Faculty of Electrical Engineering, Automatic Control and Computer Science

Field of study: Electrical Engineering
Winter/Summer semester (W/S)

Lp.	Course title	Semester	Σ	Lecture	Class	Lab	Project	ECTS
1	Circuits and Signals	S	30	30				**4**
2	Circuits and Signals	S	15		15			**2**
3	Fundamentals of Electronics	S	30	30				**4**
4	Fundamentals of Electronics	S	15		15			**2**
5	Aspects of life in Great Britain	S	30	30				**4**
				90	**30**			**16**

Field of study: Computer Science
Winter/Summer Semester

Lp.	Course title	Semester	Σ	Lecture	Class	Lab	Project	ECTS
1	Electromagnetic Field Theory	W	30	30				**4**
2	Circuits and Signals	W	30	30				**4**
3	Fundamentals of Electronics	S	30	30				**4**
4	Aspects of life in Great Britain	S	30	30				**4**
				120				**16**

Field of study: Electronics and Telecommunications
Winter/Summer semester (W/S)

Lp.	Course title	Semester	Σ	Lecture	Class	Lab	Project	ECTS
1	Electromagnetic Field Theory	W	30	30				**4**
	Fundamentals of Electronics	S	30	30				**4**
2	Fundamentals of Electronics	S	15		15			**2**
	Teleinformatic Networks	W/S	30	30				**4**
3	Teleinformatic Networks	W/S	30			30		**4**
	Telecommunications the 21 Century	W/S	30	30				**4**
4	Telecommunications the 21 Century	W/S	30		30			**4**
	Circuits and Signals	S	30	30				**4**
5	Circuits and Signals	S	15		15			**2**
6	Electronic Elements	W	15	15				**2**
				165	**60**	**30**		**34**

FUNDAMENTALS OF ELECTRONICS

Course	**Fundamentals of Electronics**
Course in Polish	Podstawy elektroniki
Course form *	L, C
Hours required for semester (full-time studies)	30 L + 15 C
ECTS	4+2
Course code	
Field of studies	Electrical Engineering
Specialisation	All specializations
Chair in charge of the course	Chair of Electronics and Intelligent Systems
Supervisor	Dorota Wiraszka, Ph.D.
Course level	Bachelor's degree
Course type	obligatory

* : L – *lectures*, C – *classes*, Lab – *laboratories (laboratory practicals)*, P - *project/design*

Syllabus outline:

Lectures, Classes:
Physic-chemical fundamentals of semiconductor operation. The *p-n* junction as a basic functional structure of semiconductor devices. Semiconductor diodes and their applications in typical operating systems. Bipolar and Field-Effect transistors and their applications in linear systems. Transistor amplifier analysis. Operational amplifier and its basic operating systems.

Expected Learning Outcomes:

Lectures, Classes:
Understanding of fundamentals of semiconductor devices operation; ability of basis electronic systems analysis and design.

Bibliography:

1. Marciniak W.: *Przyrządy półprzewodnikowe i układy scalone,* WNT, Warszawa 1994
2. D.L. Pulfrey – *Understanding Modern Transistors and Diodes.* Cambridge University Press, Cambridge 2010
3. D. J. Eggleston – *Basic Electronics for Scientists and Engineers*. Cambridge University Press, Cambridge 2011
4. Floyd T. L.: *Electronic Devices,* Macmillan Publishing Company, New York 1998

TELEINFORMATIC NETWORKS

Faculty	**Electrical Engineering, Automatics and Computer Science**
Field of study	Electronics and Telecommunication
Course title in English	**Teleinformatic Networks**
Form	Lecture & Laboratory
Number of lectures	30+30
ECTS	4
Specialisation	Telecommunication Networks
Chair	Chair of Telecommunication, Photonics and
	Nanomaterials
Responsible persons	Radoslaw BELKA, Miroslaw PŁAZA

Learning level	bachelor

L – *lectures*, C – *classes*, Lab – *laboratories (laboratory practicals)*, P - *project/design*

Conspect

Introduction to Networking. Networking Fundamentals. LAN, MAN and WAN networks. Communicating over the Network. OSI and TCP/IP models. Application Layer Functionality and Protocols. Short overview of HTTP, SMTP, POP, FTP, TFTP, DNS, DHCP, Gnutella protocols. OSI Transport Layer. TCP and UDP protocols. Port numbers. OSI Network Layer. IPv4 and IPv6 protocols. Addressing IPv4 - subnetting and VLSM. Data Link Layer. Multiple Access Network. Physical Layer. Cables and media. Basic LAN technology. Ethernet. Cabling and testing.

