

**Monika Badecka-Kozikowska**

**ENGLISH  
FOR STUDENTS  
OF ELECTRONICS AND  
TELECOMMUNICATIONS**

Text based activities in developing  
English for Specific Purposes

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*Janusz T. Cieśliński*

RECENZENCI

*Zbigniew Czaja*

*Iwona Gajewska-Skrzypczak*

PROJEKT OKŁADKI

*Wioleta Lipska-Kamińska*

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# Table of Contents

Preface .....	5
Acknowledgements .....	6
Language and Subject-Matter Content .....	7
UNIT ONE	
<b>COMPUTATIONAL ELECTROMAGNETICS</b> .....	9
UNIT TWO	
<b>AUTOMATED DESIGN AND OPTIMIZATION OF MICROWAVE COMPONENTS FOR WIRELESS COMMUNICATION SYSTEMS</b> .....	17
UNIT THREE	
<b>OPTOELECTRONICS</b> .....	29
UNIT FOUR	
<b>ELECTRONIC MEASUREMENT AND TEST INSTRUMENTS</b> .....	48
UNIT FIVE	
<b>AUDIO CODING</b> .....	59
UNIT SIX	
<b>MODERN NAVIGATION SYSTEMS</b> .....	68
UNIT SEVEN	
<b>DESIGN OF ADVANCED INTEGRATED CIRCUITS</b> .....	74
UNIT EIGHT	
<b>PROPAGATION OF RADIO WAVES</b> .....	84
UNIT NINE	
<b>SOFTWARE DEFINED RADIO</b> .....	94
UNIT TEN	
<b>FROM TELEPHONY TO NEXT GENERATION NETWORK</b> .....	100
Glossary .....	108
Computational Electromagnetics .....	108
Automated Design and Optimization of Microwave Components for Wireless Communication Systems .....	110
Optoelectronics .....	111
Electronic Measurement and Test Instruments .....	114
Audio Coding .....	116
Modern Navigation Systems .....	118
Design of Advanced Integrated Circuits .....	119
Propagation of Radio Waves .....	121
Software Defined Radio .....	122
From Telephony to Next Generation Network .....	123
Communication activities .....	125
Bibliography .....	128



## Preface



In the era of English becoming the language of instruction of lectures, seminars and classes at the level of tertiary education in Poland the book *English for Students of Electronics and Telecommunications* addresses the need for developing language and academic skills in technical English at level B2 and upwards.

The academics and researchers at the Gdańsk University of Technology, Faculty of Electronics, Telecommunications and Informatics (see the Acknowledgements) have devised a selection of English texts dealing with various disciplines of Electronics and Telecommunications which have become an inspiration for creating language activities, exercises and pronunciation drills intended for the practice of technical vocabulary, language structures that naturally emerge from the texts or are inspired by them, as well as academic skills such as presentation skills, note-taking, summary writing, presentation based on a visual, and other skills.

The experience of many years' observation of student performance on English courses at Polish universities reveals a picture of many students, who despite their fluency struggle with grammar, are unable to give a well-planned and clearly delivered presentation or stumble over pronunciation of more sophisticated and specialist vocabulary. *English for Students of Electronics and Telecommunications* offers a variety of pronunciation drills, including those on a light note which I encourage the teachers not to ignore since they are to eradicate pronunciation problems frequently neglected in the English class. The drills are a nice break from class routine and have a remedial value.

The book is devised for students at level B2 upwards, but ambitious students at high level B1 may undertake an adventure with the language and subject-matter content, as well. For lower level students *English for Students of Electronics and Telecommunications* is supplementary to all kinds of technical course-books like Technical English – 2 and 3 by David Bonamy, Cambridge University Press. It is a good idea to go over the language and subject-matter material content on page 7 to get some insight into what can be done with *English for Students of Electronics and Telecommunications*. The book, however, does not cover all the fields of Electronics and Telecommunications but is a selection of a few important topics.

Feel free to use the book in any order of the ten units. The book is independent of any strict syllabus guidelines but covers topics regarded as vital ones. The glossaries devised specifically for each unit may come in handy for discovering what some notions look and sound like in Polish, and also for more formal English-Polish and Polish-English translation. The Teacher's Book and audio recordings are available online – <http://cjo.pg.edu.pl/badecka>.

## Acknowledgements



I want to express my appreciation of the contribution to this publication by the academics from the Faculty of Electronics, Telecommunications and Informatics of the Gdańsk University of Technology. They have delivered a selection of subject-matter texts in English as listed in the table of contents. The texts are the basis for the language activities in *English for Students of Electronics and Telecommunications*.

