# Engr. Dr. Muhammad Amjad


**PERSONAL INFORMATION:**

**Assistant Professor**
Department of Mechanical Engineering, Faculty of Engineering and Technology
International Islamic University Islamabad, Pakistan.
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**KEY POSITIONS:**

In charge Graduate Program Mechanical, Energy System Engineering, Engineering Management. Nov 2024 till date.

Responsibilities

- Ensuring implementation of graduate policies and procedures.
- Make recommendation to the Dean and chairman regarding the admissions.
- Student Advisory, progress and their inputs.
- Allocation of Courses.

Lab Manager 2014-2020 & 2021-May 2023

Responsibilities:

- Allocation and supervision of labs to lab engineers
- Procurement for consumable materials for labs
- Preparation of technical specification for purchase of new lab equipment
- Maintenance of lab equipment
- Inviting industries representatives at Open House of undergraduate students for commercial evaluation of projects

Convener Community Services Committee

Responsibilities:

- Organizing seminars, works shops, awareness walks

Student Advisor DME, FET.

**AWARDS & HONORS:**

- Post Doctoral Fellowship 2025

- Universiti Teknologi Malaysia Research fellow at Computational Solid Mechanics Lab 2016-2017.
- Gold Medal and Performance Certificate 2013.
- Merit Scholarships at UET Peshawar.

**EDUCATION:**

| | |
|---|---|
| 2014-2021 | **Ph.D.** Mechanical Engineering, International Islamic University Islamabad, Pakistan. (Mechanisms of Fatigue Fracture for Nickle free Titanium Alloys in Biomedical Applications). |
| 2003-2007 | **MSc.** Mechanical Engineering Design, UET Peshawar, KP, Pakistan. |
| 1996-2001 | **B. Sc.** Mechanical Engineering, UET Peshawar KP Pakistan. |
| 1993-1995 | **F. Sc.** Pre-Engineering, BISE, Peshawar |
| 1988-1993 | **SSc.** Science, BISE, Peshawar |

**TEACHING EXPERIENCE :** (September 2014 to date)

Courses taught

- Heating, ventilating, and air-conditioning.
- Maintenance Engineering
- Heat and Mass Transfer
- Refrigeration and Air-conditioning
- Renewable Energy.

**RESEARCH INTEREST:**

Biomaterials, Advance Materials, Composites, Fracture Mechanics, Damage Mechanics, Fatigue, Finite Element Method, Mechanical Design, Heating Ventilation and Airconditioning Design, Heat Transfer, Design of Energy Systems.

**RESEARCH SUPERVISION ACTIVITIES:**

**PhD. Thesis**

- Development of hydroxyapatite coating for Mg with improved properties for Biomedical application (Completed).
- Development of thermally sprayed aluminum based composite coating on AA6061 alloy to improve its mechanical tribological and electrochemical properties (In-Progress)
- Investigation of Fracture behavior of moisture absorbed glass epoxy composite laminated at freezing temperature (In-Progress).

**Master Thesis**

- Fatigue Assessment of rector pressure vessel of pressurized water reactor using ANSYS workbench.
- Finite Element Analysis of Prosthetic femur under human gait pattern fatigue cycle.
- To investigate the effect of ground clearance on the performance of vertical axis tidal current turbine.

- Effect of upstream turbine operation on the fatigue life of downstream turbine in staggered arrays.

