



Hafiz Muhammad Khalid Mahmood

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Home Page <http://pu.edu.pk/faculty/description/421/Dr-Muhammad-Khalid-Mahmood.html>

<https://www.researchgate.net/profile/Muhammad-Mahmood-5>

<https://scholar.google.com/citations?user=WZ8No6IAAAJ&hl=en>

Teaching Lectures YouTube Channel **Vist my Chennel to Watch My Lectures on Real Analysis, Group Theory and Topology at**

<https://www.youtube.com/@dr.khalidmahmood9756>

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Father's Name Abdul Majeed

HEC Recognized Teaching Experience **Round 23 years Teaching Experience** = About 21 years in University of the Punjab (Still Working) and about two years in University of Central Punjab (PICS)

Present Position **August 2020 to Date**, Working as Associate Professor (Permanent) with **Department of Mathematics, University of the Punjab**, Lahore-Pakistan.

Work Experience

- **August 2011 - August 2020**, Worked as Assistant Professor (Permanent) with **Department of Mathematics, University of the Punjab**, Lahore-Pakistan.

- **August 2001 - August 2011**, Worked as Lecturer (Permanent) with **Department of Mathematics, University of the Punjab**, Lahore-Pakistan.
- **December 1999 to August 2001**, Worked with **University of Central Punjab (PICS)** as Permanent Senior Lecturer of Mathematics.
- **August 1999 to December 1999**, Worked with **Hajvery University of Emerging Sciences** as Lecturer of Mathematics.
- **December 1997 to August 1999**, Worked with **Muslim Post Graduate College** as Lecturer of Mathematics.

Visiting Experience

- August 2001 to 2004, Worked with University of Central Punjab as Visiting Teacher of Mathematics.
- In August 2002, Worked with Punjab University College of Information Technology, University of the Punjab as Visiting Teacher of Mathematics.
- July 2003 to 2004, Worked with Department of Bio-Chemistry and Bio Technology University of the Punjab as Visiting Teacher of Mathematics.
- July 2004 to 2005, Worked with Department of Chemistry University of the Punjab as Visiting Teacher of Mathematics.
- July 2003 to 2004, Worked with University of Management and Technology (UMT) as Visiting Teacher of Mathematics.
- In 2004, 2007, 2015 and 2017 Worked with National University (Fast) as Visiting Teacher.
- September 2007 to 2009 Worked with Institute of Business Administration, University of the Punjab, Lahore-Pakistan as Visiting Teacher.
- September 2009 to 2011 Worked with Institute of Education and Research, University of the Punjab, Lahore-Pakistan as Visiting Teacher.
- September 2017 to 2019 Worked with Department of Physics, University of the Punjab, Lahore-Pakistan as Visiting Teacher.
- September 2018 to 2019 Worked with Institute of Chemical Engineering,, University of the Punjab, Lahore-Pakistan as Visiting Teacher.

Qualifications

- PhD (Pure Mathematics) : from Department of Mathematics, University of the Punjab, Lahore-Pakistan
- M.Phil. (Pure Mathematics) : from Department of Mathematics, University of the Punjab, Lahore-Pakistan with 3.76 CGPA
- M.Sc. (Mathematics): from Department of Mathematics, University of the Punjab, Lahore-Pakistan in 1st Division.
- B.Sc. (Pure & Applied Mathematics, Statistics): from University of the Punjab, Lahore-Pakistan in 1st Division.
- Higher Secondary School Certificate: from Lahore Board of Intermediate & Secondary Education, Lahore-Pakistan in 1st Division.
- Secondary School Certificate: from Lahore Board of Intermediate & Secondary Education, Lahore-Pakistan in 1st Division.
- Qualified GAT-General Test for M.Phil Admission.
- Qualified GAT-Subject Test for PhD Admission.
- Qualified GRE-Subject Test (**ETS**) for PhD Admission.

