwritten* (nothing from a printer) any notes you think might help. The lowest quiz grade will be dropped, so if you have to miss a class, that quiz will be your dropped quiz grade.

Final examination: The final exam is closed book, closed note. However, you will be able to bring up to 10 pages of your own *handwritten* notes—it is probably easiest for you to bring the individual quiz preparation sheets you have previously made up for each quiz. (Tables from the book will be supplied where necessary.) Note that pre-printed materials are not allowed on your individual sheets—this is because handwriting helps you to neurally encode the material so that you learn better.

Teams and Homework. You will be assigned a team to work with are responsible for doing the homework problems. (Your team assignment will be given in the first class.) These homework problems will help you to understand the material. TURN IN ONLY ONE HOMEWORK ASSIGNMENT PER TEAM, *but do the homework yourself before beginning to work with your team, so that when you get together, you can check answers and get help wherever you might be stuck.*

Team roles. On each homework assignment, your team should designate a coordinator to organize work sessions, make sure everyone knows where and when to meet and understand who is supposed to be doing what, a recorder to prepare and turn in the final solution set or description, and one or two checkers to check the solutions for correctness and verify that everyone in the group understands both the solutions and the strategies used to obtain them. The team roles must rotate on every assignment–once a team member has carried out a role, he/she may not do it again until everyone else on the team has done it.

Homework (problem set) format. Use one side of each page, and box the final answers. Staple the pages, putting the names and roles (coordinator, recorder, checker) of the *participating* group members and the problem set number and date at the top. *If a student's name appears on a solution set, it certifies that he/she has participated in solving the problems.* *Make a copy of all homework solutions before you turn them in.* I will sometimes retain homework sets, and will occasionally return homework sets with problems graded at random. The randomly graded homeworks will form the basis for your homework grade in the course. *If you blow off your homework assignments, your team will rate you down, and it will affect your homework grade.* Essentially, your team mates will be letting me know whether you are preparing effectively for quizzes and examinations.

Individual assessments for team homework. All students will periodically be asked to submit evaluations of how well they and their teammates performed as team members. These evaluations will be incorporated into the assignment of homework grades. (A copy of the peer rating form to be used in these periodic ratings is attached.) If repeated efforts to improve team functioning (including faculty intervention) fail, a non-participant may be fired by unanimous consent of the rest of the team. A fired team member will be expected to do all remaining homework on their own. A team member may elect to opt out of a team if they feel they are doing all the work. They may do so only with the teacher's permission—he will help this individual find a new team.

Grading: The final course grade will be a weighted average of:

Laboratory	15%
Homework	10%
Moodle quizzes	20%
In class quizzes	30%
Final Exam	25%

Course Objectives: In order to satisfactorily complete this course, a student is expected to demonstrate competency concerning their understanding of the following objectives:

1. Describe the role of an Industrial Engineer in a manufacturing/service industry.
2. Apply probability concepts of counting, mean, variance, expectation and others.
3. Apply discrete distributions including uniform, binomial, Poisson, geometric, and others.
4. Apply continuous distributions including uniform, normal, exponential, lognormal and others.
5. Estimate parameters with a given level of confidence.
6. Apply the concept of probability to real world problems.
7. Analyze data and estimate variation in a data set.
8. Apply probability and statistical operations on data using Excel.
9. Demonstrate how to perform a single population hypothesis test on the mean for a given level of significance.

Student Outcomes are a set of skills that assure the achievement of the ISE Program Educational Objectives. Before graduating, ISE students will demonstrate their skills in the following key areas:

a. an ability to apply knowledge of mathematics, science, and engineering
b. an ability to design and conduct experiments, as well as to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. an ability to function on multi-disciplinary teams
e. an ability to identify, formulate, and solve engineering problems
f. an understanding of professional and ethical responsibility
g. an ability to communicate effectively
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i. a recognition of the need for, and an ability to engage in life-long learning
j. a knowledge of contemporary issues
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Policies and Procedures

This syllabus may be changed at the discretion of the instructor—changes will be announced via email.

Academic Conduct Policy: Collaborating with anyone else in any way when taking online quizzes or tests is considered to be cheating. The Oakland University Academic Conduct Policy will be followed with no exceptions. It may be found through the OU website at www.oakland.edu/?id=1610&sid=75. ***All online and in-class quizzes and examinations must be completed by you, and you alone.*** For online quizzes, you may use the textbook, notes you took in class and the notes you took in relation to the videos. You may also recheck the videos themselves, although you generally only have a limited time to complete a quiz and examination, so you won't be able to do much of this sort of thing. Additionally, you may use results related to your homework and the solutions I've provided you in relation to homework and the solutions to the problems in the textbook.

