Themen:

A&D:

* Kostenmodell
  + O-Notation
  + Komplexität, Kosten, Laufzeit
* Mathematische Grundlagen
  + Beweise per Induktion
  + Summenformeln
  + Rekurrenzen
* DP
  + Knappsack
  + Maximum Subarray Sum
  + Längste aufsteigende Teilfolge
  + Längste gemeinsame Teilfolge
  + Minimale Editierdistanz
  + Matrixkettenmultiplikation
  + Subset Sum
* Suchen in sortierten Arrays
  + Binäre Suche
  + Interpolationssuche
  + Untere Schranke
* Sortierverfahren
  + Bubblesort
  + Insertionsort
  + Selectionsort
  + Heapsort
  + Mergesort
    - Rekursiv
    - Rein
    - Natürlich
  + Quicksort
* Datenstruktur
  + Selbstanordnung
  + Natürliche Suchbäume
  + AVL-Bäume
* Graphen
  + Datenstrukturen
  + BFS
  + DFS
  + Zusammenhangskomponente
  + Topologische Sortierung
  + Kürzeste Wege
    - Dijkstra
    - Bellman-Ford
    - Jonson
    - etc

Eprog:

Linalg:

Diskmath:

* Mathematical Statements
  + Concept
  + Composition
* Concept of Proof
  + Informal Understanding of Proof Concept
  + Logical Constants, Operators, Formulas
  + Logical Consequence
  + Lifting Equivalences and Consequences to Formulas
  + Tautologies and Satisfiability
* Predicate Logic
  + Predicates
  + Functions
  + Quantifiers
  + Nested Quantifiers
  + Interpretation of Formulas
  + Equivalence
* Logical Formulas vs Mathematical Statements
* Proof pattern
* Pigeonhole Principle
* Sets, Operations on Sets
  + Set Description
  + Set Equality
  + Subsets
  + Empty Set
  + Cartesian Product of Sets
* Relations
  + Concept
  + Set Operations on Relations
    - Inverse of Relation
    - Composition of Relation
    - Special Properties
  + Partial Order Relations
  + Combinations of Posets and the Lexicographic Order
  + Special Elements in Posets
  + Meet Join Lattices
* Countable and Uncountable Sets
  + Finite / Countably Infinite
* Number Theory
  + Divisors / Division
  + Division with Remainders
  + Greatest Common Divisors
  + Least Common Multiples
* Factorization into Primes
  + Modular Arithmetic
  + Multiplicative Inverses
  + Chinese Remainder Theorem
  + Diffie-Hellman Key-Agreement
* Algebra
  + Algebraic Structures
  + Monoids and Groups
  + Neutral Elements
  + Associativity and Monoids
  + Inverses and Groups
* Structure of Groups
  + Direct Products of Groups
  + Group Homomorphisms
  + Subgroups
  + The Order of Group Elements and of a Group
  + Cyclic Groups
  + Diffie Hellman for General Groups
  + Eulers Function
  + RSA Public – Key Encryption
  + E-th Roots in a Group
* Rings and Fields
  + Divisors
  + Units and the Multiplicative Group of a Ring
  + Zerodivisors and Integral Domains
  + Polynomial Rings
  + Fields
  + Polynomials over a Field
  + Factorization and Irreducible Polynomials
  + Division Property in F[x]
  + Polynomials as Functions
    - Roots
    - Polynomial Interpolation
  + Finite Fields
  + Error – Correcting Codes
* Logic
  + Proof System
  + Syntax, Semantics, Interpretation, Model
  + Satisfiability, Tautology, Consequence, Equivalence
  + Logical Operators and, or, negation
  + Logical Consequence vs. Unsatisfiability
* Logical Calculi
  + Hilbert-Style Calculi
  + Derivations from Assumptions
  + Propositional Logic
    - Syntax
    - Semantics
  + Normal Forms
* Resolution Calculus for Propositional Logic
* Predicate Logic (First-order Logic)
* Free Variables and Variable Substitution
* Substitution of Bound Variables
* Universal Instantiation