Areas of Interest

- Group Theory
- Number Theory
- Real Analysis
- Linear Algebra
- Topology
- Combinatorics
- Discrete Mathematics
- Mathematical Statistics
- Bio-Informatics Modelling Via Statistical Distributions
- Fuzzy Logic and Fuzzy Algebra

Distinctions/Awards

- Hafiz-e-Qur'an
- Secured 2nd position in M. Phil from Department of Mathematics, University of the Punjab, Lahore-Pakistan
- Gold. Medalist from Govt. College Sheikhpura, Pakistan.
- Silver Medalist and National Talent Scholarship holder from Lahore Board of Intermediate & Secondary Education, Lahore-Pakistan.
- UGC (President, Talent Forming Scheme) scholarship holder with 2nd position at Pakistan Level.
- Secured First Position in M. Phil Admission Test
- Secured First Position in PhD Admission Test
- Earned Cash Prize research incentive award from PU for the Year 2012
- Earned Cash Prize research incentive award from PU for the Year 2014

- Earned Cash Prize Performance evaluation award from PU for the Year 2013
- Earned Cash Prize Performance evaluation award from PU for the Year 2014
- Earned Cash Prize Performance evaluation award from PU for the Year 2015
- Earned Cash Prize Performance evaluation award from PU for the Year 2016
- Won Rs.150,000 Research Project from PU for the Year 2015
- Earned Cash Prize research incentive award from PU for the Year 2016
- Won Rs.150,000 Research Project from PU for the Year 2017
- Earned Cash Prize research incentive award from PU for the Year 2017
- Earned Cash Prize Performance evaluation award from PU for the Year 2017
- Earned Cash Prize research incentive award from PU for the Year 2018
- Earned Cash Prize Performance evaluation award from PU for the Year 2018
- Earned Cash Prize research incentive award from PU for the Year 2019
- Earned Cash Prize Performance evaluation award from PU for the Year 2019
- Earned Cash Prize research incentive award from PU for the Year 2020
- Earned Cash Prize Performance evaluation award from PU for the Year 2020
- Incentive award 2021 and Performance evaluation award for the Year 2021, are in Process

**Research
Experience/
Publications**

- Completed PhD Thesis titled “Structures of Discrete Graphs and Modular Arithmetics ” from Department of Mathematics, University of the Punjab under the guidance of Dr. Khalid Latif Mir (Professor, Department of Mathematics, University of the Punjab, Lahore) and Dr. Farooq Ahmad (Associate Professor, Faculty of Information Technology, university of Central Punjab, Lahore, 2009-2014).

List of Publications

For List of Publications, please visit my Home Page at
<http://pu.edu.pk/faculty/description/421/Dr-Muhammad-Khalid-Mahmood.html>

Research Supervision

- Supervised PhD. Thesis (Completed) on “A structural study of digraphs over finite rings using modular exponentiation” by M. Haris Mateen (2016-2021), Department of Mathematics, University of the Punjab.
- Supervised PhD. Thesis (Completed) on New Classes of Integers and Their Applications in Graphs by Shahbaz Ali (2018-2021), Department of Mathematics, University of the Punjab.
- Supervised PhD. Thesis (completed) on “A Computationally Efficient Mathematical Model for the Pattern Analysis in Proteomics (2018-2021) by Asma Ihsan, Department of Mathematics, University of the Punjab.
- Supervising PhD. Thesis (continued) on “Structural Properties of Power Digraphs Using Number Theory (2020-204) by Asif Abdurehman, Department of Mathematics, University of the Punjab.
- Supervising PhD. Thesis (continued) on “Structures of Graphs Based on Classical Groups (2020-204) by Sufyan Asif, Department of Mathematics, University of the Punjab.
- Supervising PhD. Thesis (continued) on “Structures of Graphs Based on Number Theory and Their Novel Metrics s (2020-204) by Aneela Ashraf, Department of Mathematics, University of the Punjab.
- Supervising PhD. Thesis (continued) on “Fuzzy Modeling” by Abrar Ahmad, Department of Mathematics, University of the Punjab.
- Supervised M.Phil. Thesis on Probabilistic Modeling and Factor Graphs with Applications by Sidra Yousaf (2020),

Department of Mathematics, University of the Punjab.

- Supervised M.Phil. Thesis on “Digraphs over Number Theoretic Multiplicative Functions” by Muhammad Asif (2019), Department of Mathematics, University of the Punjab.
- Supervised M.Phil. Thesis on “New Aggregation Operators for Multi-Criteria Decision Making” by Muhammad Ghulfam (2019), Department of Mathematics, University of the Punjab.
- Supervised M.Phil. Thesis on New Families of Congruences over Regular Partition and Regular Bipartitions of Integers by Syfyan Asif (2018), Department of Mathematics, University of the Punjab.
- Supervised M.Phil. Thesis on Identification of Acetylalanine Sites by Incorporating Mathematical Modeling and Statistical Moments into Chou’s PseAAC (2018), Department of Mathematics, University of the Punjab.
- Supervised M.Phil. Thesis on Structures of Digraphs Defined Over Lambert-Type Maps (2018), Department of Mathematics, University of the Punjab.
- Supervised M.Phil. Thesis on Applications of q -ochhammer Symbol and New Modular Investigations for Regular Partition of Integers by Aneela (2017-2018), Department of Mathematics, University of the Punjab.
- Supervised M.Phil. Thesis New Numbers on Euler’s Totient Numbers With Applications by Shahbaz Ali (2016-2017), Department of Mathematics, University of the Punjab.
- Supervised M.Phil. Thesis on Applications of Mathematical Modelling for the Position and Composition based Features

Proteomics by Asma Ihsan (2016-2017) at Department of Mathematics, University of the Punjab.

