Teaching Plan: B.Sc. (Hons.) Mathematics, Semester-4

DSC-10: Sequences and Series of Functions

Weeks 1 to 3: Pointwise and uniform convergence of sequence of functions, The uniform norm, Cauchy criterion for uniform convergence.
[1]: Chapter 8 (Section 8.1).

Weeks 4 to 6: Continuity of the limit function of a sequence of functions, Interchange of the limit and derivative, and the interchange of the limit and integral of a sequence of functions, Bounded convergence theorem.
[1]: Chapter 8 (Section 8.2 up to 8.2.5).

Weeks 7 and 8: Pointwise and uniform convergence of series of functions, Theorems on the continuity, and integrability of the sum function of a series of functions.
[1]: Chapter 9 (Section 9.4 [9.4.1 to 9.4.3]).

Weeks 9 and 10: Theorem on the differentiability of the sum function of a series of functions, Cauchy criterion, and the Weierstrass M-test for uniform convergence.
[1]: Chapter 9 (Section 9.4 [9.4.4 to 9.4.6]).

Week 11: Definition of a power series, Radius of convergence, Absolute convergence (Cauchy-Hadamard theorem).
[1]: Chapter 9 (Section 9.4 [9.4.7 to 9.4.9 followed by the Remark]).

Week 12: Differentiation and integration of power series, Abel's theorem.
[2]: Chapter 4 (Section 26).

Week 13: Weierstrass's approximation theorem.
[2]: Chapter 4 (Section 27).

Week 14: The exponential and logarithmic functions: Definitions and their basic properties.
[1]: Chapter 8 (Section 8.3).

Week 15: The trigonometric functions: Definitions and their basic properties.
[1]: Chapter 8 (Section 8.4).

Essential Readings

1. Bartle, Robert G., & Sherbert, Donald R. (2011). Introduction to Real Analysis (4th ed.). Wiley India Edition. Indian Reprint.
2. Ross, Kenneth A. (2013). Elementary Analysis: The Theory of Calculus (2nd ed.). Undergraduate Texts in Mathematics, Springer. Indian Reprint.

DSC-11: Multivariate Calculus

Week 1: Definition and examples of function of two variables, Level curves and surfaces, Limits and continuity of functions of two variables. [1]: Chapter 11 (Sections 11.1 [up to Example 3], and 11.2).

Week 2: Partial differentiation and partial derivatives as slope and rate, Higher order partial derivatives. [1]: Chapter 11 (Section 11.3).

Week 3: Tangent planes, Total differential, Differentiability, Chain rule for one independent variable.
[1]: Chapter 11 (Sections 11.4 [except Examples 2, and 3], and 11.5 [up to Example 5]).

Weeks 4 and 5: Extensions of the chain rule to two independent parameters, Directional derivatives and the gradient, Maximal and normal property of the gradient, Tangent planes and normal lines.
[1]: Chapter 11 (Sections 11.5 [Examples 6 to 8], and 11.6).

Week 6: Extrema of functions of two variables, Lagrange multipliers method for optimization problems with one constraint. [1]: Chapter 11 (Sections 11.7 [up to Example 6], and 11.8 [Examples 1 and 2]).

Week 7: Double integration over rectangular regions. [1]: Chapter 12 (Section 12.1).

Week 8: Double integration over nonrectangular regions, Double integrals in polar coordinates.
[1]: Chapter 12 (Sections 12.2, and 12.3).

Week 9: Triple integral over a parallelopiped, Triple integral over solid regions, Volume by triple integrals**.**
[1]: Chapter 12 (Section 12.5).

Week 10: Triple integration in cylindrical and spherical coordinates. [1]: Chapter 12 (Section 12.7).

Week 11: Jacobians: Change of variables in double and triple integrals. [1]: Chapter 12 (Section 12.8).

Week 12: Vector field, Divergence and curl, Line integrals and its properties, Applications of line integrals to mass and work. [1]: Chapter 13 (Sections 13.1, and 13.2).

Week 13: Fundamental theorem for line integrals, Conservative vector fields and path independence, Green's theorem for simply connected region, Area as a line integral.
[1]: Chapter 13 (Sections 13.3, and 13.4 [up to Example 3])**.**

Weeks 14 and 15: Surface integrals, Statements of Stokes' theorem and Gauss divergence theorem.
[1]: Chapter 13 (Sections 13.5, 13.6, and 13.7 [up to Example 3, for all three respective sections]).

