SIKKIM MANIPAL INSTITUTE OF TECHNOLOGY

Engineering Mathematics III

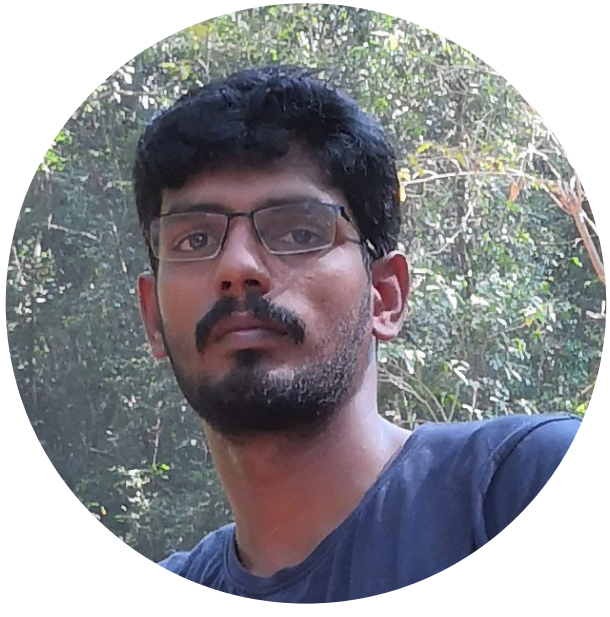
Discreate Mathematics

Lecture 1

Overview of the Course
&
Set Theory: Introduction, Principle of Inclusion and Exclusion (Part 1)

This course is taught to Computer Science Engineering students in SMIT, India during Jun-Dec, 2019.

About the instructor



Assistant Professor

Department of mathematics

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🎓 My Education

- B.Sc in Mathematics
- M.Sc in Mathematics
- M.Phil in Mathematics
- PhD in Mathematics (pursuing)

🎓 Known Softwares and Programmes

- LaTeX, Geogebra, Inkscape
- Python, SageMath, R
- Mathematica
- PHP, JavaScript

Overview of the Course...

What are the objectives this course?

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- to familiarize on numerous counting techniques and abstract structures which appear frequently in many areas such as Algorithm analysis, data structures, database management system

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- introducing graph theory because of its applications in computer networks, switching
- introducing group theory because of applications in coding theory, cypher security, crypography etc.,

Course Outcome

This course will empower the students to build better understanding related to their problems and enhance the capability of performing critical analysis using mathematical tools.

How are we going to achieve this?

We are going to use a moodle called canvas.

All the lectures will be recorded and uploaded as class materials in the Canvas Moodle.

Assignments and Quizes

Of course Sessionals & Semester Exams will be conducted.

Are you awake? Read this...

- Dont' Come Late
- Submit your assignments on time
- Submit your online quizes on time
- Don't disturb others

Lets Start our day...

What is our agenda for today?

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- Revising the concept of Sets

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- Revising the concept of Sets
- Principle of Inclusion and Exclusion

What is our agenda for today?

- Revising the concept of Sets
- Principle of Inclusion and Exclusion
- Some Examples and Exercises

What is a Set?

What do you think about these?

- Collection of beautiful flowers in SMIT
- Collection of awesome parents in the INDIA
- Collection of flowers in the INDIA

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What is a Set?

Set is a collection of **distinct** and **Well Defined** Objects

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Exercises

1. Are the following sets?
    - Collection of all email id's of the pupil in the class
    - Collection of passwords of the pupil in the class
    - Collection of all registration numbers of the pupil in SMIT
    - Collection of all good quality color pencils

Representation of a Set

Roaster Form

Eg. $\{1, 2, 3, 4, 5\}$

Set Builder Form

Eg. $\{x \in \mathbb{N} : 0 < x \leq 5\}$

Types of Sets

- Empty Set
- Singleton Set
- Finite Set
- Infinite Set

Cardinal Number of a Set

The number of distinct elements in a given set A is called the cardinal number of A. It is denoted by $n(A)$ or $|A|$.

Equivalent Sets & Equal Sets

Two sets A and B are said to be **equivalent** if their cardinal number is same.

Two sets A and B are said to be **equal** if they contain the same elements.

Subset of a Set

Let A and B be two sets, if all the elements in A is also in B, then we say that A is a subset of B, and denote it as $A \subseteq B$.

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- The change in order of writing the elements does not make any changes in the set.
- Empty is set is a subset of all the sets
- If A is a set, then $A \subseteq A$. That is every set is a subset of itself.

Questions?

Thank you