

GLOBAL JOURNAL OF ENGINEERING EDUCATION

Editor-in-Chief: Zenon J. Pudlowski

World Institute for Engineering and Technology Education (WIETE) Glen Waverley, Melbourne, VIC 3150, Australia

WIETE Partners



Association of Taiwan Engineering Education and Management (ATEEM) Taipei, Taiwan



Department of Electrical and Power Engineering, AGH University of Science & Technology, Kraków, Poland



Journal of Security and Sustainability Issues The General Jonas Žemaitis Military Academy of Lithuania, Vilnius, Lithuania



Technological Education Institute of Piraeus Piraeus-Athens, Greece



College of Engineering & Engineering Technology Northern Illinois University DeKalb, Illinois, USA





Department of Physics and Technical Studies University of Ljubljana Ljubljana, Slovenia



Polytechnic Institute of New York University New York, USA



College of Management Hungkuang University Taichung, Taiwan



Faculty of Electrical, Electronic, Computer & Control Engineering Technical University of Łódź, Łódź, Poland



Russian Association of Engineering Universities Moscow, Russia



Commonwealth Science and Technology Academy for Research (C-STAR) Chennai, India



iProfesor A Platform Bringing Together Men of Science Łódź, Poland



Society for the Development of Technology Education (SDTE) Ljubljana, Slovenia



UNIVERSITY OF BOTSWANA

University of Botswana Gaborone, Botswana

Published by:

World Institute for Engineering and Technology Education (WIETE) 34 Hampshire Road, Glen Waverley, Melbourne, VIC 3150, Australia

E-mail: info@wiete.com.au Internet: http://www.wiete.com.au

© 2011 WIETE

ISSN 1328-3154

Articles published in the *Global Journal of Engineering Education* (GJEE) have undergone a formal process of peer review by international referees.

This Journal is copyright. Apart from any fair dealing for the purpose of private study, research, criticism or review as permitted under the Copyright Act, no part may be reproduced by any process without the written permission of the publisher.

Responsibility for the contents of these articles rests upon the authors and not the publisher. Data presented and conclusions developed by the authors are for information only and are not intended for use without independent substantiating investigations on the part of the potential user.

Global Journal of Engineering Education

EDITOR-IN-CHIEF

Prof. Zenon J. Pudlowski World Institute for Engineering and Technology Education (WIETE)

34 Hampshire Road, Glen Waverley, Melbourne, VIC 3150, Australia Tel/Fax: +61 3 95618247, E-mail: zenon.pudlowski@wiete.com.au

Internet: http://www.wiete.com.au

MANAGER & ASSOCIATE

EDITOR

Dr Dianne Q. Nguyen Monash University & WIETE, Melbourne, Australia

ASSOCIATE EDITORS

Dr Elena A. Danilova Monash University & WIETE, Melbourne, Australia

Dr Ian R. Dobson Monash University, Melbourne, Australia

Ms Krystyna Wareing Independent Communications Consultant, Crawley, West Sussex, England, UK

ADVISORY BOARD MEMBERS

Prof. Hosni I. Abu-Mulaweh Indiana University-Purdue University Fort Wayne, Fort Wayne, USA

Prof. Colin U. Chisholm Glasgow Caledonian University, Glasgow, Scotland, UK

Prof. Ahmad Ibrahim Yorkville University, Toronto, Ontario, Canada

Prof. Adinarayana Kalanidhi Commonwealth Science and Technology Academy for Research, Chennai, India

Prof. Efrossini C. Kalkani
Prof. Krzysztof Kluszczyński
A/Prof. Slavko Kocijancic
National Technical University of Athens, Athens, Greece
Silesian University of Technology, Gliwice, Poland
University of Ljubljana, Ljubljana, Slovenia

Prof. Romanas V. Krivickas Kaunas University of Technology, Kaunas, Lithuania

A/Prof. Wojciech Kuczborski

A/Prof. Paul Maj

Edith Cowan University, Perth, Australia

Edith Cowan University, Perth, Australia

Prof. George Metaxas Technological Education Institute of Piraeus, Piraeus-Athens, Greece

Prof. Stanisław A. Mitkowski AGH University of Science and Technology, Kraków, Poland

Prof. Nikos J. Mourtos San José State University, San José, USA

Prof. Andrew Nafalski University of South Australia, Adelaide, Australia

Prof. Derek O. Northwood University of Windsor, Windsor, Canada

Prof. Gyula Patkó University of Miskolc, Miskolc-Egyetemváros, Hungary

Prof. Dieter Schott Hochschule Wismar - University of Technology, Business and Design, Wismar,

Germany

Prof. Kin Wai Michael Siu Hong Kong Polytechnic University, Hong Kong, PRC

Prof. David W.S. Tai Association of Taiwan Engineering Education and Management, Taichung, Taiwan

Prof. Jacek Uziak University of Botswana, Gaborone, Botswana

Prof. Algirdas V. Valiulis Vilnius Gediminas Technical University, Vilnius, Lithuania

Prof. Promod Vohra

Northern Illinois University, DeKalb, USA

Prof. Sławomir Wiak

Northern Illinois University of Łódź, Łódź, Poland

Global Journal of Engineering Education

Contents

Z.J. Pudlowski	95	Editorial
O. Ghrayeb, P. Damodaran and P. Vohra	96	Art of triangulation: an effective assessment validation strategy
S. Wiak, D. Jeske, M. Krasuski and R. Stryjek	102	Computer-aided business intelligence for non-business solutions
A.P. Chanan, J. Kandasamy and S. Vigneswaran	110	Role of case study research in training the renaissance water engineer
G. Patkó, A.Sz. Váradi and L. Szentirmai	117	Higher engineering education post-2010 focusing on achievements at the University of Miskolc
M.A. Ayub, R. Jaafar and Z.A. Majid	126	Embedding technopreneurship with mechatronics engineering in outcome-based curriculum development for postgraduate education in Malaysia
A.M. Dąbrowski, S.A. Mitkowski and A. Porębska	132	The use of mathematical programs and numerical methods in teaching selected topics in circuit theory based on Maple and MATLAB
Y-J. Lee, C-H. Chao and C-Y. Chen	140	The influences of interest in learning and learning hours on learning outcomes of vocational college students in Taiwan: using a teacher's instructional attitude as the moderator
Index of Authors	154	