Essential Reading

1. Strauss, Monty J., Bradley, Gerald L., & Smith, Karl J. (2007). Calculus (3rd ed.). Dorling Kindersley (India) Pvt. Ltd. Pearson Education. Indian Reprint.

Suggestive Reading

- Marsden, J. E., Tromba, A., & Weinstein, A. (2004). Basic Multivariable Calculus. Springer (SIE). Indian Reprint.

Note. 1. For weeks 9 to 11, please refer to sections **12.4, 12.5, and 12.6** while using the Indian print version.
2. To improve the problem-solving ability, for similar kind of examples based upon the above contents, the Suggestive Reading may be consulted.

DSC-12: Numerical Analysis

Weeks 1 and 2: Rate and order of convergence; Bisection method, False position method and their convergence analysis.
[1]: Chapter 1 (Section 1.2).
[1]: Chapter 2 (Sections 2.1, and 2.2).

Weeks 3 and 4: Fixed point iteration method, Newton's method, and Secant method, their order of convergence and convergence analysis.
[1]: Chapter 2 (Sections 2.3, 2.4, and 2.5).

Weeks 5 and 6: LU decomposition and its application to solve system of linear equations;
Iterative methods: Gauss−Jacobi, and Gauss−Seidel methods to solve system of linear equations.
[1]: Chapter 3 (Sections 3.5 [up to Example 3.14], and 3.8 [up to Example 3.23]).

Weeks 7 to 9: Lagrange interpolation: Linear and higher order interpolation, and error in it. Divided difference and Newton interpolation, Piecewise linear interpolation.
[1] Chapter 5 (Sections 5.1, 5.3, and 5.5).

Weeks 10 and 11: First and higher order approximation for the first derivative and error in the approximation, Second order forward, Backward and central difference approximations for the second derivative.
[1]: Chapter 6 (Section 6.2).

Weeks 12 and 13: Numerical integration by closed Newton−Cotes formulae: Trapezoidal rule, Simpson's rule, and its error analysis.
[1]: Chapter 6 (Section 6.4).

Weeks 14 and 15: Euler’s method to solve ODE’s, Modified Euler method, Runge−Kutta Method (fourth-order).
[1]: Chapter 7 (Sections 7.2 [up to Example 7.7], and 7.4 [up to Example 7.14]).

Essential Reading

1. Bradie, Brian. (2006). A Friendly Introduction to Numerical Analysis. Pearson Education India. Dorling Kindersley (India) Pvt. Ltd. Third impression 2011.

DSE-2(i): Biomathematics

Week 1: Using data to formulate a model, Discrete versus Continuous models, A continuous population growth model.
[1]: Chapter 1 (Sections 1 to 3).

Week 2: Long-term behavior and equilibrium states, Analyzing equilibrium states.
[1]: Chapter 1 (Sections 6, and 7).

Week 3: The Verhulst model for discrete population growth, Administration of drugs.
[1]: Chapter 1 (Section 8).
[2]: Chapter 1 (Section 1.2).

Week 4: Differential equation of Chemical Reactions.
[2]: Chapter 4 (Section 4.4)

Week 5: Predator-prey models (Function response: Types I, II and III).
[2]: Chapter 4 (Section 4.5).

Weeks 6 and 7: Introduction to infectious disease, The spread of an Epidemic: The SIS Model, Interpreting the parameter β, The long-term evolution of the disease, The SIR and SEIR models of an epidemic. [1] Chapter 2 (Sections 1, and 2).

Week 8: Phase plane analysis of epidemic model, Stability of equilibrium points.
[1]: Chapter 2 (Sections 3, and 4).

Week 9: Classifying the equilibrium state; Local stability.
[1]: Chapter 2 (Section 6).
[2]: Chapter 5 (Section 5.4).

Week 10: Limit cycles, Limit cycle criterion and Poincaré-Bendixson theorem (interpretation only with Example 5.6.1). [2]: Chapter 5 (Section 5.6).

Week 11: Bifurcation, Bifurcation of a limit cycle. [2]: Chapter 13 (Sections 13.1, and 13.2).

Week 12: Discrete bifurcation and period-doubling, Chaos.
[2]: Chapter 13 (Sections 13.3, and 13.4).

