

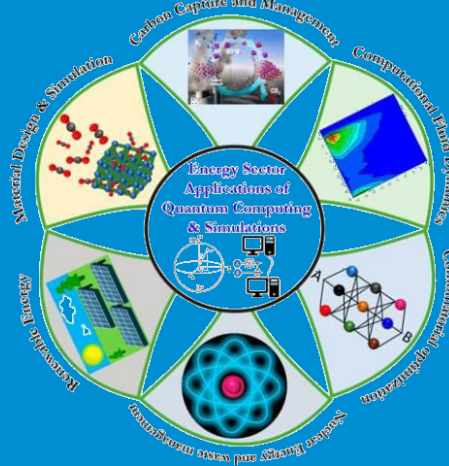
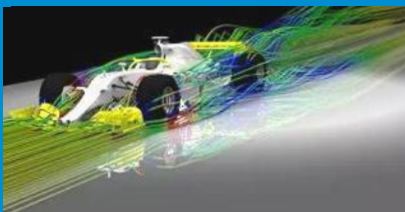


**Centurion**  
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# Centre for Computational Mathematics

**Estd. 2020**



**CENTURION UNIVERSITY OF TECHNOLOGY AND MANAGEMENT, ODISHA**

**Vrsion 1 / 2023**

# Message from the Centre Head



*Computational Mathematics is a broad multidisciplinary and integrative area including a variety of applications in science, engineering, numerical methods, applied mathematics where computing plays a central and essential role. It plays a vital role in bridging the gap between the Academia, R&D and Industry sectors as the focus is more on computational fields in the present scenario. Because computation reduces the engineering testing costs, product-to-market time and costs, provides comprehensive data which are not easily obtainable from experimental tests. Even the computational techniques easily complement the experimental and theoretical techniques in solving the problems with high complexity.*

*Keeping in view the latest trends of Industry, our Research Centre emphasizes on and creates fundamental advances in Computational Science, including Computational Fluid Dynamics(CFD), Quantum Computing and High-Performance Computing. We aim to provide a supportive environment where researchers of different experiences but common interests can work together and learn from each other. Our Centre also gives an insight to the patents and research publications on some selected areas such as Nanofluids, MHD flow through porous media, Casson and Jeffrey fluids, CFD, CAE, Aerodynamics etc..*

A handwritten signature in blue ink that reads "A. Misra" with a long horizontal line extending to the right.

**Prof. Ashok Misra**

Head

Centre for Computational Mathematics

# Members of the Centre



**Dr. Ashok Misra** (Coordinator)  
Deptt. of Mathematics, PKD Campus

**Dr. R.C.Mohanty**

Deptt. of Mechanical Engg., BBSR Campus



**Dr. Goutam Kumar Mahato**  
Deptt. of Mathematics, BBSR Campus

**Dr. Swarnalata Jena**

Deptt. of Mathematics, BBSR Campus



**Dr. Sujit Mishra**  
Deptt. of Mechanical Engg., PKD Campus

**Mr. Manas Ranjan Padhi**

Deptt. of Mechanical Engg., BBSR Campus



**Dr. Sasi Bhusan Padhi**  
Deptt. of Mathematics, BBSR Campus

**Dr. Banitamani Mallik**

Deptt. of Mathematics, PKD Campus



**Dr. Tumbanath Samantara**  
Deptt. of Mathematics, BBSR Campus

**Dr. Balaji Padhy**

Deptt. of Mathematics, PKD Campus



**Dr. Bhairaba Kumar Majhi**  
Deptt. of Mathematics, Balangir Campus

**Dr. Santosh Kumar Bhal**

Deptt. of Mathematics, PKD Campus





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## 1. Aim and Objective of the Centre

