Semester I

Subject 1

ME010101 Abstract Algebra

Text book : John B. Fraleigh, A first course in abstract algebra, 7th edition, Pearson Education, 2003

Week 1 Reading : §11.1-17

Day 1 Introduction to Abstract Algebra.

Day 2 Direct product of Groups. Reading : §11.1-11.
Exercise : 11.1-20, 32-36, 45, 46-53

Day 3 Finitely generated Abelian Groups. Reading : §11.12-17.
Exercise : 11.21-31, 37-44, 54

Day 4

Day 5

Jan 08, 2020 Assignment : Exercises 11

Week 2 Reading : §14.1-15

Day 1 Cosets and Homomorphism. (Reading : §13.1-20)

Day 2 Factor Groups. Reading : §14.1-8

Day 3 Fundamental Homomorphism & Automorphism. Reading : §14.9-15

Day 4

Day 5

Jan 15, 2020 Assignment : Exercises 14

Week 3 Reading : S16.1-17

Day 1 Simple Groups. (Reading : §15)

Day 2 Group Action. Reading : §16.1-8

Day 3 Isotropy Subgroups. Reading : §16.9-17

Day 4

Day 5

Jan 22, 2020 Assignment : Exercises 16

Week 4 Reading : §17.1-7

Day 1 Burnside's forumula. Reading : §17.1-7

Day 2

Day 3

Day 4

Day 5

Jan 29, 2020 Assignment : Exercises 17
Feb 05, 2021 Module 1 Internal Examination

Week 5 Reading : §34.1-10

Day 1 First Isomorphism Theorem. Reading : §34.1-2

Day 2 Second Isomorphism Theorem. Reading : §34.3-5

Day 3 Third Isomorphism Theorem. Reading : §34.6-10

Day 4

Day 5

Feb 12, 2021 Assignment : Exercise 34

Week 6 Reading : §36.1-13

Day 1 Cauchy's Theorem. Reading : §36.1-4

Day 2 First Sylow's Theorem. Reading : §36.5-8

Day 3 Second Sylow's Theorem. Reading : §36.9-10

Day 4 Third Sylow's Theorem. Reading : §36.11-13

Day 5

Feb 19, 2021 Assignment : Exercise 36

Week 7 Reading : §37.1-15

Day 1 Applications. Reading : §37.1-6

Day 2 More Applications. Reading : §37.7-15

Day 3

Day 4

Day 5

Feb 26, 2021 Assignment : Exercise 37
Mar 05, 2021 Module 1 & 2 Internal Examination

Week 8 Reading : §20.1-15 & §21.1-9

Day 1 Rings, Fields & Integral Domains. (Reading : §18,19)

Day 2 Fermat, Euler Theorems. Reading : §20.1-15

Day 3 Field of Quotients. Reading : §21.1-9

Day 4

Day 5

Mar 12, 2021 Assignment : Exercise 20, 21

Week 9 Reading : §22.1-11

Day 1 Ring of Polynomials. Reading : §22.1-3

Day 2 Evaluation Homomorpism. Reading : §22.4-11

Day 3

Day 4

Day 5

Mar 19, 2021 Assignment : Exercise 22

Week 10 Reading : §23.1-21

Day 1 Factor Theorem. §23.1-6

Day 2 Irreducible Polynomials. §23.7-17

Day 3 Unique factorisation. §23.18-21

Day 4

Day 5

Mar 26, 2021 Assignment : Exercise 23
Apr 02, 2021 Module 3 Internal Examination

Week 11 Reading : §24.1-10

Day 1 Group Rings. Reading : §24.1-8

Day 2 Finite Division Ring. Reading : §24.9-10

Day 3

Day 4

Day 5

Apr 09, 2021 Assignment : Exercise 24

Week 12 Reading : §26.1-19

Day 1 Homomorphism. Reading : §26.1-6

Day 2 Factor Ring. Reading : §26.7-15

Day 3 Fundamental Homomorphism Theorem. Reading : §26-16-19

Day 4

Day 5

Apr 16, 2021 Assignment : Exercise 26

Week 13 Reading : §27.1-27

Day 1 Ideals. Reading : §27.1-6

Day 2 Maximal, Prime Ideals. Reading : §27.7-16

Day 3 Prime Fields. Reading : §27.17-27

Day 4

Day 5

Apr 23, 2021 Assignment : Exercise 27
Apr 30, 2021 Module 3 & 4 Internal Examination

