COM-414

Satellite communications systems and networks

Farserotu John

Cursus	Sem.	Type
SC master EPFL	MA1, MA3	Opt.
Space technologies minor	H	Opt.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Written
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

Study of satellite communication (SATCOM) systems and IP satellite networks.

Content

Introduction to satellite communication
- Systems and services (e.g. INMARSAT)
- SATCOM transmitters, receivers and antennas
- SATCOM link budget analysis
Mobile satellite channel
- Multipath, shadowing, Doppler spread, delay spread
- Waveform design implications
SATCOM multiple access and access control
- FDMA, TDMA, CDMA and capacity and trades
- Random access and MAC (e.g. FAMA, DAMA)
SATCOM modulation, error correction and control
- MPSK, MPSK TCM modulation and demodulation
- Convolutional coding, Viterbi decoding, error control
SATCOM antennas
- Satellite phased array and mobile terminal antennas
- Antenna diversity combining techniques
TCP/IP over SATCOM
- TCP/IP over satellite performance issues
- Satellite IP enhancements, routing, congestion control
IP/ATM over satellite networks
-Introduction to IP/ATM over SATCOM
- IP/ATM SATCOM network integration
Emerging systems and issues
- Broadand and Satellite UMTS (S-UMTS)
- SATCOM system cost considerations
Special topics in wireless communication
- High Altitude Platforms (HAPs)

Keywords

SATCOM, satellite channel, SATCOM multiple access, modulation, antennas, TCP/IP, IP/ATM

Learning Prerequisites

Recommended courses

No prerequisite courses

Important concepts to start the course

BS engineering

Learning Outcomes

By the end of the course, the student must be able to:

- Perform a SATCOM system design and analysis

Supervision

Office hours	No
Assistants	Yes
Forum	No

Resources

Websites

- http://moodle.epfl.ch/course/view.php?id=2551

Moodle Link

- http://moodle.epfl.ch/enrol/index.php?id=2551