It is my pleasure to thank **Wojciech Toczek, Ph.D., D.Sc.** being the very first one to respond to my e-mails and help with the materials for Electronic Measurement and Test Instruments (UNIT FOUR); to **Paweł Wierzba, Ph.D.** who delivered a huge amount of materials and additionally devised a comprehension exercise for Optoelectronics (UNIT THREE), as well as sent his own photographs of lasers, LED's and optical fibers; to **Michał Rewieński, Ph.D.** who despite becoming a “newly-born-father” managed eventually to explain the intricacies of the difficult topics of UNIT ONE (Computational Electromagnetics) and UNIT TWO (Automated Design and Optimization of Microwave Components for Wireless Communication Systems); to **Prof. Andrzej Czyżewski, Maciej Kulesza**, authors of the text on Audio Coding, and especially to **Andrzej Ciarkowski** who in no time corrected the unit in respect to the subject-matter of Audio Coding and devised the glossary for the unit; to **Jacek Marszał, Ph.D., D.Sc.** for contributing the text to the unit on Modern Navigation Systems, for the correction of the unit and devising the glossary; to **Marek Wójcikowski, Ph.D.** for authoring the text, glossary and executing the correction of Design of Advanced Integrated Circuits; to **Wojciech Siwicki** who is the author of the texts, photographs and glossaries on Software Defined Radio and Propagation of Radio Waves; to **Marcin Narloch, Ph.D.** and **Magdalena Młynarczuk**, the authors of the text, glossary and correction of UNIT TEN, From Telephony to Next Generation Network. One more person, **Assoc. Prof. Tomasz Ciszewski**, has greatly contributed to this publication by allowing his wonderful voice to be recorded in the listening comprehension exercises and pronunciation drills.

Last but not least, many thanks to **Prof. Krzysztof Goczyła** and **Marek Moszyński, Ph.D., D.Sc.** who commissioned, supervised and facilitated the whole undertaking of the book writing.

# Language and Subject-Matter Content • • • • • • • • • •

<p><b>UNIT ONE</b></p> <p>Computational Electromagnetics</p>	<p><b>Basic notions of electromagnetism and computational electromagnetics:</b> <i>electromagnetic field, electromagnetic interaction, boundary, boundary layer, Maxwell's equations, integral and partial differential equations, initial value, numerical analysis and computational electromagnetics, partial differential equations, dielectric, electric conductivity, dielectric permittivity, electric displacement, magnetic permeability, magnetic susceptibility, etc.</i></p> <p><b>Language. Adjectives describing greatness, importance, significance,</b> e.g. ... <i>of great importance, significant, enormous,</i> etc. <b>Structures for giving a presentation</b> (plus optionally derivation of equations).</p>
<p><b>UNIT TWO</b></p> <p>Automated Design and Optimization of Microwave Components for Wireless Communication Systems</p>	<p><b>Basic notions related to components for the Automated Design and Optimization of Microwave Components for Wireless Communication Systems</b> e.g. <i>multiplexers, diplexers, lossy filters, coupling circuits,</i> etc.</p> <p><b>Language. Cause &amp; Effect structures</b> e.g. <i>due to, since, therefore,</i> etc. <b>Verbs;</b> <i>influence, impact, determine, affect,</i> etc. <b>Nominalization.</b> <i>The fact that it is incapable of causing &gt;&gt;&gt; Its incapability to ...</i></p>
<p><b>UNIT THREE</b></p> <p>Optoelectronics</p>	<p><b>Basic notions of optoelectronics,</b> e.g. <i>optical fibers, optical cables, lasers, LEDs, attenuation,</i> etc.</p> <p><b>Language. Structures for expressing / describing how things, devices work, operate,</b> e.g. <i>How does the OTDR work?</i> <b>Structures to indicate simultaneous actions or actions being a result or consequence of other actions</b> – the use of the Present Participle (<i>enabling, implying,</i> etc.). <b>Applications of optoelectronics in medicine, safety,</b> etc. <b>Names of various therapeutic and diagnostic instruments and kinds of therapies</b> (e.g. <i>confocal microscopy</i>).</p>
<p><b>UNIT FOUR</b></p> <p>Electronic Measurement and Test Instruments</p>	<p><b>Measurement and test instruments and how they work, how they are used,</b> e.g. <i>Hand-held multimeters, Bench multimeter, Oscilloscope, Flash Analog-to-Digital Converter, Prescalers in frequency counters,</i> etc.</p> <p><b>Language. Complex noun phrases,</b> e.g., <i>digital sampling oscilloscope,</i> etc. Diagram completion of a multimeter. <b>Vocabulary building – nouns made of adjectives/ adjectives made of verbs,</b> e.g. <i>sensitive – sensitivity, certain – certainty, resolve – resolution, measure – measurement, to programme – programmable,</i> etc. <b>Language. Structures for functions of arguing, problem solving – decision making,</b> e.g. choosing the appropriate instrument for the company (speaking communication activities).</p>
<p><b>UNIT FIVE</b></p> <p>Audio Coding</p>	<p><b>Basic vocabulary and notions:</b> <i>audio signal, speech signal, codec, coding,(to) encode / decode, sound storage and transmission, Pulse Code Modulation (PCM) format, 8-bit code words/ 16 bit code words, novel methods, MP3, MPEG-4, AAC, PSN.</i> <b>1. Reducing bit rate requirements for audio signal storage and transmission,</b> e.g. <i>lossy coding techniques, human auditory system, compression ratio, transform codec, lossy data compression.</i> <b>2. Towards Transparent Coding Quality</b> – <i>hearing threshold, masking phenomena, quantization noise,</i> etc.</p> <p><b>Language. Structures with not only</b> – common syntax mistakes. <i>Not only</i> at the beginning of a sentence. Performing revision and summary of the unit content in diagram form – communication in pair/ team work.</p>

