

Indian Institute of Technology Guwahati
Department of Mathematics
MA 201: Mathematics - III (3-1-0-8)
Monsoon Semester AY 2024-2025

Instructor Name (Initials), Email and Phone Number:

Rajesh K. Srivastava (RKS), Office E1-208, rksri@iitg.ac.in and 0361-258-2630,

Jitendriya Swain (JS), Office E-209, jitumath@iitg.ac.in and 0361-258-2625

Satyajit Pramanik (SP), Office E1-305 satyajitp@iitg.ac.in and 0361-258-2632

Siddhartha Pratim Chakrabarty (SPC), Office E1-104, pratim@iitg.ac.in and 0361-258-2606

RKS and JS will teach the Complex Analysis part of the course (up to Mid-Sem).

SP and SPC will teach the Partial Differential Equations part of the course (after Mid-Sem).

Prerequisites: NIL

Syllabus:

Complex analysis: Complex numbers and elementary properties; Complex functions - limits, continuity and differentiation, Cauchy-Riemann equations, analytic and harmonic functions, elementary analytic functions, anti-derivatives and line (contour) integrals, Cauchy-Goursat theorem, Cauchy's integral formula, Morera's theorem, Liouville's theorem, Fundamental theorem of algebra and maximum modulus principle; Power series, Taylor series, zeros of analytic functions, singularities and Laurent series, Rouche's theorem and argument principle, residues, Cauchy's Residue theorem and applications, Mobius transformations and applications.

Partial differential equations: Fourier series, half-range Fourier series, Fourier transforms, finite sine and cosine transforms; First order partial differential equations, solutions of linear and quasilinear first order PDEs, method of characteristics; Classification of second-order PDEs, canonical form; Initial and boundary value problems involving wave equation and heat conduction equation, boundary value problems involving Laplace equation and solutions by method of separation of variables; Initial-boundary value problems in non-rectangular coordinates.

Laplace and inverse Laplace transforms, properties, convolutions; Solution of ODEs and PDEs by Laplace transform; Solution of PDEs by Fourier transform.

Texts:

1. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.
2. I. N. Sneddon, Elements of Partial Differential Equations, McGraw Hill, 1957.
3. E. Kreyszig, Advanced Engineering Mathematics, 10th Ed., Wiley, 2015.

References:

1. J. H. Mathews and R. W. Howell, Complex Analysis for Mathematics and Engineering, 3rd Ed., Narosa, 1998.
2. S. J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications, 1993.
3. K. Sankara Rao, Introduction to Partial Differential Equations, 3rd Ed., Prentice Hall of India, 2011.

4. Lectures:

Division	Branch	Lecture Slot	Lecture Days and Time	Room	Instructors
I	ECE, EEE	A	Tue (9:00 AM – 9:55 AM) Wed (10:00 AM – 10:55 AM) Thu (11:00 AM – 11:55 AM)	5G1	RKS (Complex Analysis) + SP (PDE)
II	CL, CST	A	Tue (9:00 AM – 9:55 AM) Wed (10:00 AM – 10:55 AM) Thu (11:00 AM – 11:55 AM)	5G2	JS (Complex Analysis) + SPC (PDE)
III	ME, BT	D	Mon (11:00 AM – 11:55 AM) Thu (9:00 AM – 9:55 AM) Fri (10:00 AM – 10:55 AM)	5G1	RKS (Complex Analysis) + SP (PDE)
IV	CE, M&C, Energy Engineering	D	Mon (11:00 AM – 11:55 AM) Thu (9:00 AM – 9:55 AM) Fri (10:00 AM – 10:55 AM)	5G2	JS (Complex Analysis) + SPC (PDE)

Tutorials:

Please consult the document on Tutorial Groups to identify your Tutorial Group. The schedule for the tutorial is **Monday 7:55 AM-8:50 AM (Slot A)** for all Tutorial Groups. The tutorials will be conducted by the respective Teaching Assistants (TAs).

Evaluation and Grading Policy:

Quiz-1: 10 marks (Tentative Date: 24-August-2024 (Saturday), Time: 10.00 AM - 11.00 AM, Venue: TBA)

Mid-Semester Examination: 40 marks (Date: As communicated by the Academic Section, Duration: **Three hours** instead of two hours)

Quiz-2: 10 marks (Tentative Date: 21-October-2024)

End-Semester Examination: 40 marks (Date: As communicated by the Academic Section)

Grading: Relative grading will be done based on the total marks obtained in the quizzes, mid-semester exam, and end semester.

Syllabus for exams: Will be declared in the class.

Some Important Points:

1. **No make-up exam will be held for the students who miss a quiz or mid-semester exam.**
2. You are always encouraged to ask the instructor anything regarding this course, anywhere, and anytime. However, you are discouraged from meeting the instructor to clarify a doubt or to ask for a hint of some problem on the day of any exam.
3. Grades of MA201 will be made available to the students only through the Academic Section on the stipulated date. Please do not ask us to let you know the grades.
- 4.

Class Discipline:

During class, please ensure that your mobile phone is turned off or set to silent mode and kept in your bag. Your bag should be placed below the desk, and there is no need to leave it at the classroom entrance. Only a copybook and pen should be kept on the classroom desk during all classes. Please be aware that any student found with a phone or similar device on the classroom desk, whether intentionally or unintentionally, will be asked to leave the classroom and the incident will be reported to the academic section.

Course Website (upto midsem): Please regularly visit the course website <https://fac.iitg.ac.in/rksri/> or https://fac.iitg.ac.in/rksri/MA201_2024.htm to see an update about course materials.