1. [normalization](http://www.ict.griffith.edu.au/normalization_tools/normalization/ind.php)
2. Data description models - [lecture1, p10](https://moodle.cs.ubbcluj.ro/pluginfile.php/32094/mod_resource/content/1/DB_CSEn_lecture1.pdf#page=10)
3. Structure of a DB (ANSI-SPARC) - [l1, p24](https://moodle.cs.ubbcluj.ro/pluginfile.php/32094/mod_resource/content/1/DB_CSEn_lecture1.pdf#page=24)
4. Data independence - [l1, p30](https://moodle.cs.ubbcluj.ro/pluginfile.php/32094/mod_resource/content/1/DB_CSEn_lecture1.pdf#page=30)
5. Advantages of using DBMS - [l1, p38](https://moodle.cs.ubbcluj.ro/pluginfile.php/32094/mod_resource/content/1/DB_CSEn_lecture1.pdf#page=38)
6. ER model / diagram, degree of a relationship set - [seminar1, p1](https://moodle.cs.ubbcluj.ro/pluginfile.php/29103/mod_resource/content/1/DB_CSEn_seminar1.pdf)
7. Basic SQL commands + examples - [s1, p4;](https://moodle.cs.ubbcluj.ro/pluginfile.php/29103/mod_resource/content/1/DB_CSEn_seminar1.pdf#page=4) [l2, p32](https://moodle.cs.ubbcluj.ro/pluginfile.php/32095/mod_resource/content/1/DB_CSEn_lecture2.pdf#page=32)
8. Integrity constraints - [l2, p12](https://moodle.cs.ubbcluj.ro/pluginfile.php/32095/mod_resource/content/1/DB_CSEn_lecture2.pdf#page=12)
   1. Foreign key - [l2, p18](https://moodle.cs.ubbcluj.ro/pluginfile.php/32095/mod_resource/content/1/DB_CSEn_lecture2.pdf#page=18)
9. ALTER TABLE - [l3, p2](https://moodle.cs.ubbcluj.ro/pluginfile.php/29657/mod_resource/content/1/DB_CSEn_lecture3.pdf#page=2)
10. Filter conditions - [l3, p8](https://moodle.cs.ubbcluj.ro/pluginfile.php/29657/mod_resource/content/1/DB_CSEn_lecture3.pdf#page=8)
11. **3-valued logic table** - [l3, p10](https://moodle.cs.ubbcluj.ro/pluginfile.php/29657/mod_resource/content/1/DB_CSEn_lecture3.pdf#page=10)
12. Queries - [l3, p12](https://moodle.cs.ubbcluj.ro/pluginfile.php/29657/mod_resource/content/1/DB_CSEn_lecture3.pdf#page=12); [s2, p1](https://moodle.cs.ubbcluj.ro/pluginfile.php/29865/mod_resource/content/1/DB_CSEn_seminar2.pdf)
    1. Expressions in SELECT - [l3, p26](https://moodle.cs.ubbcluj.ro/pluginfile.php/29657/mod_resource/content/1/DB_CSEn_lecture3.pdf#page=26)
    2. Nested queries - [l3, p27](https://moodle.cs.ubbcluj.ro/pluginfile.php/29657/mod_resource/content/1/DB_CSEn_lecture3.pdf#page=27); [s2, p2](https://moodle.cs.ubbcluj.ro/pluginfile.php/29865/mod_resource/content/1/DB_CSEn_seminar2.pdf#page=2)
    3. Group by,Having - [l3, p46](https://moodle.cs.ubbcluj.ro/pluginfile.php/29657/mod_resource/content/1/DB_CSEn_lecture3.pdf#page=46)
    4. Order by,Top - [l4,p5](https://moodle.cs.ubbcluj.ro/pluginfile.php/30451/mod_resource/content/1/DB_CSEn_lecture4.pdf#page=5)
13. Join - [l3, p38](https://moodle.cs.ubbcluj.ro/pluginfile.php/29657/mod_resource/content/1/DB_CSEn_lecture3.pdf#page=38); [s2, p3](https://moodle.cs.ubbcluj.ro/pluginfile.php/29865/mod_resource/content/1/DB_CSEn_seminar2.pdf#page=3)
