

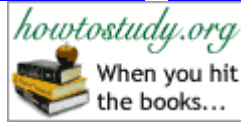
How to Study Math, Science and Engineering

by Dr. Phillip R. Rosenkrantz

California State Polytechnic University, Pomona

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1. Introduction ([back to top](#))

As a department chair from 1990-1997, I counselled most of the students to do not succeed in our department's engineering majors. Most students who fail academically, do so because of a few critical errors in judgement and in how they approach their studies. As a student (again) myself from 1984-1988, I became an avid student of "how to study" mathematically based subjects. I had the good fortune to learn some of the secrets of studying mathematically based subjects (such as statistics and engineering) and developed a few new techniques of my own. I have shared these methods with students on an individual basis and in numerous workshops and presentations. Students who have used these techniques report excellent results.

- The most effective way of communicating these techniques is in a workshop format. Unfortunately just reading this document leaves too much to the imagination. **However, if you take the time use these methods you will see that they actually work!** I look forward to sharing this information with others in a workshop format in the future.

This guide focuses on the basic strategies for being an effective math, science or engineering student. These strategies cover three phases of student life:

Phase I - Planning - Planning ahead and choosing classes

Phase II - "Inside class" activities - Note taking, listening, test taking, attendance

Phase III - "Outside class" activities - Using notes, studying, homework, term papers and projects, visiting instructor office hours, etc.

In this paper you will learn:

- How to get better grades and have more personal time (the "Big Picture") - Do's and Don'ts.
- How to organize yourself for school.
- The three basic strategies for taking notes.
- How to study.
- How to take tests.
- What policies you need to understand to succeed at the university level.
- Strategies for choosing classes and instructors.
- Reasons why capable students fail.

How to study "non-mathematical" subjects.

Survey of Available Resources - Much has been written on how to be a good student--but very little on how to be a good math, science or engineering student. On my shelf are twelve books and articles I have collected on how to be a good student or how to study. Only two of them give any special attention to "mathematics". All of the other books are directed to students majoring in non- mathematically based majors.

What Is Different About Studying Mathematically Based Subjects - The study of math (or related subjects such as engineering, science, or statistics) is a process that requires progressive, step-by- step learning of fundamentals or the "order" of things. Engineering goes beyond just learning "order" and further emphasizes the "design" process. The goal of engineering education is to learn, understand, and use laws of science within the discipline of a profession and the needs of society.

Math and science are filled with "ordered" structure. This truth makes them different from the study of humanities and social sciences where philosophy, creativity and inference may be of more concern. Unfortunately most students try to use the same methods in all classes. This approach usually leads to a deficient approach to learning math related subjects. In most cases this deficiency is compensated for by a innate intelligence, added time to the task, or persistently repeated failed courses. In many cases, however, this deficiency is not compensated for and the student fails somewhere along the way.

My belief, based on experience, is that 99% of the students who enter engineering have the brain power to graduate. Those who fail to graduate because of non-outside forces (eg. health, finances, personal problems, etc.) usually do so because of poor strategy, planning, study habits and methods.

Math Skill Self Survey

An on-line survey is linked below for the purpose of self-assessment and introducing some of the concepts that will be presented later. It is suggested you take the survey and look at your score. The lower the score, the more you may need to re-assess your methods. If your your score is very low, do not be discouraged. Finding out new strategies that allow you to succeed that actually take less of your time can be very invigorating!

<http://www.purplemath.com/stdysrvy.htm>

FOLLOWING THE IDEAS AND STRATEGIES IN THIS PAPER WILL HELP YOU TO GRADUATE IN A TIMELY MANNER, WITH HIGHER GRADES, LESS WORK, AND MORE FUN.

