

Name: Technologia światłowodów II (C-PF.I-TECHSII)

Name in Polish:

Name in English: Fiber optic technologies II

Information on course:

Course offered by department: *missing department name in English*

Course for department: Faculty of Chemistry

Default type of course examination report:

Grading

Language:

Polish

Course homepage:

<http://opticalfibers.umcs.pl/start/>

Description:

Lecture topics:

Types of silica glass. Technologies used to produce synthetic silica glass. Optical fiber preforms technologies. Optical fiber drawing processes. Optical and mechanical quality assessment of the optical fibers.

Laboratory topics:

Production of thick core fibers (PCS). Preparation of optical fiber preforms and multimode fibers. Measurements of optical fibers mechanical properties.

Seminar topics:

Glassy state. Glass - constructions theories, formation conditions and structure. Properties of glass - viscosity, crystallization, mechanical strength, thermal expansion, chemical and electrical properties, additivity of glass properties. Basics of glass technology - raw materials, glass mass melting, products forming, stress relaxation and hardening, other methods of product modification. Optical properties of glasses, optical glasses - manufacturing technology, types and their properties, photochromic glass, optical fibers drawing processes. Ceramic processes: sintering and seeds growth, nucleation and crystallization. Materials used for the production of silica optical fibers - characteristics (types of glasses). Materials used for the production of polymer optical fibers - characteristics. Analytical methods used to analyze materials suitable for polymer and silica optical fibers. Protective coatings. Inorganic and organic dopants and their influence on the materials properties from which optical fibers are made. Mechanical properties of optical fibers and mechanical analysis. Optical fiber cables. The use of optical fibers in medicine and telecommunications. Fiber optics used as lighting.

Bibliography:

Lecture and laboratory:

M. Szustakowski, "Elementy techniki światłowodowej", Wydawnictwa Naukowe-Techniczne, Warszawa (1992),

J.E. Midwinter, "Światłowodowy telekomunikacyjne", WNT, Warszawa (1983),

H. Murata, "Handbook of optical fibers and cables", Marcel Dekker Inc., New York (1996),

A. Smoliński, "Optoelektronika światłowodowa", WKŁ, Warszawa (1987)

Seminar:

Praca zbiorowa, "Technologia Szkła", Arkady, Warszawa (1987),

J. Dereń i inni, "Chemia ciała stałego", PWN (1975),

E. Gorlich, „Szkło – tworzywo znane i nieznanne”, Wrocław (1983),

O. Ziemann, J. Kranser, P.E. Zamzow, W. Daum „POF Handbook”, Springer (2008) - dostępne u prowadzącego

J.F. Rabek "Współczesna wiedza o polimerach", PWN (2008),

J.D. Menczel, R.B. Prime „Thermal analysis of polymers”, John Wiley&Sons (2009).

Learning outcomes:

Based on the MCSU Senate Resolutions No. XXII-39.12/12 of 25 April 2012

i.e. since the educational cycle of 2012/2013

KNOWLEDGE

W1. Has basic knowledge in the field of physics, knows and understands the basic physicochemical phenomena K_W02

W2. Has knowledge about the basic definitions regarding optical fibers technology K_W03

W3. Has basic knowledge about the construction of a optical fiber drawing tower K_W10

W4. Knows and understands the basic technological processes related to the production of synthetic glass and optical fiber preforms

K_W10

W5. Knows and understands the silica optical fiber drawing process K_W18

W6. Knows the basic principles of health and safety at work K_W15

SKILLS

U1. Can use knowledge in the field of physics and mathematics to understand the phenomena occurring in the surrounding world K_U02

U2. Is able to present the obtained results in a comprehensible way, and draw conclusions from them K_U06 K_U30 K_U33

SOCIAL COMPETENCIES

K1. Understands the need to improve professional and personal competences K_K01

K2. Can perform tasks both individually and in a team K K02 K K05

missing attribute description in English

Lecture 15
Laboratory 30
Seminar 15
Consultations 2
Total number of hours with the participation of an academic teacher 62
Number of ECTS with the participation of an academic teacher 2
Self-study of lecture topics 25
Individual preparation for the laboratory 25
Participation in consultations 2
Preparing to pass the test 8
Total number of non-contact hours 60
Number of ECTS for non-contact hours 2
Total number of ECTS for module 4

missing attribute description in English

Way of the learning outcomes verification for B.Sc. students course approved based on the MCSU Senate Resolutions No. XXII-39.12/12 of 25 April 2012 i.e. since the educational cycle of 2012/2013
W1-5 lecture, final test
W1-6 laboratory, assignments, class reports, test
W1-5 seminar, scientific discussion, multimedia presentations, test
U1-2 laboratory, class reports
U1-2 seminar, scientific discussion, multimedia presentations
K1-2 laboratory, assignments, class reports
K1-2 seminar, scientific discussion, multimedia presentations

Requirements

Basic knowledge of inorganic and organic chemistry, basic knowledge of physics. The basic scope of knowledge learned during the course "Optics, theory and metrology of optical fibers"

Equivalent courses in various terms:

missing study program description in English (C-C-LS)		
Equivalent course	First term	Last term
Statistical thermodynamics (C-PF.I-TS)	16/17Z	16/17Z
Parallel programming in FORTRAN 95 (C-PS.I5-ProgF95)	16/17Z	16/17Z

Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	4	15/16	