

# RAFIQ MANNA'

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*Ph.D. M.Sc. B.Sc.* in Mechanical Engineering  
Assistant Professor of Mechanical Engineering

**Date of Birth:** Nov. 16, 1977

**Nationality:** Jordanian, Canadian

**Marital Status:** Married with Two Children

**Google Scholar:** <https://scholar.google.com/citations?user=uWczYlwAAAAJ&hl=en>

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## Profile

I am currently working as an Assistant Professor in the Department of Mechanical Engineering at Al-Zaytoonah University of Jordan. Prior to this, I have worked as an Adjunct Assistant Professor in the Department of Mechanical and Materials Engineering at Queen's University, Canada. I have also worked as a Postdoctoral Research Associate in the Department of Mechanical and Aerospace Engineering at Royal Military College of Canada. My research interest is in the areas of thermo-fluids, energy, and thermal management systems. My industrial experience includes working for the Union Industries Company, Jordan as a mechanical engineer for about five years. My research is published in ten papers in various international journals and peer-reviewed conference proceedings.

## Education

- **Ph.D.** Mechanical and Materials Engineering (2019); Queen's University, Ontario, Canada. GPA: 4.23/4.30.
- **M.Sc.** Mechanical Engineering (2004); University of Jordan, Amman, Jordan.
- **B.Sc.** Mechanical Engineering (2001); University of Jordan, Amman, Jordan.

## Awards/Fellowships/Assistantships and Honours

- 2015 – 2019: Research/Teaching Assistantship (12,000 CAD\$ per year)
- 2015 – 2019: Queen's Graduate Award (6000 CAD\$ per year): awarded based on eligibility and departmental recommendation.
- 2017 – 2018: R. Samuel McLaughlin Fellowship (10,000 CAD\$): awarded based on academic excellence in the most recent two years of study.
- 1995: Top Ten Students List in the General Secondary Scientific Education Certificate Examination, with a percentage average of 99.6%.

## Professional Experience

### Research Experience

- **Nov. 2020 – Apr. 2022, Postdoctoral Research Associate**  
*Department of Mechanical and Aerospace Engineering, Royal Military College of Canada, Kingston, Ontario, Canada*

### Academic Experience

- **Sep. 2022 – Present, Assistant Professor**  
*Department of Mechanical Engineering, Faculty of Engineering and Technology, Al-Zaytoonah University of Jordan, Amman, Jordan*
- **Jan. 2020 – Sep. 2022, Adjunct Assistant Professor**
- **Sep. 2019 – Dec. 2019, Teaching Fellow**  
*Department of Mechanical and Materials Engineering, Faculty of Engineering and Applied Science, Queen's University, Kingston, Ontario, Canada*

### Courses Taught (Undergraduate Level)

1. Heat Transfer (MECH 346), Winter 2022  
Introduction to analytical and numerical analysis of conduction, convection and radiation modes of heat transfer, combined modes of heat transfer, and the design of heat exchangers.  
Number of students: 194.
  2. Turbomachinery (MECH 439), Winter 2022  
Fluid mechanics and thermodynamics applied to turbomachines, dimensionless performance characteristics, cascade aerodynamics, compressors and turbines, reaction and stage loading, radial equilibrium, radial flow machines, application of generalized performance to choice of compressors, and auxiliary systems.  
Number of students: 68.
  3. Applied Thermodynamics II (MECH 330), Fall 2021, Fall 2019  
Exergy analysis, advanced vapor power and gas cycles, refrigeration and heat pumps, gas mixtures and psychrometrics, and combustion.  
Average number of students: 160.
  4. Fluid Mechanics II (MECH 341), Winter 2020  
Differential form of conservation laws, boundary layer and external flows, compressible flows, and the operation of rotational fluid machinery.  
Number of students: 165.
- **Sep. 2015 – Sep. 2019, Research / Teaching Assistant**  
*Mechanical and Materials Engineering Department, Faculty of Engineering and Applied Science, Queen's University, Kingston, Ontario, Canada*
  - Doctoral research scholarship funded by the Natural Science and Engineering Research Council of Canada (NSERC). This research investigated the natural convective heat transfer from two-sided horizontal and inclined plates of different shapes and existing under various boundary conditions.
  - Assisted in teaching and grading various undergraduate mechanical engineering courses such as Applied Thermodynamics II (MECH 330), Heat Transfer (MECH 346), Compressible Fluid Flow (MECH 448), and Mechanical Engineering Laboratory II (MECH 399).
- **Sep. 2005 - Aug. 2015, Senior Instructor**  
*Mechanical Technology Department, Riyadh College of Technology, Riyadh-Saudi Arabia*

## Responsibilities:

### *Teaching*

- Taught 6 courses in the Bachelor program and 8 courses in the Associate (2-year professional) program.

