

*Memorandum of Understanding*

**DEPARTMENT OF MATHEMATICS**  
**2019-20**



**KAKATIYA GOVERNMENT COLLEGE HANUMAKONDA,**  
**TELANGANA**

## ACTIVITIES UNDER MOU

| MoU Signed With                            | Year of Signing | Duration | Year Wise Activities | List the actual activities under each MOU               |
|--|-----------------|----------|----------------------|---|
| National Institute of Technology, Warangal | 2020            | 5 years  | 2020-21              | Collaborative Research work under the SERB TARE project |
| Kakatiya University, Warangal              | 2019            | 5 years  | 2019-20              | Collaborative Research work                             |
|  |                 |          | 2020-21              | Collaborative Research work                             |

**Place: Hanumakonda**

## DEPARTMENT OF MATHEMATICS

### Memorandum of Understanding between NIT Warangal & Department of Mathematics KGC Hanamkonda

07-01-2020

#### MEMORANDUM OF UNDERSTANDING (MoU)

Memorandum of understanding (MoU) is taken on 07.01.2020 by Department of Mathematics, Kakatiya Government College, Hanamkonda and Department of Mathematics, National Institute of Technology, Warangal.

This MoU is entered with the following specific objectives:

- i) Permitting students to Field Trips to National Institute of Technology, Warangal.
- ii) Assist in programmes like certificate courses.
- iii) Allowing students to take up internships for study projects.
- iv) Supporting faculty to undertake collaborative research and offer free consultancy service to faculty in their research activity.
- v) Providing career guidance to the students of Mathematics and create awareness on future prospects in the domain areas of Mathematics.
- vi) Offering extension lectures to students of Kakatiya Government College..

#### Terms and Conditions:

The academic assistance and support is proposed to be extended by Department of Mathematics, National Institute of Technology, Warangal is purely on voluntary basis and no financial commitment is involved.

#### Duration of MoU:

The MoU comes into force from the date signing and valid for a period of FIVE years.



Head

Department of Mathematics  
National Institute of Technology, Warangal  
Head Dept. of Mathematics  
National Institute of Technology,  
Warangal, Telangana - INDIA - 506 004.



Head, Department of Mathematics  
Kakatiya Government College  
Hanamkonda, Warangal (U)



Principal

Kakatiya Government College  
Hanamkonda, Warangal (U)

PRINCIPAL  
KAKATIYA GOVT COLLEGE  
HANAMKONDA

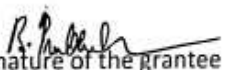
**Activities under MoU  
(2020-21)**

Science and Engineering Research Board  
Teachers Associateship for Research Excellence

Joining Report

TARE Reference Number TAR/2020/000012

This is to certify that Bettapuu Prabhakar has joined this institution National Institute of Technology, Warangal under the mentorship of Dr.D.Srinivasacharya, Professor of Mathematics with effect from 01-12-2020.

  
Signature of the grantee

Date: 01.12.2020



Signature of the Mentor

Date: 01-12-2020

  
Signature & Seal of Registrar / Director

Date:   
राष्ट्रीय प्रौद्योगिकी संस्थान, वरंगल  
Director  
National Institute of Technology, Warangal.

Dr. B. Prabhakar Assistant Professor of Mathematics joined as Principal  
Investigator in Collaborative Research work under the SERB TARE project in  
NIT Warangal 01-12-2020

# Research Grant of Rs. 18, 30,000 from SERB TARE

FILE NO. TAR/2020/000012  
SCIENCE & ENGINEERING RESEARCH BOARD(SERB)  
(A statutory body of the Department of Science & Technology, government of India)

5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 22-Dec-2020

## ORDER

Subject: Financial Sanction under Teachers Associateship for Research Excellence (TARE) to Dr. BETTAPU PRABHAKAR, KAKATIYA GOVERNMENT COLLEGE, New Bus Stand Rd, Sai Nagar, Hanamkonda, Telangana, Warangal, Telangana-506001- under the mentorship of Dr.D.Srinivasacharya, at National Institute of Technology, Warangal NIT Warangal - 506004- Release of 1st grant.