2. First Things First ([back to top](#))

The following steps should ideally be done before even deciding to go school. School needs to "fit into" your life, not "become" your life at all costs. This concern becomes larger as we get older and more involved with job and family. This step-by-step process can be done on your own or with the help of a parent, spouse, faculty advisor or mentor.

that you can sustain yourself for as many years as it takes to graduate. **PLAN** your week so that you have enough time to study properly and have a **BALANCED** life. You need to balance your academic, financial (career/work), personal, family, social, and spiritual life. **If you are spending more than 60-70 total hours per week on school plus work, then you may be out of balance.**

Use a Time Picture - There are 168 hours in a week. Use a "Time Picture" to determine how much time you can devote to school. Then use that information to determine how many classes you can take. Below are the steps for constructing a "Time Picture". Following is an example time picture. Use the blank "Time Picture" provided at the end to go through the steps yourself.

Step 1 - Block out personal time -

Using vertical lines or arrows, block out personal time first. Personal time includes **sleeping, eating, personal hygiene, dressing, exercise, watching your favorite TV program, hobbies, reading, prayer and meditation, etc.** You need proper food, rest, and mental freshness in order to function properly in all the other areas of your life.

Step 2 - Block out work time -

Block out your job or work time if it is something you have little or no control over. Include driving or transportation time.

Step 3 - Block out time you need for personal priorities and balance -

Next block out your spiritual, family, and social time. Block out time for church, dating, recreation, family outings, coaching a sports team, helping children with homework, etc. **THIS STEP IS IMPORTANT.** These things need to go in before school work because having these needs satisfied and being at peace with this will release you to perform properly in your school work. You will make better decisions in your life if you are not worrying about the other areas and do not feel like you are "depriving" yourself.

Step 4 - Block out school time -

Finally block out time for taking classes, studying, and for **Flexible Time**. Flexible time is a block (or blocks) of time that can be used for either school, family, or personal--whichever needs it the most. For example, Saturday morning from 8 am - 12 noon can be flexible time. You would normally use it for family but could use it for doing a term paper or studying for final exams if needed. Simply put, "flexible time" allows you to be flexible and meet your personal, family and educational needs. Plan your study time for the hours when you are fresh. My experience is that the earlier in the day you study, the better. After you have been awake for 15 hours your mind's ability to concentrate on and comprehend difficult math concepts diminishes rapidly. Do not expect to get difficult homework problems solved rapidly late at night.

Step 5 - Determine how many units of classes you can take.

If you are married you should discuss the results with your spouse. How flexible time can be used is the major concern here. For example, if your spouse or child wants you to do something with them or for them that goes beyond your scheduled family time, you could use the flexible time to meet the request or

reschedule study time into the flexible time block. Also, if you have a job which requires a flexible work schedule you should show the time picture to your supervisor or manager to get any agreements you can about scheduling work hours, overtime, travel, and vacation. It is difficult to imagine being able to go to school for two to five years without some employer cooperation.

Step 6 - Estimate your school workload.

As a rule of thumb, you should plan for four hours of time for each unit of college credit. The four hours covers times for lecture, fixing up and transcribing notes, doing homework, studying for quizzes and exams, library research, laboratory time, working in small groups, travel to school and seeing your instructor during office hours. For example: Suppose you have 24 hours available for school. Then $24 \div 4 = 6$ units. This means you could take two 3 unit classes or one 4 unit class and one 2 unit class. If you wanted to take 7 units for some reason, you could consider it based on the nature and expected difficulty of the class. The length of time it will take you to graduate will primarily depend on how many units you can comfortably take each quarter.

Step 7 - Plan ahead for your last year.

If at all possible begin planning a way that you can be a full-time student during your final year. If you can, by planning two or three years in advance, manage to go to school full-time during your last year will reap many benefits. This practice would, for example, shorten the time to degree significantly, make it easier to take all those "hard to get" classes, enable you to complete your senior project on time, and give you more time to concentrate on your senior level classes. Remember, the classes you take in the last year are the hardest, require more reports and presentations, and are the most related to the degree.

SAMPLE TIME PICTURE

The sample below happens to be for a part-time summer school student taking Chemistry (3 units) and Math (4 units), working two part-time jobs and in a leadership position with an extra-curricular activity.