Week 13: Stability of limit cycles, Introduction of Poincaré plane.
[2]: Chapter 13 (Sections 13.5, and 13.6)

Weeks 14 and 15: Modelling molecular evolution: Matrix models of base substitutions for DNA sequences, Jukes-Cantor and Kimura models; Phylogenetic distances.
[3]: Chapter 4 (Sections 4.4, and 4.5).

Essential Readings

1. Robeva, Raina S., et al. (2008). An Invitation to Biomathematics. Academic press.
2. Jones, D. S., Plank, M. J., & Sleeman, B. D. (2009). Differential Equations and Mathematical Biology (2nd ed.). CRC Press, Taylor & Francis Group.
3. Allman, Elizabeth S., & Rhodes, John A. (2004). Mathematical Models in Biology: An Introduction. Cambridge University Press.

Note. For an introduction to the SEIR model, refer to Chapter 4 (Section 4.1) of the textbook: Ellen Kuhl, Computational Epidemiology, 2021, Springer. (https://link.springer.com/chapter/10.1007/978-3-030-82890-5_4)

DSE-2(ii): Mathematical Modeling

Weeks 1 and 2: Modeling concepts and examples, Scaling of variables, and approximations of functions.
[1]: Chapter 0 (Sections 0.2, 0.3, 0.5, and 0.6).

Weeks 3 and 4: SIR and SEIR models for disease spread: Methodology, Standard and solvable SIR models, Basic reproduction number.
[1]: Chapter 7 (Section 7.4.3), and Chapter 8.

Week 5: Dieting model with analysis and approximate solutions.
[1]: Chapter 9.

Weeks 6 and 7: Stability and the phase plane, Almost linear systems.
[2]: Chapter 6 (Sections 6.1, and 6.2)

Weeks 8 and 9: Ecological models: Predators and competitors, Critical points, Oscillating populations, Survival of single species, Peaceful coexistence of two species, Interaction of logistic populations, Wildlife conservation preserve.
[2]: Chapter 6 (Section 6.3).

Week 10: Nonlinear mechanical systems: Hard and soft spring oscillations, Damped nonlinear vibrations.
[2]: Chapter 6 (Section 6.4 up to Example 2).

Weeks 11 and 12: Monte Carlo simulating deterministic, and probabilistic behavior, Generating random numbers.
[3]: Chapter 5 (Sections 5.1, 5.2, and 5.3).

Weeks 13 and 14: Linear programming model: Geometric and algebraic solutions, Simplex method and its tableau format.
[3]: Chapter 7 (Sections 7.2, 7.3, and 7.4).

Week 15: Sensitivity analysis.
[3]: Chapter 7 (Section 7.5).

Essential Readings

1. Mickens, Ronald E. (2022). Mathematical Modelling with Differential Equations. CRC Press, Taylor & Francis Group.
2. Edwards, C. Henry, Penney, David E., & Calvis, David T. (2023). Differential Equations and Boundary Value Problems: Computing and Modeling (6th ed.). Pearson.
3. Giordano, Frank R., Fox, William P., & Horton, Steven B. (2014). A First Course in Mathematical Modeling (5th ed.). Brooks/Cole, Cengage Learning India Pvt. Ltd.

Note. In the practical syllabus, please refer to 3(ii) [3] Chapter 7 (Projects 7.4 and 7.5).

DSE-2(iii): Mechanics

Week 1: Fundamental laws of Newtonian mechanics, Law of parallelogram of forces; Equilibrium of a particle, Lamy's theorem.
[1]: Chapter 1 (Section 1.4).
[1]: Chapter 2 (Section 2.2).

Weeks 2 and 3: Equilibrium of a system of particles, External and internal forces, Couples, Reduction of a plane force system, Work, Principle of virtual work, Potential energy and conservative field.
[1]: Chapter 2 (Sections 2.3, and 2.4).

Weeks 4 and 5: Mass centers, Centers of gravity, Friction.
[1]: Chapter 3 (Sections 3.1, and 3.2).

Week 6: Kinematics of a particle, Motion of a particle.
[1]: Chapter 4 (Section 4.1).
[1]: Chapter 5 (Section 5.1).

Weeks 7 and 8: Motion of a system, Principle of linear momentum, Motion of mass center, Principle of angular momentum, Motion relative to mass center, Principle of energy, D'Alembert's principle; Moving frames of reference, Frames of reference with uniform translational velocity, Frames of reference with constant angular velocity.
[1]: Chapter 5 (Sections 5.2, and 5.3).

