Report

I am working as an Assistant Professor in Mathematics in School of Liberal Studies at Dr. B. R. Ambedkar University Delhi (AUD). In the forthcoming semester, one of the courses may be assigned to me for teaching in first semester is "**Introduction to Mathematical Thinking**". The content of this course is as follows:

Discrete Elements: Induction, Fundamental Theorem of Arithmetic, Euclid's Division Algorithm, G. C. D, Congruences, Proofs (Euler's infinitude of primes, infinitude of primes, $\sqrt{n}$ irrational for n non-square)

Linear Algebra: Real coordinate space, vectors, vector addition, scalar multiplication, linear combination, linear independence and dependence, linear transformations, geometric transformations.

Real Analysis: Review of functions, real line and absolute value, statement of the Archimedean property, sequence of real numbers, limit of a sequence, algebra of convergent sequences, sequential limit of a function.

The texts used will be from the following books:
(i) R. G. Bartle and D. R. Sherbert, *Introduction to Real Analysis* (3rd Edition), John Wiley and Sons (Asia) Pte. Ltd., Singapore, 2002.

(ii) David C. Lay, *Linear Algebra and its Applications* (3rd Edition), Pearson Education Asia, Indian Reprint, 2007.

(iii) Joseph A. Gallian, *Contemporary Abstract Algebra* (4th Edition), Narosa Publishing House, New Delhi, 1999.

(iv) Edgar G. Goodaire and Michael M. Parmenter, Discrete Mathematics with Graph Theory (2nd Edition), Pearson Education (Singapore) Pte. Ltd., Indian Reprint 2003

Objectives and learning outcomes: This course has been designed with the aim of introducing students towards reading and writing Mathematics. A certain exposure to abstract mathematics is also an aim of the course. There will be due emphasis on an intuitive understanding of topics as well as the rigor required to do Mathematics. Writing proofs is an essential part of this course.

After completing this course, students will be able to describe some of the basic concepts of discrete elements, linear algebra and real analysis. Also they will learn how to write the mathematical proofs of some statement/theorem.

Pedagogy and Assessment structure:

There will be four lectures a week and one tutorial per week for this course.

S.No	Assessment	Date/period in which Assessment will take place	Weightage
1	Class test	As per AUD Academic Calendar	10%
2	Mid Semester Exam	As per AUD Academic Calendar	25%
3	Tut/Quiz/Home Assignments	As per AUD Academic Calendar	15%
4	Presentation/ Viva	As per AUD Academic Calendar	15%
5	End Semester Exam	As per AUD Academic Calendar	35%

I would like to mention the following points:

1. I do not propose any change in the course content at this moment as it has been recently revised by learned and experience internal/external experts in the field.
2. During the induction program at IISER Bhopal, various modern pedagogy tools such as flipped classroom, blended learning, Socratic method, Massive Open Online Courses (MOOC's) etc. have

been discussed through various activity sessions. In the forthcoming semester, I would try to incorporate some of these tools to enhance the learning of students. The following online resources may be used at various stages during the semester:
http://nptel.ac.in/courses/111104026/[For Discrete Elements]
http://nptel.ac.in/courses/111106051/ [For Linear Algebra]
http://nptel.ac.in/courses/122104017[For Real Analysis]