

## Course Syllabus

### 020PLSGS4 Plastic Analysis of Structures

1. **Course number and name:** 020PLSGS4 Plastic Analysis of Structures
2. **Credits and contact hours:** 2 credits, 2x1:15 course hours
3. **Instructor's or course coordinator's name:** Fouad KADDAH
4. **Textbook and other supplemental material:**
  - a. Instructor's class notes
  - b. Traite de Genie Civil de l'Ecole polytechnique federale de Lausanne Volume 2: Analyse des structures et milieux continus ; Mecanique des structures; Auteurs Francois Frey.
  - c. Structural Analysis: A unified classical and matrix approach sixth edition; A Ghali, A. M. Neville and T. G. Brown; Spon Press 2009
  - d. Structural and Stress analysis, second edition ; Dr T. G. H. Megson; Elsevier 2005
  - e. Engineering mechanics of solids; Auteur: Popov, Prentice Hall 1990
5. **Specific course information**
  - a. **Catalog description:** Introduce the plasticity criteria, the plastic hinge theory and the strategy to evaluate the plastic load factor.
  - b. **Prerequisites:** 020RDMGS2 Strength of Materials.
  - c. **Required/Elective/Selected Elective:** Required major course for Civil Engineering Specialty students.
6. **Specific goals for the course**
  - a. **Specific outcomes of instruction:**
    - Understand the conditions required to apply the theory of plasticity
    - know how to calculate the plastic failure mechanism of a construction and to calculate the plastic failure load in order to evaluate its bearing capacity
    - understand how plasticity theory is used in the verification of ultimate limit state of a construction
  - b. **KPIs addressed by the course:**

KPI	a1	c1	e2	e3	k1	k2
Covered	x	x	x	x	x	x
Assessed						
Give Feedback						

7. **Brief list of topics to be covered and approximate number of lectures:**
  1. General introduction to plastic theory (2 hours)
  2. Plastic traction-compression (2 hours)
  3. Plastic bending (4 hours)
  4. Plastic load capacity of indeterminate structure: Step by step method (2 hours)
  5. Plastic load capacity of indeterminate structure: fundamentals theorems of plasticity (4 hours)
  6. Calculation of reinforced concrete slabs by the yield-line method (3 hours)