Weeks 9 and 10: Applications in plane dynamics- Motion of a projectile, Harmonic oscillators, General motion under central forces.
[1]: Chapter 6 (Sections 6.1 to 6.4).

Week 11: Planetary orbits.
[1]: Chapter 6 (Section 6.5).

Weeks 12 and 13: Shearing stress, Pressure, Perfect fluid, Pressure at a point in a fluid, Transmissibility of liquid pressure, Compression, Specific gravity.
[2]: Chapter 1.

Weeks 14 and 15: Pressure of heavy fluid- Pressure at all points in a horizontal plane, Surface of equal density; Thrust on plane surfaces.
[2]: Chapter 2

Essential Readings

1. Synge, J. L., & Griffith, B. A. (2017). Principles of Mechanics (3rd ed.). McGraw-Hill Education. Indian Reprint.
2. Ramsey, A. S. (2017). Hydrostatics. Cambridge University Press. Indian Reprint.

Teaching Plan: B.A. (Prog.) with Mathematics as Major, and B.Sc. (Physical Sc./Mathematical Sc.), Semester-4

DSC-4, and DSE-2(ii): Introduction to Graph Theory

Week 1: Graphs and their representation, Pseudographs, Subgraphs, Degree sequence, Euler's theorem.
[1]: Chapter 9 (Sections 9.1, and 9.2).

Week 2: Isomorphism of Graphs, Paths and Circuits, Connected graphs, Eulerian circuits.
[1]: Chapter 9 (Section 9.3).
[1]: Chapter 10 (Section 10.1 [Theorems 10.1.4, and 10.1.5 without proofs]).

Week 3: Hamiltonian paths cycles, Adjacency Matrix.
[1]: Chapter 10 (Sections 10.2 [Theorems 10.2.4, and 10.2.6 without proofs, exclude 10.2.3], and 10.3).

Week 4: Weighted graphs, Travelling salesman problem, Shortest path problem, Dijkstra's algorithm (without proof), Dijkstra's algorithm improved (without proof).
[1]: Chapter 10 (Section 10.4 up to 10.4.3 [applications only]).

Week 5: The Chinese postman problem; Digraphs, Bellman-Ford algorithm.
[1]: Chapter 11 (Sections 11.1, and 11.2).

Week 6: Tournaments, Directed network, Scheduling problem.
[1]: Chapter 11 (Sections 11.4, and 11.5).

Weeks 7 and 8: Trees and their properties, Spanning Trees.
[1]: Chapter 12 (Sections 12.1 [with exercise 26 on forest], and 12.2 [Theorem 12.2.3 without proof]).

Week 9 and 10: Minimum Spanning Tree Algorithms: Kruskal's algorithm, Prim's algorithm (without proofs), Acyclic digraphs and Bellman's algorithm.
[1]: Chapter 12 (Sections 12.3, and 12.4 [Proposition 12.4.5, and corollary 12.4.6 without proofs]).

Week 11: Planar graphs, Euler's formula, Kuratowski theorem.
[1]: Chapter 13 (Section 13.1).

Week 12: Graph coloring, Applications of graph coloring.
[1]: Chapter 13 (Section 13.2 [Theorem 13.2.4 without proof]).

Week 13: Circuit testing and facilities design.
[1]: Chapter 13 (Section 13.3).

Week 14 and 15: Flows and cuts, Max flow-min cut theorem, Matchings, Hall's theorem.
[1]: Chapter 14 (Sections 14.1, 14.2, and 14.4).

Essential Reading

1. Goodaire, Edgar G., & Parmenter, Michael M. (2011). Discrete Mathematics with Graph Theory (3rd ed.). Pearson Education Pvt. Ltd. Indian Reprint.

Teaching Plan: B.A. /B.Sc. (Prog.) with Mathematics, and B.Sc. (Physical Sc./Mathematical Sc.), Semester-4

Discipline A-4: Abstract Algebra

Weeks 1 and 2: Modular arithmetic; Definition and examples of groups, Elementary properties of groups.
[1]: Chapter 0 (up to page 7, and Exercises 3, 7, 9 and 11).
[1]: Chapter 2.

Weeks 3 and 4: Order of a group and order of an element of a group; Subgroups and its examples, Subgroup tests; Center of a group and centralizer of an element of a group.
[1]: Chapter 3.

