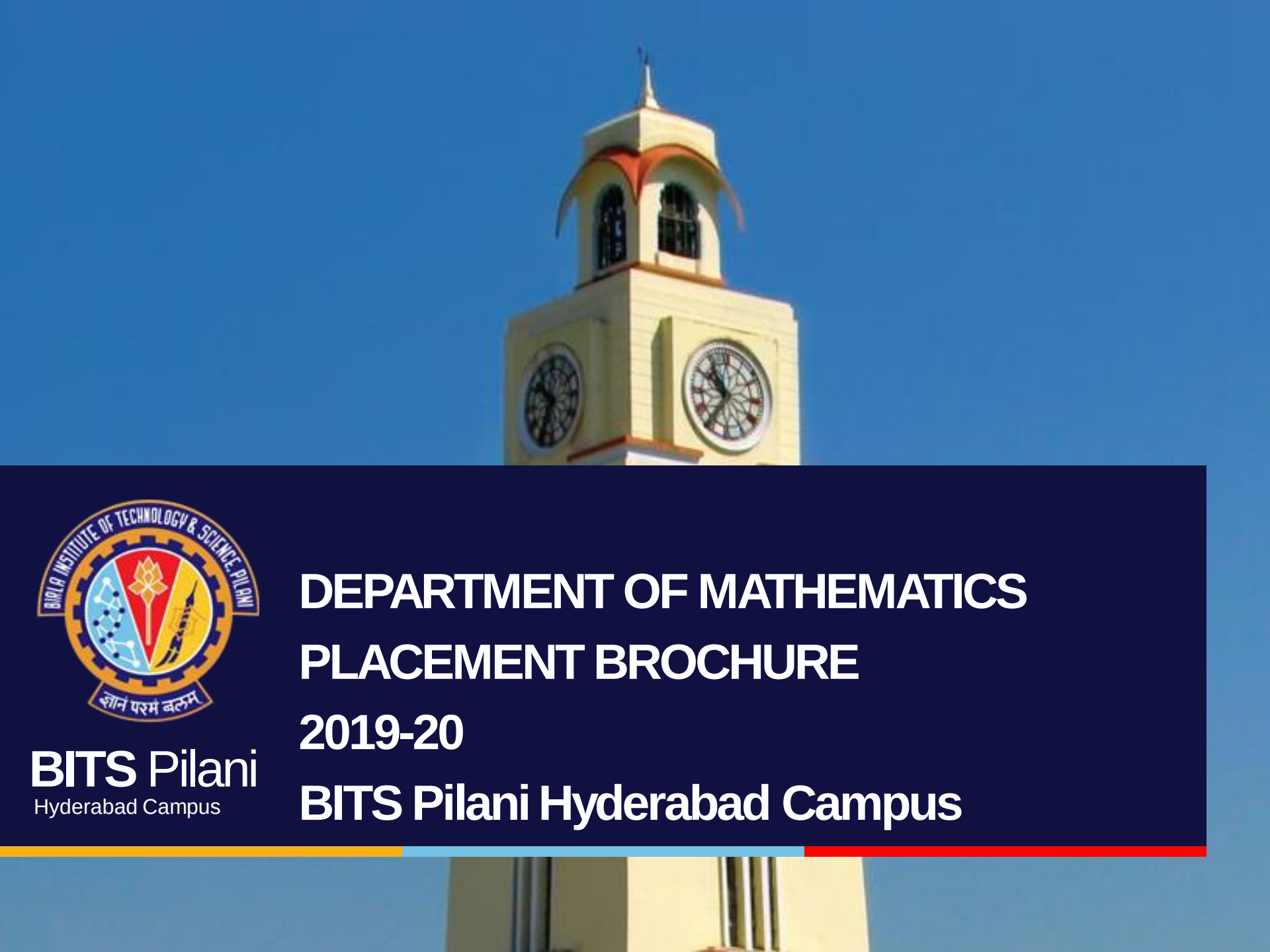

BITS Pilani
Hyderabad Campus

DEPARTMENT OF MATHEMATICS
PLACEMENT BROCHURE
2019-20
BITS Pilani Hyderabad Campus

Message from Head of the Department

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"The Department of Mathematics, BITS-Pilani, Hyderabad Campus provides fascinating and challenging program for UG/PG students of Engineering and Mathematics. The aim of the department is to pursue excellence in Mathematics through teaching and research. The subject seeks to establish truth by arduous deductions, being the core foundation of the field of Engineering, aids to build analytical, reasoning & logical skills of the future engineers and researchers. The department encourages educational and research excellence in its students. Many go on to earn higher degrees and have careers in teaching & research, or go straight into key positions in high-tech MNC, financial institutions, as well as R&D in industry and the public sector."