Oakland University has strict policies regarding cheating on quizzes and examinations. I want to point out one statement in particular from the academic conduct policy. "No student shall copy from someone else's work or help someone else copy work or substitute another's work as one's own."

Note that I take violations of Oakland's academic conduct policy very seriously—violations of this policy can result in suspension for multiple semesters or even expulsion from the university.

I do want to make it clear that unlike quizzes and examinations, where NO collaboration is authorized, you are expected to collaborate with your group on your homework.

Add/Drops: The University add/drop policy will be explicitly followed. It is the student's responsibility to be aware of the University deadline dates for dropping the course.

Special Considerations: Students with disabilities who may require special considerations should make an appointment with campus Disability Support Services. Students should also bring their needs to the attention of the instructor as soon as possible.

Course Coverage

1) Introduction to Industrial and Systems Engineering (and Simulation):
2) Introduction to probability & statistics: Chapter 1, Sections 2-1 & 2-2
3) Statistical independence, conditional probability & Baye's Rule: Sections 2-3 thru 2-7
4) Random variables, expected value & variance: Section 2-8, 3-1 thru 3-4
5) Discrete probability distributions: Sections 3-5 thru 3-9
6) Continuous random variables, probability density function: Sections 4-1 thru 4-4
7) Continuous probability distributions: Sections 4-5 thru 4-12
8) Bivariate distributions & covariance: Sections 5-1 thru 5-3
9) Descriptive statistics & probability plots: Sections 6-1, 6-3, 6-5
10) Sampling, the central limit theorem & point estimators: Sections 7-1 thru 7-3
11) Confidence intervals & the *t* distribution: Sections 8-1 thru 8-6
12) Hypothesis testing: Sections 9-1 thru 9-5

EGR 260: Tentative Schedule. Moodle quiz dates are posted online		
Week beginning	**Course Coverage**	**Assignments due**
Jan 4-10 **Meet in class** **Thursday, Jan 4**	Introduction to course, dividing into teams, intro Chapter 2	• Moodle Integrity and Course Policy Quiz (Jan 4-10) • (Individual) Ice breaker resume activity (Due online, Jan 10) • Moodle Quiz #2A (Jan 4-12) • Moodle Quiz #2B1 (Jan 4-12) • Moodle Quiz #2B2 (Jan 4-12)
Jan 11-15 **Meet in class** **Thursday, Jan 11**	Chapter 2: Probability	• In Class Quiz • HW #2A & 2B (Group—turn in in class Jan 11) • Comment on resumes of those in your team. (Due online, Jan 17) • Moodle Quiz #2C (Jan 13-17) • Moodle Quiz #2D (Jan 13-17)
Jan 16-24 **Meet in class** **Tuesday, Jan 16**	Chapter 2: Probability & Intro to Chapter 3: Discrete Random Variables and Probability Distributions → **Labs begin online**	• In Class Quiz • HW #2C & 2D (Group—turn in in class Jan 16) • Moodle Quiz 3A (Jan 17-26) • Moodle Quiz 3B (Jan 17-26)
Jan 25-31 **Meet in class** **Thursday, Jan 25**	Chapter 3: Discrete Random Variables and Probability Distributions	• In Class Quiz • HW #3A & 3B (Group—turn in in class Jan 25) • Moodle Quiz 3C (Jan 26-Feb 2) • Moodle Quiz 3D1 (Jan 26-Feb 2)
Feb 1-7 **Meet in class** **Thursday, Feb 1**	Chapter 3: Discrete Random Variables and Probability Distributions; Chapter 4: Continuous Random Variables and Probability Distributions	• In Class Quiz • HW #3C, 3D1, (Group—turn in in class Feb 1) • Moodle Quiz on Engineers & Thinking (Feb 2-8) • Moodle Quiz 3D2 (Feb 2-8) • Moodle Quiz 3E (Feb 2-9)
Feb 8-14 **Meet in class** **Thursday, Feb 8**	Chapter 4: Continuous Random Variables and Probability Distributions	• In Class Quiz • HW 3D2, 3E (Group—turn in in class Feb 8) • Moodle Quiz 4A (Feb 9-16) • Moodle Quiz 4B1 (Feb 9-16)
Feb 15-16 **Meet in class** **Thursday, Feb 15**	Chapter 4: Continuous Random Variables and Probability Distributions; Chapter 5: Joint Probability Distributions	• In Class Quiz • HW #4A, 4B1 (Group—turn in in class Feb 15) • Moodle Quiz 4B2A (Feb 16-Mar 2) • Moodle Quiz 4B2B (Feb 16- Mar 2) • Moodle Quiz 4B3 (Feb 16- Mar 2) • First peer assessment (due online, Mar 2)
Feb 17 – 25 **Winter break**		
Mar 1-7 **Meet in class** **Thursday, Mar 1**	Chapter 5: Joint Probability Distributions	• In Class Quiz • HW #4B2A, 4B2B, 4B3 (Group—turn in in class Mar 1) • Moodle Quiz 5A (Mar 2-9) • Moodle Quiz 5B (Mar 2-9) • Moodle Quiz 5C (Mar 2-9)
Mar 8 - 14 **Meet in class** **Thursday, Mar 8**	Chapter 5: Joint Probability Distributions; Chapter 6: Descriptive Statistics; Chapter 7: Sampling Distributions	• In Class Quiz • HW #5A, 5B & 5C (Group—turn in in class Mar 8) • One paragraph synthesis of Ch 6 Probability plot video (online) (Due Mar 16) • Moodle Quiz 7A (Mar 9-16) • Moodle Quiz 7B (Mar 9-16)
Mar 15 - 22 **Meet in class** **Thursday, Mar 15**	Chapter 7: Sampling Distributions; Chapter 8: Statistical Intervals for a Single Sample	• In Class Quiz • HW #7A & 7B (Group—turn in in class Mar 15) • Moodle Quiz 8A (Mar 16-23) • Moodle Quiz 8B-C (Mar 16-23)

