



# Engineering Optimization with Application in Automation and Computer Vision

Under the Karyashala Scheme - A SERB Initiative

July 17-23 2023

Funded By

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Organized By

Visvesvaraya National Institute of Technology Nagpur

## **ABOUT KARYASHALA**

'KARYASHALA' scheme by SERB is meant for skill development training on topics required for scientific research work. It is an effort to improve research productivity of promising PG and PhD students from universities and colleges through high end workshops on specific themes. This program aims to provide opportunities to acquire specialized research skills.

## **ABOUT VNIT, NAGPUR**

Visvesvaraya National Institute of Technology Nagpur is one of the thirty-one National Institute of Technology in the country. The Govt. of India conferred on the Institute, the Deemed to be University status (under University Grant Commission Act, 1956) with effect from 26th June 2002. Subsequently, the Central Govt. by Act of Parliament (National Institutes of Technology Act, 2007) declared VNIT Nagpur as an Institute of National Importance along with all former regional engineering colleges. The act was brought into force from 15th August 2007. Earlier, the Institute was known as Visvesvaraya Regional College of Engineering (VRCE). It was established in the year 1960 under the scheme sponsored by Govt. of India and Govt. of Maharashtra. The college was started in June 1960 by amalgamating the State Govt. Engineering College functioning at Nagpur since July 1956. In the meeting held in October 1962, the Governing Board of the College resolved to name it after the eminent engineer, planner, and statesman of the country Sir M. Visvesvaraya.

## **BRIEF DESCRIPTION ABOUT THE WORKSHOP**

The STTP is aimed to expose participants to current practices and recent trends in the field of optimization and its applications. It is targeted at faculty members, students, researchers and engineers working in these rapidly evolving areas with an aim to make the audience aware of the recent advancements and state-of-the-art research in this field. Optimization finds diverse applications today ranging from office automation, industrial automation, remote sensing, scientific application, criminology, astronomy and space application, meteorology, printing and graphic cards, military to human health in the form of medical image analysis, to names a few. All these applications broadly accomplish tasks involving multivariable system in nature. In the field of Automation multivariable system with uncertainty with optimal control approaches, including handling constraints on states and input, computational tractability and guarantees on closed-loop stability. MPC is an optimization-based technique, which uses predictions from a model over a future control horizon to determine control inputs to achieve the target. In image processing and analysis tasks using classical optimization, soft computing based techniques to machine learning tools such as Reinforcement image acquisition, preprocessing for de-noising and quality improvement (enhancement), correction of visual artifacts (restoration), object background partitioning (segmentation), feature extraction followed by classification (image analysis) etc. While developing automated schemes, each of these image processing and analysis operations faces different challenges and achieving the best results needs solving various optimization problems.

### **Tentative List of Sessions:**

- Background of Optimization Technique
- Application of Optimization in Automation
- Application of Optimization in Computer Vision
- Future scope in Automation

**Speakers from: IITs, NITs, IIITs**

### **Important Dates:**

**Registration Opens: June 30, 2023**

**Last Date of Application: July 10, 2023**

**Intimation to Shortlisted Candidates: July 11, 2023**

**Workshop Dates: July 17-23, 2023**

**Link to registration:**

<https://docs.google.com/forms/d/1HXqgnjuMcQhJTd5vYRfzqcqXVH/B3S9gXINeZIXyueYo/edit?pli=1>

### **Registration Guidelines**

- Registration Fee: *NIL*
- Eligibility: *PG & PhD students of Electrical/Electronics & Communication Engineering or Computer Science or any other relevant specializations. Number of seats are limited to 25.*
- Accommodation for participants may be provided at VNIT Nagpur.
- Students selected for this workshop are eligible for Travel allowance (TA) reimbursement (3rd AC) for their journey to and from VNIT Nagpur as per SERB norms.
- Daily necessary expenses such as stationary, accommodation, food etc. for participants will be covered under the funds approved by SERB as per norms.
- Participants are entitle to a certificate after successful completion of the workshop.

### **Workshop Coordinators:**

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