

# Mathematics Elective Courses From All Departments

(M): Mandatory

(E): Elective

## Elective Courses For The Second Year

- **Mathematics**

1. Math 240 Analytical Mechanics
2. Math 303 History of Mathematical Concepts 1
3. Math 304 History of Mathematical Concepts 2
4. Math 366 Number Theory
5. Math 405 Variational Analysis
6. Math 200 Undergraduate Seminar
7. Math 260 Mathematics for Sustainability
8. Math 201 Introduction to Mathematical Programming

- **PHYSICS**

- 1- Phys 203 Classical Mechanics 1 (M)
- 2- Phys 204 Classical Mechanics 2 (M)
- 3- Phys 222 Modern Physics (M)

- **Molecular Biology and Genetics (MBG)**

- 1- MBG 205 Biostatistics (M)

- **Mechanical Engineering**

- 1- Econ 205 Principles of Economics (M)

- **Computer Engineering**

- 1- Ceng 211 Programming Fundamentals (M)
- 2- Ceng 213 Theory of Computation (M)
- 3- Ceng 212 Concepts of Programming Languages (M)
- 4- Ceng 214 Logic Design (M)
- 5- Ceng 216 Numerical Computation (M)
- 6- Ceng 218 Analysis and Design of Algorithms (M)

## **Elective Courses For The Third Year**

- **Mathematics**

9. MATH 301 Dynamical Systems
10. MATH 372 Differential Geometry
11. MATH 381 Numerical Analysis
12. MATH 303 History Of Mathematical Concepts I
13. MATH 304 History Of Mathematical Concepts II
14. MATH 307 Introduction to Graph Theory
15. MATH 308 Introduction to Combinatorics
16. MATH 311 Coding theory
17. MATH 312 Computational mathematics and algorithms
18. MATH 313 Introduction to Cryptography
19. MATH 330 Trending Mathematical Algorithms
20. MATH 333 Introduction to Mathematical Modeling
21. MATH 341 Advanced Mathematics Internship
22. MATH 342 Mathematics Internship
23. MATH 366 Number Theory
24. MATH 368 An Introduction to Mathematical Control Theory
25. MATH 382 Numerical Analysis II
26. MATH 385 Special Functions of Applied Mathematics
27. MATH 386 Fluid Dynamics
28. MATH 338 Mathematics for Machine Learning
29. MATH 387 An Introduction to Topology of Surfaces
30. MATH 389 Introduction to Commutative Ring Theory
31. MATH 334 Introduction to Wavelet and Applications
32. MATH 335 Mathematical Image Deblurring

- **PHYSICS**

- 1- Phys 301 Electromagnetic Theory 1 (M)
- 2- Phys 302 Electromagnetic Theory 2 (M)
- 3- Phys 321 Quantum Mechanics 1 (M)
- 4- Phys 322 Quantum Mechanics 2 (M)
- 5- Phys 314 Astronomy (E)

- **Computer Engineering**

1. Ceng 311 Computer Architecture (M)
2. Ceng 315 Information Management (M)
3. Ceng 312 Computer Networks (M)
4. Ceng 316 Software Engineering (M)
5. Ceng 322 Operating Systems (M)
6. Ceng 381 Stochastic Processes (E)
7. Ceng 382 Information Theory (E)
8. Ceng 385 Mathematical Logic (E)
9. Ceng 388 Web Programming (E)
10. Ceng 389 Mobile Application Development (E)
11. Ceng 390 Cloud Computing (E)

## **Elective Courses For The Fourth Year**

Students are allowed to take mathematics courses from the elective list of second and third year, or from the mathematics courses list below, or any suitable course from other departments if their advisors approve.

33. MATH 401 Quantum Mechanics
34. MATH 403 Combinatorial Design theory
35. MATH 404 Quantum Computations and Information
36. MATH 405 Variational Analysis
37. MATH 406 Mathematics of Public Key Cryptography
38. MATH 407 Conformal Mappings
39. MATH 408 Advanced Topics in Graph Theory
40. MATH 409 Advanced Topics in Combinatorics
41. MATH 410 Green's functions
42. MATH 411 Mathematical optimization

- 43.MATH 412** Hyperbolic geometry
- 44.MATH 413** Linear and Nonlinear Waves
- 45.MATH 414** Introduction to Integral Equations
- 46.MATH 422** Introduction to Abelian Groups
- 47.MATH 430** Contemporary Applications of Mathematics
- 48.MATH 432** Analysis of Symmetric Encryption and Hash Functions
- 49.MATH 440** Knot Theory and Its Applications
- 50.MATH 441** Introduction to Geometric Topology
- 51.MATH 442** An Introduction to Topological Data Analysis
- 52.MATH 443** Introduction to Analytic Number Theory
- 53.MATH 444** Introduction to Modules and Rings
- 54.MATH 445** Mathematical Aspects of Blockchain Technologies
- 55.MATH 446** Curriculum Supporting Course
- 56.MATH 447** Entrepreneurship Education
- 57.MATH 450** Scale Invariance and Dimensional Analysis
- 58.MATH 451** Mathematics and Technology
- 59.MATH 452** Functional Analysis
- 60.MATH 453** Introduction to Generalized Functions
- 61.MATH 455** Control of Infinite Dimensional Systems
- 62.MATH 456** Galois Theory
- 63.MATH 481** Differential Equations with Numerical Methods
- 64.MATH 482** Numerical Solutions of Linear Integral Equations
- 65.MATH 499** Cooperative Education Course