Week 5: Cyclic groups and its properties, Generators of a cyclic group.
[1]: Chapter 4 (up to page 80).

Weeks 6 and 7: Group of symmetries; Permutation groups, Cyclic decomposition of permutations and its properties, Even and odd permutations and the alternating group.
[1]: Chapter 1.
[1]: Chapter 5 (Examples 1 to 9 and illustrations of Theorems 5.1 to 5.7 without proofs).

Weeks 8 and 9: Cosets and Lagrange's theorem; Definition and examples of normal subgroups, Quotient groups.
[1]: Chapter 7 (up to Corollary 5, page 143).
[1]: Chapter 9 (up to Example 11, page 178).

Week 10: Group homomorphisms and properties.
[1]: Chapter 10 (up to Example 14, page 202).

Weeks 11 to 13: Definition, examples and properties of rings, subrings, integral domains, fields, Characteristic of a ring.
[1]: Chapters 12, and 13.

Weeks 14 and 15: Ideals and factor rings; Ring homomorphisms and properties.
[1]: Chapter 14 (up to Example 9, page 251).
[1]: Chapter 15 (Definition and Examples 1 to 7, and properties of ring homomorphisms, up to Corollary 2, page 268).

Essential Reading

1. Gallian, Joseph. A. (2017). Contemporary Abstract Algebra (9th ed.). Cengage Learning India Private Limited, Delhi. Indian Reprint (2021).

Teaching Plan: B.Sc. (Physical Sc./Mathematical Sc.), Semester-4

DSE-2(i): Elements of Discrete Mathematics

Week 1: Sets, Propositions and logical operations.
[2]: Chapter 1 (Section 1.1), and Chapter 2 (Section 2.1).

Week 2: Conditional statements, Mathematical induction.
[2]: Chapter 2 (Sections 2.2, and 2.4).

Week 3: Relations and equivalence relation, Equivalence classes, Partial order relation, Partially ordered set.
[1]: Chapter 1 (Section 1.1, up to the Definition of POSET).
[2]: Chapter 4 (Sections 4.2 (up to Example 16), 4.4, and 4.5).

Weeks 4 and 5: Hasse diagrams, Chain, Maximal and minimal elements, Least and greatest elements, Least upper bound, greatest lower bound in POSETS, Zorn's lemma, Functions and bijective functions.
[1]: Chapter 1 (Sections 1.1 to 1.4).
[2]: Chapter 5 (Section 5.1).

Week 6 and 7: Functions between POSETS, Order isomorphism, Lattice as a POSET, Lattice as an algebra and their equivalence.
[1]: Chapter 1 (Sections 1.5 to 1.10, and 1.12 to 1.14).
[2]: Chapter 6 (Section 6.1).

Week 8: Bounded lattice, Sublattice, Interval in a lattice.
[1]: Chapter 1 (Sections 1.11, 1.15, and 1.16).

Week 9: Products and homomorphism of lattices, Isomorphism of lattices.
[1]: Chapter 1 (Sections 1.17 to 1.20).

Week 10: Distributive lattices, Complemented lattice, Partition and pentagonal lattice.
[1]: Chapter 1 (Sections 2.1 to 2.10).

Weeks 11 and 12: Boolean algebra, De Morgan's laws, Boolean expressions, Truth tables, Logic diagrams.
[1]: Chapter 1 (Sections 3.1 to 3.6).
[2]: Chapter 6 (Section 6.5).

Week 13: Boolean functions, Disjunctive normal forms (as join of meets), Minimal forms of Boolean polynomials.
[1]: Chapter 1 (Sections 4.13, and 4.15 to 4.17).

Week 14: Quine Mc-Cluskey method, Karnaugh maps.
[1]: Chapter 1 (Sections 6.1 to 6.5).
[2]: Chapter 6 (Section 6.6).

Week 15: Switching circuits, Applications of switching circuits.
[1]: Chapter 2 (Sections 7, and 8).

References:

1. Rudolf Lidl, & Gunter Pilz (2004). *Applied Abstract Algebra* (2nd ed.). Undergraduate text in Mathematics, Springer (SIE), Indian Reprint.
2. Bernard Kolman, Robert C. Busby, & Sharon Cutler Ross (2009). *Discrete Mathematical Structures* (6th ed.). Pearson education Inc., Indian reprint.

