

### **CEN 342: Introduction to Data Transmission**

- Credit Hours (Lectures, Lab, Tutorial): 3 (3 + 0 + 1).
- Prerequisites: CEN 340.

**Courses content:** Introduction to communication systems: wired & wireless, coaxial cables, optical fiber, microwave and satellite channel. Transmission Impairments: Noise, attenuation, phase and envelope distortion, non-linearity; Data encoding: AM, PM and FM modulations, NRZ, Biphase and differential codes, PCM, DPCM and DM, ASK, FSK, PSK and M-ary signal; Data Multiplexing: FDM and TDM, Statistical TDM, spread spectrum, T1 & E1, SONET/SDH; Data Communication Techniques: HDX, FDX, Asynchronous and synchronous transmission; Interfacing techniques and protocols: EIA 232, V.24, X.21 standards; Data transmission over telephone lines: Modems, basic modem design; Error detecting techniques: CRC; Switching techniques: circuit switching (space & Time), Packet switching (datagrams, virtual circuits); Communication Systems: Telephone Network, Basics of ISDN.