- Supervised M.Phil. Thesis on Structures of Digraphs Arising from Discrete Lambert Mappings by Lubna Anwar (2014-2015) at Department of Mathematics, University of the Punjab.
- Supervised B.Sc. (Hons.) Thesis on Wonders of Numbers by Farooq Ahmad and Hafiz Muteerahman (2008-2009) at Department of Mathematics, University of the Punjab.
- Supervised thesis of B.Sc. (Hons.) on Modular Arithmetic by Farkhanda Afzal and Maryam (2007-2008) at Department of Mathematics, University of the Punjab.

Seminars/Conference

- Delivered a Seminar on Group Representations at Mathematics Department Computer Lab 2004.
- Delivered a Seminar on Group Theory at Mathematics Department Queen Mary College, Lahore 2005.
- Delivered a Seminar on Rings and Vector Spaces at Mathematics Department, Queen Mary College, Lahore 2006.
- Delivered a Seminar on Congruences and Primitive Roots at Mathematics Department, Government College, Sheikhpura 2008.
- Delivered a Seminar on G-subsets of $Q^*(\sqrt{n})$ by $PSL(2, Z)$ at Mathematics Department Computer Lab 2009.
- Delivered a Seminar on 'Classification of the Elements of $Q^*(\sqrt{n})$ via Congruences and the Modular Group $PSL(2, Z)$ at Mathematics Department Computer Lab 2009.
- Delivered a Seminar on Applications of Congruences at

Mathematics Department Computer Lab 2011.

- Delivered a Seminar on Degree Reduction of Congruences at Mathematics Department Computer Lab 2012.
- Delivered a Seminar on Simple Graphs Arising from Congruences at Mathematics Department Computer Lab 2013.
- Delivered a Seminar on Components of Some Diagraphs at Mathematics Department Computer Lab 2014.
- Delivered a Seminar on 'Structures of Discrete Graphs and Modular Arithmetics at Mathematics Department Computer Lab 2014.
- Delivered a Seminar on ' Role of Statistical Moments in Image Recognition at University of Central Punjab 2015.
- Delivered a Seminar on Symmetries of Groups at Mathematics Department, Government College, Sheikhpura 2017-2018.
- Delivered a Seminar on Uniform Convergence and R. Integrals at Department of Mathematics Government Women College, Satilite Town, Gujranwala 2017-2018.
- Delivered a Seminar on Constructions of Groups at Department of Mathematics Government Women College, Satilite Town, Gujranwala 2018.
- Delivered a Seminar on Geometry and Topology at Department of Mathematics Government Women College, Satilite Town, Gujranwala 2019.
- Attended Seminar Series arranged by Department of Mathematics every year 2013-2021.
- Attended International Conference ICORE on Education, PU, Pakistan 2014, 2018
- Arranged all Pakistan level competitive exams among all

universities of Pakistan at graduate level for the years 2021 and 2022.

YouTube-Lecture Series (Group Theory)

Sr. No	Topic	Link
1	Conjugacy Relation Between the Elements in a Group	https://youtu.be/xq6bAfKNPmw
2	Class-Equation and Conjugacy Classes of Dihedral Groups D_n	https://youtu.be/pe9sJ5A2KBw
3	Conjugacy Classes of S_n : A Computational Approach	https://youtu.be/mdmG1AVeRQA
4	Size of Conjugacy Classes of S_n and A_n with Class-Equations	https://youtu.be/tyStctXvKJs
5	Conjugacy Classes and Their Size: An Alternative Approach	https://youtu.be/YgLHEu2X7IE
6	P-Groups: Definition and Related Theorems	https://youtu.be/P5YaYj1eg08
7	p-group Continued...	https://youtu.be/ZZEAwGlyzOU
8	Cauchy's Theorems: Abelian and Non-Abelian Cases	https://youtu.be/H3PO8q7FFjE
9	Sylow-p Subgroup, Examples and Sylow First Theorem	https://youtu.be/WiuKUv5m0YY
10	Double Cosets and Examples with Related Theorems	https://youtu.be/uBTfY8oN8qo
11	Sylow Second	https://youtu.be/gwKJX7JbSkI

