Computer Methods in Civil Engineering (15L+15C)
Civil Engineering, II cycle, specialty Building and Engineering Constructions

Lectures - dr hab. inż. Jerzy Pamin, prof. PK

1. FEM as Galerkin method – example of axial bar deformation
2. FEM for continuum mechanics
3. Solution of nonlinear problems
4. FEM for elastic-plastic problems
5. FEM in plate and shell analysis – buckling problem
6. Other computational methods and selected applications
7. Recapitulation of most important issues, preparation to test
8. Test

Laboratory - dr M. Klimczak (coordinator)

1. PDETOOL – plane strain problem (exercise)
2. MATLAB – bar statics and longitudinal vibrations (exercise)
3. ABAQUS – package introduction and panel example
4. ABAQUS – static plate bending (assignment 1)
5. ABAQUS – dynamic plate bending (assignment 2)
6. ABAQUS – elastic-plastic deformation of panel (exercise)
7. ABAQUS – assignment delivery

Course requirements:
1. The presence at lab exercises and lectures is compulsory, only one absence without excuse is admissible.
2. Positive grades from the test and labs are necessary conditions to obtain a pass grade.
3. The final grade is a weighted sum of grades from lab exercises (E) and the test (T) as follows: 0.49*E +0.51*T.
4. The test (composed of short problems and multiple choice tasks) will be organized 3 times: I during last lecture, II (resit) during examination session before summer holidays, III (2nd resit) in September session.
5. The resit test can be taken only by students with a pass grade from lab exercises. The 2nd resit can be taken only by students who have not taken one of previous tests due to important reasons or who scored in one of the previous tests at least 80% of points required for a pass.

Literature:
1. Course materials online.
2. T. Belytschko, W.K. Liu and B. Moran, *Nonlinear Finite Elements for Continua and Structures*, John Wiley & Sons, 2000.
3. R. Cook, *Finite Element Method for Stress Analysis*, J. Wiley & Sons 1995.
4. G. Rakowski, Z. Kacprzyk, *Metoda elementów skończonych w mechanice konstrukcji*, Wydanie III, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2016
5. O.C. Zienkiewicz and R.L.Taylor, *The Finite Element Method for Solid and Structural Mechanics*, Elsevier Butterworth-Heinemann, Amsterdam 2005.