



COURSE: NUMERICAL METHODS IN BIOMEDICINE		
DEGREE: BIOMEDICAL ENGINEERING	YEAR: 2	TERM: 2

WEEKLY PLANNING								
WEEK	SESSI ON	DESCRIPTION	GROUPS (mark X)		Special room for session ?	WEEKLY PROGRAM FOR STUDENT		
			LECTU RES	SEMI NARS		DETAILED DESCRIPTION	CLASS HOURS	HOMEWORK HOURS (Max. 7h week)
1	1	Chap. I: Numerical Math, 1	X			Introduction: errors. References: Notes 1, DCM 3.5.3.	1,66	6,5
1	2	Practice 1		X	C	Review of Matlab. Practice 1. R: DCM Examples 3.5, 3.7. DCM App.A.	1,66	
2	3	Chap. I: Numerical Math, 2	X			Machine numbers. Taylor polynomials. R: Notes 1, 3.2. DCM page 76.	1,66	6,5
2	4	Problems		X	C	Problems chapter 1. R: DCM 3 numerical examples.	1,66	
3	5	Chap. II: Rootfinding	X			Methods to solve nonlinear equations. R: Notes 2.1-2.4, 2.6. QSS 6.1. DCM 5.7.	1,66	6,5
3	6	Problems		X	C	Problems chapter 2. R: DCM 5 numerical examples. HH 8.1.	1,66	
4	7	Chap. III: Unc. optimization, 1	X			Convexity. Steepest descent. R: NSA. BC 3.1-3.5.	1,66	6,5
4	8	Problems		X	C	Problems chapter 3. R: HH 8.2-8.4.	1,66	
5	9	Chap. III: Unc. optimization, 2	X			Conjugate gradient. Newton's methods. R: NSA. BC 3.6-3.7.	1,66	6,5
5	10	Practice 2		X	C	Practice 2. R: FJNT 3, 4, algorithms.	1,66	
6	11	Chap. III: Unc. optimization, 3	X			Quasi-Newton meth. Line search. R: NSA. BC 3.8-3.9.	1,66	6,5
6	12	Problems		X	C	Problems chapter 3. R: FJNT 3, 5, algorithms.	1,66	
7	13	Chap. IV: Finite differences, 1	X			Interpolation. R: Notes 3.3. DCM 6.3-6.7.	1,66	6,5

7	14	Problems		X	C	Problems chapter 4.	R: DCM 6.7 numerical examples.	1,66	
8	15	Chap. IV: Finite differences, 2	X			Splines. Numerical differentiation.	R: Notes 3.4, 4.5. DCM 6.8.	1,66	
8	16	Problems		X	C	Problems chapter 4.	R: QSS 8.6.1 numerical examples.	1,66	6,5
9	17	Chap. IV: Finite differences, 3	X			Numerical integration. Extrapolation.	R: Notes 4.3-4.4. DCM 6.9, 6.10.	1,66	
9	18	Problems		X	C	Problems chapter 4.	R: QSS 9.2-9.6 programs.	1,66	6,5
10	19	Chap. V: ODEs, 1	X			Partial exam. ODEs: Forward Euler method.	R: Notes 5. DCM 7.2-7.4.1.	1,66	
10	20	Problems		X	C	Problems chapter 5. Plotting stability regions.	R: DCM 7 numerical examples.	1,66	6,5
11	21	Chap. V: ODEs, 2	X			Implicit methods. Multistep methods.	R: NSA. DCM 7.4.1, 7.4.3.	1,66	
11	22	Practice 3		X	C	Practice 3. Plotting stability regions.	R: DCM 7 numerical examples.	1,66	6,5
12	23	Chap. V: ODEs, 3	X			Runge-Kutta methods.	R: DCM 7.4.2.	1,66	
12	24	Problems		X	C	Problems chapter 5.	R: QSS 11.7 program.	1,66	6,5
13	25	Chap. V: ODEs, 4	X			Stability and stiff problems.	R: DCM 7.6, 7.7, App. E.1-E.3, E.6.	1,66	
13	26	Problems		X	C	Problems chapters 5.	R: DCM 7 numerical examples.	1,66	6,5
14	27	Chap. VI: Approximation Theory	X			Least squares and Fast Fourier Transform.	R: QSS 10.7-10.9.	1,66	6,5
14	28	Problems		X	C	Problems chapter 6.	R: QSS 10.9 programs.	1,66	
Subtotal 1								46,5	91
Total 1 (Hours of class plus student homework hours between weeks 1-14)								137,5	
15						Tutorials, handing in, etc		2	
16								3	7,5
17									
18						Assessment			
Subtotal 2								5	7,5
Total 2 (Hours of class plus student homework hours between weeks 15-18)								12,5	
TOTAL (T1 + T2)						150			