### *Bachelor Level*

1. Heat Transfer
2. Fluid Mechanics
3. Engineering Measurements
4. Advanced Refrigeration and Air-Conditioning systems
5. Commercial Refrigeration System Design
6. Energy Analysis and Audit

### *Associate Level*

1. Refrigeration Systems and Equipment (lecture, tutorial and lab)
  2. Air-Conditioning Systems and Equipment (lecture, tutorial and lab)
  3. Principles of Refrigeration Technology (lecture, tutorial and lab)
  4. Principles of Air-Conditioning Technology (lecture, tutorial and lab)
  5. Engineering Measurements (lecture, tutorial and lab)
  6. Vocational Safety
  7. Commercial and Industrial Refrigeration
  8. Principles of Electrical and Electronic Technology
- Supervised 5+ Graduation Projects for students in the Bachelor program.

### *Other Activities*

- Re-authored the notes and comments for a course on Refrigeration Systems and Equipment (course and lab) based on the update in the associate program developed curriculum.
- Reviewed curriculum plans for the Bachelor and Associate programs to match the updated international standards.
- Supervised students of Technical Trainers College in the Collaborative Program between Riyadh College of Technology and Technical Trainers College (about 8 students per week every semester) to let the students be aware of the teaching environment for their future careers.

### *Committee Memberships*

- Chair of Public Relations Committee in Mechanical Technology Department (2009-2014)
- Member of Labs. and Workshops Development Committee (2013-2015)
- Member of Scientific Committee (2012-2015)
- Member of Bachelor Program Curriculum Development Project (2012-2015)
- Member of Department Committee (2012-2015)
- Member of Graduation Projects Committee (2006-2009)

### *Industrial Experience*

- *Mar. 2001 - Sep. 2005, Maintenance Mechanical Engineer / Engineering Department Union Industries Co., Amman-Jordan*

### Responsibilities:

- Modified the working mechanism of a wrapping machine using specific types and dimensions of pulleys, bearings, and belts to achieve longer life of the working mechanism (about 50% increase in a lifetime).
- Supervised approximately 8 technicians and 16 operators per shift (there were 3 shifts per day).
- Inspected machines installation based on the installation manuals to pass the operation protocol.
- Controlled production lines operation and performance by following a regular monitoring plan to maintain the final product within the quality standards and meet the production target.
- Conducted planned maintenance activities following the maintenance schedule and unplanned maintenance activities based on urgent issues with machines to keep them running efficiently.
- Conducted mechanical troubleshooting by analyzing the problem and its influence on the production line and/or the product.

### **Training Sessions Delivered**

- Central Air-Conditioning for Buildings, Riyadh College of Technology (Aug.-Sep. 2014).
- Thermal and Water Insulation, Saudi Electric Company, Riyadh (May-June 2013).
- Refrigeration and Air-Conditioning Maintenance for Buildings, Riyadh College of Technology (Sep.-Oct. 2012).
- Fluid Mechanics (Pitot Tube), Riyadh College of Technology (Aug. 2012).
- Absorption Refrigeration Systems, Riyadh College of Technology (June 2012).
- Engineering Measurements and Calibration, Riyadh College of Technology (Apr. 2011).
- Desert Air-Conditioning System, Riyadh College of Technology (Feb. 2007).

### **Training Sessions Attended**

- Computer Controlled Air-Conditioning Units, by EDIBON International S.A, Riyadh College of Technology (Oct. 2010).
- Installation Works, Riyadh College of Technology (Sep. 2008).
- Cooling Refrigerants and Compounds, Riyadh College of Technology (June 2007).
- Training Methods for Trainers, Riyadh College of Technology (Sep. 2006).
- Supervision of Technicians, Riyadh College of Technology (Aug. 2006).
- Compressors & Motors Troubleshooting, Riyadh College of Technology (Aug. 2006).
- German Language courses 1 & 2, Goethe Institute (July-Aug. 2004).
- Operation, Maintenance and Troubleshooting on FOCKE packing machine, Verden Aller, Germany (Aug. 2003).
- Advanced Internet & Web-Publishing, University of Jordan (Sep. 1999).
- Computer Maintenance, University of Jordan (Aug. 1999).

### **Professional Workshops Attended**

- **Expanding Horizons Workshops Series**, School of Graduate Studies, Queen's University, Kingston, Ontario, Canada.
- **Professional Development in University Teaching and Learning Workshop Series**, Queen's University, Kingston, Ontario, Canada:
  - Accessible Teaching and Learning (June 2019)
  - Scholarship in Teaching and Learning, (May 2019)
  - Educational Leadership (Apr. 2019)

- Practical Experience (Mar. 2019)
- Foundations in Teaching and Learning (Feb. 2019)
- **Refrigeration and Air Conditioning Good Practice**, National Program for Elimination of Ozone-Depleting Materials, Riyadh College of Technology (Apr. 2012).

### Professional Certifications

- **Leadership in Energy and Environmental Design (LEED) Green Associate (GA) Training**, Queen's University, Kingston, Ontario, Canada (Nov. 2018). Successfully completed LEED: Green Building Core Concepts and Strategy Course (2018).
- **Health and Safety Awareness Training Session**, Queen's University, Kingston, Ontario, Canada (Sep. 2015). By successfully completed a prescribed written examination, I have met the requirements of "*Occupational Health and Safety Act*", *Ontario Regulation 297/13*.