- i. *To predict a complex turbulent flow field obtained through interactions amongst multiple sources of fluid flow in a three-dimensional space mostly confined by multiple solid boundaries and even in presence of strong pressure gradient and under other influences of variety of body forces as well using SIMULIA platform offered by Dessault Systems.*
- ii. *To solve complex problems pertaining to Computational Chemistry, Cyber security & Cryptography, Artificial Intelligence & Machine Learning, Financial Modelling etc. using Quantum Computing which is more efficiently than on classical computing on “Qiskit” platform of IBM Quantum Experience.*
- iii. *To deal with the performance evaluation of variety of industrial application problems through high Performance Computing using Quda C of nVIDIA as well as GPU Rig.*

## Achievements...



### 2. Patents: 5

Granted: 2 Published: 3

- i. **Title:** A RPMS system for power management and power quality improvement of isolated hybrid microgrid  
**Inventors:** Kuldip Singh, Satyasis Mishra, **Ramesh Chandra Mohanty**, Madhusmita Shial, Susanta Kumar Biswal  
**Filing Country:** Australia  
**Status:** Published & Granted on 06.04.2022  
**Patent number:** 2021103987
- ii. **Title:** Portable Photovoltaic Mounting Assembly for Agrivoltaics  
**Applicant:** Centurion University of Technology and Management, Odisha  
**Inventors:** Nimay Chandra Giri, **Ramesh Chandra Mohanty**, Jagannath Padhi  
**Filing Country:** India  
**Status:** Published on 10.06.2022  
**Patent number:** 202231026515A
- iii. **Title:** An economically low cost integrated model for the hybridization and electric transformation of cars and added mechatronic vehicles.  
**Inventors:** A. Pritam, **M. R. Padhi**, B. P. Ganthia, A. Parida  
**Filing Country:** India  
**Status:** Published on 18.02.2022  
**Patent number:** 202231004407
- iv. **Title:** A system and a method of improved SCA-ELM based densenet121 for classification of fruit diseases.  
**Inventors:** Satyasis Mishra, Mohammed Siddique, Sunita Satapathy, **Ramesh Chandra Mohanty**, **Goutam Kumar Mahato**, Tumbanath Samantara, Sasmita Nayak, Nilamadhab Dash  
**Filing Country:** Republic of South Africa  
**Status:** Granted on 30.11.2022
- v. **Title:** Polycentric Knee Joint for Improved Stability and Flexion  
**Applicant:** Centurion University of Technology and Management, Odisha  
**Inventors:** Rajesh Kumar Mohanty, **R.C. Mohanty**, Sukanta Kumar Sabut  
**Filing country:** India  
**Status:** Published on 29.07.2022