	Theorem: Proof and Consequences	
12	Sylow's Third Theorem : Statement and Discussion	https://youtu.be/JUtWImZI6cY
13	Proof of Sylow's Third Theorem	https://youtu.be/8FgK2pGyqs8
14	Converse of Lagrange Theorem, Importance of Sylow Theory and Consequences	https://youtu.be/wJ_0eAWuIpM
15	Sylow's Theorems :Consequences Continued...	https://youtu.be/z_oh8cZE8N4
16	Remaining of Lec-15	https://youtu.be/-hr-wjXFh5w
17	Sylow's Theorems: A Normal Subgroup and Normalizers of Sylow's-p Subgroups	https://youtu.be/3PoXT9j7Qnc
18	Sylow's Theorems: A group of Order pq as Cyclic and a Decomposition of G	https://youtu.be/GZtYII3PAes
19	Applications of Sylow's Theorems: Groups of order 6, 15, and 2p	https://youtu.be/Ioqk8VSy25E
20	Applications of Sylow's Theorems: Classification of Groups of order 30	https://youtu.be/f-Vb2EbLxQI

YouTube-Lecture Series (Real Analysis)

Sr. No	Topic	Link
1	Sets and Operations on Sets	https://youtu.be/EnUDMsya8X8
2	Relation and Types of Relations	https://youtu.be/TCqQeubst2M

3	Types of Functions	https://youtu.be/XD_HFdC-Hu8
4	Functions Continued...	https://youtu.be/hT2wdGCj_G0
5	Algebraic and Order Properties of Real Numbers	https://youtu.be/XafyZmI95mQ
6	Methods of Proofs Continued	https://youtu.be/m4q3Et7vvk0
7	Complete and Incomplete Ordered Fields	https://youtu.be/0Kh0ympI2Gw
8	Properties of Suprimum and Infimum	https://youtu.be/RABO0MfA-ks
9	Properties of Suprimum and Infimum Continued	https://youtu.be/p8E68BJ2oSY
10	Maximum, Minimum, Maximal and Minimal Elements of Subsets of Real Numbers	https://youtu.be/h3TB1hKJfuM
11	Archimedean and Condensation Properties	https://youtu.be/CP7zGXogr-k
12	Existence and Uniqueness of Positive Nth Root of Positive Numbers	https://youtu.be/WPBQeMamEd8
13	Schwarz Inequality and Euclidean Spaces	https://youtu.be/1cLbMZUNgok

14	Sequences and Their Convergence	https://youtu.be/mwkY46zJdc8
15	Bounded Sequences and Limit Theorems	https://youtu.be/ynZulAHxWTo
16	Applications of Sandwich Theorem	https://youtu.be/cVt71hMupkw
17	Monotone Bounded Sequences	https://youtu.be/uGEIbmFj5p8
18	Applications of Monotone Convergence Theorem	https://youtu.be/wBjooPegMvc
19	Monotone Subsequence and Bolzano Weirstrass Theorems	https://youtu.be/ctH0yAykSIE
20	Cauchy Sequence	https://youtu.be/UqyxLwqVQ-4
21	Contractive as Cauchy (or Convergent) Sequence of Real Numbers	https://youtu.be/H3csaQOBVmU
22	Divergent and Properly Divergent Sequences	https://youtu.be/4wXf4D4uSAU
23	Infinite Series: A brief Introduction	https://youtu.be/QOV_Q1epZ7Y
24	Convergence of Positive Term Series and Cauchy Criterion for Series	https://youtu.be/9RUF836_Msc
25	Cauchy	https://youtu.be/0OjIS61Uw_g

	Condensation Test with Applications	
26	Comparison, Limit Comparison, Ratio and Root Tests	https://youtu.be/FsO-hCmfKds
27	The Completeness Property of Real Numbers	https://youtu.be/KTqENC3KzWQ
28	Alternating Series Test. Dirichlet's and Abel's Tests	https://youtu.be/q8ZHpVGH6VI
29	Grouping of Series	https://youtu.be/udXESonA3Zk
30	Rearrangement of Series	https://youtu.be/UQotdehokQg
31	Limits of Functions	https://youtu.be/SgEmKb1I2WU
32	Limits of Functions Continued	https://youtu.be/REo4VSNYSxk
33	Sequential Criterion for Limits of Functions	https://youtu.be/xWH0WmU7GWA
34	Divergence Criterion for Limits and Applications	https://youtu.be/3A7euFJf5ZM
35	Bounded Functions	https://youtu.be/HAbxwSWOxac
36	Bounded Functions Continued...	https://youtu.be/cDyaCUuD5S4
37	Bounded Functions and Compact Sets	https://youtu.be/bW4QL5e_iOg
38	Proofs of Limit Theorems	https://youtu.be/9sSZyL4mhR4
39	Limit Theorems with Applications	https://youtu.be/IQBWghJC8V4

