



nr 103/2018

ISSN 2451-2486 (online)
ISSN 1644-1818 (printed)
DOI: 10.26408

ZESZYTY NAUKOWE

Akademii Morskiej w Gdyni

Scientific Journal of Gdynia Maritime University

Kwartalnik

Gdynia, marzec 2018

Quarterly

Gdynia, March 2018

REDAKTOR NACZELNY/EDITOR-IN-CHIEF: Ireneusz CZARNOWSKI
REDAKTOR TEMATYCZNY /SUBJECT EDITOR: Janusz MINDYKOWSKI

KOMITET NAUKOWY/SCIENTIFIC BOARD:

Ireneusz CZARNOWSKI – Gdynia Maritime University, Poland – Przewodniczący/Chair
Haitham ABU-RUB – Texas A&M University at Qatar, Qatar
Marcjanna AUGUSTYN – Hull University Business School, Great Britain
Artur BEJGER – Maritime University of Szczecin, Poland
Andrzej BIEN – AGH University of Science and Technology in Cracow, Poland
Enrique Romero CADAVAL – University of Extremadura, Badajoz, Spain
Jose Manuel Ferreira das Dores COSTA – Infante D. Henrique Nauticals School, Lisbon, Portugal
Piotr Oskar CZECHOWSKI – Gdynia Maritime University, Poland
Sergej Petrovic DENISIUK – National Technical University Igor Sikorsky Kyiv Polytechnic Institute, Ukraine
Jacek JANUSZEWSKI – Gdynia Maritime University, Poland
Andrei KHUDDOLEY – V. Luikov Heat and Mass Transfer Institute of the National Academy of Sciences of Belarus, Belarus
Serdjo KOS – University of Rijeka, Croatia
Pentti KUJALA – Helsinki University of Technology, Finland
Tatyana KUZNETSOVA – V. Luikov Heat and Mass Transfer Institute of the National Academy of Sciences of Belarus, Belarus
Pasqualina LAGANA – University of Messina, Italy
Vladimir LOGINOVSKY – Admiral Makarow State Maritime Academy, St. Petersburg, Russia
Bohdan MANDZIJ – Lviv Polytechnic National University, Ukraine
Barbara MARCISZEWSKA – Gdynia Maritime University, Poland
Takeshi OKADA – Dept of Applied Linguistics Graduate School of International Cultural Studies, Tohoku University, Japan
Salvatore PARIZI – Ministry of Health, Italy
Stanislav RUSZ – VŠB - Technical University of Ostrava, Czechia
Volodymyr SAFONOV – National Science Center Kharkov Institute of Physics and Technology, Ukraine
Izabela STEINKA – Gdynia Maritime University, Poland
Ryszard STRZELECKI – The Institute of Electrical Engineering in Warsaw, Poland
Paweł ŚNIATAŁA – Poznań University of Technology, Poland
Adam WEINTRIT – Gdynia Maritime University, Poland
Krzysztof WIERZCHOLSKI – Koszalin University of Technology, Poland
Hideo YABUKI – Tokyo University of Marine Science and Technology, Japan
Paweł ZALEWSKI – Maritime University of Szczecin, Poland
Burkhard ZIEGLER – The Mittelhessen University of Applied Sciences, Germany
Ganna ZYKOVA – National Science Center Kharkov Institute of Physics and Technology, Ukraine
Joanna ŻUKOWSKA – Gdańsk University of Technology, Poland

REDAKCJA I KOREKTA/EDITING AND PROOFREADING: Ewa Giedziun

KOREKTA W JĘZYKU ANGIELSKIM/ENGLISH PROOFREADING: Mirosława Sztramska

PROJEKT OKŁADKI/COVER DESIGN: Jolanta Białous

WYDAWNICTWO/EDITORIAL STAFF: Wydawnictwo Akademii Morskiej w Gdyni

WYDAWCA/PUBLISHER:



AKADEMIA MORSKA W GDYNI

ul. Morska 81-87
81-225 Gdynia
www.am.gdynia.pl

© Copyright by Akademia Morska w Gdyni

<http://zeszyty.am.gdynia.pl>

ISSN 2451-2486 (online)

ISSN 1644-1818 (printed)

DOI: 10.26408