### 3. Research Article Publication: 93

**Web of Science (SCIE):** 11 Published & 04 Accepted

**Scopus:** 54 Published & 05 Accepted

**UGC CARE Category-I:** 15 Published & 04 Accepted



#### Some publications with Impact Factor:

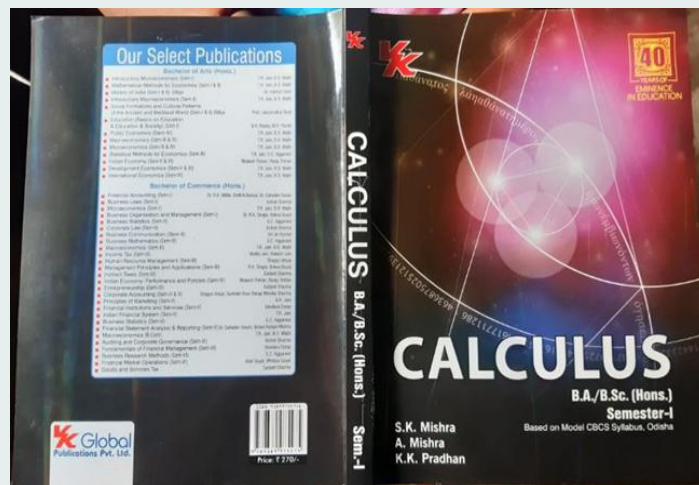
- i. Sachin Shaw, S S Samantaray, **A Misra**, M K Nayak and O D Makinde, Hydromagnetic flow and thermal interpretations of cross hybrid nanofluid influenced by linear, nonlinear and quadratic thermal radiations for any Prandtl number, International Communications in Heat and Mass Transfer, Elsevier, 130, Jan 2022, 105816, ISSN: 0735-1933  
**SCIE, Impact Factor: 5.683**
- ii. M.K. Nayak, Rashid Mehmood, S. Mishra, **A. Misra** and Taseer Muhammad, Thermal and velocity slip effects in mixed convection flow of magnetized ceramic-nanofluids over a thin needle with variable physical properties, Waves in Random and Complex Media, Taylor and Francis, October 2021, ISSN: 1745-5049.  
**SCIE, Impact Factor: 4.853**
- iii. Rajesh Kumar Mohanty, S.K. Sabut, **R.C. Mohanty**, "A Systematic Review on Design Technology and Application of Polycentric Prosthetic Knee in Amputee Rehabilitation", Physical and Engineering Sciences in Medicine (PESM), Springer, 43(3), pp. 781-798, Sept 2020. ISSN: 2662-4737.  
**SCIE, Impact Factor: 1.91**
- iv. Vijay Kumar Garlapati, Sudhansu Bhusan Mohapatra, **Ramesh Chandra Mohanty**, Premanand Das, "Transesterified Olax Scandens oil as a bio-additive: Production and Engine performance studies", Tribology International, Elsevier, 153, pp. 1-8, Jan 2021. ISSN: 0301-679X.  
**SCIE, Impact Factor: 5.620**
- v. Nimay Chandra Giri, **R.C. Mohanty**, "Design of agrivoltaic system to optimize land use for clean energy food production: a socioeconomic and environmental assessment", Clean Technologies and Environmental Policy, Springer, pp. 1-12, June 2022, ISSN: 1618-954X  
**SCIE, Impact Factor: 4.9**
- vi. Rajesh Kumar Mohanty, **R.C. Mohanty**, Sukanta Kumar Sabut, "Conformity Assessment with Structural Strength Requirements of Mechanical Polycentric Prosthetic Knee used for Amputee Rehabilitation", Computer Methods in Biomechanics and Biomedical Engineering, Taylor and Francis, June 2022, ISSN: 1025-5842.  
**SCIE, Impact Factor: 1.763**
- vii. Nimay Chandra Giri, **R.C. Mohanty**, "Agrivoltaic System: Experimental Analysis for Enhancing Land Productivity and Revenue of Farmers", Energy for Sustainable Development, Elsevier, ISSN: 0973-0826 (In press).  
**SCIE, Impact Factor: 5.655**
- viii. D Bhukta, G Dash, S R Mishra, **S Jena**, Analytical estimation of energy dissipations: Viscous, Joulian and Darcy of visco elastic fluid flow phenomena over a deformable surface, Heat Transfer, Vol.50, Issue8, 2021, pp. 7798-7816.  
**SCOPUS, Impact Factor: 2.443**
- ix. Pradyumna Kumar Pattnaik, Satyaranjan Mishra, **Swarnalata Jena**, Dissipative heat for the Casson fluid flow past an expanding cylindrical surface, Heat Transfer, Vol.51, Issue3, 2022, pp. 2476-2487.  
**SCOPUS, Impact Factor: 2.443**

- x. P Chandini Pattanaik, SR Mishra, **S Jena**, PK Pattnaik, Impact of radiative and dissipative heat on the Williamson nanofluid flow within a parallel channel due to thermal buoyancy, Proceedings of the Institution of Mechanical Engineers, Part N: Journal of Nanomaterials, Nanoengineering and Nanosystems, Vol.236, Issue1-2, 2022, pp. 3-18.  
**SCOPUS, Impact Factor: 2.263**
- xi. Anup Patnaik, **Banitamani Mallik** & M. Vamsi Krishna : "Blockchain based holistic trust management protocol for ubiquitous and pervasive IOT network", Journal of Experimental and Theoretical Artificial Intelligence, Taylor & Francis, 09 Feb 2022, E-ISSN: 1362-3079.  
**SCIE, Impact Factor: 2.296**