**RESEARCH PUBLICATIONS:**

1. Ahmad, S., Badshah, S., **Amjad, M**., Jan, S., Ibrahim, M., & Tamin, M. N. (2025). Evaluation of Fretting-Induced Degradation in Steel Wire Rope Strand Using Continuum Damage Mechanics. Fatigue & Fracture of Engineering Materials & Structures.
2. **Muhammad Amjad**, Saeed Badshah, Sajjad Ahmad, Mujahid Badshah, Sakhi Jan, Muhammad Yasir, Waseem Akram, Imtiaz Alam Shah, Riaz Muhammad, Muhammad Imran Khan, Tabassam Yasmeen "Finite element modeling of stress distribution and safety factors in a Ti-27Nb alloy hip implant under real-world physiological loading scenarios." *PloS one* 19.8 (2024): e0300270.
3. Mohd Nasir Tamin Sajjad Ahmad, Saeed Badshah, Seyed Saeid Rahimian Koloor, **Muhammad Amjad**, Sakhi Jan"Cumulative fretting fatigue damage model for steel wire ropes." *Fatigue & Fracture of Engineering Materials & Structures* 47.5 (2024): 1656-1676.
4. Waseem Akram, Rafiullah Khan, Michal Petru, **Muhammad Amjad**, Khalil Ahmad, Muhammad Yasir, Sajjad Ahmad, Seyed Saeid Rahiamin Koloor, Hydroxyapatite Coating for Control Degradation and Parametric Optimization of Pure Magnesium: An Electrophoretic Deposition Technique for Biodegradable Implants, Journal of Materials Research and Technology, 2023
5. Akram, W., Khan, R., **Amjad**, M., Muhammad, R., & Yasir, M. (2023). Densification of Nanocrystalline Hydroxyapatite Powder via Sintering: Enhancing Mechanical Properties for Biomedical Applications. Materials Research Express.
6. Ahmad, Sajjad, Rafiullah Khan, **Amjad** Khattak, and Sajjad Ahmed. "Fatigue Delamination Behavior of GFRP Composites Under Mixed-Mode I/II Loading." Iranian Journal of Chemistry and Chemical Engineering (2023).
7. Idrees, U., Ahmad, S., Shah, I. A., Talha, M., Shehzad, R., **Amjad**, M., & Koloor, S. S. R. (2023). Finite Element Analysis of Car Frame Frontal Crash using Lightweight Materials. Journal of Engineering Research, 100007.
8. Alam, Khurshid, Muhammad Iqbal, Ahmed Al-Balushi, Afzal Husain, Afaq Ahmed, Abdullah Al-Amrani, Sakhi Jan, **Muhammad Amjad**, and Saeed Badshah. "Numerical Modeling and Analysis of a Horizontal Axis RM1 NACA-4415 Wind Turbine." *CFD Letters* 15, no. 3 (2023): 1-11.
9. Ahmed, S., Rahman, R. A. U., Awan, A., Ahmad, S., Akram, W., **Amjad**, M., ... & Rahimian Koloor, S. S. (2022). Optimization of Process Parameters in Friction Stir Welding of Aluminum 5451 in Marine Applications. Journal of Marine Science and Engineering, 10(10), 1539.
10. Ahmed Zaib, M., Waqar, A., Abbas, S., Badshah, S., Ahmad, S., **Amjad**, M., ... & Eldessouki, M. (2022). Effect of Blade Diameter on the Performance of Horizontal-Axis Ocean Current Turbine. Energies, 15(15), 5323.
11. Shah, I. A., Khan, R., Koloor, S. S. R., Petrů, M., Badshah, S., Ahmad, S., & **Amjad, M**. (2022). Finite Element Analysis of the Ballistic Impact on Auxetic Sandwich Composite Human Body Armor. Materials, 15(6), 2064.
12. Rehman, Z. U., Badshah, S., Rafique, A. F., Badshah, M., Jan, S., & **Amjad**, M. (2021). Effect of a Support Tower on the Performance and Wake of a Tidal Current Turbine. Energies, 14(4), 1059.

13. Alam, K., Iqbal, M., Umer, J., **Amjad, M**., & Al-Ghaithi, A. (2020). Experimental study on biological damage in bone in vibrational drilling. Bio-Medical Materials and Engineering, (Preprint), 1-9.
14. **Amjad**, M., Badshah, S., Rafique, A. F., Adil Khattak, M., Khan, R. U., & Abdullah Harasani, W. I. (2020). Mechanism of Fatigue Crack Growth in Biomedical Alloy Ti-27Nb. Materials, 13(10), 2299.
15. Ahmad, S**.**, Badshah, S., Ul Haq, I., Abdullah Malik, S., **Amjad, M**., & Nasir Tamin, M. (2019). Numerical Investigation of 1× 7 Steel Wire Strand under Fretting Fatigue Condition. Materials, 12(21), 3463.
16. **Amjad, M**., Rafai, A., Badshah, S., Khan, R. U., & Ahmad, S. (2018). Finite element analysis of the real life loadings on the ti-27nb hip bone implant. journal of engineering and applied sciences, 37(2), 15-20.
17. **Amjad, M**., Badshah, S., Khattak, M. A., Khan, R. U., & Mujahid, M. (2017). Characterization of Nickle Free Titanium Alloy TI-27Nb for Biomedical Applications. Journal of Engineering and Applied Sciences (JEAS), 36(2).
18. Badshah, M., Badshah, S., Altaf, M., Jan, S., **Amjad, M**., & Anjum, N. A. (2017). Research progress in tidal energy technology-a review. Technical Journal, 22(IV).
19. Badshah, S., M. Badshah, and **M. Amjad**. "Characterization of Tidal Current Turbine Dynamics Using Fluid Structure Interaction (FSI)." Technical Journal 22, no. 3 (2017).
20. Ibrahim, Muhammad, Shahid Maqsood, Rafullah Khan, **Muhammad Amjad**, and Sakhi Jaan. "Optimization of gas tungsten arc welding parameters on penetration depth and bead width using Taguchi method." journal of engineering and applied sciences 35, no. 2 (2016): 51-60.
21. Khan, R., Jan, S., **Amjad**, M., Badshah, S., & Ahmad, S. (2017). Crack Closure and Fibre Bridging Contribution in The Stress ratio Effect on Delamination Growth Under Fatigue. Journal of Engineering and Applied Sciences, 36(1), 107-114.
22. Khan, R., ur Rahman, W., Ullah, M., Afaq, K., **Amjad, M**., & Jan, S. (2016). Age Effect on The Mechanical Properties of Hip Joint Bone: An Experimental Investigation. Journal of Engineering and Applied Sciences, 35(1), 37-44.
23. Ahmad, S., Jan, S., Khan, R., **Amjad, M**., & Badshah, S. Effect of Velocity and Temperature Ratios on the Film Cooling of Turbine Blades.
24. Khan, R., Jan, **S.,** Ahmad, S., **Amjad**, M., Badshah, S., & Ahmad, M. (2015). Fractographical Investigation of the Delamination under Fatigue using Laser Confocal Electron Microscope. International Journal of Scientific Engineering and Technology, 4(2), 120-122.
25. Jan, S., Khan, R. U., Ahmad, S., **Amjad**, M., Badshah, S., & Ahmad, M. (2015). Flexural strength of honeycomb sandwich structures. Int J Appl Sci Eng Res, 4(1), 86-93.

