

TEHNIČKI GLASNIK - TECHNICAL JOURNAL

Scientific-professional journal of University North

Volume 15
Varaždin, March 2021Number 1
Pages 1–167**Editorial Office:**

Sveučilište Sjever / University North – Tehnički glasnik / Technical journal
Sveučilišni centar Varaždin / University Center Varaždin
Jurja Križanića 31b, 42000 Varaždin, Croatia
Tel. ++385 42 493 328, Fax. ++385 42 493 333
E-mail: tehnickiglasnik@unin.hr
<https://tehnickiglasnik.unin.hr>
<https://www.unin.hr/djelatnost/izdavastvo/tehnicki-glasnik/>
<https://hrcak.srce.hr/tehnickiglasnik>

Founder and Publisher:

Sveučilište Sjever / University North

Council of Journal:

Marin MILKOVIĆ, Chairman; Anica HUNJET, Member; Goran KOZINA, Member; Mario TOMIŠA, Member;
Vlado TROPŠA, Member; Damir VUSIĆ, Member; Milan KLJAJIN, Member; Anatolii KOVROV, Member

Editorial Board:

Chairman Damir VUSIĆ (1), Milan KLJAJIN (1), Marin MILKOVIĆ (1), Krešimir BUNTAK (1), Anica HUNJET (1), Živko KONDIĆ (1), Goran KOZINA (1), Ljudevit KRPAN (1), Krunoslav HAJDEK (1), Marko STOJIC (1), Božo SOLDO (1), Mario TOMIŠA (1), Vlado TROPŠA (1), Vinko VIŠNJIĆ (1), Duško PAVLETIĆ (5), Branimir PAVKOVIĆ (5), Mile MATIJEVIĆ (3), Damir MODRIĆ (3), Nikola MRVAC (3), Klaudio PAP (3), Ivana ŽILJAK STANIMIROVIĆ (3), Krešimir GRILEC (6), Biserka RUNJE (6), Predrag ČOŠIĆ (6), Sara HAVRLIŠAN (2), Dražan KOZAK (2), Roberto LUJIĆ (2), Leon MAGLIĆ (2), Ivan SAMARDŽIĆ (2), Antun STOIC (2), Katica ŠIMUNOVIĆ (2), Goran ŠIMUNOVIĆ (2), Ladislav LAZIĆ (7), Ante ČIKIĆ (1)/(2), Darko DUKIĆ (9), Gordana DUKIĆ (10), Srđan MEDIĆ (11), Sanja KALAMBURA (12), Marko DUNĐER (13), Zlata DOLAČEK-ALDUK (4), Dina STOBBER (4)

International Editorial Council:

Boris TOVORNIK (14), Milan KUHTA (15), Nenad INJAC (16), Džafer KUDUMOVIC (17), Marin PETROVIĆ (18), Salim IBRAHIMEFENDIĆ (19), Zoran LOVREKOVIĆ (20), Igor BUDAK (21), Darko BAJIĆ (22), Tomáš HANÁK (23), Evgenij KLIMENKO (24), Oleg POPOV (24), Ivo ČOLAK (25), Katarina MONKOVA (26), Berenika HAUSNEROVA (8), Nenad GUBELJAK (27), Charlie FAIRFIELD (28), Stefanija KLARIC (28), Bertrand MARESCHAL (29), Sachin R. SAKHARE (30), Suresh LIMKAR (31), Mandeep KAUR (32), Aleksandar Sedmak (33), Han-Cheh CHAO (34)

Editor-in-Chief:

Milan KLJAJIN

Technical Editor:

Goran KOZINA

Graphics Editor:

Snježana IVANČIĆ VALENKO

Linguistic Advisers for English language:

Ivana GRABAR, Iva GRUBJEŠIĆ

IT support:

Tomislav HORVAT

Print:

Centar za digitalno nakladništvo, Sveučilište Sjever

**All manuscripts published in journal have been reviewed.
Manuscripts are not returned.**

The journal is free of charge and four issues per year are published

(In March, June, September and December)

Circulation: 100 copies**Journal is indexed and abstracted in:**

Web of Science Core Collection (Emerging Sources Citation Index - ESCI), EBSCOhost Academic Search Complete, EBSCOhost – One Belt, One Road Reference Source Product, ERIH PLUS, CITEFACTOR – Academic Scientific Journals, DOAJ – Directory of Open Access Journals, Hrcak – Portal znanstvenih časopisa RH

Registration of journal:

The journal "Tehnički glasnik" is listed in the HGK Register on the issuance and distribution of printed editions on the 18th October 2007 under number 825.

Preparation ended:

March 2021

Legend:

(1) University North, (2) Mechanical Engineering Faculty in Slavonski Brod, (3) Faculty of Graphic Arts Zagreb, (4) Faculty of Civil Engineering Osijek, (5) Faculty of Engineering Rijeka, (6) Faculty of Mechanical Engineering and Naval Architecture Zagreb, (7) Faculty of Metallurgy Sisak, (8) Tomas Bata University in Zlin, (9) Department of Physics of the University of Josip Juraj Strossmayer in Osijek, (10) Faculty of Humanities and Social Sciences Osijek, (11) Karlovac University of Applied Sciences, (12) University of Applied Sciences Velika Gorica, (13) Department of Polytechnics - Faculty of Humanities and Social Sciences Rijeka, (14) Faculty of Electrical Engineering and Computer Science - University of Maribor, (15) Faculty of Civil Engineering - University of Maribor, (16) University College of Teacher Education of Christian Churches Vienna/Krems, (17) Mechanical Engineering Faculty Tuzla, (18) Mechanical Engineering Faculty Sarajevo, (19) University of Travnik - Faculty of Technical Studies, (20) Higher Education Technical School of Professional Studies in Novi Sad, (21) University of Novi Sad - Faculty of Technical Sciences, (22) Faculty of Mechanical Engineering - University of Montenegro, (23) Brno University of Technology, (24) Odessa State Academy of Civil Engineering and Architecture, (25) Faculty of Civil Engineering - University of Mostar, (26) Faculty of Manufacturing Technologies with the seat in Prešov - Technical University in Košice, (27) Faculty of Mechanical Engineering - University of Maribor, (28) College of Engineering, IT & Environment - Charles Darwin University, (29) Université Libre de Bruxelles, (30) Vishwakarma Institute of Information Technology (Pune, India), (31) AISSMS Institute of Information Technology (Pune, India), (32) Permtech Research Solutions (India), (33) University of Belgrade, (34) National Dong Hwa University - Taiwan