Sanction of Science and Engineering Research Board (SERB) is hereby accorded to the above mentioned grant at a total cost of Rs. 18,30,000/- (Rs. Rupees Eighteen Lakh Thirty Thousand only) for a duration of 36 months.

The date of start of the project will be 01 December 2020. The items of expenditure for which the total allocation of Rs. 18,30,000/- has been approved are given below:

The following budget is proposed for

**KAKATIYA GOVERNMENT COLLEGE, New Bus Stand Rd, Sai Nagar, Hanamkonda, Telangana, Warangal, Telangana-506001 (Parent)**

| Sl. No. | Budget Head    | Amount                                 |
|---------|----------------|--|
| 1.      | Fellowship     | Rs. 0 ( @0/- per month (consolidated)) |
| 2.      | Research Grant | Rs. 2,50,000/- per annum               |
| 3.      | Overheads      | Rs. 25,000/- per annum                 |

### National Institute of Technology, Warangal NIT Warangal - 506004 (Host)

| Sl. No. | Budget Head    | Amount   |
|---------|----------------|--|
| 1.      | Fellowship     | Rs. 50,000 ( on completion of 90 days mandatory attendance in the host institute every year) |
| 2.      | Research Grant | Rs. 2,50,000/- per annum   |
| 3.      | Overheads      | Rs. 25,000/- per annum   |

2. Sanction of the SERB is also accorded to the payment of Rs. 2,75,000/- (Rupees Two Lakh Seventy Five Thousand only) to KAKATIYA GOVERNMENT COLLEGE, New Bus Stand Rd, Sai Nagar, Hanamkonda, Telangana. Rs. 3,35,000/- (Rupees Three Lakh Thirty Five Thousand only) to National Institute of Technology, Warangal NIT Warangal - 506004 being the first installment of the grant for the year 2020-2021 for implementation of the said research project.

3. The expenditure involved is debitable to

Fund for Science & Engineering Research (FSER)

This release is being made under Teachers Associateship For Research Excellence (TARE). (Mathematical science)

4. The Sanction has been issued to with the approval of the competent authority vide Diary No. SERB/F/1959/2020-2021 dated 21 December 2020

5. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website ([www.serb.gov.in](http://www.serb.gov.in)).

6. Overhead expenses are meant for the host institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.

7. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.

8. The release amount of Rs. 2,75,000/- (Rupees Two Lakh Seventy Five Thousand only) will be drawn by the Under Secretary of the SERB and will be disbursed by means of RTGS transaction as per their Bank details given below:

**KAKATIYA GOVERNMENT COLLEGE, New bus stand rd, sai nagar, hanamkonda, telangana, Warangal, Telangana-506001 (Parent) :**

|                                    |  |
|------------------------------------|--|
| PFMS Unique Code                   | KGC1138  |
| Account Name                       | Principal, Kakatiya Government College, Hanamkonda   |
| Account Number                     | 51090100012499   |
| Bank Name & Branch                 | BANK OF BARODA HANAMKONDA, P B NO 3 , BHARADWAJ COMPLEX , TAILORS STREET , HANAMKONDA , 506011 |
| IFSC/RTGS Code                     | BARB0VJHARD  |
| Email address of PI                | prabhakarbesthagu@gmail.com  |
| Email id of A/C Holder             | prf-gdc-hnk-ce@telangana.gov.in  |
| Email address of concerned officer | ms_tare@serbonline.in  |

The release amount of Rs. 3,35,000/- (Rupees Three Lakh Thirty Five Thousand only) will be drawn by the Under Secretary of the SERB and will be disbursed by means of RTGS transaction as per their Bank details given below:

**National Institute of Technology, Warangal NIT Warangal - 506004 (Host) :**

|                  |                 |
|------------------|-----------------|
| PFMS Unique Code | VATL/WAD0006429 |
| Account Name     | NITW SERB       |

|                                    |  |
|------------------------------------|--|
| Account Number                     | 38631724470                              |
| Bank Name & Branch                 | STATE BANK OF INDIA NIT BRANCH, WARANGAL |
| IFSC/RTGS Code                     | SBIN0020149                              |
| Email address of PI                | prabhakarbesthapu@gmail.com              |
| Email id of A/C Holder             | registrar@nitw.ac.in                     |
| Email address of concerned officer | ms_tare@serbonline.in                    |

9 Both the institutes will furnish Utilization certificate(UCs) financial year wise to the SERB and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.