Mar 22 - 28 **Meet in class Thursday, Mar 22**	Chapter 8: Statistical Intervals for a Single Sample	• In Class Quiz • HW #8A & 8B-C (Group—turn in in class Mar 22) • Moodle Quiz 8 T-tests (Mar 23-30)
Mar 29 – April 4 **Meet in class Thursday, Mar 29**	Chapter 8: Statistical Intervals for a Single Sample;	• In Class Quiz • HW #8, T-Tests (Group—turn in in class Mar 29) • Moodle Quiz 9A (Mar 30- April 6) • Moodle Quiz 9B (Mar 30- April 6)
April 4-11 **Meet in class Thursday, April 5**	Chapter 9: Hypothesis Testing	• In Class Quiz • HW 9A & 9B (Group—turn in in class April 5)
April 11-18 **Meet in class Thursday, April 12**	Review for final	• Peer evaluation form (online) Due by April 12
April 19, Thursday 3:30 – 5:30 PM	Final examination	• In Class Exam

TEAM POLICIES[†]

Your team will have a number of responsibilities as it completes group problem and project assignments.

- *Designate a coordinator, recorder and checker for each assignment. Add a monitor for 4-person teams.* Rotate these roles for every assignment.
- *Agree on a common meeting time and what each member should have done before the meeting* (readings, taking the first cut at some or all of the assigned work, etc.)
- *Do the required individual preparation.*
- *Coordinator checks with other team members before the meeting to remind them of when and where they will meet and what they are supposed to do.*
- *Meet and work.* **Coordinator** keeps everyone on task and makes sure everyone is involved, **recorder** prepares the final solution to be turned in, **monitor** checks to makes sure everyone understands both the solution and the strategy used to get it, and **checker** double-checks it before it is handed in. Agree on next meeting time and roles for next assignment. For teams of three, the same person should cover the monitor and checker roles.
- *Checker turns in the assignment, with the names on it of every team member who participated actively in completing it.* If the checker anticipates a problem getting to class on time on the due date of the assignment, it is his/her responsibility to make sure *someone* turns it in.
- *Review returned assignments.* Make sure everyone understands why points were lost and how to correct **errors.**
- *Consult with your instructor if a conflict arises that can't be worked through by the team.*
- **Dealing with non-cooperative team members.** If a team member refuses to cooperate on an assignment, his/her name should not be included on the completed work. If the problem persists, the team should meet with the instructor so that the problem can be resolved, if possible. If the problem still continues, the cooperating team members may notify the uncooperative member in writing that he/she is in danger of being fired, sending a copy of the memo to the instructor. If there is no subsequent improvement, they should notify the individual in writing (copy to the instructor) that he/she is no longer with the team. The fired student should meet with his/her instructor to discuss options. Similarly, students who are consistently doing all the work for their team may issue a warning memo that they will quit unless they start getting cooperation, and a second memo quitting the team if the cooperation is not forthcoming. Students who get fired or quit must either find another team willing to add them as a member or get zeroes for the remaining assignments.