Results and effects

Basic skills on local computer networks. Configuration and diagnostic skills (using ping, tracert, netstat, nslookup, arp commands). Packet sniffing and analyzing using Wireshark software. Network addressing and subnetting. Network simulation and visualization using Packet Tracer. Possibility to receiving a CCNA – Network Foundamentals Certificate of Course Completion.

Literature:

1. M. A. Dye, R. McDonald, A. W. Rufi, "CCNA Exploration Network Fundamentals. Second Edition"
2. K. R. Fall, W. R. Stevens, "TCP/IP Illustrated, Volume 1: The Protocols (2nd Edition)

TELECOMMUNICATIONS IN THE 21ST CENTURY

Faculty	**Electrical Engineering, Automatics and Computer Science**
Field of study	**Electronics and Telecommunications**
Course title	**Telekomunikacja 21 wieku**
Course title in English	**Telecommunications in the 21st Century**
Course form *	L
Number of hours	30
ECTS	4
Specialisation	Telecommunications
Chair	Katedra Telekomunikacji, Fotoniki i Nanomateriałów
Supervisor	Marian Marciniak
Course level	Bachelor/Master

L – *lectures*, C – *classes*, Lab – *laboratories (laboratory practicals)*, P - *project/design*

Contents of education

Lecture:

1. Broadband Services and Technologies
2. Convergence of voice (SDH/SONET) and data (Ethernet) networks
3. Integration of Fixed/Mobile/Satellite Communications
4. Optical wired and wireless communications

5. Wireless Systems and Technologies
6. New frequency bands (Mid-Infrared and Terahertz)
7. Emergency Communications
8. Next Generation Networking
9. Long Term Evolution Networks
10. Future Networks and Future Internet
11. Standardisation activities (European and international bodies – IEEE, ITU, IEC, ETSI, CENELEC)
12. Pervasive and sensor networking
13. ICTs in motor vehicles - Fully Networked Car
14. Cybersecurity, Spam and Cybercrime
15. ICTs and Climate Change, Green Communications

Efects of education

Students will gain the of fundamental knowledge of modern telecommunications and the directions of future developments. They will acquire an ability of a creative approach to modern telecommunications.

Literature:

Govind P. Agrawal, Fiber-Optic Communication Systems, 4th Edition, ISBN: 978-0-470-50511-3, Wiley, November 2010
Andreas F. Molisch, Wireless Communications, 2nd Edition, ISBN: 978-0-470-74186-3 , Wiley, November 2010

TELECOMMUNICATIONS IN THE 21ST CENTURY

Faculty	**Electrical Engineering, Automatics and Computer Science**
Field of study	**Electronics and Telecommunications**
Course title	**Telekomunikacja 21 wieku**
Course title in English	**Telecommunications in the 21st Century**
Course form *	C
Number of hours	30
ECTS	4
Specialisation	Telecommunications
Chair	Katedra Telekomunikacji, Fotoniki i Nanomateriałów
Supervisor	Marian Marciniak
Course level	Bachelor/Master

L – *lectures*, C – *classes*, Lab – *laboratories (laboratory practicals)*, P - *project/design*

Contents of education

Classes:

1. Broadband Services and Technologies
2. Convergence of voice (SDH/SONET) and data (Ethernet) networks

3. Integration of Fixed/Mobile/Satellite Communications
4. Optical wired and wireless communications
5. Wireless Systems and Technologies
6. New frequency bands (Mid-Infrared and Terahertz)
7. Emergency Communications
8. Next Generation Networking
9. Long Term Evolution Networks
10. Future Networks and Future Internet
11. Standardisation activities (European and international bodies – IEEE, ITU, IEC, ETSI, CENELEC)
12. Pervasive and sensor networking
13. ICTs in motor vehicles - Fully Networked Car
14. Cybersecurity, Spam and Cybercrime
15. ICTs and Climate Change, Green Communications

Efects of education

The ability of analysing and finding optimal solutions for standard problems in modern telecommunications.

