INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR
DISCIPLINE OF MATHEMATICS

MA 631: SPECIAL FUNCTIONS
Course Plan Semester I - 2017-2018

Instructor: ATUL DIXIT

Email: adixit@iitgn.ac.in

Office: Academic Block 5, Room 340

PRE-REQUISITES

Basic knowledge of real and complex analysis.

COURSE CONTENTS

- Bernoulli, Euler and Stirling numbers, the Gamma function, hypergeometric functions, orthogonal polynomials, differential equations associated with various special functions, Bessel functions, elliptic functions, theta functions, introduction to the theory of Riemann zeta function $\zeta(s)$ - Riemann's memoir, the functional equation for $\zeta(s)$, asymptotic expansions of special functions, applications of special functions.

  Note: Selection of the topics from above will be done at the discretion of the instructor.

BOOKS

1. **Textbook:** Nico M. Temme, *Special functions: An Introduction to the Classical Functions of Mathematical Physics*, John Wiley & Sons, 2011.

2. **Recommended book:** G.E. Andrews, R. Askey and R. Roy, Special Functions, Encyclopedia of Mathematics and its Applications, **71**, Cambridge University Press, Cambridge, 1999.

3. **Recommended book:** Harold Davenport. Multiplicative Number Theory, 3rd ed., Springer–Verlag, New York, 2000.

In addition, I will be using my own notes for some topics.

LECTURES AND TUTORIALS

Lectures: Monday: 3 pm - 4 pm, Wednesday and Friday: 2 pm - 3 pm (Room 7/207)

Tutorial: TBA.

Office hours: Monday: 4 pm - 5:30 pm
Thursday: 5 pm - 6:30 pm
Office hours will be held in my office 5/340.

HOMEWORK

Homework problems will be given every two to three weeks. It is absolutely imperative to work on each of the problems assigned for homework. Discussing in a group is allowed and encouraged, but only after you have sufficiently worked on the problem. The homework solutions must be written in your own way. Mere copying of others' work is strictly prohibited and will lead to serious consequences.

POLICY FOR EVALUATION

Homework: 40%
Mid-semester exam: 30%
End semester exam: 30%

GRADING RUBRIC

Relative grading policy will be followed.