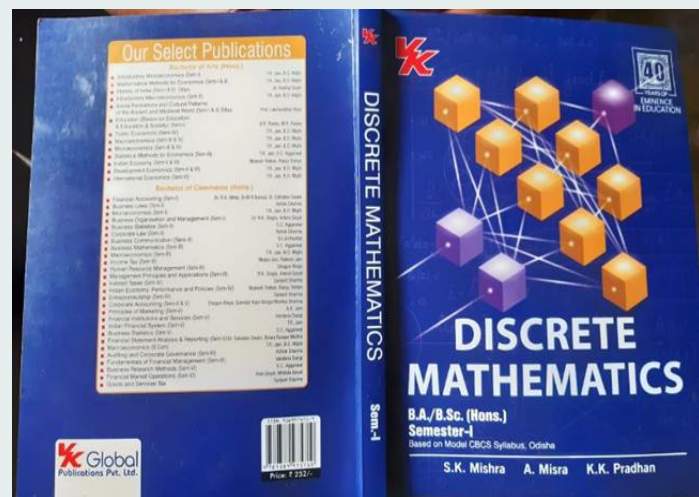
### 4. Book Publication: 6

**Authored: 3, Edited: 2 & Translated: 1**

- i. Authors: Saroj Kumar Mishra, **Ashok Misra** & Kamal Kumar Pradhan  
Title: Calculus  
Publisher: VK Global Publications Pvt. Ltd., Delhi  
Year: 2020  
ISBN: 978-93-89975-47-5  
Year: 2020

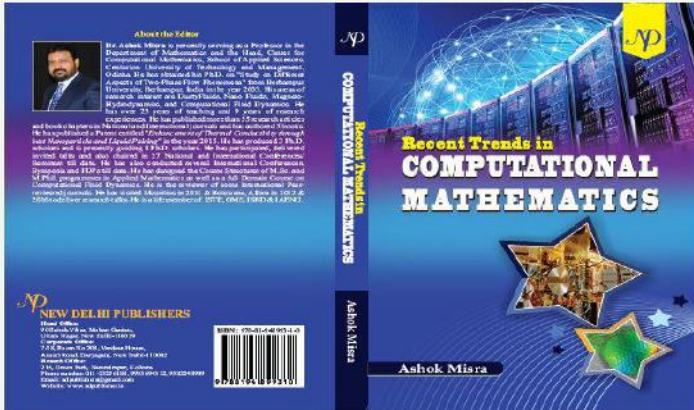


- ii. Authors: Saroj Kumar Mishra, **Ashok Misra** & Kamal Kumar Pradhan  
Title: Discrete Mathematics  
Publisher: VK Global Publications Pvt. Ltd., Delhi  
ISBN: 978-93-89975-71-0  
Year: 2020

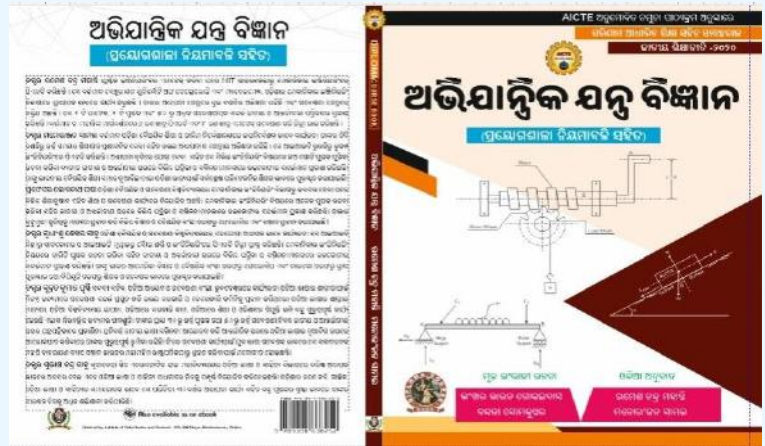




iii. Editor: **Ashok Misra**  
 Title: Recent Trends in Computational Mathematics  
 Publisher: New Delhi Publishers, New Delhi  
 ISBN: 978-81-948993-1-0  
 Year: 2020



