

**BAE 103**  
**Energy in Biological Systems**

**Engineering Problem Solving Approach**

Problem solving skills become second nature for most professional engineers. In this course you will be required to follow a regimented approach to solving engineering problems. While some aspects of this approach will seem rather mundane or tedious, the focus is to instill within you the ability to organize your thoughts regarding the solution to engineering problems, and then to clearly convey your thoughts to other professionals. You will be awarded 90% credit for setting up solutions to assignments with the remaining 10% awarded for the correct answer. Because most of the credit you will receive will be partial credit, it is in your interest to be as thorough and complete in the development of your solutions as possible. Please use the following steps as you prepare your homework assignments for submission:

1. All hand written assignments must be submitted on green engineering paper (Staedtler Form Number 937 811 E or similar). Use only the front side of the paper for your solution. The grid can be used as a guide to align sketches and text.
2. The title block at the top of the first page should be completed as follows: Block 1 – bank (this will be used for stapling multiple pages together), Block 2 – assignment name (e.g. Homework Set No. 2), Block 3 – course identifier (e.g. BAE 103), Block 4 – name (e.g. Jane G. Smith), and Lower Block Right – page number (e.g. 1/5 on first page of 5 page submission, 2/5, 3/5 .... On subsequent pages).
3. Begin your solution by reading the problem statement completely.
4. Determine what answer(s) is/are required along with the final units of the answer(s).
5. Carefully study the problem statement to determine what information is provided.
6. Begin your solution by writing the problem number in the upper left hand corner of the blank paper. Draw a rectangle around the problem number.
7. Provide a simple sketch if appropriate.
8. Reference any information that you get from a location other than the problem statement.
9. List any assumptions that you made when developing your solution.
10. Jot down any pertinent equations that will be used in the solution. Be certain to identify each variable and units where appropriate.

11. Using your math skills isolate the unknown variable on the left-hand side of the equation.
12. Beginning at the left-hand side of the page, draw a blank, enter the units of the final answer, and then draw the “=” sign.
13. Begin the right-hand side of the equation by entering the known values in place of the variables for the equation you are using.
14. Perform a dimensional analysis of your equation to insure your equation is set up correctly.
15. Where appropriate, add conversion factors to the right-side of the equation.
16. Perform a unit analysis to insure the appropriate conversions have been made (In general each number you enter into the equation should have units associated with it. There are a few exceptions to this rule such as “Pi.”)
17. Perform the necessary computations being certain to double check your numerical answer.
18. Steps 12 through 18 may need to be repeated within solutions to multi-step problems.
19. Ask yourself if the final answer is logical – is it a valid solution?
20. Report your final numerical answer to three significant figures in the blank space at the left of the equation.
21. Re-write your final answer at the lower right of your solution and draw a box around it.
22. Using a straight edge, draw a horizontal line across the paper to indicate the start of a new solution.