Hour	Mon	Tues	Wed	Thur	Fri	Sat	Sun
6 - 7 am	-	-	-	-	-	-	-
7 - 8 am	-	(travel)	-	(travel)	-	-	-
8 - 9 am	-	MAT012	-	MAT012	-	Rose Float	Church
9 - 10 am	-		-		-		
10 - 11 am	Study	Lab Monitor	Study	-	Study		

11 - 12 noon							
12 - 1 pm	-		-	Study	-		
1 - 2 pm	-		-	-	Flex time		Family Lunch
2 - 3 pm	Flex time	CHM121	Flex time	CHM121			-
3 - 4 pm		-		(travel)	-		-
4 - 5 pm	-	Lab Monitor	-	Yardwork	-		
5 - 6 pm	-		-	-	-	-	
6 - 7 pm	-	(travel)	-	-	-		
7 - 8 pm	Flex time	Work	Flex time	-	-	Work	Work
8 - 9 pm				-	Rose Float		
9 - 10 pm				-			
10 - 11 pm	-		-	-			
11 - 12 midnight	-	-	-	-	-	-	-
12 - 6 am	-	-	-	-	-	-	-

Work: Work (21 hours) + Rose Float (11 hours) = 32 hours

School: CHM 121 (3 units) + MAT 012 (4 units) = 7 units. Allowing 4 hours per unit for all school needs = 28 hours

Total Hours for Work and School: $32 + 28 = 60$ hours.

Analysis: This is an example of a balanced schedule. The student should have plenty of time for both part time jobs, a major extracurricular activity and two math/science classes AND STILL HAVE A BALANCED PERSONAL LIFE. The student should cut back on something if he wants to take more units.

3. Planning Your Curriculum ([back to top](#))

Strategy For Graduation Planning - Follow these basic guidelines and you will minimize your difficulties in completing your program.

Know your curriculum. Understand which courses are prerequisites for others, when courses are traditionally offered, what electives you want to take, and what options you have. Know what courses are on the "critical path" and make sure your are on track for taking them.

Balance classes by degree of difficulty - Categorize courses into the three categories discussed later in this paper. Balance your class load so that your are not taking courses all in one category (if possible).

Be prepared for classes - Do not take courses for which you do not have the necessary prerequisites or skills. This practice takes the fun out of learning, leads to delays and frustrations and may result in having to repeat the course. If you have to repeat the course you have not gained anything anyway.

Time your prerequisites - Try to take courses just after their prerequisite if possible.

Try to plan your curriculum one year in advance - If possible, always be looking ahead for one year of classes and roughly plan your coursework out to graduation. If your department has a forecast of classes or a historical pattern, then use it to plan. **Know what substitutes, if any, are commonly being allowed by your department.** Also, every department has unwritten policies and procedures. Get to know people who can help you understand what these policies and procedures are.

See your advisor with your proposed schedule - Do not ask your advisor to make your schedule--he or she does not have time. They can, however, critique a schedule you have already worked out.

Understand University Policies and Procedures as specified in the University Catalog. Especially know what the catalog says about adding and dropping classes, probation and disqualification, staying enrolled, repeated courses, holds, academic integrity (cheating), credit by examination, course load, leaves, withdrawing from the quarter or university, graduation requirements, graduation with honors and paying fees. You should own a University Catalog and at least be familiar with the list of topics found in the first 100 or so pages.

Understand Your Learning Style - Learning styles vary from person to person. Traditional college

"lecture" courses favor *verbal* learners. Some instructors may have teaching styles that are aimed at *visual* learners. Very few courses are aimed at *active* learners who favor doing and learning by discovery. The beauty of the techniques taught here is that they will help learners with **ANY** learning style become successful by compensating for imbalances. It has been my experience that this methodology can even help overcome certain types of mild learning disabilities (Note: On many campuses students can obtain a very comprehensive assessment of learning disabilities they may have. If you have struggled in school for any length of time and cannot seem to figure out why, consider getting an assessment). One of the better learning styles questionnaires available on the web is at:

<http://www2.ncsu.edu/unity/lockers/users/f/felder/public/ILSdir/ilswweb.html>

This questionnaire provides an assessment using four scales or dimensions related to learning style. A four-page explanation including tips for coping with various styles is provided at:

<http://www2.ncsu.edu/unity/lockers/users/f/felder/public/ILSdir/styles.htm>

Strategy for Learning and Taking Classes - To "properly" learn math, science, or engineering you should plan on spending 2 to 4 hours of outside study for each hour of class. The nature of these courses is that the material is cumulative in two ways:

- Each course builds on the previous one. A poor grade in an early class could doom you to a low grade in the next course because of lack of mastery of concepts--the ability to perform *quickly*.
- Each lecture builds on the previous lectures. This factor makes it imperative to stay on top of the material during the quarter. Good attendance and completion of assignments is essential.

The methodology explained below is designed to give the student tools to effectively learn the material in a progressive manner rather than by "cramming" (Cramming" is the practice of not keeping up with class assignments and then trying to learn the course material the night before a quiz or test. Some students in non mathematically related courses or curriculums manage to "pass" some of their classes this way. In addition to the obvious possibility of failing a class, the main disadvantage of cramming is that the retention rate for the material is practically zero--which hurts later on). In order to have time to learn progressively the student needs to have a balanced class load because some class types will require more time than others. A "balanced" load is a mixture of types and difficulties of classes. For example, it is not desirable to be taking all engineering science classes or all general education classes.

Try not to take more than one pure math or statistics class at a time. These are not subjects you can cram because you are building and training all the time. Certain engineering classes should not be taken together in the same quarter because they can be very difficult and time consuming. In particular the "engineering sciences" are traditionally very difficult. These classes include statics, dynamics, strength of materials, fluid mechanics, thermodynamics, metallurgy, operations research, etc. In fact, many students find themselves having to repeat some of these classes because a C- or better is required to continue the sequence. Again, try to only take one "engineering science" course each quarter.

Another type of class to take without being hampered by a heavy class load are what I call "**critical path**"

classes. A critical path class is a major class that is embedded in a long series of prerequisites. If you were to fail a critical path class, for example, it could delay your graduation from one quarter to one year, depending on how often it is offered. Critical path classes are often considered very important in your major and you would do well to learn the material thoroughly. Below is a sample classload:

Quantity & Type of Class	Examples	Note Taking Method	Remarks
one math, statistics, or difficult engineering science class	calculus, statistics, statics, operations research	transcription (one transcription course per term recommended)	some classes are both a math class and a critical path class for most engineers
one engineering science or critical path major class	physics, statics, dynamics, thermodynamics, systems engineering	transcription or non-transcription	"engineering science" classes are problem solving type classes
one major (with or without lab), support (with or without lab), or general education class	graphics, manuf. processes, chemistry, physics, electrical circuits, economics	non-transcription or St. PIE	-
Additional classes should be easy to moderate major or support classes (no lab), or non-mathematical GE classes	cost accounting for engineers, philosophy,	non-transcription or St. PIE	-

Other considerations: Try to limit the number of classes requiring term papers or quarter projects to three or less. Try to limit the number of labs to three or less--preferably no more than two.

Example: Lets take a look at the [Industrial Engineering Curriculum at Cal Poly Pomona](#). The "Critical Path" is the longest string of consecutive classes that must (or should) be taken in sequence. I would say it is:

- MAT 114 Calculus I**
- MAT 115 Calculus II**
- MAT 116 Calculus III**
- MAT 214 Multivariate Calculus I**
- MAT 215 Multivariate Calculus II**
- MAT 216 Differential Equations**
- STA 309 Probability and Statistics**
- IME 312 Probability and Statistics for Engineers**
- IE 311 Math for Engineers**
- IE 327 Systems Engineering**
- IE 416 Operations Research I**
- IE 436 Advanced Production Planning**

Strictly speaking, several of these classes could be taken concurrently (eg. STA 309 can be taken concurrent with MAT 215). The problem then becomes taking two heavy math courses at the same time.