Literature:

Govind P. Agrawal, Fiber-Optic Communication Systems, 4th Edition, ISBN: 978-0-470-50511-3, Wiley, November 2010
Andreas F. Molisch, Wireless Communications, 2nd Edition, ISBN: 978-0-470-74186-3 , Wiley, November 2010

ASPECTS OF LIFE IN GREAT BRITAIN

Faculty	**Electrical Engineering, Automatics and Computer Science**
Field of study	**Electrical Engineering**
Course title	ASPEKTY ŻYCIA W WIELKIEJ BRYTANII
Course title in English	ASPECTS OF LIFE IN GREAT BRITAIN
Course form *	LECTURE
Number of hours	30
ECTS	4
Specialisation	
Chair	WYDZIAŁOWE LABORATORIUM JĘZYKA
	ANGIELSKIEGO
Supervisor	mgr Agnieszka Janowska
Course level	master
L-lectures, C- classes, Lab- laboratories, P- project	

Contents of education

Lecture:

1. Geography of the UK, the division, the area, the capitals, the population, geographical features, etc.
2. The capitals of England, Scotland, Wales and Northern Ireland: location, population, short history, famous places.
3. The UK's national symbols, emblems, anthems, flags.
4. The English language: its history, modern varieties. Other languages in the UK.
5. British education system. Famous universities.
6. Politics and government: the Sovereign, the Parliament, Prime Minister and the Cabinet, Political Parties, religions in the UK.
7. History of the UK.
8. Industrial Revolution.
9. Culture of the UK: important people in science and philosophy, styles in architecture, important painters, theatre, classical composers, popular music groups, important people in cinema.
10. Sport of the UK: football, cricket, other popular sports.
11. British literature.
12. Famous places, landmarks and institutions.
13. Daily life: money, weights and measures, bank holidays, British food, pubs.
14. Polish immigration to the UK.

Efects of education

Students know geographical facts about the UK. They can name the four political divisions and their capitals. They know national symbols of the UK. Students have knowledge about the English language, its origin and modern varieties. They understand British education system, especially related to higher education. They can name the most famous British universities. They have basic knowledge about the Sovereign, the Parliament, political parties, elections. They can discuss one selected, important period in British history. They know the role of Britain in the Industrial Revolution. They know names and achievements of people in science, philosophy, painting architecture, theatre, cinema and music. They know popular sports in the UK. They can name famous British writers and discuss one selected piece of British literature. They can name famous places and institutions in the UK. They know the system of weights and measures used in the UK. They can discuss traditions connected with bank holidays. They can discuss the history of Polish immigration to the UK, its positive and negative aspects.

Literature:

Baugh, A.C. & Cable, T. 2002, *A History of the English Language*.
London, Routledge Burges, A. 1974, *English Literature*. Harlow:
Longman.
Davies, N. 1999. *The Isles. A History*. London:
Macmillan Harvey, P. & Jones, R. 1992. *Britain*
Explored. Harlow: Longman
McDowall, D. 1989. *An illustrated History of Britain.* Harlow:
Longman O'Discroll, J. 1995. *Britain*. Oxford: Oxford
University Press
Internet Resources:

www.royal.gov.uk www.cabinet-office.gov.uk
www.thecommonwealth.org www.church-of-england.org
www.parliament.uk www.number-10.gov.uk www.ukworldheritage.org.uk
www.polish-migrants.co.uk www.brytannica.com