14. Functional dependency - [l4, p34](https://moodle.cs.ubbcluj.ro/pluginfile.php/30451/mod_resource/content/1/DB_CSEn_lecture4.pdf#page=34)
    1. Properties - [l5, p3](https://moodle.cs.ubbcluj.ro/pluginfile.php/30452/mod_resource/content/1/DB_CSEn_lecture5.pdf#page=3)
15. 2NF - [l5, p4](https://moodle.cs.ubbcluj.ro/pluginfile.php/30452/mod_resource/content/1/DB_CSEn_lecture5.pdf#page=4)
16. 3NF - [l5, p8](https://moodle.cs.ubbcluj.ro/pluginfile.php/30452/mod_resource/content/1/DB_CSEn_lecture5.pdf#page=8)
17. BCNF - [l5, p12](https://moodle.cs.ubbcluj.ro/pluginfile.php/30452/mod_resource/content/1/DB_CSEn_lecture5.pdf#page=12)
18. 4NF - [l6, p13](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=13)
19. 5NF - [l6, p21](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=21)
20. Armstrong’s axioms + derived rules - [l5, p15](https://moodle.cs.ubbcluj.ro/pluginfile.php/30452/mod_resource/content/1/DB_CSEn_lecture5.pdf#page=15)
21. Stored procedures - [s3, p1](https://moodle.cs.ubbcluj.ro/pluginfile.php/30615/mod_resource/content/1/DB_CSEn_seminar3.pdf)
22. Global variables - [s3, p2](https://moodle.cs.ubbcluj.ro/pluginfile.php/30615/mod_resource/content/1/DB_CSEn_seminar3.pdf#page=2)
23. Dynamic execution, cursors - [s3, p3](https://moodle.cs.ubbcluj.ro/pluginfile.php/30615/mod_resource/content/1/DB_CSEn_seminar3.pdf#page=3)
24. Minimal cover - [l6, p4](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=4)
25. Multivalued dependency - [l6, p9](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=9)
26. Join dependency - [l6, p21](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=21)
27. Algebra operators
    1. Select - [l6, p27](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=27)
    2. Projection - [l6, p28](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=28)
    3. Cross-product - [l6, p29](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=29)
    4. Union, set diff, intersection - [l6, p30](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=30)
    5. Condition join - [l6, p31](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=31)
    6. Natural join - [l6, p32](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=32)
    7. Left outer join - [l6, p33](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=33)
    8. Right outer join - [l6, p34](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=34)
    9. Full outer join - [l6, p35](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=35)
    10. Left semi join - [l6, p36](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=36)
    11. Right semi join - [l6, p37](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=37)
    12. Division - [l6, p38](https://moodle.cs.ubbcluj.ro/pluginfile.php/30759/mod_resource/content/1/DB_CSEn_lecture6.pdf#page=38)
    13. Renaming operator - [l7, p2](https://moodle.cs.ubbcluj.ro/pluginfile.php/31115/mod_resource/content/1/DB_CSEn_lecture7.pdf#page=2)