Major classes that are engineering science that actually should be taken prior to IE 436 include:

IE 417 Operations Research II - IE 429 System Simulation (on the list of core courses)
ME 214 Statics - ME 215 Dynamics - ME 218 Strength of Materials - ME 219 Strength of Materials
ECE 231/251L Electric Circuits - ECE 333/383L Electrical Controls

All of the above classes should be taken with the **Transcription Method** (explained later) of note-taking except IE 436 and the ECE classes. (Note: If I were a full-time student I would include the physics classes here and use the transcription method with them as well).

Most of the rest of the core and support courses are technical as well and the **Non-transcription Method** of note-taking should be used.

Several core and support classes and most of the GE classes can be taken with using the "**St. PIE**" Method of note-taking.

There are 17 total lab classes (assuming that chemistry and physics classes and labs are taken concurrently). Therefore, it should not be necessary to take more than two lab classes in any one quarter.

Analysis: If I were a **full-time, freshman IE student** I would try to take the critical path classes close to the order shown (several can be switched) and schedule everything else around the critical path. I would balance the other engineering science and lab classes so that I was not over loaded in any one quarter.

If I were a **part-time student**, I would map out the critical path, other engineering science courses, and classes with labs so that I never had more than two of them in any one quarter.

If I were a **transfer student**, I would make sure I had all lower division lab classes and ME classes out of the way early so I would not get caught with scheduling conflicts and difficult schedules later on. I would try to be a full-time student (non-working) my last three quarters if at all possible.

4. Study Skills ([back to top](#))

Next we discuss "In Class" (Phase II) and "Outside Class" (Phase III) activities. Your ability to be successful here depends on the study habits described below and whether or not you have set yourself up to be successful in planning your time and classes (Phase I activities). The three areas covered below are:

- a. Note-taking skills (Phase II & III)
- b. Study skills (Phase III)
- c. Exam techniques (Phase II)

The Importance of Notes and Note-taking Skills - The focal point of this study technique is the development and use of your notes.

Properly developed notes typically reflect the ideas, concepts, methods, examples, and "do's

& don'ts'' that your instructor believes to be important and will expect you to know well.

Mastery of your notes will be the best use of your time and is much more efficient than basing your study around the textbook. I recommend three different note taking strategies--depending on the class and/or instructor.

1. **Transcription method** (for math, statistics, engineering science, and selected critical path classes)
2. **Non transcription method** (for most technical major classes and technical GE classes)
3. **St. PIE method** (for humanities, social science, and other non-technical classes)

Each strategy uses the two-column system to start with. What you do after that is what makes the three methods or strategies different. The two-column method is adapted from a notetaking format developed at Cornell. The following illustration shows how 8 x 11, three-hole paper is used for taking notes.

Cornell Notetaking Format

<p style="text-align: center;">Column 1</p> <p style="text-align: center;">Comment Section (2.5 inches wide)</p> <p style="text-align: center;">Questions and Answers</p> <p style="text-align: center;">Ideas</p> <p>Notes to tie concepts together</p> <p style="text-align: center;">Rules</p> <p style="text-align: center;">Comments</p>	<p style="text-align: center;">Column 2</p> <p style="text-align: center;">Capture Section (6 inches wide)</p> <p style="text-align: center;">Write down all information:</p> <p style="text-align: center;">Statements Proof Information Examples</p>
<p style="text-align: center;">Index (1 - 1.5 inches high) New terms Topics covered on page People to contact</p>	

Transcription Method: Most math and engineering textbooks are not easy to follow on their own so you need something additional to study. Preparing proper notes can provide the proper study materials. Take rough notes in class by copying everything down on 8x11 paper with two lines (drawn either freehand or with a straight edge ahead of time) following the Cornell format as best you can (see above). Do not neglect to write down anything because it may be important later (even though not obvious at the time). **Then later, outside of class, "transcribe" (recopy) notes using the two-column system. Transcribing is where you learn because it forces you to think things through for yourself-not just follow the instructors thinking.**

The two-column system - The two columns are mentioned below. Subsequent notes explain the logic and use of the system. On the last page is a sample page of notes using this system.

