

PROFILE

Experienced educator and curriculum developer with 7+ years of university teaching and research experience in mechanical engineering, with a strong focus on applied computational methods and renewable energy technologies. Skilled in designing and delivering technical educational content in Python programming and machine learning, particularly tailored for engineering applications. Certified in AI, ML, and instructional design through Coursera and LinkedIn Learning. Proven ability to collaborate with subject matter experts to develop engaging, technically accurate, and pedagogically sound course materials. Enthusiastic about building world-class educational experiences to support global learners in the AI-powered future.

EDUCATIONAL QUALIFICATIONS

| Program | Institution | Completion |
|--------------------------------|---|------------|
| Ph.D. Mechanical Engineering | Indian Institute of Technology Madras | 2021 |
| M.Tech. Heat Power Engineering | Visvesvaraya National Institute of Technology, Nagpur | 2008 |
| B.Tech. Mechanical Engineering | DVR College of Engineering, Kashipur | 2006 |
| Class XII, BIE AP | Gnanadeep Junior College, Kamareddy | 2000 |
| Class X, BSE AP | Vani Vidyalayam High School, Kamareddy | 1998 |

TEACHING EXPERIENCE

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| Assistant Professor | SR University, Warangal, India <ul style="list-style-type: none"> ❖ Designed and enhanced undergraduate courses, focusing on hands-on learning. ❖ Designed the curriculum, content and delivered a custom elective course "Machine Learning in Mechanical Engineering" ❖ Planned and executed curriculum delivery in alignment with institutional academic standards and departmental learning objectives, ensuring consistency and educational excellence. ❖ Developed engaging course materials, assignments, open-book examination frameworks, and effective evaluation metrics to improve learning outcomes. ❖ Managed Learning Management System content, ensuring seamless student engagement. ❖ Served as Head of the Department of Mechanical Engineering, overseeing departmental administration, academic planning, and faculty coordination to ensure smooth operations and high-quality education delivery. ❖ Supervised undergraduate projects focused on applying machine learning techniques to solve problems in mechanical engineering. ❖ Conducted training and workshops for Ph.D. students. ❖ Served as Convener for the "2nd Congress on Control, Robotics, and Mechatronics – 2024", overseeing event planning, technical content coordination, and speaker engagement. | (Dec 2020- Dec 2024) |
| | Courses Taught <ul style="list-style-type: none"> ❖ Problem Solving Using Python Programming ❖ Heat Transfer ❖ Renewable Energy Systems ❖ Machine Learning in Mechanical Engineering ❖ Thermodynamics ❖ Power Plant Engineering | |
| Teaching Assistant | Indian Institute of Technology Madras <p>Assisted faculty in delivering classroom lectures, supported student learning through assignment discussions and assisted in evaluations.</p> <p>TA Courses: Introduction to Renewable Energy Technology, Introduction to Energy and Environment, Thermodynamics</p> | (Jan 2013-Jun 2014) |
| Assistant Professor | Institute of Aeronautical Engineering (JNTUH), Hyderabad, India <ul style="list-style-type: none"> ❖ Delivered theoretical and practical instruction to undergraduate students in the Department of Mechanical and Aeronautical Engineering, ensuring strong foundational understanding and applied learning. ❖ Prepared comprehensive lecture notes, laboratory manuals, session plans, and academic compliance reports in alignment with curriculum requirements and quality standards. ❖ Guided and supervised undergraduate research projects in the fields of Computational Fluid Dynamics (CFD), heat transfer, and alternative energy technologies, fostering analytical thinking and innovation. | (Oct 2008- Dec 2011) |
| | Theoretical Courses Taught <ul style="list-style-type: none"> ❖ Engineering Drawing ❖ Engineering Thermodynamics ❖ Engineering Mechanics ❖ Operations Research ❖ Engineering Thermodynamics ❖ Thermal Engineering - I ❖ Heat Transfer ❖ Refrigeration and Air Conditioning ❖ Fluid Mechanics ❖ Computational Fluid Dynamics | |

