Miloš D. Đurić

English for Electrical Engineering (Modules 1 and 2)

Academic Mind and Faculty of Electrical Engineering University of Belgrade Publishers: Academic Mind (Belgrade) and Faculty of Electrical Engineering (University of Belgrade)

Reviewers: **Prof. Dr Vesna Polovina**, Faculty of Philology, University of Belgrade

Prof. Dr Biljana Čubrović, Faculty of Philology, University of Belgrade

Prof. Dr Marija Krivokapić, Faculty of Philosophy in Nikšić, University of Montenegro

Prof. Dr Aleksandra Nikčević-Batrićević, Faculty of Philosophy in Nikšić, University of Montenegro

Ljiljana Šobajić, Sworn-In Court Interpreter, Scientific and Technical Translator

Emeritus Prof. Dr Srđan Stanković, Faculty of Electrical Engineering, University of Belgrade

Prof. Dr Branko Kovačević, Faculty of Electrical Engineering, University of Belgrade

Prof. Dr Predrag Pejović, Faculty of Electrical Engineering, University of Belgrade

Language-Editors: Ljiljana Šobajić, Dr Biljana Čubrović,
Dr Marija Krivokapić, Dr Aleksandra Nikčević
Batrićević

Proof-reading: Ljiljana Šobajić, Dr Aleksandra Nikčević Batrićević Dr Marija Krivokapić

Computer Typeset: Dr Miloš D. Đurić

Cover design and illustrations: Milan Đurić, Assistant Professor

ISBN 978-86-7466-501-5

© Miloš D. Đurić 2014

All rights reserved. Except for the quotation of short passages for the purposes of criticism and review, no part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the author and the publisher.

Table of Contents

Preface and acknowledgments	1
Unit 1 - Electrical Engineering	3
Unit 2 - Physics	6
Unit 3 - Mathematics	16
Unit 3.1 - The Notion of Theorem	23
Unit 4 - Geometry	28
Unit 4.1 - Square	32
Unit 5 - Euclidean Geometry	34
Unit 6 - Triangle and the Pythagorean Theorem	39
Unit 7 - SI Units	46
Unit 7.1 SI writing style and SI rules	49
Unit 8 - Newton's Laws	51
Unit 8.1 - Sir Isaac Newton	55
Unit 9 - Pascal	58
Unit 9.1 Blaise Pascal	62
Unit 10 - A New Model of the Atom	66
Unit 11 - Subatomic Particles	70
Unit 12 - Atomic Physics and Nuclear Physics	73
Unit 13 - Nuclear Fission and Nuclear Fusion	77
Unit 14 - Electronics	84
Unit 15 - Measuring Instruments	86
Unit 16 - Oscilloscope	90
Unit 17 - Resistors	95
Unit 18 - Capacitors	100
Unit 19 - Inductors	107
Unit 20 - Amplifiers	112
Unit 21 - Renewable Energy	116
Unit 22 - Robot	123
Unit 23 - Computer Networks	132
Unit 24 - Integrated Circuits	138
Unit 24.1 Optical Fibres	144
Unit 25 - The Internet	148
Unit 25.1 The World Wide Web	154
Unit 26 - Artificial Intelligence	159
Unit 27 - Ohm's Law, Thévenin's Theorem	162
Unit 27.1 Kurt Gödel	166

Unit 27.2 Bertrand Russell	169
Unit 28 - Special Relativity	172
Appendix 1 – Grammar – Brief Reminder	177
The Present Simple Tense	177
The Present Continuous Tense	178
The Past Simple Tense	179
The Past Continuous Tense	180
The Present Perfect Tense	181
The Present Perfect Continuous Tense	183
The Past Perfect Tense	184
The Past Perfect Continuous Tense	184
The Future Simple Tense	185
The Future Continuous Tense	186
Expressing future by means of "Be going to"	186
Modal Verbs / Modals	187
Gerund	189
Question Tags	190
The Subjunctive	191
Conditional Sentences	192
The Passive Voice	193
Indirect Speech	195
Causative verb "Have"	196
Articles	197
Nouns	200
Adjectives	202
Adverbs	205
British/American/Dual Spelling	207
Appendix 2 - Concise list of common and frequent grammar errors	210
Appendix 3 - List of relevant irregular verbs	212
Appendix 4 - Writing a CV, Résumé	216
Appendix 5 - Cover letter/covering letter/motivation letter/motivational lett motivation	
Ribliography	222