    14. Assignment, eliminate duplicates, sort, group by - [l7, p6](https://moodle.cs.ubbcluj.ro/pluginfile.php/31115/mod_resource/content/1/DB_CSEn_lecture7.pdf#page=6)
28. Examples of queries in algebra / sql form - [l7, p7](https://moodle.cs.ubbcluj.ro/pluginfile.php/31115/mod_resource/content/1/DB_CSEn_lecture7.pdf#page=7); [l11, p8](https://moodle.cs.ubbcluj.ro/pluginfile.php/31954/mod_resource/content/1/DB_CSEn_lecture11.pdf#page=8)
29. User-defined functions - [s4, p1](https://moodle.cs.ubbcluj.ro/pluginfile.php/31360/mod_resource/content/1/DB_CSEn_seminar4.pdf)
30. Views, system catalog - [s4, p2](https://moodle.cs.ubbcluj.ro/pluginfile.php/31360/mod_resource/content/1/DB_CSEn_seminar4.pdf#page=2)
31. Triggers - [s4, p3](https://moodle.cs.ubbcluj.ro/pluginfile.php/31360/mod_resource/content/1/DB_CSEn_seminar4.pdf#page=3)
32. Change data capture - [s4, p4](https://moodle.cs.ubbcluj.ro/pluginfile.php/31360/mod_resource/content/1/DB_CSEn_seminar4.pdf#page=4)
33. Merge statement - [s4, p5](https://moodle.cs.ubbcluj.ro/pluginfile.php/31360/mod_resource/content/1/DB_CSEn_seminar4.pdf#page=5)
34. Memory hierarchy - [l8, p3](https://moodle.cs.ubbcluj.ro/pluginfile.php/31399/mod_resource/content/1/DB_CSEn_lecture8.pdf#page=3)
35. Magnetic disks - [l8, p5](https://moodle.cs.ubbcluj.ro/pluginfile.php/31399/mod_resource/content/1/DB_CSEn_lecture8.pdf#page=5)
36. Disk space manager - [l8, p13](https://moodle.cs.ubbcluj.ro/pluginfile.php/31399/mod_resource/content/1/DB_CSEn_lecture8.pdf#page=13)
37. Buffer manager - [l8, p15](https://moodle.cs.ubbcluj.ro/pluginfile.php/31399/mod_resource/content/1/DB_CSEn_lecture8.pdf#page=15)
38. Heap files - [l8, p26](https://moodle.cs.ubbcluj.ro/pluginfile.php/31399/mod_resource/content/1/DB_CSEn_lecture8.pdf#page=26)
39. Record formats - [l8, p31](https://moodle.cs.ubbcluj.ro/pluginfile.php/31399/mod_resource/content/1/DB_CSEn_lecture8.pdf#page=31)
40. Page formats - [l8, p34](https://moodle.cs.ubbcluj.ro/pluginfile.php/31399/mod_resource/content/1/DB_CSEn_lecture8.pdf#page=34)
41. Index - [l8, p40](https://moodle.cs.ubbcluj.ro/pluginfile.php/31399/mod_resource/content/1/DB_CSEn_lecture8.pdf#page=40); [s5, p2](https://moodle.cs.ubbcluj.ro/pluginfile.php/31695/mod_resource/content/1/DB_CSEn_seminar5.pdf#page=2)
    1. Data entry - [l8, p45](https://moodle.cs.ubbcluj.ro/pluginfile.php/31399/mod_resource/content/1/DB_CSEn_lecture8.pdf#page=45); [l9, p2](https://moodle.cs.ubbcluj.ro/pluginfile.php/31584/mod_resource/content/1/DB_CSEn_Lecture9.pdf#page=2)
    2. Clustered / unclustered index - [l9, p5](https://moodle.cs.ubbcluj.ro/pluginfile.php/31584/mod_resource/content/1/DB_CSEn_Lecture9.pdf#page=5); [s5,p5](https://moodle.cs.ubbcluj.ro/pluginfile.php/31695/mod_resource/content/1/DB_CSEn_seminar5.pdf#page=5)