DSE-2(iii), and GE-4(ii) (Generic Elective): Linear Programming

Weeks 1 and 2: Standard form of the LPP, graphical method of solution, basic feasible solutions, and convexity.
[1]: Chapter 2 (Section 2.2).
[1]: Chapter 3 (Sections 3.1, 3.2, and 3.9).

Weeks 3 and 4: Introduction to the simplex method: Optimality criterion and unboundedness, Simplex tableau and examples.
[1]: Chapter 3 (Sections 3.3, 3.4, and 3.5).

Weeks 5 and 6: Artificial variables, Introduction to duality, Formulation of the dual problem with examples.
[1]: Chapter 3 (Section 3.6).
[1]: Chapter 4 (Sections 4.1, 4.2, and 4.3 [Examples 4.3.1, and 4.3.2]).

Weeks 7 to 9: Definition of transportation problem, finding initial basic feasible solution using Northwest-corner method, Least-cost method, and Vogel approximation method; Algorithm for solving transportation problems (Only minimization, balanced and non-degenerate transportation problems to be done).
[2]: Chapter 5 (Sections 5.1, and 5.3).

Weeks 10 and 11: Hungarian method of solving assignment problem.
[2]: Chapter 5 (Section 5.4).

Weeks 12 to 15: Introduction to game theory, rectangular games, Mixed strategies, Dominance principle; Formulation of game to primal and dual linear programming problems.
[1]: Chapter 9 (Sections 9.1, 9.3, 9.4, and 9.6).
[2]: Chapter 15 (Section 15.4).

Essential Readings

1. Thie, Paul R., & Keough, G. E. (2014). An Introduction to Linear Programming and Game Theory. (3rd ed.). Wiley India Pvt. Ltd.
2. Taha, Hamdy A. (2017). Operations Research: An Introduction (10th ed.). Pearson.

Teaching Plan for Generic Elective, Semester-4

GE-4(i): Elements of Real analysis

Weeks 1 and 2: Field and order properties of $\mathbb{R}$, basic properties and inequalities of the absolute value of a real number.
[1]: Chapter 1 (Sections 1.1, and 1.2).

Weeks 3 and 4: Bounded above and bounded below sets, Suprema and infima, The completeness axiom and the Archimedean property of $\mathbb{R}$.
[1]: Chapter 1 (Section 1.6 [1.6.1 to 1.6.14, Theorems 1.6.2 and 1.6.10 without proofs]).
[1]: Chapter 1 (Section 1.5 [1.5.1, 1.5.2, and 1.5.9]).

Weeks 5 and 6: Convergence of a real sequence, Algebra of limits.
[1]: Chapter 2 (Section 2.1).
[1]: Chapter 2 (Section 2.2 [2.2.1 to 2.2.14, Theorems 2.2.8, 2.2.12, and 2.2.13(d to f) without proofs]).

Week 7: The squeeze principle and applications.
[1]: Chapter 2 (Section 2.3 [2.3.1 to 2.3.14, Theorems 2.3.6, 2.3.10, and 2.3.14 without proofs]).

Weeks 8 and 9: Monotone sequences, Monotone convergence theorem and applications.
[1]: Chapter 2 (Section 2.5 [2.5.1 to 2.5.10, Theorems 2.5.5 and 2.5.7 without proofs).

Week 10: Cauchy sequences, Cauchy criterion for convergence and applications.
[1]: Chapter 2 (Section 2.7 [2.7.1 to 2.7.6, Theorem 2.7.4 without proof]).

Week 11: Convergence and divergence of infinite series of real numbers, Necessary condition for convergence, Cauchy criterion for convergence of series.
[1]: Chapter 2 (Section 8.1).

Weeks 12 to 14: Tests for convergence of positive term series, Applications of the integral test, Comparison tests, D'Alembert's ratio test, Cauchy's *n*th root test, Raabe's test.
[1]: Chapter 2 (Section 8.2 [8.2.1 to 8.2.12, 8.2.14, 8.2.15, 8.2.17, 8.2.21, and 8.2.22, with all theorems without proofs]).

Week 15: Alternating series, Leibniz alternating series test, Absolute and conditional convergence.
[1]: Chapter 2 (Section 8.3 [8.3.1 to 8.3.10, Theorems 8.3.2 and 8.3.4 without proofs]).

Essential Reading

1. Denlinger, Charles G. (2011). Elements of Real Analysis. Jones & Bartlett India Pvt. Ltd. Student Edition. Reprinted 2015.