<p><b>UNIT SIX</b></p> <p>Modern Navigation Systems</p>	<p><b>Basic notions in the topic of Hydroacoustic Ship Berthing Aid System at the Gdańsk North Harbour:</b> <i>jetty, berth / berthing, anchor, precision, navigation, complicated manoeuvres, sound propagation, visibility, dock, sonar, aircraft hydroacoustic, luminescent, luminance, hydroacoustic, ultrasound transducers, echo pulses.</i></p> <p><b>Language. Describing how a berthing system operates. Collocations for noun verb associations.</b> Producing a commentary to a video from the Internet – on berthing operations (communication activity – speaking, writing, recording).</p>
<p><b>UNIT SEVEN</b></p> <p>Design of Advanced Integrated Circuits</p>	<p><b>Basic vocabulary and notions of the discipline:</b> e.g. <i>state, gate array, flip-flops, driver, clock, middleware, microprocessor, peripheral, bus, netlist, core clock, Field Programmable Gate Array, clock gating, memory, semi-conductor structures of an Application Specific Integrated Circuit.</i></p> <p><b>Basic acronyms used in the discipline:</b> IC, ASIC, SoC, CAD, IP, HDL, VHDL, FPGA, PCB, JTAG, CPU, GPU and what they stand for.</p> <p><b>Vocabulary and language – compact hyphenated phrases.</b> <i>Example: an enterprise on a small scale – a small-scale enterprise.</i> <b>Nouns</b> like the word “manufacturability”, <b>with the ending – ability.</b> Communication activity – Team presentation based on a visual.</p>
<p><b>UNIT EIGHT</b></p> <p>Propagation of Radio Waves</p>	<p><b>Basic notions. Phenomena concerning propagation of light waves / electromagnetic waves.</b> Absorption. Tropospheric scattering. Multipath propagation. Reflection and refraction. Diffraction. Frequency Bands. Power Budget. Fresnel zones. Fresnel clearance.</p> <p><b>Language. Equation completion. Problem solving</b> – calculating a mathematical / physics problem.</p>
<p><b>UNIT NINE</b></p> <p>Software Defined Radio</p>	<p><b>Basic notions:</b> <i>mixer, demodulator, transmitter, filter, etc.</i> <b>Difference between classic and Software Defined Radio. Components of SDR:</b> <i>DSP (Digital Signal Processing), IF (Intermediate Frequency amplifiers), A/D Converter, Demodulation detection, hardware/ software.</i></p> <p><b>Language. An amplified definition in academic writing</b> – what something is, how it works, what properties it has, how it is used, future development of the thing / system. Task. Write an amplified definition of cognitive radio.</p>
<p><b>UNIT TEN</b></p> <p>From Telephony to Next Generation Network</p>	<p><b>Topic of the History of Telephony. Telephony Related Technology. The Next Generation Network and how it will differ from today’s Internet. Sophisticated vocabulary:</b> <i>ubiquitous, unfettered, unrestricted, independent, convergence, intercept.</i> <b>Technology of the NGN – vocabulary:</b> <i>comprise, packet, designate, carrier, synchronous, nodes, asynchronous, conversational voice teleservice Voice over Packet, Voice over Internet Protocol (VoIP), real-time services, non-real time services, data transfer and access to streaming and multimedia content, delivery of interactive Internet Protocol Television available via the Internet (over IP).</i></p> <p><b>Language: comparing, arguing, holding a debate</b> on the global – political, economic and social impact of the NGN. <b>Essay writing</b> / Alternatively – <b>speech delivery.</b></p>