

Exam demands for the course Control Engineering WB2207

The depth of knowledge required for each course item ranges from overview knowledge to full detailed knowledge as follows:

Overview (O):	Gives the background for the theory or extra information.
Facts (F):	You must know and understand concepts, notations, definitions, schemes, methods.
Working Knowledge (W):	You must be able to apply definitions, formulas and theorems to given problems of the same kind as in the, book, lectures and exercises.
Derivation (D):	Know and be able to derive formulas.

1 An Overview and Brief History of Feedback Control

1.1 A Simple Feedback System	F
1.2 A First Analysis of Feedback	F, W
1.3 A Brief History	O
1.4 An Overview of the Book	O

2 Dynamic Models

2.1 Dynamics of Mechanical Systems	W
2.2 Models of Electric Circuits	W
2.3 Models of Electromechanical Systems	W
2.4 Heat- and Fluid-Flow Models	W
2.5 Complex Mechanical Systems	W

3 Dynamic Response

3.1 Review of Laplace Transforms	W
3.2 System Modeling Diagrams	W
3.3 Effect of Pole Locations	D
3.4 Time-Domain Specifications	W
3.5 Effects of Zeros and Additional Poles	D
3.6 Amplitude and Time Scaling	O
3.7 Stability	W
3.8 Obtaining Models from Experimental Data	F
3.9 Mason's Rule and the Signal-Flow Graph	O

4 Basic Properties of Feedback

4.1 The Basic Equations of Control	W
4.2 Control of Steady-State Error: System Type	W
4.3 Control of Dynamic Error: PID Control	W
4.4 Extensions to the Basic Feedback Concepts	O

5 The Root-Locus Design Method

5.1 Root Locus of a Basic Feedback System	D
5.2 Guidelines for Sketching a Root Locus	W
5.3 Selected Illustrative Root Loci	W
5.4 Selecting the Parameter Value	W
5.5 Design Using Dynamic Compensation	W
5.6 A Design Example Using the Root Locus	W
5.7 Extensions of the Root-Locus Method	O

6 The Frequency-Response Design Method

6.1 Frequency Response	F, W
6.2 Neutral Stability	D
6.3 The Nyquist Stability Criterion	W
6.4 Stability Margins	F, W
6.5 Bode's Gain-Phase Relationship	O
6.6 Closed-Loop Frequency Response	D
6.7 Compensation	W
6.8 Alternate Presentations of Data	O
6.9 Specifications in Terms of the Sensitivity Function	W
6.10 Time Delay	W

7 State-Space Design

7.1 Advantages of State Space	F
7.2 System Description in State Space	D
7.3 Block Diagrams and State Space	W
7.4 Analysis of the State Equations	W
7.5 Control-Law Design for Full-State Feedback	W
7.6.1 Selection of Pole Locations for Good Design	W

Let op: De hoofdstukken 1 t/m 4 worden geacht bekend te zijn na het eerste jaars vak Regeltechniek 1. Dit houdt echter niet in dat de stof niet terug kan komen in de examenvragen van dit vak!