10. The institute will maintain separate audited accounts for the fellowship. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.

11. The File no. **TAR/2020/000012** may also be mentioned in all research communications arising from the above project with due acknowledgement of **SERB**

12. As this is the first grant for the fellowship, no previous U/C is required.

13. The institute may refund any unspent balance to SERB by means of a Demand Draft favoring '**FUND FOR SCIENCE AND ENGINEERING RESEARCH**' payable at New Delhi.

14. The organization/institute/university should ensure that the technical support/financial assistance provided to them by the Science & Engineering Research Board, a statutory body of the Department of Science & Technology (DST), Government of India should invariably be highlighted/ acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report.

15. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by the Science & Engineering Research Board, a statutory body of Department of Science & Technology (DST), Government of India.

(Dr. T Thangarajou)  
Scientist E  
ms\_tare@serbonline.in

To,  
Under Secretary  
SERB, New Delhi

Copy forwarded for information and necessary action to:-

|    |   |
|----|---|
| 1. | The Principal Director of Audit, A.G.C.R Building, IIIrd Floor I.P. Estate, Delhi-110002  |
| 2. | Sanction Folder, SERB, New Delhi.   |
| 3. | File Copy   |
| 4. | (i) Dr. BETTAPU PRABHAKAR<br>Mathematics<br>KAKATIYA GOVERNMENT COLLEGE, New bus stand rd, sai nagar, hanamkonda, telangana, Warangal, Telangana-506001<br>Email: prabhakarbesthapu@gmail.com<br>Mobile: 919959767440<br><br>(ii) Dr.D.Srinivasacharya<br>National Institute of Technology, Warangal NIT Warangal - 506004<br><br>(Start date of the project may be intimated by name to the undersigned. For guidance, terms & Conditions etc. Please visit <a href="http://www.serb.gov.in">www.serb.gov.in</a> ) |
| 5. | (i) Principal,<br>KAKATIYA GOVERNMENT COLLEGE, New Bus Stand Rd, Sai Nagar, Hanamkonda, Telangana<br><br>(ii) Director<br>National Institute of Technology, Warangal NIT Warangal - 506004<br><br>(Receipt of Grant may be intimated by name to the undersigned)  |

(Dr. T Thangarajou)  
Scientist E  
ms\_tare@serbonline.in

**Dr. B. Prabhakar Assistant Professor of Mathematics – Received Research Grant of 18, 30,000 from SERB (01-12-2020)**

Memorandum of Understanding between Kakatiya University &  
Department of Mathematics KGC Hanamkonda, 2019

27-11-2019

MEMORANDUM OF UNDERSTANDING (MoU)

Memorandum of understanding (MoU) is taken on 27.11.2019 by Department of Mathematics, Kakatiya Government College, Hanamkonda and Department of Mathematics, Kakatiya University, Warangal.

This MoU is entered with the following specific objectives:

- i) Permitting students to Field Trips to Department of Mathematics, KU.
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- iii) Allowing students to take up internships for study projects.
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Duration of MoU:

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Head  
Department of Mathematics  
Kakatiya University, Warangal  
**HEAD**  
Department of Mathematics  
KAKATIYA UNIVERSITY  
WARANGAL - 505 007 (U.S.)

  
Head, Department of Mathematics  
Kakatiya Government College  
Hanamkonda, Warangal (U) College  
Kakatiya Government  
Hanamkonda - T.S.

  
Principal  
Kakatiya Government College  
Hanamkonda, Warangal (U)  
**PRINCIPAL**  
KAKATIYA GOVT COLLEGE  
Hanamkonda.

Department of Mathematics MoU With Kakatiya University in 2019

## **Activities under MoU in 2019-20**

Memorandum of Understanding was signed between the department of Mathematics, Kakatiya University, Warangal, Telangana state, and the Department of Mathematics Kakatiya Government College, Hanumakonda. The department of Mathematics, Kakatiya University provided technical support, library facilities to M. Venugopal and D. Venkanna, Assistant Professors of Mathematics their Ph.Ds.