As you will find out, group work isn't always easy—team members sometimes cannot prepare for or attend group sessions because of other responsibilities, and conflicts often result from differing skill levels and work ethics. When teams work and communicate well, however, the benefits more than compensate for the difficulties. One way to improve the chances that a team will work well is to agree beforehand on what everyone on the team expects from everyone else. Reaching this understanding is the goal of the assignment on the *Team Expectations Agreement* handout.

[†] Adapted from R.M. Felder & R. Brent, *Effective Teaching,* North Carolina State University, 2000.

EVALUATION OF PROGRESS TOWARD EFFECTIVE TEAM FUNCTIONING[†]

Your Team Name:_____

Symptoms of Internal Meeting Problems	**Usually**	**Some-times**	**Hardly Ever**
Team meetings generally begin 5-15 minutes late			
Members often arrive late, leave early, or never even show up for the meetings.			
No agenda exists—members simply have a vague notion of what they want to accomplish.			
One or two members monopolize discussion throughout the meeting.			
Members have not read the assignment, performed the necessary background research, or done what they were expected to do. Consequently, individuals are poorly prepared for the meeting.			
With words or by appearance, some members clearly convey that they would rather be elsewhere.			
Members constantly interrupt each other or talk in pairs without listening to the individual who has the floor.			
Issues never get resolved, only put on the back burner until next time.			
No follow-up action plan is developed. Members are confused with regard to what the next step is and who is responsible for performing it.			
The same individual or individuals end up doing the majority of the work.			
The meetings run on and on and on with little to show for the time spent on them			
Assignments are not completed on time or are completed poorly.			

[†] Adapted from Jack McGourty and Kenneth P. De Meuse, *The Team Developer: An Assesssment and Skill Building Program*, 2001, John Wiley & Sons, New York.

PEER RATING OF TEAM MEMBERS[†]

Your Name_____ **Your Team** _____

Please write the names of all of your team members, INCLUDING YOURSELF, and rate the degree to which each member fulfilled his/her responsibilities in completing the team assignments. *DO NOT LEAVE ANY COMMENTARY BLANK!* Place this form in a sealed envelope, with your team name/number on the outside, and give it to your instructor. The possible ratings are as follows:

Excellent: Consistently carried more than his/her fair share of the workload.
Very good: Consistently did what he/she was supposed to do, very well prepared and cooperative.
Satisfactory: Usually did what he/she was supposed to do, acceptably prepared and cooperative.
Ordinary: Often did what he/she was supposed to do, minimally prepared and cooperative.
Marginal: Sometimes failed to show up or complete assignments, rarely prepared.
Deficient: Often failed to show up or complete assignments, rarely prepared.
Unsatisfactory: Consistently failed to show up or complete assignments, unprepared.
Superficial: Practically no participation.
No show: No participation at all.

These ratings should reflect each individual's level of participation and effort and sense of responsibility, not his or her academic ability.

Name of team member	**Rating**	**Commentary (DO NOT LEAVE BLANK!)**
_____	_____	_____
		_____
		_____
_____	_____	_____
		_____
		_____
_____	_____	_____
		_____
		_____
_____	_____	_____
		_____
		_____

Your Signature_____

[†] Adapted from R.M. Felder & R. Brent, *Effective Teaching,* North Carolina State University, 2000.

Coping with Hitchhikers and Couch Potatoes on Teams[†]

You will usually find your university teammates as interested in learning as you are. Occasionally, however, you may encounter a person who creates difficulties. This handout is meant to give you practical advice for this type of situation.

