Engineering 160 Exam 2 Topics

• **Statics**
  - **Free Body Diagrams**
    - Correctly Label FBS
      - Include all units
      - Include all values / angles / measurements
    - Make sure all Forces are included
    - Split angular forces into components
      - $F_{\cos \theta}$ for $F_x$ of $F_y$ (depending on which angle you use)
      - $F_{\sin \theta}$ for $F_y$ or $F_x$ (depending on which angle you use)
  - **Know and Practice Writing the 3 Equilibrium Equations:**
    - $\sum F_x = 0$
    - $\sum F_y = 0$
    - $\sum M_A = 0$
  - Remember Units
  - Define positive directions (ie. Right, Up, CCW)
  - **Practice Solving for Tensions and Resultant Forces**
    - Remember to write final answers:
      - As Magnitudes (meaning as a single number; NOT in x/y components)
      - With Direction (ie. $20^\circ$)
      - With Units (ie. m, N, m/N, etc.)
    - Practice doing calculations with simple calculator

• **Statistics**
  - **Mean**
  - **Median**
  - **Standard Deviation**
    - $s = \sqrt{\frac{n \sum x_i^2 - (\sum x_i)^2}{n(n-1)}}$
    - Practice doing calculations with simple calculator

• **Programming**
  - **Sub Functions**
    - How to write a function
      - Opening statement
        - Example: Function Add (ByValx1 as single, ByVal x2 as single, ByVal x3 as single) as single
      - Output to main sub, from previous example will be:
        - $ADD = x1 + x2 + x3$
      - Don’t forget End Function
    - How to call Function from a main sub
      - Ex: sum= Add(x1, x2, x3)
Sub Routines
  ▪ How to write a SubRoutine
    • Opening statement
      o Example: SubProb1 (ByVal x1 as single, ByVal x2 as single, ByVal x3 as single, ByRef sum as single, average as single)
    • Output to desired variables to main sub, from previous example will be:
      o sum = x1 + x2 + x3 & average = (sum/3)
    • Don’t forget End Sub
  ▪ How to call SubRoutine from a main sub
    • Ex: Call Prob1(x1, x2, x3, sum, average)

By Val vs By Ref
  ▪ ByRef:
    • Allows subprogram to change the value
    • Bringing calculated values from subprogram back up
    • Always used with arrays
  ▪ ByVal:
    • Does not allow subprogram to change the value
    • Used for known variables brought down from main program

Msgbox/Inputbox/Input/Output/Open/Close
  ▪ Know how to write and use the above

1D Arrays
  ▪ Know how to dimension arrays
    • Ex: Dim Array (1 to 100) as Single
  ▪ Know how to enter in array values using For-Next loops

Best Cheat Sheet Practices:
  • Include useful examples of
    o A full Statics problem
    o Using Statistics formula
    o Various lines of VBA, like the examples above
  • Make it neat
    o Separate different sections
    o Write legibly
    o Type it up if out need to

Don’t forget: Your Cheat Sheet, Pencil(s), Simple Calculator, Eraser