Preface and acknowledgments

A quick word on how the textbook, entitled "English for Electrical Engineering – Modules 1 and 2" came about. When I started teaching the subject *English for Electrical Engineering* to my students at the Faculty of Electrical Engineering in Belgrade, it was with one chief purpose in mind, to introduce my students to the specific electrical engineering discourse, both written and spoken in the form of authentic written and spoken material. At the same time, I wanted to motivate my students, future engineers, to revise, refine and extend their knowledge of English grammar they encountered at lower levels, but on authentic electrical engineering discourse material. It is with this in mind that the material for this textbook has been chosen, consisting mostly of authentic texts pertaining to diverse areas of electrical engineering.

The present textbook, which grew out of my lecture notes and handouts, meets the requirement for two terms of the following two subjects, i.e. modules, entitled *English Language 1* and *English Language 2*, respectively. However, the textbook presupposes some previous knowledge of General English.

English for Electrical Engineering (Modules 1 and 2) is primarily intended for first-year students of the Faculty of Electrical Engineering. My principal aim is to introduce my students to certain fundamental terms excerpted from electrical engineering discourse and to show them how these terms and constructions function in this register of English. At the same time, I want to equip them with useful phrases and constructions that they may use later in their professional development, as well as with some practical language tools for their future communication in the engineering world.

The content, form and style of this textbook have primarily been adapted to suit English courses 1 and 2 and the examination format of these courses, but they have also been tailored to accommodate more general aims of English for Specific Purposes. Different versions of the textbook's material have been tried out with several generations of students and the comments of students have been extremely helpful and have resulted in a number of corrections and improvements. The grammar appendix does not cover all major areas that form the basis of English grammar, but primarily those deemed useful for coping with specific language tasks and developing different language skills in the domain of electrical engineering register.

My thanks are due to the following academics and scholars, who are reviewers of the present textbook. My special gratitude goes to Professor Vesna Polovina (Faculty of Philology, University of Belgrade), my professor and mentor, for her wholehearted and invaluable support. My very special gratitude goes to Professor Biljana Čubrović (Faculty of Philology, University of Belgrade), for her invaluable contribution to the creation of this textbook. My boundless thanks go to Professor Marija Krivokapić (Faculty of Philosophy in Nikšić, University of Montenegro) who smoothed the way for the production of the textbook. I owe gratitude to Professor Aleksandra Nikčević-Batrićević (Faculty of Philosophy in Nikšić, University of Montenegro) for her genuine interest in the textbook.

My boundless thanks go to Mrs. Ljiljana Šobajić, my dear colleague and friend, who kindly read the manuscript twice and offered more than constructive suggestions. I was the fortunate recipient of her brilliant knowledge and kindness. I am deeply in the debt of Professor Srđan Stanković, Emeritus Professor (Faculty of Electrical Engineering, University of Belgrade), who patiently answered a number of demanding questions. My gratitude goes to Professor Branko Kovačević (Faculty of Electrical Engineering, University of Belgrade) for his generous support and encouragement.

My special thanks go to Professor Predrag Pejović (Faculty of Electrical Engineering, University of Belgrade), for his patience and wisdom. His expertise one cannot but admire.

My thanks go to my language-editors and proof-readers: first and foremost to Ljiljana Šobajić for her most constructive scrutiny, Dr Marija Krivokapić and Dr Aleksandra Nikčević-Batrićević, for their thorough inspection of the manuscript, Dr Biljana Čubrović, for her endless patience whilst editing the textbook. Their criticisms were most helpful for subsequent revision. Needless to say, if I have not taken all of their suggestions into account, and the textbook suffers in parts, I alone am at fault.

Special thanks to Milan Đurić, Assistant Professor of Graphic Design for providing me with cover design for my textbook.

Above all, I am grateful to my students, who helped me realise what they did not understand and how to make English electrical engineering discourse more approachable.

Ultimately, I express eternal gratitude to my parents for having brought me up in the spirit of true life values.

Belgrade, February, 2014

Miloš D. Đurić