

# Pushkin Kumar

Postgraduate(M.Tech, Solid Mechanics and Design)  
Department of Mechanical Engineering  
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## ACADEMIC QUALIFICATIONS

Year	Degree/Certificate	Institute	CPI/%
2021 - Present	Master Of Technology	Indian Institute of Technology, Kanpur	8.5/10
2019	Bachelor of Technology	National Institute Of Technology, Jamshedpur	7.37/10
2014	Higher Secondary(XII)	Kendriya Vidyalaya No.2 (AFS), Jodhpur	93.4%
2012	Secondary(X)	Kendriya Vidyalaya No.2 (AFS), Jodhpur	91.2%

## ACADEMIC ACHIEVEMENTS

- Secured a **GATE 2020** AIR of **331** with a score of 836.
- Selected for Indian National Mathematical Olympiad Preparatory camp organised by KVS New Delhi 2014.
- Secured a national rank of 211 in EduHeal Foundation interactive olympiad 2009.
- Secured a national rank of 357 in EduHeal Foundation interactive olympiad vix NIMO 2010.
- Secured a national rank of 673 in EduHeal Foundation First Nationawide Biotechnology Olympiad 2006.
- Secured a Jodhpur Divion rank of 4 in CLC talent hunt(DTSC) 2014.

## INDUSTRIAL TRAINING

- **Henry Harvin Education India LLP** (17 July 2022-17 August 2022)
  - Worked with Analytics Deaprtment and was actively and diligently involved in the projects and tasks assigned.

## ACADEMIC PROJECTS

- **Master's Thesis** : Kanpur version of the Newton method, quasi-Newton method, sequential quadratic programming. (*Ongoing*)  
**Mentor: Dr Bhaskar Dasgupta**, Department of Mechanical Engineering, IIT Kanpur.

To establish and explore the following proposed algorithms for constrained and unconstrained **OPTIMIZATION** problems:-

- Kanpur version of the Newton's method using damped Choleskey decomposition for positive definitness of the Hessian (unconstrained optimization).
- Kanpur version of quasi-Newton method with rank one updates via the Choleskey route (unconstrained optimization).
- Kanpur version of sequential quadratic programming by Hessian projection in tangent space (constrained optimization).

- **Term Projects at IIT Kanpur :**

### 1. Algorithm study

- Assessed in-depth functioning and performance of simplex methods in constrained linear programming problems.
- Assessed in-depth functioning and performance of interior point methods in constrained linear programming problems.
- Ran a comparison between the two methods via computing time and identified the circumstances of higher performance for each method. (*Optimization methods in engineering design ME752A*)

### 2. Presented a tutorial talk on Hermite curve of 4, 6 and more points.

- Assessed the performance of a new method based on a 'discrepancy' value to fit the best possible curve.
- Compared the performance of the proposed method to curve fitting by least square method. (*CAD ME751A*)

## TECHNICAL SKILLS

- **Data Structures and Algorithms** (C++).
- **Programming Languages:** C++, MATLAB, Python, HTML, CSS, JavaScript, ReactJS.
- **Libraries and frameworks** Numpy, Matplotlib, Pandas, sklearn
- **Other Software tools:** SolidWorks, ANSYS, CATIA, L<sup>A</sup>T<sub>E</sub>X.

## POSITIONS OF RESPONSIBILITY

- Orientation team member of Counselling Services of IITK for Academic Year 2021-2022.
- **Teaching Assistant** : Assisted course TA101AA (Technical Arts) in even semester, 2021-2022 .
- **Teaching Assistant** : Assisted course ME352A (Theory of mechanisms and machines) in odd semester, 2022-2023.

## RELEVANT COURSEWORK

- **Optimization methods in engineering design (ME752A)**, Instructor: Dr Bhaskar Dasgupta.
- **Applied Numerical Methods (ME685A)**, Instructor: Dr K. Muralidhar.
- **Finite Element Analysis (ME623A)**, Instructor: Dr Ushasi Roy.
- **Computer Aided Engineering Design (ME751A)**, Instructor: Dr Bhaskar Dasgupta.

- **Mathematics for engineers (ME681A)**, Instructor: Dr Manjesh Singh.
- **Robot motion planning(ME766A)**, Instructor: Dr Ashish Dutta , awarded with grade A\*.

## EXTRA-CURRICULAR ACTIVITIES

- Served as an active member of scout and guides with Titiya Sopan certification.
- Secured Two golds medals in tug of war mechanical engineering department during Annual athletics and sports meet'17 and Urja'18.
- Stood third in Hindi Skit in Sub-Cluster Level Social Science Exhibiton 2010.
- Stood finalist in Multiple Obstacle Race organised by Adventure Wheels.

## HOBBIES & INTERESTS

- **Hobbies :** Playing chess and solving puzzles.
- **Area of Interest :** Swimming.