To begin with, let's imagine you have been assigned to a combined homework and lab group this semester with three others: Mary, Henry, and Jack. Mary is okay—she's not good at solving problems, but she tries hard, and she willingly does things like get extra help from the professor. Henry is irritating. He's a nice guy, but he just doesn't put in the effort to do a good job. He'll sheepishly hand over partially worked homework problems and confess to spending the weekend watching TV. Jack, on the other hand, has been nothing but a problem. Here are a few of the things Jack has done:

- When you tried to set up meetings at the beginning of the semester, Jack just couldn't meet, because he was too busy.
- Jack infrequently turns in his part of the homework. When he does, it's almost always wrong—he obviously spent just enough time to scribble something down that looks like work.
- Jack has never answered phone messages. When you confront him, he denies getting any messages. You e-mail him, but he's "too busy to answer."
- Jack misses every meeting—he always promises he'll be there, but never shows up.
- His writing skills are okay, but he can't seem to do anything right for lab reports. He loses the drafts, doesn't reread his work, leaves out tables, or does something sloppy like write equations by hand. You've stopped assigning him work because you don't want to miss your professor's strict deadlines.
- Jack constantly complains about his fifty-hour work weeks, heavy school load, bad textbooks, and terrible teachers. At first you felt sorry for him—but recently you've begun to wonder if Jack is using you.
- Jack speaks loudly and self-confidently when you try to discuss his problems–he thinks the problems are everyone else's fault. He is so self-assured that you can't help wondering sometimes if he's right.

Your group finally was so upset they went to discuss the situation with Professor Distracted. He in turn talked, along with the group, to Jack, who in sincere and convincing fashion said he hadn't really understood what everyone wanted him to do. Dr. Distracted said the problem must be the group was not communicating effectively. He noticed you, Mary, and Henry looked angry and agitated, while Jack simply looked bewildered, a little hurt, and not at all guilty. It was easy for Dr. Distracted to conclude this was a dysfunctional group, and everyone was at fault—probably Jack least of all.

The bottom line: You and your teammates are left holding the bag. Jack is getting the same good grades as everyone else without doing any work. Oh yes—he managed to make you all look bad while he was at it.

What this group did wrong: Absorbing

This was an 'absorber' group. From the very beginning they absorbed the problem when Jack did something wrong, and took pride in getting the job done whatever the cost. *Hitchhikers count on you to act in a self-sacrificing manner*. However, the nicer you are (or the nicer you think you are being), the more the hitchhiker will be able to hitchhike their way through the university—and through life. By absorbing the hitchhiker's problems, you are inadvertently training the hitchhiker to become the kind of person who thinks it is all right to take credit for the work of others.

What this group should have done: Mirroring

It's important to reflect back the dysfunctional behavior of the hitchhiker, so the hitchhiker pays the price—not you. Never accept accusations, blame, or criticism from a hitchhiker. Maintain your own sense of reality despite what the hitchhiker says, (easier said than done). Show you have a bottom line: there are limits to the behavior you will accept. Clearly communicate these limits and act consistently on them. For example, here is what the group could have done:

- When Jack couldn't find time to meet in his busy schedule, even when alternatives were suggested, you needed to decide whether Jack was a hitchhiker. Was Jack brusque, self-important, and in a hurry to get away? Those are suspicious signs. Someone needed to tell Jack up front to either find time to meet, or talk to the professor.
- If Jack turns nothing in, his name does not go on the finished work. (Note: if you know your teammate is generally a contributor, it is appropriate to help if something unexpected arises.) Many professors allow a team to fire a student, so the would-be freeloader has to work alone the rest of the semester. Discuss this option with your instructor if the student has not contributed over the course of an assignment or two.
- If Jack turns in poorly prepared homework or lab reports, you must tell him he has not contributed meaningfully, so his name will not go on the submitted work. *No matter what Jack says, stick to your guns!* If Jack gets abusive, show the professor his work. Do this the *first time* the junk is submitted, before Jack has taken much advantage—not after a month, when you are really getting frustrated.

[†] This essay is a brief, adapted version from "It Takes Two to Tango: How 'Good' Students Enable Problematic Behavior in Teams," Barbara Oakley, *Journal of Student Centered Learning*, Volume 1, Issue 1, Fall, 2002, pp. 19-27.

- Set your limits early and high, because hitchhikers have an uncanny ability to detect just how much they can get away with.
- If Jack doesn't respond to e-mails, answer phone messages, or show up for meetings, don't waste more time trying to contact him. (It can be helpful, particularly in industry, to use e-mail for contacting purposes, because then a written record is available about the contact attempt. Copying the e-mail to Jack's supervisor or other important people can often produce surprisingly effective results.)
- Keep in mind the only one who can handle Jack's problems is Jack. You can't change him—you can only change your own attitude so he no longer takes advantage of you. Only Jack can change Jack—and he will have no incentive to change if you do all his work for him.

