MA102 Mathematics-II

January-May 2019 Semester

Syllabus (Linear Algebra)

- **Linear algebra**: Systems of linear equations, matrices, Gaussian elimination, echelon form, column space, null space, rank of a matrix, inverse and determinant; Vector spaces (over the field of real and complex numbers), subspaces, spanning set, linear independence, basis and dimension; Linear transformations, rank-nullity theorem, matrix of a linear transformation, change of basis and similarity; Eigenvalues and eigenvectors, algebraic and geometric multiplicity, diagonalization by similarity; Inner-product spaces, Gram-Schmidt process, orthonormal basis; Orthogonal, Hermitian and symmetric matrices, spectral theorem for real symmetric matrices.

Books for Linear Algebra

Text Book:

- **D. Poole, Linear Algebra: A Modern Introduction, Cengage Learning India Private Limited, 4th Edition, 2015.**

Reference Books:

- G. Strang, Linear Algebra and Its Applications, Cengage Learning, 4th Edition, 2006.
- J. Gilbert and L. Gilbert, Linear Algebra and Matrix Theory, Academic Press, 1995.
- K. Hoffman and R. Kunze, Linear Algebra, Pearson India, 2nd Edition, 2015.

Syllabus (ODE)

- First order differential equations – exact differential equations, integrating factors, Bernoulli equations, existence and uniqueness theorem, applications; Higher-order linear differential equations – solutions of homogeneous and nonhomogeneous equations, method of variation of parameters, operator method; Series solutions of linear differential equations, Legendre equation and Legendre polynomials, Bessel equation and Bessel functions of first and second kinds; Systems of first-order equations, phase plane, critical points, stability.

Books for ODE

Text Book:

- **S. L. Ross, Differential Equations, Wiley India, 3rd Edition, 2004.**

Reference Books:

- E. A. Coddington, An Introduction to Ordinary Differential Equations, Dover Publications, 1989.
- E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
- W. E. Boyce and R. C. DiPrima, Elementary Differential Equations, Wiley India, 9th Edition, 2008.

Grading Policy

Continuous Assessment Component	Weightage (% of Marks)
Quiz-1 on 14.02.2019	10%
Mid Semester Exam on 27.02.2019	30%
Quiz-2 on 25.04.2019	10%
End Semester Exam on 08.05.2019	50%
Total	100%

Grading of the course will be done based on total marks scored by the students in all the above mentioned Components. For absentees, No MAKE UP Test for Quiz-1, Quiz-2 & Mid Semester Exam irrespective any reasons.

Attendance Policy

- All students (including Backlog Students) of MA102 must attend all lecture classes and tutorial classes of MA102.
- For attendance in the lecture classes of MA102, a bio-metric finger print device will be circulated during the lecture. It is the responsibility of the student to mark his/ her attendance in the biometric device of MA102.
- For attendance in the tutorial classes of MA102, Roll call attendance will be taken by the tutors. Attending tutorial classes is highly important and useful.
- **All students should maintain minimum of 75% attendance in the course MA102 (Tutorial + Lecture together).**
- **In the first week of Lectures, all backlog students should record their finger prints in the biometric devices of the lecture divisions in which they are attending classes of MA102. All backlog students of MA102 also should maintain minimum of 75% attendance in the course MA102 (Tutorial + Lecture together).**
- **If a student fails to maintain minimum 75% attendance in the course MA102, then he/she will debarred from appearing in the End Semester Examination and will be awarded F-Grade in MA102. Further such students (getting F due to attendance shortage) are NOT eligible for appearing in the Supplementary Examination of MA102.**

Tutorial Policy

- Tutorial sheets will be uploaded in the moodle webpage of MA102 in the folder "Tutorial Sheets". Students are instructed to visit this folder frequently and see & download tutorial sheets.
- All students should work out problems as much as possible from the tutorial sheets before coming to the tutorial classes. The aim of tutorials is to clear doubts of the students by working out important/ difficult problems. Students should note it down the material / answers worked out on the board by the tutors.
- **Solutions to Tutorial Sheets will NOT be uploaded in this moodle webpage of MA102.**

Course Webpage at Moodle

- The course webpage for MA102 Mathematics-II (January-May 2019) is maintained at Intranet Moodle site. The course information, notices, tutorial sheets, lecture slides, everything will be uploaded in this moodle webpage of MA102.
- **You are requested to login at https://intranet.iitg.ernet.in/moodle/ and do enrollment / registration for the course MA102 Mathematics-II (January-May 2019) with the enrolment key linearode**
- Students of MA102 need to login regularly every week and see the updates.