### Reviewing Service

Reviewer for International Journal of Mechanical Engineering Education (Sage).

### Publications

#### *International Journals*

1. **Manna, R.**, Ravikumar, N., Harrison, S., Goni Boulama, K., Aircraft Fuel Thermal Management System and Flight Thermal Endurance, Transactions of the Canadian Society for Mechanical Engineering, Canadian Society for Mechanical Engineering, 2021, DOI: <https://doi.org/10.1139/tcsme-2021-0146>.
2. **Manna, R.**, Oosthuizen, P.H., A Numerical and Experimental Study of Natural Convective Heat Transfer from Two-Sided Circular and Square Heated Horizontal Plates Having a Finite Thickness, *Heat and Mass Transfer*, Volume 56, Issue 7, Pages 2225-2238, Springer, 2020, DOI: <https://doi.org/10.1007/s00231-020-02851-8>.
3. **Manna, R.**, Oosthuizen, P.H., A Numerical and Experimental Investigation of Natural Convective Heat Transfer from Two-Sided Diagonally Inclined Square Plates Having a Finite Thickness, *Frontiers in Heat and Mass Transfer (FHMT)*, An International Journal, Volume 13, Issue 7, Global Digital Central, 2019, DOI: <http://dx.doi.org/10.5098/hmt.13.7>.

#### *Conference Proceedings*

1. **Manna, R.**, Oosthuizen, P.H., A Numerical Study of Natural Convective Heat Transfer from Two-Sided Inclined Square Plates Having a Finite Thickness, *Proceedings of the ASME International Mechanical Engineering Congress and Exposition (IMECE 2019)*, Volume 8: Heat Transfer and Thermal Engineering, Paper No: IMECE2019-11864, 9 pages, Salt Lake City, Utah, USA, 2019, DOI: <https://doi.org/10.1115/IMECE2019-11864>.
2. **Manna, R.**, Oosthuizen, P.H., Numerical and Experimental Studies of Natural Convective Heat Transfer from Two-Sided Diagonally Inclined Square Plates Having a Finite Thickness, *Proceedings of the 14th International Conference of Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT)*, Wicklow, Ireland, 2019.
3. **Manna, R.**, Oosthuizen, P.H., A Numerical Study of Natural Convective Heat Transfer from a Two-Sided Circular Horizontal Isothermal Element Having a Linearly-Inclined Nonflat Surface, *Proceedings of the Joint Canadian Society for Mechanical Engineering and Computational Fluid Dynamics Society of Canada (CSME-CFDSC) Congress*, London, Ontario, Canada, 2019.
4. **Manna, R.**, Oosthuizen, P.H., Natural Convective Heat Transfer from Two-Sided Heated Horizontal Isothermal Plates Having a Complex Shape and a Finite Thickness, *Proceedings of*

*the 16th International Heat Transfer Conference*, Paper No. IHTC16-22634, Pages 3025-3032, Beijing, China, 2018, DOI: <https://doi.org/10.1615/IHTC16.cov.022634>.

5. **Manna, R.**, Oosthuizen, P.H., A Numerical Study of the Simultaneous Natural Convective Heat Transfer from the Upper and Lower Surfaces of a Thin Isothermal Diagonally Inclined Square Plate, *Proceedings of the 26th Annual Conference of the Computational Fluid Dynamics Society of Canada*, Winnipeg, Manitoba, Canada, 2018.
6. **Manna, R.**, Oosthuizen, P.H., A Numerical Study of Natural Convective Heat Transfer from Two-Sided Circular and Square Heated Horizontal Isothermal Plates Having a Finite Thickness, *Proceedings of the 3rd Thermal and Fluids Engineering Conference*, Paper No. TFEC-2018-21540, Pages 113-127, Fort Lauderdale, FL, USA, 2018, DOI: <https://doi.org/10.1615/TFEC2018.cfd.021540>.
7. **Manna, R.**, Husain, M. al, Hammad, M.A., The Performance of a Chest Freezer Using Liquefied Petrol Gas by Computer Simulation Method, *Proceedings of the International Institute of Refrigeration Conference on Latest Developments in Refrigerated Storage, Transportation and Display of Food Products*, Paper No. 5A/2005-1-CD/IIF, Volume 2005-1, Session 4, 13 pages, Amman, Jordan, 2005.

### Books

Natural Convective Heat Transfer from Two-Sided Plates, Springer, 2020 (Proposal Accepted).

### Professional Affiliations

- The American Society of Mechanical Engineers (ASME)
- The Canadian Society for Mechanical Engineering (CSME)
- American Society of Thermal and Fluids Engineers (ASTFE)
- Jordan Engineers Association (JEA), Licensed Mechanical Engineer
- Professional Engineers, Ontario, P.Eng. (application in process)

### Computer Skills

- Platform and General Tools: Windows, Office Applications
- Engineering Tools: MATLAB, FORTRAN, AutoCAD
- Engineering Softwares: ANSYS (FLUENT, GAMBIT)

### Communication Skills

- Arabic: Native Tongue
- English: Excellent (Read, Written and Spoken)

### References

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