Column 1 - This space is where you write in "cautions, observations, verbal clues from the instructor, typical errors and mistakes, or do's and don'ts resulting from homework, quizzes, and tests". This column is also where you summarize rules or patterns that govern the process. This information is usually added later after you have identified all the steps. Also write rules on **index cards** for review purposes and to study for tests. The index cards can be carried with you in the car or anywhere and looked at for memorization. This "spaced repetition" helps you to internalize the rules.

Column 2 - Record everything written on the board and whatever you can that is said to explain the material. Include exercises and examples in this column line-by-line. Whenever possible add references to the textbook such as page and section numbers. Always write the sequential page number and date that the notes were taken in the upper right hand side. You will be amazed at how often this information is useful.

Index - On the right side of the index area list the topics covered on the page. On the left list any new "terms" or "vocabulary" introduced. Also write any notes to yourself about who you should see or what you should do about anything on the page.

Index or Table of Contents Page - Create an Index or Table of Contents by transferring the index headings and page number it is on to a page at the beginning of your notes. This "Table of Contents" for your notes is invaluable when studying and taking open-note exams.

While transcribing you will find gaps in logic or things you do not understand. Missing steps of proofs, errors or incorrect statements, and undefined terms are just a few examples of questions you will find only by using the transcription method. **Identify these questions in your notes so you can ask the instructor later. This is done by using Post-it notes. Place the post-it with the question written on it so it sticks out of the page. See your instructor during their office hours and resolve your questions by going through the post-it notes. You will find most instructors will be very happy to help if you use this method.**

In math there are two parts to learning:

"Can do" - What you can do is given by the instructor.

"Can't do" - You add this later in column 1. These are all the cautions and places where mistakes can be made. After you see the homework solutions and get back graded quizzes and exams, analyze the mistakes you made and add cautions to your notes in column 1. This makes studying for later tests (especially final exams) much more meaningful.

Color coding - Use color coding of notes to help you study and use your notes efficiently. A suggested use of colored highlighters is:

Pink - Headings

Green - Rules

Yellow - Cautions, things to memorize

Orange - New words or items

Purple (blue) - Examples

Optional **Blue** (purple) - Old rules and things you should know

Non-Transcription Method - The non-transcription method is the same as the transcription method except that the you do not rewrite the notes. Use the two-column ruled paper and write your original notes as neatly as possible. Then color code and fix up these notes as outlined above. This system works best if you have an instructor that does not go to fast. A speedy instructor forces you to get sloppy sometimes.

St. PIE Method - This method is from the excellent book by Laia Hanau, Play the STUDY GAME for Better Grades, Harper & Row, Fifth Ed. 1972. Briefly stated, use the Cornell Method and write down everything you can in the capture area. When studying you then try to classify the material in your notes as either:

Statement

Proof

Information

Examples.

Thus the acronym **St. PIE**.

In a humanities or social science class, for example, you would then make all the connections. The instructor does not always "tie things together". They leave that to the student. When you see a statement (postulate, theory, axiom, contention, opinion, premise) for ask yourself where the proof, information, and examples are in your notes. Tie them together with lines, arrows, and notes. **When you do this you are predicting the test questions in advance.** Aren't many test questions things like: This is an example of ..., Give proof to support ..., etc.

Study Skills - With math and applied mathematics fields it is not enough to simply "know" or "understand" material. **You need to know the material well enough to perform quickly-- without hesitation.**

Therefore, knowing involves DOING AND DOING QUICKLY. Learning the rules well will help you tremendously. Studying consists of studying the rules, trouble spots, and practicing examples. Studying is

not paging through the book working problems. Math is a "doing" subject, not a "reading" subject.

