# MA-300 Calculus III

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| Program | BS( MA) |
| Credit Hours | **3** |
| Duration | One Semester |
| Prerequisites | (Calculus-I) |
| Resource Person | Mr. Khawar Nadeem |
| Counseling Timing |  |
| Contact |  |

**Learning Objective**

Linear Algebra & complex variables. is an important course for mathematics, physics, economics and computer-science majors. Students apply the concepts and methods described in the syllabus and will become capable to solve problems using linear algebra, they will know a number of applications of linear algebra, and they will be able to understand the logic (proof) behind a particular phenomenon. The text and class discussion will introduce the concepts, methods, applications, and proofs; students will practice them and solve problems on assignments, and they will be tested on quizzes, midterms, and the final. For physics majors this subject has applications in quantum mechanics, economics majors will find it useful in courses like econometrics, computer-science students will see its application in computer graphics.

**Learning Methodology**

Lecture, interactive, participative

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Qizzes 20

Assignments

Mid Term 30

Attendance & Class Participation

Term Project 10

Presentations

Final exam 40

Total 100

**Recommended Text Books**

Anton, Howard and Chris Rorre*s*, *Elementary Linear Algebra, Applications Version*, 8th Edition. Wiley Publishing,2000. Complex Variable and Applications by: James Ward Brown .

**Reference Books**

* Gilbert Strang, Linear Algebra and its Applications, 4th Edition.
* David C. Ley, Linear Algebra and its Applications, Latest Edition.
* Bernard Kolman, David Hill, Elementary Linear Algebra with Applications, Latest Edition.
* Otto Bretcher, Linear Algebra with Applications, Latest Edition.
* James M. Ortega Matrix Theory-A second course
* Advanced Engineering Mathematics –by Erwin Kreyszig (latest Edition), John Wiley;
* Mathematical Physics - by H. K Dass (latest Edition),

**Calendar of Course contents to be covered during semester**

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| **Week** | Topics | **Pages in Text Book** |
| **1** | 1. Discussion of Course Plan
2. *Introduction* to systems of *linear* equations.
3. Matrices.
 | Pages: 1 - 7Pages: 23 - 25 |
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| **2** |  Matrix operations, Rules of matrix Arithmetic (Transpose and Inverse of Non- Singular Matrices)  | Pages: 25 - 49 |
| **3** | 1. *Inverses* of higher order Matrices
2. *Elementary row operations* leading to *Echelon* form for the *solution* of simultaneous linear equations*.*
 | Pages: 50 - 58Pages: 8 - 12 |
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| **4** |  1) *Elementary row operations* leading to *Reduced* Echelon form  for the *solution* of simultaneous linear equations*.* 2) *Determinants* of higher order matrices  | Pages: 12 - 23Pages: 81 – 88 |
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| **5** | Properties of the Determinants of the Higher Order Matrices | Pages: 89 - 103 |
| **6** | *Cofactor* Expansion; *Cramers’s* Rule | Pages: 104-118 |
| **7** | 1) Norm and Dot product of Vectors 2) Periodic functions, Trigonometric series. | Pages: 126 -137Pages: 203-210 |
| **8** | Fourier Series Function | Pages: 211-221 |
| **9** | Range expension, complex Fourier Series | **Pages: 221-230** |
| **10** | Complex Numbers, complex Plane , Polar form of complex numbers. | Pages:231- 245 |
| **11** | De-Moiver’s theorem | Pages: 320-330  |
| **12** | The nth root of complex Numbers  | Pages: 337-346 |
| **13** | Application of De-Moiver’s theorem in summation of series  | Pages: 275-297 |
| **14** | *Revision* | Pages: 261-268 |
| **15** | **FINAL EXAM (FROM THE WHOLE COURSE)** |  |