



МИНИСТЕРСТВО НА ОБРАЗОВАНИЕТО И НАУКАТА

Проект BG051PO001-3.1.07-0048 „Актуализиране на учебните планове и програми на специалностите във ФЕТТ, ФТК и МТФ на ТУ-София и създаване на нова съвместна магистърска специалност в съответствие с потребностите на пазара на труда”

DESCRIPTION OF THE COURSE

Name of the course: Nano communication devices and networks	Code: MMTN04	Semester: 1
Type of teaching: Lectures, laboratory work and Course task	Lessons per week L-2 hours LW-2 hours	Number of credits 6

LECTURER:

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Technical University of Sofia, Telecommunications Faculty, Department of Technologies and Management of Telecommunication Systems

COURSE STATUS IN THE CURRICULUM:

Compulsory for the students in specialty "Microtechnologies and Nano Engineering" MEng programme of FETT.

AIMS AND OBJECTIVES OF THE COURSE

The objective of the course “NCDN” is students to get knowledge of the advanced approaches for communication devices realization through nano technologies and with nano communication networks as the next step in communication technologies. Fundamental requirements for communication networks are predefined, as well as design algorithms, architecture, topology, connectivity, routing, reliability and security of nano networks.

DESCRIPTION OF THE COURSE:

The course considers topics as electromagnetic nano networks, neural networks for nano communications, molecular and bacterial communications. Examples of nano communication devices are given as nano tube radio, nano sensor node, antennas from graphene or carbon, Terahertz channel, as well as piezoelectric nano connections for energy harvesting. Other topics are protocols for nano communication devices, nano communication networks security. modeling and simulation of nano communication devices and networks with the software tools MATLAB, COMSOL Multiphysics, CST Microwave Studio, QCAD Design, etc.

PREREQUISITES:

Communication networks.

TEACHING METHODS:

The lectures are e-presentations and video clips assisted. Laboratory works are carried out through “laboratory work guide” and protocols. Course tasks are individual for each student.

METHOD OF ASSESSMENT:

Written exam in the end of 1st semester

INSTRUCTION LANGUAGE: Bulgarian (English is possible also)

BIBLIOGRAPHY:

1. D. Molchanov, Lectures ELT-53406, Special course on networking, Tampere University of Technology. 2013, <http://www.cs.tut.fi/kurssit/ELT-53406/>
2. F. Dressler, F. Karglb, Towards Security in Nano-communication: Challenges and Opportunities, Elsevier Nano Communication Networks 3(3) (2012) 151-160.
3. I. F. Akyildiz, F. Brunetti, C. Blazquez, Nanonetworks: A new communication paradigm, Computer Networks 52 (2008) pp.2260–2279
4. M. S. Islam, Logeeswaran VJ, Nanoscale Materials and Devices for Future Communication Networks, IEEE Communications Magazine, June 2010, pp.112-120