Study Steps - Write down the first line of an example problem on a piece of scratch paper, close your book or notes, then work as far as you can without looking. Then start over and repeat the process four or five times until you can do the example QUICKLY all the way through. By the time you have worked through the example repeatedly you have the rules memorized. The repetition in this process is the key to learning. This phase of the study process is where you find the "can't do's" to enter them into column one of your notes.

Now the homework should be the "frosting on the cake" and should only take a few minutes. Contrast this technique to the common practice of digging into homework without proper preparation. The homework may eventually get done after a lot of "page flipping", but the student still does not know the material proficiently and rules are not internalized.

Study Time - How long should you plan on for studying and how should it be used?

3/4 - 1 hours - to transcribe notes and understand steps.

1/2 - 1 hours - to work examples over and over.

1/2 - 1 hours - to do homework.

These steps total to 2 to 4 hours of study for each hour of class. You will experience two extremes when studying when using this method: The frustration of not getting the homework done quickly, and the reward of finally getting it out with a fair good understanding and internalization of the material.

Closure - When you stop studying you should always allow a few minutes to ask yourself what you have learned the last hour and what the key points are. This step will help you solidify what you have studied.

Exam Techniques -

Do's and Don't's when studying for an exam:

DON'T cram

DO get a good night's sleep

DON'T cram in the morning

DO use index cards to review before the exam

DO take lots of breaks when studying. A five or ten minute break or "cat-nap" for each hour of studying may keep you fresh enough to continue fruitfully.

DO study during your most productive time. Each person has certain times when they peak mentally. Try to use these periods to study math.

During the test:

Go through the entire test and decide what types of problems there are.

Put a check mark next to those problems you are good at.

Put a question mark next to those problems that are "maybes".

Put an X by those problems you are not good at.

Do the check-marked () questions first. This builds confidence and helps you relax during the test. Your strategy is to get the points you can get. These points (and your grade) generally come from what you know, not from what you do not know.

Additional Ideas

o Transcribe notes only on the front side of each page. Use the back side of pages to enter examples, notes, and theorems from the textbook that correspond to the open page of class notes. If done properly, your notes will be a complete reference source and you will not need to reference the text very often. Notes prepared in the above fashion give you a sense of pride and are considered very valuable.

o Always write the problem number, page and the problem itself above your homework solutions. If not, you will always need your text to make any sense out of your homework papers.

o Consider using a pressboard binder (the kind with two metal strips that fit three hole paper) to store your pages as they leave your 3-ring notebook. At the end of the course you will have a completely "self-contained" reference complete with notes and homework problems.

The Quality Student - Most students do not realize that they can improve their GPA simply by demonstrating to the professor that they are a serious, conscientious, hard-working student. Why? Because the professor may give you the "benefit-of-the-doubt" while grading quizzes or exams or even reward you for your good attitude when determining your final course grade. The "Quality Student" does the following:

1. Always attends class
2. Always takes the prerequisite courses
3. Always pays attention in class
4. Always takes notes
5. Always attempts and turns in their homework
6. Always notifies the instructor about difficult situations that may be keeping them from optimum performance
7. Listens for helpful hints from the instructor
8. Keeps up with class material
9. Plans time to review and study for exams
10. Has a balanced life
11. Does their fair share on team projects
12. Does not "bicker" with the instructor over partial credit

- 13. Visits the instructor during their office hours with genuine questions from class notes or attempted problems
- 14. Always buys and keeps their books, software, and other "tools"
- 15. Looks for the best in every situation
- 16. Is a student of "interpersonal communications"

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TIME PICTURE

Hour	Mon	Tues	Wed	Thur	Fri	Sat	Sun
5 - 6 am							
6 - 7 am							
7 - 8 am							
8 - 9 am							
9 - 10 am							
10 - 11 am							
11 - 12 noon							
12 - 1 pm							
1 - 2 pm							
2 - 3 pm							
3 - 4 pm							
4 - 5 pm							
6 - 7 pm							
7 - 8 pm							
8 - 9 pm							
9 - 10 pm							

10 - 11 pm							
11 - 12 midnight							
12 - 5 am							