Prof. P. MallaReddy, HoD, Mathematics, Controller of Examinations visited  
Mathematics department under MoU on 27-11-2019



## Activities under MoU in 2020-21

### Research Work



Original Paper | [Published: 19 February 2022](#)

# Propagation of Vibrations in a Plane Angular Sector of Double Porosity Elliptic Cone

[D. Venkanna](#) , [M. Venugopal](#) & [P. Malla Reddy](#)

*International Journal of Applied and Computational Mathematics* **8**, Article number: 53 (2022) | [Cite this article](#)

**15** Accesses | [Metrics](#)

## Abstract

This paper deals with vibrations in a plane angular sector (PAS) of double porosity isotropic solids of elliptic cone shape. The frequency equation is obtained in the frame work of isotropic double porosity solids. This extended frame work was based on Biot's theory of isotropic single poroelastic solids. For illustration purpose, two materials namely, Berea sandstone saturated with kerosene and Berea sandstone saturated with water are used. The non-dimensionalisation of single porosity isotropic solids is extended here to double porosity isotropic solids. Non-dimensional phase velocity as a function of non-dimensional wavenumber is computed for various corner angles of PAS.

D. Venkanna Assistant Professor of Mathematics , Research paper Accepted on  
December 2021

<https://link.springer.com/article/10.1007/s40819-021-01239-4>

Published: 01 April 2022

# G-Type Wave Propagation in an Initially Stressed Fluid Saturated Viscoporoelastic Layer Lying over Heterogeneous Poroelastic Half Space

M. Venugopal, G. Rajitha  & P. Malla Reddy

*Mechanics of Solids* **57**, 193–204 (2022) | [Cite this article](#)

26 Accesses | [Metrics](#)

## Abstract

G-type waves in an initially stressed poroelastic semi-infinite solid consists of a layer lying on a half space are investigated in the framework of Biot's theory of isotropic poroelasticity with some variants. Dispersion equation is obtained on solving the resultant Hill's differential equation with the aid of Laplace transform by the Valeev's method. Numerical examples for phase velocity, group velocity, angular frequency, and attenuation are presented graphically as a function of wavenumber for various values of viscosity, initial stress, and heterogeneity parameter. Some particular cases are discussed.

<https://link.springer.com/article/10.3103/S0025654422010150>

Research paper accepted in March 2021 Dr. M. Venugopal, Assistant Professor  
of Mathematics Research work in Kakatiya University in 2022

Published: 11 July 2022

# STUDY OF SH-WAVE PROPAGATION IN AN INITIALLY STRESSED TRICLINIC LAYER SANDWICHED BETWEEN TRANSVERSELY ISOTROPIC ELASTIC AND HETEROGENEOUS POROELASTIC HALF-SPACES

P. Mallu Reddy, M. Venugopal  & G. Rajitha

*Journal of Applied Mechanics and Technical Physics* **63**, 259–267 (2022) | [Cite this article](#)

[Metrics](#)

## Abstract

In this paper, SH-wave propagation in an initially stressed triclinic layer welded between two half-spaces is investigated. The upper half-space is considered to be transversely isotropic and elastic, while the lower one is heterogeneous, isotropic, and poroelastic. In the case of the lower half-space, the problem is reduced to the Whittaker differential equation. Frequency equations are derived for the layer as a whole and half-spaces. It is found that the phase velocity is strongly influenced by the initial stress, porosity, and heterogeneity.

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Research paper accepted in March 2021 Dr. M. Venugopal, Assistant Professor of Mathematics Research work in Kakatiya University in 2022

[https://link.springer.com/article/10.1134/S0021894422020092?utm\\_source=toc&utm\\_medium=email&utm\\_campaign=toc\\_10808\\_63\\_2&utm\\_content=etoc\\_springer\\_20220713](https://link.springer.com/article/10.1134/S0021894422020092?utm_source=toc&utm_medium=email&utm_campaign=toc_10808_63_2&utm_content=etoc_springer_20220713)

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