About the Department

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Department of Mathematics started in 2008 along with the institute. Presently the department has 21 faculty members and 16 Ph.D. students. The department offers various Mathematics courses to the students of all Engineering and Science streams. Our focus is to make our students more competent, motivated engineers and scientists with a strong mathematical background through effective and innovative teaching. Over a period we have brought in several changes in the teaching methodologies for some courses using new technologies. At the same time, we are committed to produce good research environment in the department through research publications, sponsored projects and organizing scientific events. Our skills, innovation and drive is our strength, which we are committed to take to the next level.

Programs Offered by the Department

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1. Master of Science. (M.Sc)

2. Doctor of Philosophy. (Ph.D)

3. Minor in Data Science.

Important Courses for B.E

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Foundations Courses

Advanced Calculus
Linear Algebra
Complex Analysis
Differential Equations
Probability and Statistics

Important Courses for M.Sc

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Core Discipline Courses

Optimization
Discrete Mathematics
Elementary Real Analysis
Algebra-I
Mathematical Methods
Operations Research
Graphs and Networks
Measure & Integration
Introduction to Topology
Ordinary Differential Equations (ODE)
Numerical Analysis
Introduction to Functional Analysis
Differential Geometry
Partial Differential Equations

Important Courses for M.Sc

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Discipline Elective Courses

Number Theory

Game Theory and its Applications

Cryptography

Statistical Inference and Applications

Advance Probability Theory

Complex Analysis

Cosmology

Nonlinear Optimization

Mathematical Modeling

Important Courses for M.Sc

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Discipline Elective Courses

Fuzzy Logic and Applications

Applied Stochastic Process

Applied Statistical Methods

Data Structures and Algorithms

Discrete Mathematical Structures

Design and Analysis of Algorithms

Mathematical Fluid Dynamics

Numerical Solutions of ODE

Facilities in Department:

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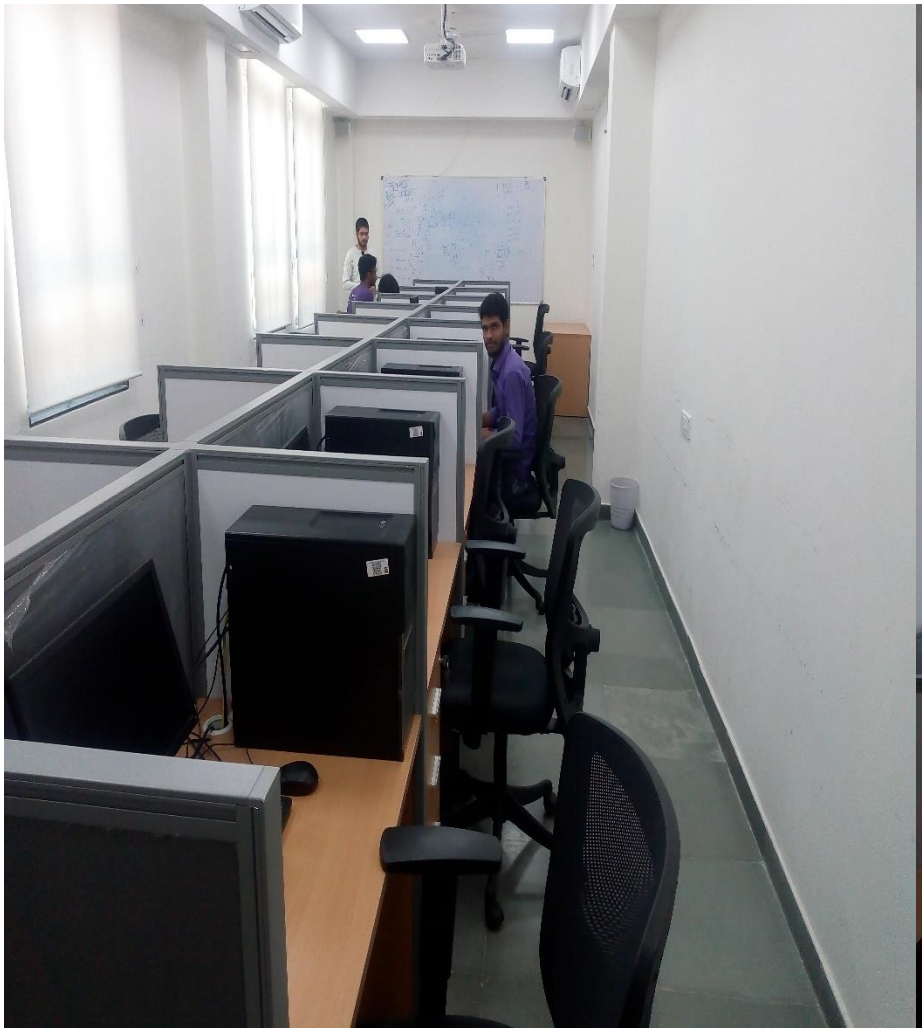
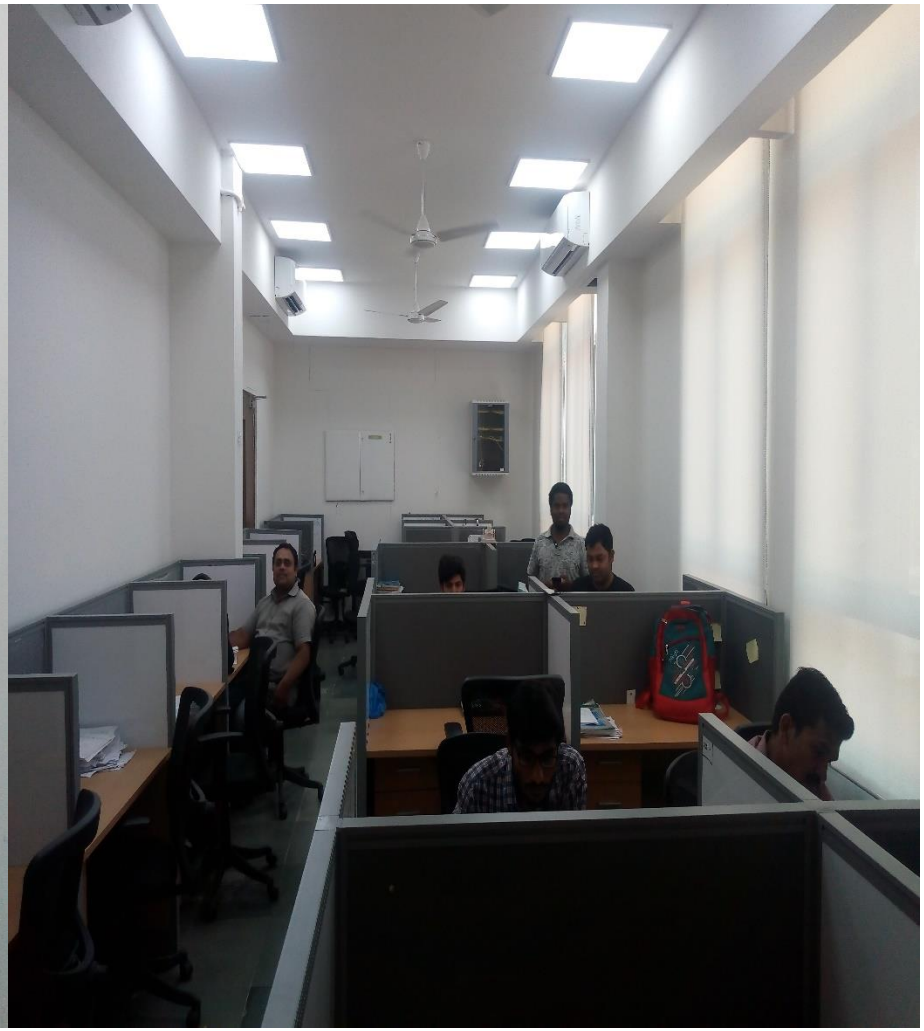
Academic Laboratories

DST-FIST Sponsored Computer Lab: The computer lab has 20 computers, one main node and two computational nodes. One Xerox machine is also available in the department.

Software available in Lab: Mathematica, Matlab

Computer Lab and Research Workspace:





Thrust Areas of Research

Algebraic topology
Algorithm and Graph theory
Computational fluid dynamics
Cosmology and relativity
Differential geometry and optimization
Discrete fractional calculus
Dynamic optimization
Functional analysis
Fuzzy geometry
Mathematical modelling and Multivariate data analysis
Numerical solutions to PDE and numerical linear algebra
Theoretical seismology
Topological dynamics
Wavelet analysis and its application

Completed Projects

The department has been funded by the agencies DST, UGC-CSIR, NBHM,BITS -and is in a continuous process of strengthening its University-Industry ties.