Subject 2

ME010102 Linear Algebra

Week 1

Subject 3

ME010103 Basic Topology

Week 1

Subject 4

ME010103 Real Analysis

Week 1

Subject 5

Graph Theory

Week 1

Semester II

Subject 6

ME010201 Advanced Abstract Algebra

Week 1

Subject 7

ME010202 Advanced Topology

Week 1

Subject 8

Numerical Analysis with Python3

Revision Plan

Day 1 Gauss elimination - Elimination phase('Pivot Equation', n^3 operations), Back substitution phase. §2.2(Kiusalaas pages 37-44) **Oct 8, 2020**

Day 2 Doolittle LU decomposition - ('LU' factorisation, Comparison), Modifications to Gauss Elimination, combined matrix, Forward + Back substitution §2.3(Kiusalaas pages 44-47) **Oct 9, 2020**

Day 3 Numerical Integration - Lagrange's interpolant, Newton-Cotes formula **Oct 12, 2020**

Subject 9

ME010204 Complex Analysis

Week 1

Subject 10

ME010205 Measure & Integration

Week 1

Semester III

Subject 11

ME010301 Advanced Complex Analysis

Week 1

Subject 12

ME010302 Partial Differential Equations

Week 1

Subject 13

ME010303 Multivariate Calculus & Integral Transforms

Textbooks : Tom M. Apostol, Mathematical Analysis, 2nd Edition, Addison-Wesley, 1974
Walter Rudin, Principles of mathematical analysis, 3rd Edition

Week 1 Weierstrass approximation theorem, other forms of Fourier series, Fourier integral theorem, exponential form of Fourier integral theorem, integral transforms. Reading : §11.15-20

Week 2 Directional derivatives, Total Derivative, Complex valued functions, matrix of linear functions, Jacobian matrix. Reading: §12.1-8

Week 3 chain rule, matrix form of chain rule, mean-value theorem. Reading : §12.9-11[1]

Week 4 Reading : §12.12-13

- Day 1 Sufficient condition for differentiability. Reading : §12.12
- Day 2 Sufficient condition for equality of partial derivatives. Reading : §12.13

Jan 08, 2020 Internal Examination Module 2

Week 5 Reading : §13.1-4

- Day 1 Implicit function, Jacobian determinant $J_f(\overline{x})$, Jacobian determinant of complex-valued functions §13.1
- Day 2 Continuity of f with $J_f(\overline{x}) \neq 0$. Reading : §13.2 Theorem 13.2
- Day 3 Function f with $J_f(\overline{x}) \neq 0$ is an open mapping. §13.2 Theorem 13.3
- Day 4 Inverse function therorem. Reading : §13.3
- Day 5 Implicit function theorem. Reading : §13.4

[1] Semester 2, University Examinations

Jan 15, 2020

Week 6 Reading : §13:5-6

Day 1 Extrema of function on one variable. Reading : §13.5

Day 2 Extrema of functions on several variables. Reading : §13.6

Jan 22, 2020

Week 7 Convolution theorem for Fourier transforms. Reading : §11.21 (pending)
Jan 29, 2020

Week 8 Reading : §10.1-9

Day 1 k-cell I_k, integration over k-cell, support, primitive mappings, flip, local represenation as composition of primitives and flips, partitions of unity, change of variables on continuous functions with compact support.

Feb 05, 2020

Week 9 Reading : §10.10-14

Day 1 k-surface, k-form (differential form of order k), properties of k-forms, basic k-forms.

Feb 12, 2020

Subject 14

ME010304 Functional Analysis

Week 1

Subject 15

ME010305 Optimization Technique

Week 1

Semester IV

Subject 16

ME010401 Spectral Theory

Week 1

Subject 17

ME010402 Analytic Number Theory

Week 1

Subject 18

ME800401 Differential Geometry

Week 1

Subject 19

ME800402 Algorithmic Graph Theory

Week 1

Subject 20

ME800403 Combinatorics

Week 1

Subject 21

Probability Theory

Week 1

Subject 22

Operational Research

Week 1

Subject 23

Operational Research

Week 1

Subject 24

Commutative Algebra

Week 1

Subject 25

Ordinary Differential Equations

Week 1

Subject 26

Classical Mechanics

Week 1

Bibliography