ELECTROMAGNETIC FIELD THEORY

Faculty	**Electrical Engineering, Automatics and Computer Science**
Field of study	**Electronics and Telecommunication**
Course title	**Electromagnetic Field Theory**
Form	Lecture
Number of lectures	30
ECTS	4
Specialisation	
Department	Department of Electrical Engineering and Measurement Systems
Responsible person	Katarzyna Ciosk
Learning level	bachelor

L - lectures, C - classes, Lab - laboratories(laboratory practicals), P- project/design

Course contents

Introduction to the theory of field; Fundamentals of electromagnetic field, Maxwell's equations, boundary conditions, power and energy, constitutive parameters; Electrostatics, Laplace's equation, Poisson's equation; Magnetostatics, Biot-Savart law, Faraday's law, magnetic induction, magnetic materials; Electromagnetic waves, plane waves in free space and materials, plane wave reflection and transmission at material interfaces.

Results and effects

Skills on the properties of electric and magnetic fields. Understanding the behavior of electromagnetic fields and ways in which they are used in electrical engineering, including their relationship to circuit theory. Ability to describe electric and magnetic fields in simple systems and to apply the relevant mathematical methods. Possibility to solve electrostatic or magnetostaics problems for basic geometries and boundary conditions. to solve them. Skills on wave propagation and reflection.

Literature:

Bo Thide, Electromagnetic Field Theory, Dover Publications, 2011

ELECTROMAGNETIC FIELD THEORY

Faculty	**Electrical Engineering, Automatics and Computer Science**
Field of study	**Electrical Engineering**
Course title	**Electromagnetic Field Theory**
Form	Lecture
Number of lectures	30
ECTS	4
Specialisation	
Department	Department of Electrical Engineering and Measurement Systems
Responsible person	Katarzyna Ciosk
Learning level	master

L - lectures, C - classes, Lab - laboratories(laboratory practicals), P- project/design

Course contents

Introduction to the theory of field; Fundamentals of electromagnetic field, Maxwell's equations, boundary conditions, power and energy, constitutive parameters; Electrostatics, Laplace's equation, Poisson's equation; Magnetostatics, Biot-Savart law, Faraday's law, magnetic induction, magnetic materials; Electromagnetic waves, plane waves in free space and materials, plane wave reflection and transmission at material interfaces.

Results and effects

Skills on the properties of electric and magnetic fields. Understanding the behavior of electromagnetic fields and ways in which they are used in electrical engineering, including their relationship to circuit theory. Ability to describe electric and magnetic fields in simple systems and to apply the relevant mathematical methods. Possibility to solve electrostatic or magnetostaics problems for basic geometries and boundary conditions. to solve them. Skills on wave propagation and reflection.

Literature:

Bo Thide, Electromagnetic Field Theory, Dover Publications, 2011

CIRCUITS AND SIGNALS

Faculty	**Electrical Engineering, Automatics and Computer Science**
Field of study	**Electrical Engineering**
Course title	**Circuits and Signals**
Form	Lecture & Classes
Number of lectures	30 + 15
ECTS	6
Specialisation	
Department	Department of Electrical Engineering and Measurement Systems
Responsible person	Katarzyna Ciosk
Learning level	bachelor

L - lectures, C - classes, Lab - laboratories(laboratory practicals), P- project/design

Course contents

Circuit varibles and elements; Circuit laws, Ohm's Law, Kirchhoff's Laws, Network techniques, DC circuit analysis, Methods of circuit analysis: Nodal analysis, Mesh analysis, Thivenin and Norton equivalents, superposition, Signals, Sinusoidal signal, AC steady-state circuits analysis, Power calculation, Resonance,Transient-state circuits analysis, Laplace transform in circuit analysis, Periodic signals and Fourier series analysis, Introduction to nonlinear circuits.

Results and effects

Having necessary background on maths, natural sciences and related engineering fields, A good understanding of the way electrical circuits work. Skills on circuit theorems and analysis. Identify and define circuit problems, formulate and solve them. Possibility to analyse DC and AC circuits.

Literature:

1. J. W. Nilsson, S. A. Riedel, Electric circuits, Pretice-Hall. Inc., 2000
2. Shlomo Karni, Applied circuit analysis, John Wiley & sons, New York, 1988