40	Extensions of Limits: Definition and Examples	https://youtu.be/D46Yf_gtAxM
41	One Sided Limits for Monotone Function	https://youtu.be/BPPB6aZaZhE
42	Limits: Monotone Functions Continued	https://youtu.be/-J_E3qlfenU
43	Continuity at a Point: Definition	https://youtu.be/YkOagOjNFyU
44	Classifications of Discontinuities	https://youtu.be/UKR4-KIAvVU
45	Composition of Continuous Functions	https://youtu.be/lZdJqCUccB0
46	Continuous Functions on Intervals	https://youtu.be/TUeFYtVHGbE
47	Continuity on Intervals Continued	https://youtu.be/uioKPCpBXY
48	Location of Roots Via Nested Intervals Property	https://youtu.be/C6egUO-FtxY
49	Bolzano's Intermediate Value & Brower's Theorem	https://youtu.be/UisRoWi7RAY

YouTube-Lecture Series (Topology)

Sr. No	Topic	Link
1	A Brief Introduction and Definition	https://youtu.be/urpfcUhbi-w
2	Types of	https://youtu.be/UqNAVtUtNSA

	Topological Spaces	
3	Co-finite and Relative Topology	https://youtu.be/tXsB7UJshek
4	Open and Closed Sets	https://youtu.be/7Pf9nQWpwR4
5	Closure of a Subset and Related Theorems	https://youtu.be/Jjw3LR3qqrM
6	Interior Point and Interior of a Subset in a Topological Space	https://youtu.be/WYmB7NcLNic
7	Exterior and Boundary of a Subset in a Topological Space	https://youtu.be/dUJclmuMBCE
8	Frontier (of boundary) and Related Theorems	https://youtu.be/TzaTe7lCxl8
9	Definition of Limit Point of a Subset in Topological Space	https://youtu.be/YIOEdg6hnmqM
10	Derived Subset, Dense Subset and Separable Spaces	https://youtu.be/gmgexfGUdC0
11	Base for a Topology	https://youtu.be/xroUy5RophM
12	Base for a Topology (Continued)	https://youtu.be/tZbnxfRVAQI
13	Base for a Topology Continued	https://youtu.be/dC2Q2Dovb70
14	Subbase for a Topology	https://youtu.be/bkeRosF0h-U
15	Neighborhood and	https://youtu.be/yyoKj_wtqKk

	Neighborhood System of a Point	
16	Neighborhood or Local Base (or base at a point of X)	https://youtu.be/SYtryJgyfu8
17	First and Second Countable Topological Spaces (Local and Global)	https://youtu.be/WCDIR4LFSAk
18	Lindelof Space	https://youtu.be/MCEE29Q9cvQ
19	Results on Lindelof and Separable Spaces	https://youtu.be/n0YnetWCy4Y
20	A Countable Base in a Separable Metric Space	https://youtu.be/2zX2w3C3XSI

Administrative Skills

- Editor, Punjab University Journal of Mathematics, Department of Mathematics, University of the Punjab, Lahore-Pakistan.
- Student's Advisor (2001-2002, 2003-2008, 2010-2011) Department of Mathematics, University of the Punjab, Lahore-Pakistan.
- Member, Board of studies in Mathematics, Department of Mathematics, University of the Punjab Lahore. (2001-2002, 2009 to 2011, 2016-2018, 2020 to date)
- Member Purchase Committee (2003-2006, 2009-2012, 2018 to date), Department of Mathematics, University of the Punjab, Lahore-Pakistan.
- Staff Secretary (2001-2007), Department of Mathematics, University of the Punjab, Lahore-Pakistan.
- Member, Departmental Admission Committee (2001-2010, 2013-2019 to date)
- Focal Person, Departmental Career Counselling (2014-2019)

to date).

- Member, Board of Faculty of Sciences (2004-2007, 2016-2018)
- Proficient in English, Urdu, Arabic and Punjabi

Languages
References

Would be furnished on request