Course Syllabus

1. **Course number and name:** 020EMECI3 Electromagnetism
2. **Credits and contact hours:** 6 ECTS credits, 3x1:15 course hours
3. **Instructor's or course coordinator's name:** Rémi Z. DAOU
4. **Text book:** *Physique tout-en-un MP, Salamito, J'intègre-Dunod, 2014*
5. **Specific course information**
    a. **catalog description:** This course starts with a separate study in the stationary case of the electric and the magnetic fields. Geometrical symmetries are used to benefit from the properties of the flux and the circulation of a vector field. Stationary local equations are introduced as a special case of Maxwell equations. After a presentation of the Maxwell equations and the electromagnetic (EM) energy, attention is focused on the propagation of EM waves in vacuum, in conductors, in plasma and far away form an EM oscillating dipole.
    b. **prerequisites or co-requisites:** 020SPHNI1 Physical Signals – 020AGNNI1 General Analysis.
    c. **Required/Elective/Selected Elective:** Required
6. **Specific goals for the course**
    a. **Specific outcomes of instruction:**
        - Master the notions of scalar and vector fields
        - Conduct invariance and symmetry analyses and evaluate fields using properties of their flux and their circulation
        - State the laws of electrodynamics in local and integral form
        - Conduct energy balance between EM field and matter
        - Describe the propagation of EM waves in vacuum and dispersive media
        - Relate the EM fields to their sources in the case of oscillating dipoles
    b. **KPIs addressed by the course:**

KPI	a1	a2	b1	b2	b3
Covered	x				
Assessed	x				
Give Feedback	x				

7. **Brief list of topics to be covered and approximate number of lectures:**
    1. Stationary electric field and dipole (7 lectures)
    2. Stationary magnetic field and dipole (5 lectures)
    3. Maxwell equations (6 lectures)
    4. Electromagnetic Energy (4 lectures)
    5. Propagation of electromagnetic waves in vacuum (5 lectures)
    6. Propagation of electromagnetic waves in a dispersive medium (8 lectures)
    7. Electromagnetic waves in conductors (4 lectures)
    8. Radiation of an oscillating electric dipole (3 lectures)