People like Jack can be skilled manipulators. By the time you find out his problems are never-ending, and he himself is their cause, the semester has ended and he is off to repeat his manipulations on a new, unsuspecting group. Stop allowing these dysfunctional patterns early in the game—before the hitchhiker takes advantage of you and the rest of your team!

Henry, the Couch Potato

But we haven't discussed Henry yet. Although Henry stood up with the rest of the group to try to battle against Jack's irrational behavior, he hasn't really been pulling his weight. (If you think of yourself as tired and bored and really more interested in watching TV than working on your homework—everyone has had times like these—you begin to get a picture of the couch potato.)

You will find the best way to deal with a couch potato like Henry is the way you deal with a hitchhiker: set firm, explicit expectations—then stick to your guns. Although couch potatoes are not as manipulative as hitchhikers, they will definitely test your limits. If your limits are weak, you then share the blame if you have Henry's work to do as well as your own.

But I've Never Liked Telling People What to Do!

If you are a nice person who has always avoided confrontation, working with a couch potato or a hitchhiker can help you grow as a person and learn the important character trait of firmness. Just be patient with yourself as you learn. The first few times you try to be firm, you may find yourself thinking—'but now he/she won't like me—it's not worth the pain!' But many people just like you have had exactly the same troubled reaction the first few (or even many) times they tried to be firm. Just keep trying—*and stick to your guns!* Someday it will seem more natural and you won't feel so guilty about having reasonable expectations for others. In the meantime, you will find you have more time to spend with your family, friends, or schoolwork, because you aren't doing someone else's job along with your own.

Common Characteristics that Allow a Hitchhiker to Take Advantage

- Unwillingness to allow a slacker to fail and subsequently learn from their own mistakes.
- Devotion to the ideal of 'the good of the team'—without common-sense realization of how this can allow others to take advantage of you. Sometimes you show (and are secretly proud of) irrational loyalty to others.
- You like to make others happy even at your own expense.
- You always feel you have to do better—your best is never enough.
- Your willingness to interpret the slightest contribution by a slacker as 'progress.'
- You are willing to make personal sacrifices so as to not abandon a hitchhiker—without realizing you are devaluing yourself in this process.
- Long-suffering martyrdom—nobody but you could stand this.
- The ability to cooperate but not delegate.
- Excessive conscientiousness.
- The tendency to feel responsible for others at the expense of being responsible for yourself.

A related circumstance: you're doing all the work

As soon as you become aware everyone is leaving the work to you—or doing such poor work that you are left doing it all, you need to take action. Many professors allow you the leeway to request a move to another team. (You cannot move to another group on your own.) Your professor will probably ask some questions before taking the appropriate action.

Later on—out on the job and in your personal life

You will meet couch potatoes and hitchhikers throughout the course of your professional career. Couch potatoes are relatively benign, can often be firmly guided to do reasonably good work, and can even become your friends. However, hitchhikers are completely different people—ones who can work their way into your confidence and then destroy it. (Hitchhikers may infrequently try to befriend you and cooperate once you've gained their respect because they can't manipulate you. Just because they've changed their behavior towards you, however, doesn't mean they won't continue to do the same thing to others.) Occasionally, a colleague, subordinate, supervisor, friend, or acquaintance could be a hitchhiker. If this is the case, and your personal or professional life is being affected, it will help if you keep in mind the techniques suggested above.

TEAM EXPECTATIONS AGREEMENT[†]

On a single sheet of paper, put your names and list the rules and expectations you agree as a team to adopt. You can deal with any or all aspects of the responsibilities outlined above—preparation for and attendance at group meetings, making sure everyone understands all the solutions, communicating frankly but with respect when conflicts arise, etc. Each team member should sign the sheet, indicating acceptance of these expectations and intention to fulfill them. Turn one copy into the professor, and keep a remaining copy or copies for yourselves.

These expectations are for your use and benefit—they won't be graded or commented on unless you specifically ask for comments. Note, however, that if you make the list fairly thorough without being unrealistic you'll be giving yourselves the best chance. For example, "We will each solve every problem in every assignment completely before we get together" or "We will get 100 on every assignment" or "We will never miss a meeting" are probably unrealistic, but "We will try to set up the problems individually before meeting" and "We will make sure that anyone who misses a meeting for good cause gets caught up on the work" are realistic.

[†] R.M. Felder & R. Brent, *Effective Teaching,* North Carolina State University, 2000.