RESEARCH EXPERIENCE

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| Doctoral Thesis | <p><i>Numerical Investigations and Techno-Economic Analysis of Solar Parabolic Trough Collector Systems for Once-Through Direct Steam Generation (Apr 2014-March 2021)</i></p> <ul style="list-style-type: none"> ❖ Designed and developed a thermo-hydraulic model for once-through direct steam generation (DSG) in a solar parabolic trough collector system. ❖ Formulated a comprehensive methodology for the techno-economic analysis of a solar parabolic trough thermal power plant using both thermic fluid and DSG modes, tailored for an indigenously developed PTC module at IIT Madras. ❖ Implemented a drift flux model to numerically simulate two-phase flow within the absorber tube under non-uniform solar flux conditions. ❖ Investigated and evaluated the performance of solar parabolic trough absorber tubes equipped with metal foam inserts to reduce thermal gradients, and enhance heat transfer and collector efficiency. |
| Layout and Piping of a Solar PTC Module | <p><i>Layout and Piping of a Solar Parabolic Trough Collector Module for DSG (Apr 2014-Dec 2016)</i></p> <ul style="list-style-type: none"> ❖ Executed the layout and piping design for the solar parabolic trough collector (PTC) module, incorporating the receiver tube, cooling tower, and heat exchangers. ❖ Engineered and integrated piping connections for the tracking mechanism using flexible hoses and low-torque ball joints to enable efficient and reliable movement. ❖ Configured and calibrated high-temperature pressure transducers, RTDs, and flow meters for accurate instrumentation and real-time performance monitoring of the PTC module. |
| Collaborative Research on Solar PTC Plants | <p><i>Collaborative Research with University of Constantine, Algeria on 4E Analysis of Solar Parabolic Trough Thermal Power Plants (May 2014 – Aug 2014)</i></p> <ul style="list-style-type: none"> ❖ 4E Analysis of solar PTC thermal power plants with and without thermal energy storage and fuel back-up. ❖ Optimization and feasibility study of solar PTC plants for Algerian climatic conditions. |
| Estimation and Measurement of Thermo-physical Properties | <p><i>Estimation and Measurement of Thermal Conductivity of Two-Phase Systems (Jul 2012-Mar 2014)</i></p> <ul style="list-style-type: none"> ❖ Developed models to estimate the effective thermal conductivity of porous materials. ❖ Measured and analyzed the thermal conductivity of various materials, including insulation materials (rock wool, glass wool, etc.), concrete, soil samples, powder and solid propellants, metal oxide powders, vegetable oils, and nanofluids. ❖ Investigated the influence of shot content on the thermal conductivity of LRB wool mattresses through experimental measurements and numerical modeling. |

LIST OF PUBLICATIONS (Google Scholar Profile)

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|-------------|--|
| Journals | <p>Published</p> <ul style="list-style-type: none"> ❖ Kumar, B. N., & Reddy, K. S. (2020). "Numerical investigations on metal foam inserted solar parabolic trough DSG absorber tube for mitigating thermal gradients and enhancing heat transfer". <i>Applied Thermal Engineering</i>, 178, 115511. ❖ Kumar, B. N., & Reddy, K. S. (2018). "Comparison of two-phase flow correlations for thermo-hydraulic modeling of direct steam generation in a solar parabolic trough collector system". <i>Journal of Thermal Science and Engineering Applications</i>, 10(4). ❖ Reddy, K. S., Ajay, C. S., & Kumar, B. N. (2018). "Sensitivity study of thermal performance characteristics based on optical parameters for direct steam generation in parabolic trough collectors". <i>Solar Energy</i>, 169, 577-593. ❖ Boukelia, T. E., Mecibah, M. S., Kumar, B. N., & Reddy, K. S. (2015). "Optimization, selection and feasibility study of solar parabolic trough power plants for Algerian conditions". <i>Energy conversion and Management</i>, 101, 450-459. ❖ Boukelia, T. E., Mecibah, M. S., Kumar, B. N., & Reddy, K. S. (2015). "Investigation of solar parabolic trough power plants with and without integrated TES (thermal energy storage) and FBS (fuel backup system) using thermic oil and solar salt". <i>Energy</i>, 88, 292-303. |
| Conferences | <p>International</p> <ul style="list-style-type: none"> ❖ Kumar, B.N., & Reddy, K.S. "Thermo-hydraulic Modelling of Direct Steam Generation in a Solar Parabolic Trough Collector System", <i>13th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics</i>, 17-19 July 2017, Portoroz , Slovenia ❖ Kumar, B.N., & Reddy, K.S. "Optimal sizing of collector field for DSG based stand-alone concentrating solar power plant", <i>11th International Exergy, Energy and Environment Symposium</i>, 14-18 July 2019, SRM IST, Chennai, India. |

