# Internet Ecosystem and Evolution

1. **Course number and name:** 020EEIES4 Internet Ecosystem and Evolution

2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours

3. **Name(s) of instructor(s) or course coordinator(s):** Juliana El Rayess

4. **Instructional materials:** Course handouts, lab experiments, white papers, magazine articles

5. **Specific course information**
   a. **Catalog description:**
   Internet governance – Autonomous system interconnection – Transit and peering agreements – Internet exchange points – Concepts of external routing – BGP routing protocol – BGP routing policies – Security of routing in the Internet – Utility and demand models – Pricing models in the Internet.

   b. **Prerequisites:** 020INRES1 Introduction to Data Networks

   c. **Selected Elective** for CCE students

6. **Educational objectives for the course**
   a. **Specific outcomes of instruction:**
   - Analyze and compare the interconnection agreements for traffic exchange in the Internet.
   - Identify the challenges of external routing in the Internet and examine the concepts of the BGP protocol.
   - Assess the scalability challenges and the security risks of routing in the Internet.
   - Apply the routing policies as BGP rules using a network simulator.
   - Identify and criticize the pricing models for Internet traffic.

   b. **PI addressed by the course:**

| PI | 1.1 | 1.2 | 1.3 | 2.3 | 2.5 | 4.2 | 6.1 | 6.2 | 6.3 | 7.2 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Covered** | x | x | x | x | | x | x | x | | |
| **Assessed** | x | x | x | x | x | x | x | x | x | x |

1. **Brief list of topics to be covered**
   - Internet governance and autonomous system interconnection (2 lectures)
   - Group activity on autonomous system interconnection (1 lecture)
   - Transit and peering agreements and Internet exchange points (2 lecturers)
   - Group activity on the Internet ecosystem in Lebanon (2 lectures)

- Concepts of external routing (2 lectures)
- Concepts of BGP protocol and routing attributes (2 lectures)
- Group activity on public data of BGP routing (2 lectures)
- Routing policies with BGP (2 lectures)
- Lab activity on implementing routing policies with a network simulator (3 lectures)
- Scalability issues with BGP routing (2 lectures)
- Security issues with routing in the Internet (2 lectures)
- Demand and utility models (2 lectures)
- Pricing models in telecommunications (2 lectures)
- Group activity on pricing for Internet access (2 lectures)