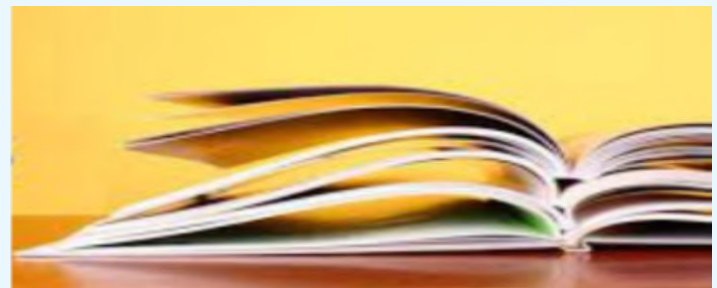
vi. Translator: **R.C. Mohanty**  
 Title: Engineering Mechanics for Diploma Engineering  
 Language: Odia  
 (AICTE initiative)



iv. Editors: Tazyn Rahman, **R.C. Mohanty**, Susanta Kumar Biswal, Sangram Keshari Swain  
 Title: Recent Research Trends in Management and Social Science  
 Publisher: Empyrean Publishing House  
 ISBN: 978-81-941253-2-7  
 Year: 2020

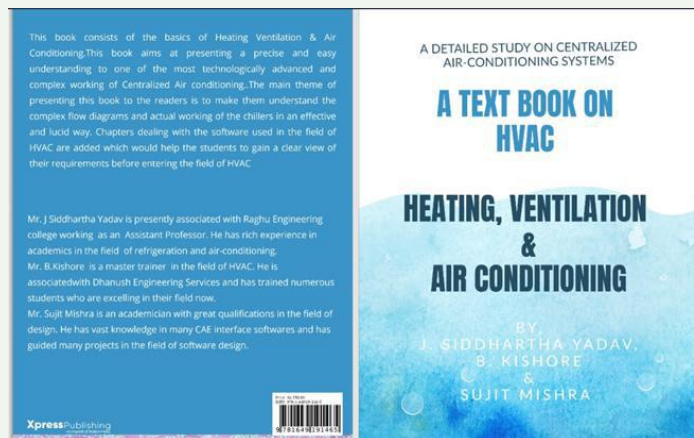


**5. Book Chapter Publication: 29**



**Some publications which are Scopus Indexed:**

v. Authors: J.Siddhartha Yadav, B.Kishore and **Sujit Mishra**  
 Title: A Text Book on HVAC Heating, Ventilation & Air Conditioning: A Detailed Study on Centralized Air- Conditioning Systems  
 Publisher: Notion Press Media Pvt Ltd, Chennai, Tamil Nadu 600004  
 ISBN: 978-1649191465  
 Year: 2020



- i. Subhashree Panda, **Ashok Misra** and Saroj Kumar Mishra, Flow analysis of H<sub>2</sub>O-Al<sub>2</sub>O<sub>3</sub> nanofluid over a moving sheet with electrified nanoparticles and viscous dissipation, Lecture Notes in Mechanical Engineering, Springer Nature, Singapore Pte Ltd., Accepted in October 2021.
- ii. Kamala Kumar Pradhan, **Ashok Misra** and Saroj Kumar Mishra, Electrification Effect of Nano particles on Nanofluid Flow over a Continuous Stretching Sheet, New Trends in Applied Analysis and Computational Mathematics, Springer Nature, Singapore Pte Ltd., 2021, pp. 249- 262.  
 ISBN: 978-981-16-1402-6
- iii. Kamala Kumar Pradhan, **Ashok Misra** and Saroj Kumar Mishra, Effect of Electrification on Boundary Layer Stagnation Point Flow of Nanofluid over a Stretching Sheet, Lecture Notes in Mechanical Engineering, Recent Trends in Applied Mathematics Springer Nature, Singapore Pte Ltd., 2021, pp. 185- 202.  
 ISBN: 978-981-15-9817-3
- iv. S.D. Mohanty, S.S. Mahapatra, **R.C. Mohanty**, J. Mohapatra, S.K. Khuntia, and S. Nayak, "Innovative Methods of EDM Electrode Manufacturing: A Review, In: Current Advances in Mechanical Engineering. Lecture Notes in Mechanical Engineering, Springer, Singapore, vol. 52, pp. 939-948, March 2021.  
 ISBN: 978-981-334-795-3
- v. S.D. Mohanty, S.S. Mahapatra, **R.C. Mohanty**, S.K. Khuntia, J. Mohapatra, "A Perceptive Approach for Multi-objective Optimization of Die-Sinking EDM Process Parameters with Utility Concept and Taguchi Method for Sustainable Machining", In: Pradhan, P., Pattanayak, B., Das, H.C., Mahanta, P. (eds) Recent Advances in Mechanical Engineering. Lecture Notes in Mechanical Engineering. Springer, pp. 133-141, June 2022.  
 ISBN: 978-981-16-9057-0