    3. Design + guidelines - [s5, p14](https://moodle.cs.ubbcluj.ro/pluginfile.php/31695/mod_resource/content/1/DB_CSEn_seminar5.pdf#page=14); [s7, p5](https://moodle.cs.ubbcluj.ro/pluginfile.php/32460/mod_resource/content/1/DB_CSEn_seminar7.pdf#page=5)
42. Indexed Sequential Access Method (ISAM) - [l9, p11](https://moodle.cs.ubbcluj.ro/pluginfile.php/31584/mod_resource/content/1/DB_CSEn_Lecture9.pdf#page=11)
43. 2-3 tree - [l9, p20](https://moodle.cs.ubbcluj.ro/pluginfile.php/31584/mod_resource/content/1/DB_CSEn_Lecture9.pdf#page=20)
    1. Add new value - [l9, p24](https://moodle.cs.ubbcluj.ro/pluginfile.php/31584/mod_resource/content/1/DB_CSEn_Lecture9.pdf#page=24)
    2. Delete - [l9, p26](https://moodle.cs.ubbcluj.ro/pluginfile.php/31584/mod_resource/content/1/DB_CSEn_Lecture9.pdf#page=26)
44. B-tree - [l9, p31](https://moodle.cs.ubbcluj.ro/pluginfile.php/31584/mod_resource/content/1/DB_CSEn_Lecture9.pdf#page=31)
    1. Add new value - [l9, p35](https://moodle.cs.ubbcluj.ro/pluginfile.php/31584/mod_resource/content/1/DB_CSEn_Lecture9.pdf#page=35); [here](https://webdocs.cs.ualberta.ca/~holte/T26/ins-b-tree.html)
    2. Delete - [l9, p41](https://moodle.cs.ubbcluj.ro/pluginfile.php/31584/mod_resource/content/1/DB_CSEn_Lecture9.pdf#page=41)
    3. Max number of required levels - [l9, p45](https://moodle.cs.ubbcluj.ro/pluginfile.php/31584/mod_resource/content/1/DB_CSEn_Lecture9.pdf#page=45)
45. B+ tree - [l10, p3](https://moodle.cs.ubbcluj.ro/pluginfile.php/31706/mod_resource/content/1/DB_CSEn_Lecture10.pdf#page=3)
46. Hash-based indexing - [l10, p11](https://moodle.cs.ubbcluj.ro/pluginfile.php/31706/mod_resource/content/1/DB_CSEn_Lecture10.pdf#page=11)
    1. Static hashing - [l10, p13](https://moodle.cs.ubbcluj.ro/pluginfile.php/31706/mod_resource/content/1/DB_CSEn_Lecture10.pdf#page=13)
    2. Extendible hashing - [l10, l21](https://moodle.cs.ubbcluj.ro/pluginfile.php/31706/mod_resource/content/1/DB_CSEn_Lecture10.pdf#page=21)
       1. Insert - [l10, p23](https://moodle.cs.ubbcluj.ro/pluginfile.php/31706/mod_resource/content/1/DB_CSEn_Lecture10.pdf#page=23)
       2. Search + delete - [l10, p29](https://moodle.cs.ubbcluj.ro/pluginfile.php/31706/mod_resource/content/1/DB_CSEn_Lecture10.pdf#page=29)
47. Table scan, index seek, index scan - [l11, p14](https://moodle.cs.ubbcluj.ro/pluginfile.php/31954/mod_resource/content/1/DB_CSEn_lecture11.pdf#page=14)
48. Cross join - [l11, p18](https://moodle.cs.ubbcluj.ro/pluginfile.php/31954/mod_resource/content/1/DB_CSEn_lecture11.pdf#page=18)
49. (indexed) nested loops join - [l11, p21-22](https://moodle.cs.ubbcluj.ro/pluginfile.php/31954/mod_resource/content/1/DB_CSEn_lecture11.pdf#page=21)
50. Merge join - [l11, p23](https://moodle.cs.ubbcluj.ro/pluginfile.php/31954/mod_resource/content/1/DB_CSEn_lecture11.pdf#page=23)
51. Hash join - [l11, p25](https://moodle.cs.ubbcluj.ro/pluginfile.php/31954/mod_resource/content/1/DB_CSEn_lecture11.pdf#page=25)
52. Hatz john - [l4, p20](https://www.youtube.com/watch?v=9knuPR-ITvY)