Sl. No.	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1.	Study of cosmological models in bimetric theory of gravitation	P. K. Sahoo	UGC	1.8	2012-2014
2.	Study on cosmological models of the universe with wet dark fluid in alternative theories of Gravitation	Bivudutta Mishra	UGC	1.9	2014-2016
3.	Bianchi type cosmological models in modified theories of gravitation	Bivudutta Mishra	SERB-DST	11.088	April, 2014 - 2017
4.	Construction of arbitrary tensor networks using cross approximation	N. Kishore Kumar	NBHM	2.895	January, 2015 - 2018

Ongoing projects

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Sl. No.	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1.	Spectral element methods for elliptic and parabolic interface problems in R^2 on parallel computers	N. Kishore Kumar	NBHM	13.591	October, 2015 - 2019
2.	Development of an encryption algorithm for secure transmission of color images	Manish Kumar	SERB - DST	15.08	May, 2016 - 2019
3.	Development of an accurate and robust unstructured grid-based adjoint approach for compressible turbulent flows	Anil Nemili	SERB - DST	15.906	March, 2017 - 2020
4.	Comparison of phase velocities of Rayleigh waves, Love waves and Torsional waves in various anisotropic geo-media	Sumit Kumar Vishwakarma	SERB - DST	13.668	July, 2017 - 2020
5.	Development of an accurate adjoint method for 2D Euler equations in mesh free framework	Anil Nemili	Aeronautical Research & Development Board (ARDB)	15.77	2017 - 2019
6.	Characterizing the sets of periodic points of automorphisms on a solenoid	Sharan Gopal	SERB - DST	19.98480	March, 2018 – 2021

Student Activities:

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AXIOM is a Mathematical Society of Students in the Department of Mathematics, BITS-Pilani, Hyderabad Campus. It was established in the year 2008 with a prime objective to conduct and organize various mathematical events to incorporate ideas, innovations and interests among students. Every year number of events and programs are being organized to enrich the knowledge and interests for Mathematics such as Guest lectures, paper presentations along with the various competitions like solving Mathematical puzzles, writing programs and codes etc. during inter-intra institutional technical events in the campus.

Student Projects

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Practice School and Dissertation

The practice school program is a unique asset of BITS where in the student is exposed to industrial problems and gain hands-on experience in solving them. The Dissertation option allows student to pursue his research for one full semester. Students are working under specific ongoing as well as new projects under the supervision of the faculty. One semester long dissertation allows student to imbibe current research trends and professional guidance of the faculty helps in better understanding and solving of the problems.

Student Projects

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Research Practice & Research Projects

These courses are designed to train the students towards acquiring competence in research methodologies and core research. Each student is assigned to a faculty member to work on specific projects.

Design Projects

Practice in engineering design through projects emphasizing creative solutions to engineering design problems. Illustrative case studies of design will be taken up. The course will be conducted through selected

Group/Individual Projects

The Research practice/Project and Design project courses impart unique blend of both research and product design knowledge to the students.

Faculty members with specialization

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1. Dipak Kumar Satpathi	Associate Professor	Mathematical Modelling of Biological Systems, Fluid Mechanics, Financial Mathematics
2. Addepalli Ramu	Professor	Computational Fluid Mechanics
3. Bivudutta Mishra	Associate Professor	Cosmology and Relativity, Modified Gravity
4. Michael Alphonse	Associate Professor	Graph Theory

Faculty members with specialization

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5. Pradyumn Kumar Sahoo	Associate Professor	Relativity, Cosmology, Dark energy
6. K. Venkata Ratnam	Assistant Professor	Dynamic optimization Mathematical modelling
7. P.T.V. Praveen Kumar	Assistant Professor	Multivariate data analysis bio statistics
8. T. S. L. Radhika	Assistant Professor	Fluid Dynamics

Faculty members with specialization

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9. Manish Kumar	Assistant Professor	Pseudo-Differential Operators, Wavelet Analysis, Image Processing
10. J. Jagan Mohan	Assistant Professor	Discrete Fractional Calculus
11. N Kishore Kumar	Assistant Professor	Numerical solutions to partial differential equations
12. Sumit Kumar Vishwakarma	Assistant Professor	Seismic Wave propagation, Elasto dynamics
13. Sharan Gopal	Assistant Professor	Topological Dynamics
14. N Anil	Assistant Professor	Aerodynamic shape optimization, High performance computing
15. Jhuma Sen Gupta	Assistant Professor	Convergence Analysis of FEM for Parabolic Problems

Faculty members with specialization

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16. V Venkata Hara Gopal	Visiting Professor	Multivariate Data Analysis, Image compression, Statistical Modelling and Time series analysis
17. Santanu Koley	Assistant Professor	Differential Equations (Existence, Uniqueness and Stability) Hyper singular Integral Equations and their applications Coupled Boundary Element - Finite Element Method Mathematical Modeling of Wave Energy Converter Devices
18. Deepika	Assistant Professor	Infinite Dimensional Holomorphy, Theory of Operator Ideals
19. Debopam Chakraborthy	Assistant Professor	Class group and class number of number fields of smaller degree and their relations with points on Elliptic Curves.