### 6. Research Guidance (Ph.D.):



9 Ph.D. Scholars have been produced under the following faculty members:

- (i) Dr.Ashok Misra: 5
- (ii) Dr.Banitamani Mallik: 2
- (iii) Dr.R.C.Mohanty: 1 &
- (iv) Dr.Goutam Kumar Mahato: 1

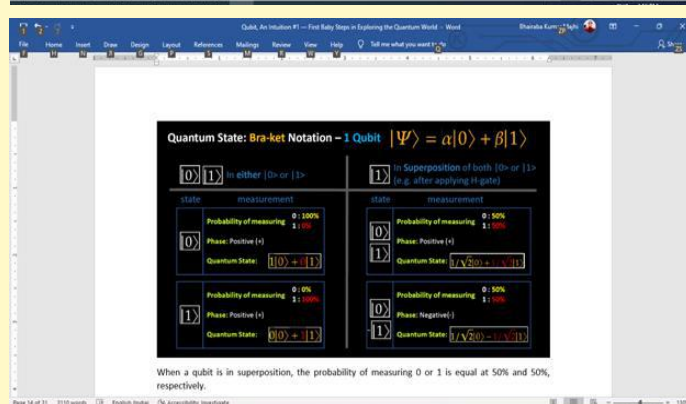
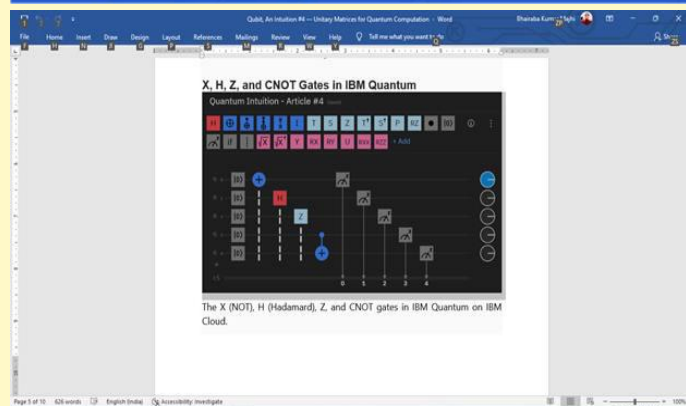
### 7. Awards:



### 8. Domain & Skill Courses Floated:

- i. Domain Course on “Computational Fluid Dynamics (20 Credits)” was floated in August 2020
- ii. Skill Course on “Introduction to Quantum Computing (4 Credits)” was floated in July 2021.

Glimpses of a few student projects on CFD and QC





9. Seminar / Webinar / FDP / Workshop Conducted: 10

i. AICTE -ATAL Online FDP on “Computational Fluid Dynamics – A Potential Engineering Design Tool” from 26/07/2021 to 30/07/2021



ii. FDP (Training Course) on “CFD – A Potential Tool for Computer Aided Engineering” from 27/06/2021 to 13/07/2021