CORE COMPETENCIES

- ❖ Technical Curriculum Development
- ❖ Instructional Design
- ❖ Machine Learning & AI Education
- ❖ Collaborative Content Creation
- ❖ Assessment and Quiz Design
- ❖ Empathy for Learners

TECHNICAL SKILLS

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|-----------|----------------|---------------|------------------------|-------------------|
| Languages | ❖ FORTRAN | ❖ C | ❖ PYTHON | ❖ MATLAB |
| Softwares | ❖ ANSYS FLUENT | ❖ CYCLE TEMPO | ❖ ASAP | ❖ SAM |
| Tools | ❖ MS OFFICE | ❖ LATEX | ❖ ARTICULATE STORYLINE | ❖ ADOBE CAPTIVATE |

AI-ML RELEVANT CERTIFICATIONS

- ❖ Exploratory Data Analysis for Machine Learning (IBM, Coursera)
- ❖ Supervised Machine Learning: Regression (IBM, Coursera)
- ❖ Supervised Machine Learning: Classification (IBM, Coursera)
- ❖ Linear Algebra: Linear Systems and Matrix Equations (John Hopkins University, Coursera)
- ❖ Programming for Everybody (Getting Started with Python) (University of Michigan, Coursera)
- ❖ Python Data Structures (University of Michigan, Coursera)
- ❖ Using Python to Access Web Data (University of Michigan, Coursera)
- ❖ Neural Networks and Deep Learning (DeepLearning.AI, Coursera)
- ❖ Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization (DeepLearning.AI, Coursera)
- ❖ Structuring Machine Learning Projects (DeepLearning.AI, Coursera)

INSTRUCTIONAL DESIGN RELEVANT CERTIFICATES

- ❖ Build Your Skills as an Instructional Designer (LinkedIn)
- ❖ Advancing Your Skills As an L&D Professional (LinkedIn)
- ❖ Instructional Design: Adult Learners
- ❖ Articulate Storyline Essential Training
- ❖ Articulate 360: Interactive Learning
- ❖ Articulate Storyline 360: Advanced Elearning
- ❖ Transform Classroom Training to E-Learning with Articulate 360
- ❖ Learning Articulate Rise
- ❖ Adobe Captivate Essential Training
- ❖ Using Design Principles to Enhance Remote Trainings
- ❖ Learning Moodle
- ❖ Elearning Essentials: SCORM and Tin Can API
- ❖ Canva for Web and Digital Design Projects

PROFESSIONAL MEMBERSHIPS AND ACADEMIC ACHIEVEMENTS

- ❖ Member, The Institution of Engineers (India) – IEI Membership No.:
- ❖ Chartered Engineer (India), awarded by The Institution of Engineers (India)
- ❖ Member, International Association of Engineers (IAENG) – IAENG Membership No.: 344295
- ❖ MHRD Fellowship for Postgraduate Studies, Ministry of Human Resource Development, Government of India
- ❖ MHRD Fellowship for Doctoral Research, Ministry of Human Resource Development, Government of India

PERSONAL INFORMATION

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| Date of Birth : 1 st May 1983 | Nationality : Indian |
| Languages : English, Hindi, Telugu | Passport : M5418930 |

REFEREES

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| Doctoral Thesis Supervisor | Dr. K Srinivas Reddy - ksreddy@iitm.ac.in (+91-9840464592, +91-8248164348) Professor Heat Transfer and Thermal Power Laboratory Department of Mechanical Engineering Indian Institute of Technology Madras Chennai-600036, India |
| Co-author (Collaborative Work) | Dr. Taqiy Eddine Boukelia - t.e.boukelia@univ-jijel.dz (00213-776594647) Associate Professor (B) Mechanical Engineering Department University of Jijel, Jijel, Algeria |
| Research Colleague | Dr. Somasundharam S- aram.s@annauniv.edu (+91-9659153963, +91-8248064270) Assistant Professor Department of Mechanical Engineering Chennai, India-600036 |
| Master's Thesis Supervisor | Dr. Nishikant V Deshpande – nishu1952@gmail.com (+91- 7896310632, +91- 9435177794) Adjunct Professor of Practice Visvesvaraya National Institute of Technology Nagpur-440010, India |

DECLARATION

I hereby declare that the information furnished above is true and correct to the best of my knowledge and belief.

Date: 22/05/2025

Bohra Nitin Kumar