**CONFERENCE PROCEEDING:**

1. Jan, S., Badshah, S., Amjad, M., & Ahmad, S. (2019, August). Wake Modeling of Tidal Current Turbine Array. In 2019 International Conference on Power Generation Systems and Renewable Energy Technologies (PGSRET) (pp. 1-5). IEEE
2. Mahboob, M., ur Rashid, T., & Amjad, M. (2019, December). Assessment of Energy Saving Potential in Residential Sector of Pakistan through Implementation of NEECA and PEC Building Standards. In 2019 15th

International Conference on Emerging Technologies (ICET) (pp. 1-6). IEEE.

3. Usman, M., Sheikh, H. A., Khan, M. Z., Amjad, M., & Rizwan, M. (2018, September). Determination of Optimum Insulation Thickness for Different Cities of Pakistan. In 2018 International Conference on Power Generation Systems and Renewable Energy Technologies (PGSRET) (pp. 1-8). IEEE.

**CONFERENCES / SYMPOSIUM / WORKSHOP ORGANISED:**

**International**

- Organizing member of 3rd Power Generation Systems and Renewable Energy Technologies 2017 (Malaysia).

**National**

- Organizing member of 4th Power Generation Systems and Renewable Energy Technologies 2018 (Pakistan).
- Organizing member of 2nd Power Generation Systems and Renewable Energy Technologies 2015 (Pakistan).

**MEMBERSHIP OF COMMITTEES/ PROFESSIONAL BODIES:**

- Member Board of Faculty
- Convener FET Journal Committee
- Convener PGSRET 2025 conference
- Convener Departmental Quality Assurance Committee.
- Member Assessment Committee IIUI
- Member Solarization of Public sector building committee for IIUI.
- Member Repair/ Maintenance of Lab/ Air conditioner Committee IIUI.
- Member electricity usage, saving committee for IIUI.
- Member Departmental Board.
- Member Curriculum Review Committee DME.
- Member Out come Based Assessment Review Committee.
- Member Departmental Purchase Committee.
- Member Departmental Research committee.
- Convener Lab Folder Committee FET.
- HEC Approved Supervisor
- Member Pakistan Engineering Council. Registration Number MECH / 15926

**INDUSTRIAL EXPERIENCE**

Mineral Development Project
2007 – 2014
(Senior Engineer)
2002 – 2007
(Junior Engineer)

Highlight of Job responsibilities and achievements:

  - Design and installation of 800 TR & 110 TR chilled water system
  - Plant room design and space allocation to all equipment like chillers, pumps, fans and AHU's.
  - Supervision & Installation work of chilled water piping, ducting, Insulations and cladding
- Design and installation of 3 x 50 TR of Direct Expansion system.
  - Distinguished features include use of VAV's to conserve energy inside the facility.
  - Use of fire dampers in each room.
- Preparation of tender documents, Bill of Quantities and comparative statements based on technical features for various projects.
- Procurement of equipment through spot purchase, open and limited tenders.

Attock Oil Refinery
Feb 2001 – Oct 2001
Trainee Engineer.

- Maintenance of rotating machinery (Pumps, Turbines)
- Installation of Oil Tanks
- Installation of bitumen plant
- Scheduling of maintenance activities

**PROFESSIONAL & ADMINISTRATIVE TRAININGS:**

- Potential of Hydrogen as energy source for industry in Pakistan.
- Digitalization of Electricity grids smart metering and energy monitoring in Pakistan
- Preparation of PC-1 & PC-II
- NTC one Day training for program evaluators (12th July2023)
- 1 Day webinar on Artificial intelligence: implications for technologies & business strategy"(6th April 2023)
- 1 Day work shop on Engineering in Medicine. (29 Dec 2022)
- 2 Days workshop on Outcome based Education (OBE)
- 1 Day workshop on Application of Primavera
- 5 Days workshop on Curriculum Development
- 2 Days workshop on Outcome Based Education (OBE)
- One month advance management course (4Q HRD Program)
- Two months training on REVIT MEP Software.
- One-day course of "Project and Contract Management".
- 12 Days HVAC Design course from NIDA
- 12 Days piping design, layout & stress analysis course from NIDA
- 5 Days workshop on Faculty Skills Development

**PROFESSIONAL SKILLS:**

- ANSYS
- Carrier HAP LOAD
- Revit MEP