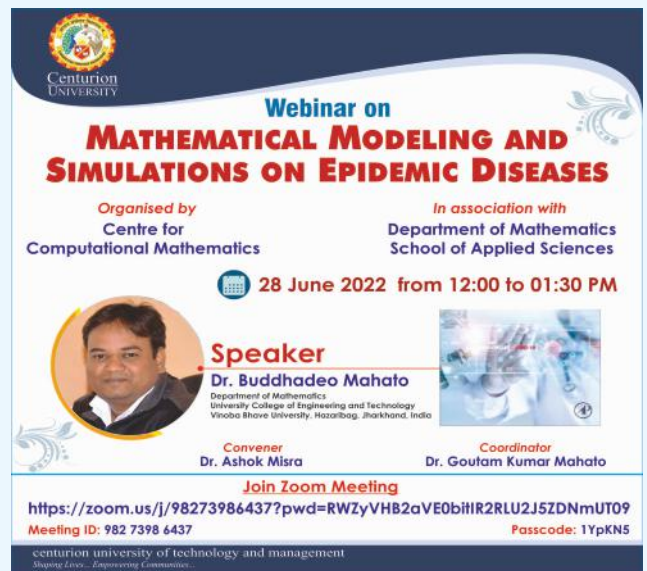
iii. SDP on “Design for Manufacturing using 3Ds Applications” from 17/01/2022 to 02/02/2022.



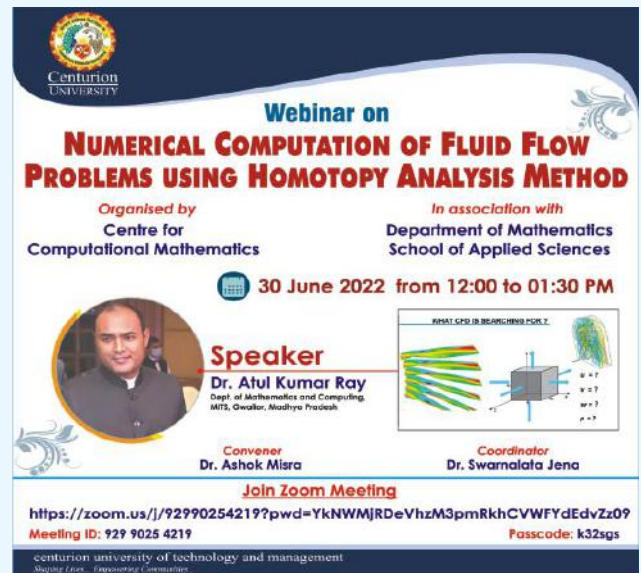
iv. FDP on "Advances in Mechanical Engineering Research" from 24/05/2022 to 28/05/2022.



v. Webinar on "Mathematical Modeling and Simulations on Epidemic Diseases " on 28/06/2022.



vi. Webinar on "Numerical Computation of Fluid Flow Problems using Homotopy Analysis Method" on 30/06/2022.



vii. Seminar on the eve of NATIONAL MATHEMATICS DAY on 22/12/2021.

**DEPARTMENT OF MATHEMATICS**  
**NATIONAL MATHEMATICS DAY CELEBRATION**  
 Organized by: Department of Mathematics, School of Applied Sciences  
**22 December 2021 from 2:30 PM**

**Speaker**  
 Prof. Seshadev Padhi  
 Prof. Dept. of Mathematics, BIT, Mesra, Ranchi

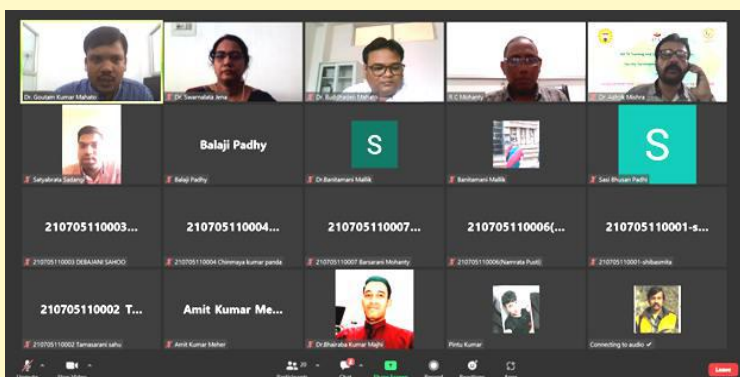
**Chief Guest**  
 Prof. Dipankar Bhattacharyay  
 Pro-VC, Research and Learning, CUTM

