Ramakrishna Mission Vidyamandira
Belur Math, Howrah - 711 202

Academic Internship 2025
Offered by
Mathematics Department

1. Special theory of relativity

Prerequisite:
a. Basic properties of groups,
b. Basic concept of vector space,
c. Coordinate geometry
d. Calculus.

Mode (Online / Offline / Hybrid): **Online**
Tentative Timeline:
a. Dates: 14th -19th May, 2nd - 6th June;
b. Time: 6:00 pm – 8:00 pm

Number of students: 25

Aims & objectives: By this internship the students will have a basic concept of postulates of special relativity, Lorentz transformation and its properties, Length contraction, Time dilation, Simultaneity, general Lorentz transformation. Students will also know about the famous equations E=mc^2, c+c=c, concept of light cone and 4-vectors.

Applicable for: Open to all who satisfies the pre-requisites.

Internship Code: MTMSM1

Possible Instructor: Dr. Saugata Mitra, Assistant Professor, Department of Mathematics, Ramakrishna Mission Vidyamandira.

2. Mathematical Modelling using Ordinary Differential Equations.

Prerequisite:
a. Single variable calculus - Continuity, differentiability.
b. Working Knowledge of Integration.
c. Basics of linear algebra - Eigen spaces.
d. (Desired but not essential) Ability to code in any programming language.

Mode (Online / Offline / Hybrid): **Online**
Tentative Timeline:
a. Dates: 16th May -11th June. Monday, Wednesday and Friday for 3 weeks
b. Times: 6:00 pm – 7:30 pm.

Number of students: 10.

Aims & objectives: The Internship aims to train students to use ordinary differential equations to model some physical and real-world phenomena. The students will learn about phase planes and the different kinds of stabilities. They will start working with linear models and if time permits, they will explore non-linear models also. Programming using Scilab / Octave will be used to plot the results. Students not having prior knowledge of coding need not worry as the basic codes will be discussed during the Internship.

Applicable for: Open to all who satisfies the pre-requisites.

Internship Code: MTMAJD1

Possible Instructor: Dr. Arnab Jyoti Das Gupta, Assistant Professor, Department of Mathematics, Ramakrishna Mission Vidyamandira.

3. Continued fraction and related topics in Elementary Number Theory

Prerequisite:
1. Basic Ring Theory
2. Interest in Number theory

Mode (Online / Offline / Hybrid): **Online**

Tentative Timeline:
a. Date: 15 May to 30 June; 1 day a week for 6 weeks.
b. Time: 7.30pm to 9.30pm.

Number of students: 4

Aims & objectives:
1. Express any rational numbers as a (finite) continued fraction,
2. learn about infinite continued fractions and the properties of its convergents,
3. solve linear Diophantine equations and certain quadratic equations,
4. approximate irrational numbers by suitable rational numbers,
5. understand the correspondence between periodic continued fractions and quadratic irrationals,
6. apply the theory of continued fractions to solve Pell's equation,
7. appreciate the significance of "the Golden ratio".

Applicable for: Open to all who satisfies the pre-requisites.

Internship Code: MTMRA1

Possible Instructor: Dr. Ratnadeep Acharya, Assistant Professor, Department of Mathematics, Ramakrishna Mission Vidyamandira.