53. Algebra equivalences - [l11, p29](https://moodle.cs.ubbcluj.ro/pluginfile.php/31954/mod_resource/content/1/DB_CSEn_lecture11.pdf#page=29)
54. Query to optimised algebra + execution plan + evaluation tree - [l11, p33](https://moodle.cs.ubbcluj.ro/pluginfile.php/31954/mod_resource/content/1/DB_CSEn_lecture11.pdf#page=33)
55. DB design stages - [l13, p2](https://moodle.cs.ubbcluj.ro/pluginfile.php/32469/mod_resource/content/1/DB_CSEn_lecture13.pdf#page=2)
56. UML class diagram - [l13, p4](https://moodle.cs.ubbcluj.ro/pluginfile.php/32469/mod_resource/content/1/DB_CSEn_lecture13.pdf#page=4)
    1. Mapping simple associations - [l13, p11](https://moodle.cs.ubbcluj.ro/pluginfile.php/32469/mod_resource/content/1/DB_CSEn_lecture13.pdf#page=11)
    2. Mapping inheritance - [l13, p18](https://moodle.cs.ubbcluj.ro/pluginfile.php/32469/mod_resource/content/1/DB_CSEn_lecture13.pdf#page=18)
57. Indexed views - [s7, p4](https://moodle.cs.ubbcluj.ro/pluginfile.php/32460/mod_resource/content/1/DB_CSEn_seminar7.pdf#page=4)
58. Fragmentation - [s7, p6](https://moodle.cs.ubbcluj.ro/pluginfile.php/32460/mod_resource/content/1/DB_CSEn_seminar7.pdf#page=6)
59. Control-of-flow
    1. Return - [s7, p15](https://moodle.cs.ubbcluj.ro/pluginfile.php/32460/mod_resource/content/1/DB_CSEn_seminar7.pdf#page=15)
    2. While, break, continue - [s7, p17](https://moodle.cs.ubbcluj.ro/pluginfile.php/32460/mod_resource/content/1/DB_CSEn_seminar7.pdf#page=17)
    3. GOTO - [s7, p18](https://moodle.cs.ubbcluj.ro/pluginfile.php/32460/mod_resource/content/1/DB_CSEn_seminar7.pdf#page=18)
    4. Waitfor - [s7, p19](https://moodle.cs.ubbcluj.ro/pluginfile.php/32460/mod_resource/content/1/DB_CSEn_seminar7.pdf#page=19)
    5. Throw - [s7, p20](https://moodle.cs.ubbcluj.ro/pluginfile.php/32460/mod_resource/content/1/DB_CSEn_seminar7.pdf#page=20)
    6. try/catch - [s7, p22](https://moodle.cs.ubbcluj.ro/pluginfile.php/32460/mod_resource/content/1/DB_CSEn_seminar7.pdf#page=22)
60. Data streams - [l14, p4](https://moodle.cs.ubbcluj.ro/pluginfile.php/32461/mod_resource/content/1/DB_CSEn_lecture14.pdf#page=4)
61. Window-based processing model - [l14, p9](https://moodle.cs.ubbcluj.ro/pluginfile.php/32461/mod_resource/content/1/DB_CSEn_lecture14.pdf#page=9)
62. Continuous query - [l14, p12](https://moodle.cs.ubbcluj.ro/pluginfile.php/32461/mod_resource/content/1/DB_CSEn_lecture14.pdf#page=12)
63. Data stream management systems - [l14, p15](https://moodle.cs.ubbcluj.ro/pluginfile.php/32461/mod_resource/content/1/DB_CSEn_lecture14.pdf#page=15)
64. STREAM (stream data manager) - [l14, p19](https://moodle.cs.ubbcluj.ro/pluginfile.php/32461/mod_resource/content/1/DB_CSEn_lecture14.pdf#page=19)
    1. Legit profa a zis ca asta se face la master, dacă ne da nouă asta la examen e [hatz johnule](https://www.biblica.com/bible/) [citesc Biblia si plang](https://www.youtube.com/watch?v=GqZRbUrdLqY)