Preliminary weekly plan
"sol.publ" = solution in "Hints & solutions…" on home page;
"hint.publ." = hints in - " -
The list of problems for each exercise is indicative. Not all problems will be worked; there will also be additions.

Week 36
Lecture 1   Mon 3 Sep   13-15   D34
Introduction, function spaces, Poisson 1D, boundary conditions, weak formulation, Galerkin method, piecewise polynomials 1D (CDE (1-4),5-6;8.1)

Lecture 2   Wed 5 Sep   8-10   D31
Poisson 2D, FEM mesh, piecewise polynomials 2D, (CDE 5.5;13;14.1-2,4;15.1)

Exercise 1   Fri 7 Sep   8-10   D31
Variational form of DE, Galerkin method, boundary conditions, corresponding system of equations:
Problems for Ex 1 and Ex 2:
4.21p73:   sol. publ.;
6.2p108: matrix singular for some λ;
8,9,10,11p119: sol. published; compute matrix & vector;
14p123:   DE->Var;
8.6,7p183: sol.publ.; compute matrix & vector; 8.7- depends on c.;
9,10p184: sol.publ.; many other solutions possible, show some;
13.30p310: hint.publ.; Green I & II from Gauss.
15.14p356: DE <= >Var - cont. second derivatives of u?;
16p357-trivial; 44p385-matrix/Robin cond.;
(**4**.22,24,25; **6**.12)

Week 37
Lecture 3   Mon 10 Sep   13-15   D34
Interpolation, piecewise polynomials, error estimation, adaptivity (CDE 5,8,14,15)

Exercise 2   Tue 11 Sep   8-10   E32
Problems: see E1, and
21.*a*(.,.) & *L*: 1p513-hint.publ.,

Lecture 4   Wed 12 Sep   15-17   D31
FEM algorithms and software; assembly, mapping, quadrature, implementation in Puffin (CDE 14;15.1)

Exercise 3   Thu 13 Sep   15-17   E31
Interpolation, error estimation:
Problems:
5. poly.interp: 8p79-sol.publ.,trivial; 9p81-hint publ., cf. num.anal. book; 13,14p83-hint publ.;
17p84- notation in publ.sol.?;
piecew.poly.:23p88-hint publ.; 24p90-trivial;
8.11p186-matrix again; 12p188-matrix w Robin cond.; 16p189-matrix w quadrature;
Error estimates: 17p190-sol.publ.; 18p191-sol.publ.; 20p193-sol.publ.; 21,23p194;
Beam eq'n: 37,40,41p203 - a big problem;
14.9p329-sol.publ. trivial;

Lab 1   Fri 14 Sep   8-10   4V4Gul, 4V6Bru
Project A

Week 38
Lecture 5　　　Mon 17 Sep　　13-15　D34
IVP, Heat equation, Wave equation, Stability, theta-method, space-time FEM
(CDE 9,10,16,17)

Exercise 4　　　Wed 19 Sep　　15-17　D31
Stability, IVP, etc.
Problems:
9. ODEscalar.math: 4p207;5,7p208; cGal:11,14p212; dGal:15,16p214;43p234;
10. ODEsyst.estimates: 18,21p257; 24(a)p259; 27,28p260; dGal:30p262;
16.14p405,15p406,cGdG:18p407;
17. Wave energy: 19,20p434, radial: 21p435, energy: 27p438;
(**9**.23,24,25,40,41,42; **16**.19,20; **17**.37(a))

Lecture 6　　　Thu 20 Sep　　15-17　E53
Abstract problem, Lax-Milgram Theorem (CDE 7,8,21)

Lab 2　　　　　Fri 21 Sep　　　8-10　4V2Rod, 4V3Ora
Project A

Week 39
Lecture 7　　　Mon 24 Sep　　13-15　D34
Adaptivity, error estimation, a priori, a posteriori, duality

Exercise 5　　　Wed 26 Sep　　15-17　D31
Abstract problem, Lax-Milgram Theorem; Error estimation, a priori, a posteriori, duality:
Problems:
8. $a\&a^{-1}$: 17p190;
9. ODEestimate:10p210;
21. LaxM: 9p520-sol.publ.,12,13p521-sol.publ.
+ extra.

Lab 3　　　　　Thu 27 Sep　　15-17　4V2Rod, 4V3Ora
Project A

Deadline　　　Fri 28 Sep　　　17.00
Report ProjA + HWA

Week 40
Lecture 8　　　Mon 1 Oct　　　13-15　E51
Space-time FEM, transport, Convection-Diffusion, stabilization (CDE 18,19)*;*
Problem **18**.6

Exercise 6　　　Wed 3 Oct　　　15-17　Q26-07
Error estimation, a priori, a posteriori, duality, stabilization:
Problems:
18. Convection: 1p453-trivial, 3,4p458(also $\beta = (-x_2, x_1)$), Sd: 7p463, Sd stab.est.: 9p466;
Green'sf.: 12p470;
19. Characteristics: 1p479-trivial, Lagrange: 2p480,4p481

Lab 4　　　　　Thu 4 Oct　　　15-17　4V4Gul, 4V6Bru
Project B

Week 41

Lecture 9 Mon 8 Oct 13-15 D31
Navier-Stokes, adaptivity, overview/review

Lab 5   Tue 9 Oct 15-17 4V2Rod, 4V3Ora
Project B

Exercise 7 Wed 10 Oct 15-17 E32
Repetition, preparation for written exam.
Problems: Leftovers, extra problems, old exams

Lab 6   Thu 11 Oct 13-15 4V2Rod, 4V3Ora
Project B

Deadline Fri 19 Oct 17.00
Report ProjB + HWB

Week 42

Written exam Thu 25 Oct 14-19 M31. M32