

# Jordan Journal of Mechanical and Industrial Engineering (JJMIE)

JJMIE is a high-quality scientific journal devoted to fields of Mechanical and Industrial Engineering. It is published by The Jordanian Ministry of Higher Education and Scientific Research in corporation with the Hashemite University.

## EDITORIAL BOARD

---

### Editor-in-Chief

Prof. Mousa S. Mohsen

### Editorial board

Prof. Bilal A. Akash  
Hashemite University

Prof. Adnan Z. Al-Kilany  
University of Jordan

Prof. Ayman A. Al-Maaitah  
Mutah University

Prof. Moh'd A. Al-Nimr  
Jordan University of Science and Technology

Prof. Ali A. Badran  
University of Jordan

Prof. Naseem M. Sawaqed  
Mutah University

### Assistant Editor

Dr. Ahmad Al-Ghandoor  
Hashemite University

## THE INTERNATIONAL ADVISORY BOARD

---

**Abu-Qudais, Mohammad**  
Jordan University of Science & Technology, Jordan

**Abu-Mulaweh, Hosni**  
Purdue University at Fort Wayne, USA

**Afaneh Abdul-Hafiz**  
Robert Bosch Corporation, USA

**Afonso, Maria Dina**  
Institute Superior Tecnico, Portugal

**Badiru, Adedji B.**  
The University of Tennessee, USA

**Bejan, Adrian**  
Duke University, USA

**Chalhoub, Nabil G.**  
Wayne State University, USA

**Cho, Kyu-Kab**  
Pusan National University, South Korea

**Dincer, Ibrahim**  
University of Ontario Institute of Technology, Canada

**Douglas, Roy**  
Queen's University, U. K

**El Bassam, Nasir**  
International Research Center for Renewable Energy,  
Germany

**Haik, Yousef**  
United Arab Emirates University, UAE

**Jaber, Jamal**  
Al- Balqa Applied University, Jordan

**Jubran, Bassam**  
Ryerson University, Canada

**Kakac, Sadik**  
University of Miami, USA

**Khalil, Essam-Eddin**  
Cairo University, Egypt

**Mutoh, Yoshiharu**  
Nagaoka University of Technology, Japan

**Pant, Durbin**  
Iowa State University, USA

**Riffat, Saffa**  
The University of Nottingham, U. K

**Saghir, Ziad**  
Ryerson University, Canada

**Sarkar, MD. Abdur Rashid** Bangladesh University of  
Engineering & Technology, Bangladesh

**Siginer, Dennis**  
Wichita State University, USA

**Sopian, Kamaruzzaman**  
University Kebangsaan Malaysia, Malaysia

**Tzou, Gow-Yi** Yung-Ta Institute of Technology and  
Commerce, Taiwan

## EDITORIAL BOARD SUPPORT TEAM

---

<b>Language Editor</b>	<b>Publishing Layout</b>
Dr. Wael Zuraiq	MCPD. Osama AlShareet

### SUBMISSION ADDRESS:

---

Prof. Mousa S. Mohsen, Editor-in-Chief  
Jordan Journal of Mechanical & Industrial Engineering,  
Hashemite University, PO Box 330127, Zarqa, 13133, Jordan  
E-mail: jjmie@hu.edu.jo