**Guest of Honour**  
 Dr. Yashaswi Nayak  
 Dean, School of Applied Sciences, CUTM

**Join Zoom Meeting Link:**  
<https://us02web.zoom.us/j/89389759549?pwd=bXJqTW1jWXhpNGF0a0hIS05ERU9ZUT09>  
**Meeting ID: 893 8975 9549** **Passcode: J2izAw**

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viii. Webinar on "Numerical prediction of microscale fluid flow and heat transfer" on 22/12/2021.



ix. Workshop on "Doing Passionate Research: Tricks and Skills" from 1/12/2020 to 04/12/2020.

x. Workshop on "E-vehicles: Design Concepts to Industrial Products" on 22/04/2022.

**10. Seminar / Webinar / FDP / Workshop Attended:**



Faculty members have participated in 54 such events for their Skill Development.

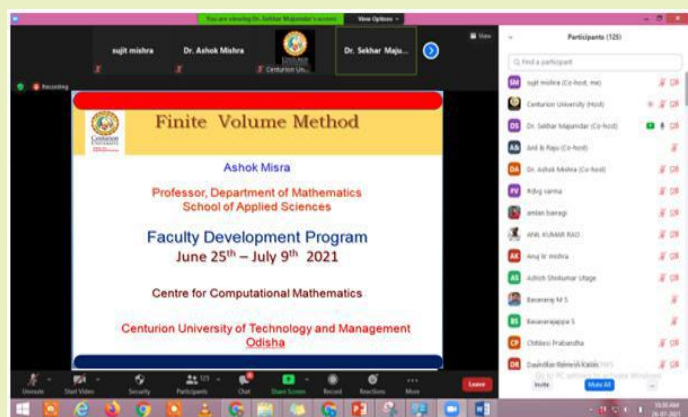
**11. Faculty as Resource Person / Visiting Faculty:**

**Dr. Ashok Misra**

i. Resource Person in AICTE -ATAL FDP "Computational Fluid Dynamics – A Potential Engineering Design Tool", from 26th July to 30th July, 2021.



ii. Resource Person in FDP (Training Course) from 25th June to 9th July 2021.



**Dr. Sujit Mishra**

i. Resource Person in ATAL FDP "Computational Fluid Dynamics – A Potential Engineering Design Tool", from 26th to 30th July, 2021.

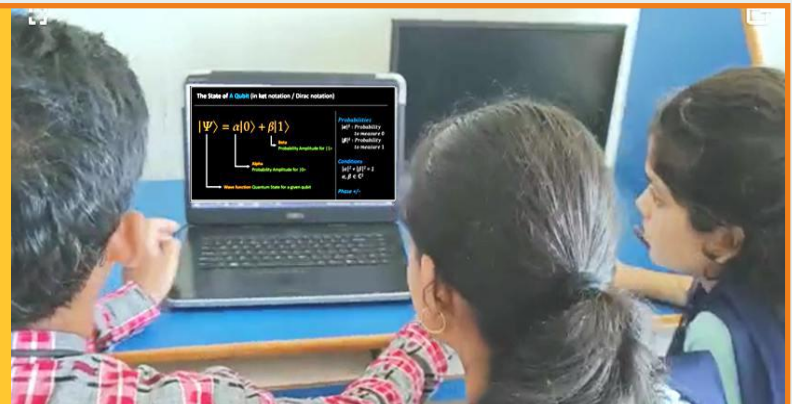




- ii. Resource Person in ATAL FDP “SMART MANUFACTURING THROUGH DIGITAL MANUFACTURING” from 22nd to 26th November, 2021.

**Dr. S.K. Bhal**

Visiting Faculty at Goa Institute of Management, Goa from 28th June to 15th July 2021 & from 24th June to 8th July 2022



### Focused Area:

- Mathematical modelling
- Digital design
- Simulation and validation

**Total number of projects carried out: 11**

**Total number of interns: 36**



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