Faculty members with specialization

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20. Gujji Murali Mohan Reddy	Assistant Professor	Finite Element Method *A Posteriori* Error Analysis Numerical Analysis of Parabolic Integro-Differential Equations Numerical Analysis of Parabolic Interface Problems The Method of Fundamental Solution Inverse Stefan Problems Inverse Cauchy-Stefan Problems, Perspective 3-point Problem.
21. Nirman Ganguly	Assistant Professor	Applied Mathematics , Quantum Information Theory , Foundations of Quantum Mechanics

Publications by First Degree Students:

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1. P.H.R.S. Moraes, P.K. Sahoo, Barkha Taori, Parbati Sahoo, “Phantom energy dominated universe as a transient stage in f(R) cosmology”, International Journal of Modern Physics D, 28 (2019) DOI:10.1142/S0218271819501244 (Impact factor 2.17) World Scientific, arXiv:1812.03873.

2. Parbati Sahoo and Raghavender Reddy, LRS BIANCHI TYPE-I BULK VISCOUS COSMOLOGICAL MODELS IN f(R, T) GRAVITY, Astrophysics, Vol. 61, No. 1, March, 2018 , (Impact factor 0.755) Springer .

3. Pratishtha Shukla and Amritha Jayadev, LRS Bianchi Type-I Cosmology with Gamma Law EoS in f(R, T) Gravity, Appl. Appl. Math., Vol. 11, Issue 1 (June 2016), pp. 229 – 237.

4. P. K. Sahoo, B. Mishra, G Chakradhar Reddy: “Axially symmetric cosmological model in f(R,T) gravity”, European Physical Journal Plus, 129(3), (2014), 49 (Impact factor 1.475) Springer.

5. . Prateek Jain, Pradyumn Kumar Sahoo, Bivudutta Mishra: “Axially Symmetric Cosmological Model with Wet Dark Fluid in Bimetric Theory of Gravitation”, International Journal of Theoretical Physics, 51 (2012), 2546-2551 (Impact Factor 1.186) Springer.

Publications by First Degree Students:

6. A Ramu P and PNS Chaitanya “Solutions to converging spherical and cylindrical shocks with zero temperature gradient in non-ideal medium, Advances in applied sciences research, 2012,3(2). Page No: 1107-1116.

7. Dipak Kumar Satpathi and B Jagadish Chandra: “The Theory of Tax Evasion and Policy Formulation: A Game Theoretic Approach”, International Journal of Engineering, Business and Enterprise Applications, 4(1), 31-34, 2013.

8. Dipak Kumar Satpathi and Ayush Agarwal: “A Game Theoretical Approach to designing Market Trading Strategies,” American International Journal of Research in Humanities, Arts and Social Sciences, 2(2), 108-110, 2013.

9. Dipak Kumar Satpathi, B Jagadish Chandra and A Ramu: “An Expository Analysis of Tax Evasion and Policy Formulation using Game Theory”, International Journal of Engineering, Business and Enterprise Applications, 5(2), 121-124, 2013.

10. Saikiranmai Gorla, Sriharshitha Velivelli, Dipak Kumar Satpathi, N L Bhanu Murthy, Aruna Malapati, ‘Named Entity Recognition using Part-of-Speech Rules for Telugu’ Accepted in the conference ICACNI 2018 (proceedings of the conference will be published by Springer) .

11. MK Kaushik, PV Kalyan, DK Satpathi and Y Yoganandan, “Evaluation of spectrum usage based on peak excursion, using an off the shelf spectrum analyzer” 2014 IEEE Global Conference on Wireless Computing and Networking (GCWCN), 1-5, 2014 (.doi:10.1109/GCWCN.2014.7030836).

12. P Shukla, Dipak Kumar Satpathi. "Coalitional game theoretic model applied to relay spectrum sensing, IEEE-ICEEOT-2016, DMI College of Engineering, Chennai, 3-5 March, 2016.

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