Information of the course on **Linear Algebra and Differential Equations (MA-1-02(TO))** for B.Tech. 2nd semester at IIT Jammu, India

Teaching assistants

- Mr. Mukul Dwivedi

- Mr. Mandeep Kumar

Course contents

- System of Linear equations, Gaussian elimination, matrix operations, Elementary matrices, Determinants, Vector Spaces, subspaces, linear independence, basis and dimensions, coordinates and change of basis, rank, nullity and the fundamental matrix spaces.

- Linear transformation, rank-nullity theorem and its applications, isomorphism, matrix representation of linear transformation, similarity, Eigenvalue and eigenvectors, Cayley-Hamilton theorem (without proof) and its applications, diagonalization.

- 1st order ODEs, Picard's iterations, Picard's theorem (without proof) and its applications, Second order and higher order linear ODEs with constant coefficients, linear independence and Wronskian, Cauchy-Euler equations, method of undetermined coefficients, variation of parameters.

- System of linear ODEs with constant coefficients, fundamental matrix and matrix methods. Boundary Value problems: Sturm-Liouville eigenvalue problems, Power series method, Laplace transformation method.

Class and tutorial timings

- Monday, 10:00 - 10:50 AM

- Tuesday, 11:00 - 11:50 AM

- Wednesday, 12:00 - 12:50 PM

- Thursday, 9:00 - 9:50 AM (Tutorial)

Office hours

- Tuesday, 2:00 - 3:30 PM, for Mechanical Engineering students

- Wednesday, 2:00 - 3:30 PM, for Material Engineering students

- Thursday, 2:00 - 3:30 PM, for CSE students

Credit system for the course:

- 5 marks for attendance in the class. There will be $15 - 20$ random attendance throughout the semester and a student will get 5 marks for attendance provided he/she has more than 75% of attendance.

- 5 marks for group homework assignments. There will be several groups of students, consisting of atleast 10 students in each group. Each group has to submit detailed solutions of the homework assignment.

- 20 marks for class tests. There will be two class tests of equal marks each. Class test 1 will be sometime during April $10 - 15$, 2023 and class test 2 will be sometime during May $27 -$ June 2, 2023.

- 30 marks for mid-sem exam. Mid-sem will be as per the institute timetable.

- 40 marks for end-Sem exam. End-sem will be as per the institute timetable.

References for the course:

1. H. Anton and C. Rorres; Elementary Linear Algebra, 11th Edition, Wiley.

2. D. C. Lay; Linear Algebra its applications, Fifth Edition.

3. G. F. Simmons; Differential Equations with Applications and Historical Notes, 2nd Edition, Tata McGraw Hill.

4. W. E. Boyce and R. C. DiPrima; Elementary Differential Equations, Wiley, 10th Edition.

5. E. A. Coddington; An introduction to ordinary differential Equations, Dover Publications.