PROJECTS FALL 2O15 T.R.Chandrupatla P.E.

Section 1

1. 1-D Bar with weight consideration
   David Gomes, Dan Mc Devitt, Raymond Luong

2. 2-D Truss with weight consideration
   Zach Bechtel, Conor Egan, Tim Egan, Patrick G. Myers

3. 2-D Truss with buckling consideration
   Rob Altieri, Dan Bede, Zach Hunt, Mike Maerten, Carolyn Oxner

4. 2-D triangle with weight consideration
   Jay Lefkowitz, Dwight Tucci, Robert Zybrick

5. 2-D Bimetal Thermal Switch
   William Urban

6. 3D- Truss I
   Tyler Babcock, Charlie Grab, Joe Nalback, Kyle Meehan

7. 3D- Truss II
   Dan Freeman, Angelo Matriciano, Brandon Rush, Morgan Sobel

8. 2-D Heat Transfer
   Nick Dow, Mitchell Henthorn, Elliott Schwartz, Megan DeGeorge

9. 3 D Tetrahedral element with temperature

10. 2-D Orthotropic Plate

11. Belleville Spring using Nonlinear Approach

See page 3 for report and presentation details

Section 2

1. 1-D Bar with weight consideration
   James Case, Ian Miller, Ryan Miller, Kathryn Wrinn

2. 2-D Truss with weight consideration
   Michael Arigot, Nicole Puzio, Jess Snyder, Eric Westphal

3. 2-D Truss with buckling consideration
   Chris Clark, Matt Leoncini, Adam Mielock, Zach Nocera

4. 2-D triangle with weight consideration
   Shalyn Brangman, Kyle Perry, Mike Stallone, Trevor Thayer

5. 2-D Bimetal Thermal Switch
   Mike Feeley, Alex Crudo

6. 3D- Truss I
   Alex Guido, Kyle Peachey, Kyle Raudenbush, Matt Vorverck

7. 3D- Truss II
   Carter Bagnell, Kate Everett, Patick C. Myers

8. 2-D Heat Transfer
   Brian Dixon, Evan McCollum, Thao Tran

9. 3 D Tetrahedral element with temperature
   Brad Johnson

10. 2-D Orthotropic Plate
    Nikhil Bezwada, Sean Marko, Robert Mourning

11. Belleville Spring using Nonlinear Approach
    George Lecakes

See page 3 for report and presentation details
See page 4 for some hints

Project Report and Presentations
Finite Element Analysis
T.R.Chandrupatla

Report
The report may be about 4 to 10 pages long.
Provide literature survey on your problem.
Discuss various aspects of your problem to show your understanding.
Formulate one or more problems and solve.
Show your code modifications.
Discuss results.
Provide references.

Presentations
Each member in the group is expected to speak.
Apart from the group grade following individual characteristics will be assessed.
Preparation
Understanding
Presentation

Some Suggested Hints

1. 1-D Bar with weight consideration
   (Read material property wt per unit vol <change NPR =2 to NPR = 3>, add contributing weight forces in element stiffness routine.
2. 2-D Truss with weight consideration
   (See comment above.)
3. 2-D Truss with buckling consideration
   (Check elements with compressive stress. Critical compressive force – Euler buckling load is $\pi^2 EI/L^2$ for pinned pinned. L is element length. See buckling of shafts reference in *machine design*, or *structural mechanics*.
4. 2-D triangle with weight consideration
   (change NPR = 3 <E,ν, α> to NPR = 4 fourth property wt per unit vol. and see comment in 1, 2 above)
5. 2-D Bimetal Thermal Switch
   (See what is bimetal switch. One of your problems may be 6.26)
6. 3D- Truss I
   (Implement section 4.3 material. One problem for consideration is 4.18. You may also check with Solidworks FEA.)
7. 3D- Truss II
   (See comment in 6)
8. 2-D Heat Transfer
   (See pages 359-368 and program HEAT2D.)
9. 3 D Tetrahedral element with temperature
   (Pages 312-322 and program TETRA3D. Choose appropriate problem)
10. 2-D Orthotropic Plate
    (Pages 216-220. Use D matrix modifications Eq. 6.81 into CST.)
11. Belleville Spring using Nonlinear Approach
    (Pages 259-260. If load is P, say $\Delta P = P/10$. Apply ΔP as load and solve using AXISYM. Add deformations u,w to the coordinates and use the new coordinates as starting point for next ΔP etc. Also store stresses at first iteration and add the stresses from second interation etc)