University Electrical Engineering Syllabus Checklist ·

Tick one box per statement: ☐ not yet ☐ nearly ☐ confident. / /

1. Circuit Analysis I (DC) I ( )

1.1 Quantities, units and measurement 、

☐☐☐ Quantities, units and measurement

1.2 Ohm's law and Kirchhoff's laws

☐☐☐ Ohm's law and Kirchhoff's laws

1.3 Nodal and mesh analysis

☐☐☐ Nodal and mesh analysis

1.4 Source transformations and network theorems

☐☐☐ Source transformations and network theorems

1.5 Ideal operational amplifiers

☐☐☐ Ideal operational amplifiers

1.6 Capacitors, inductors and energy 、

☐☐☐ Capacitors, inductors and energy

1.7 First-order RC and RL response RC RL

☐☐☐ First-order RC and RL response

2. Mathematical Methods for EE

2.1 Calculus review for signals

☐☐☐ Calculus review for signals

2.2 Complex numbers and phasor algebra

☐☐☐ Complex numbers and phasor algebra

2.3 Linear algebra essentials

☐☐☐ Linear algebra essentials

2.4 Ordinary differential equations

☐☐☐ Ordinary differential equations

2.5 Laplace transforms

☐☐☐ Laplace transforms

2.6 Fourier series

☐☐☐ Fourier series

2.7 Probability and random variables

☐☐☐ Probability and random variables

2.8 Vector calculus

☐☐☐ Vector calculus

3. Digital Logic Design

3.1 Number representations and codes

☐☐☐ Number representations and codes

3.2 Boolean algebra and Karnaugh maps

☐☐☐ Boolean algebra and Karnaugh maps

3.3 Combinational building blocks

☐☐☐ Combinational building blocks

3.4 Latches and flip-flops

☐☐☐ Latches and flip-flops

3.5 Finite state machines

☐☐☐ Finite state machines

3.6 Registers, counters and memory 、

☐☐☐ Registers, counters and memory

3.7 HDL and verification basics

☐☐☐ HDL and verification basics

4. Circuit Analysis II (AC) II ( )

4.1 Sinusoidal steady state and phasors

☐☐☐ Sinusoidal steady state and phasors

4.2 AC power and three-phase

☐☐☐ AC power and three-phase

4.3 Second-order RLC circuits RLC

☐☐☐ Second-order RLC circuits

4.4 Resonance

□□□ Resonance

4.5 Filters and Bode plots

□□□ Filters and Bode plots

4.6 Laplace circuit analysis

□□□ Laplace circuit analysis

4.7 Two-port networks

□□□ Two-port networks

5. Electronics I I

5.1 Semiconductors and diode models

□□□ Semiconductors and diode models

5.2 Rectifiers and dc supplies

□□□ Rectifiers and dc supplies

5.3 BJT biasing

□□□ BJT biasing

5.4 MOSFET biasing

□□□ MOSFET biasing

5.5 Small-signal amplifiers

□□□ Small-signal amplifiers

5.6 Op-amp feedback circuits

□□□ Op-amp feedback circuits

5.7 Frequency response of amplifiers

□□□ Frequency response of amplifiers

6. Signals and Systems

6.1 Signal representations and system properties

□□□ Signal representations and system properties

6.2 LTI systems and convolution

□□□ LTI systems and convolution

6.3 Fourier series and transforms

□□□ Fourier series and transforms

6.4 Sampling

□□□ Sampling

6.5 Laplace transform and system functions

□□□ Laplace transform and system functions

6.6 Discrete-time systems

□□□ Discrete-time systems

6.7 The z-transform Z

□□□ The z-transform

7. Electromagnetics

7.1 Vector field tools

□□□ Vector field tools

7.2 Electrostatics

□□□ Electrostatics

7.3 Magnetostatics

□□□ Magnetostatics

7.4 Maxwell's equations

□□□ Maxwell's equations

7.5 Plane waves

□□□ Plane waves

7.6 Transmission lines

□□□ Transmission lines

7.7 Waveguides and antennas

□□□ Waveguides and antennas

8. Microprocessors and Embedded Systems

8.1 Microcontroller architecture

□□□ Microcontroller architecture

8.2 Embedded C and assembly C

□□□ Embedded C and assembly

8.3 Memory and I/O /

☐☐☐ Memory and I/O

8.4 Interrupts and timers

☐☐☐ Interrupts and timers

8.5 Serial protocols (UART, SPI, I2C) （UART、SPI、I2C）

☐☐☐ Serial protocols (UART, SPI, I2C)

8.6 ADC, DAC and sensors 、

☐☐☐ ADC, DAC and sensors

8.7 Debugging and integration

☐☐☐ Debugging and integration

9. Electrical Machines and Power Systems

9.1 Magnetic circuits and transformers

☐☐☐ Magnetic circuits and transformers

9.2 DC machines

☐☐☐ DC machines

9.3 Induction machines

☐☐☐ Induction machines

9.4 Synchronous machines

☐☐☐ Synchronous machines

9.5 Power networks

☐☐☐ Power networks

9.6 Per-unit system and power flow

☐☐☐ Per-unit system and power flow

9.7 Power electronics introduction

☐☐☐ Power electronics introduction

10. Control Systems

10.1 Modelling of dynamic systems

☐☐☐ Modelling of dynamic systems

10.2 Transfer functions and block diagrams

☐☐☐ Transfer functions and block diagrams

10.3 Time-domain response

☐☐☐ Time-domain response

10.4 Routh stability

☐☐☐ Routh stability

10.5 Root locus

☐☐☐ Root locus

10.6 Bode and Nyquist analysis

☐☐☐ Bode and Nyquist analysis

10.7 PID control and compensation PID

☐☐☐ PID control and compensation

10.8 State-space introduction

☐☐☐ State-space introduction

11. Communication Systems

11.1 Signals, spectra and bandwidth 、

☐☐☐ Signals, spectra and bandwidth

11.2 Amplitude modulation

☐☐☐ Amplitude modulation

11.3 Angle modulation (FM/PM) （ / ）

☐☐☐ Angle modulation (FM/PM)

11.4 Noise and SNR

☐☐☐ Noise and SNR

11.5 PCM and baseband transmission

☐☐☐ PCM and baseband transmission

11.6 Digital modulation

☐☐☐ Digital modulation

11.7 Information and coding introduction

☐☐☐ Information and coding introduction

12. Digital Signal Processing

12.1 Discrete-time signals and systems review

☐☐☐ Discrete-time signals and systems review

12.2 DTFT and DFT

☐☐☐ DTFT and DFT

12.3 The FFT

☐☐☐ The FFT

12.4 FIR filter design FIR

☐☐☐ FIR filter design

12.5 IIR filter design IIR

☐☐☐ IIR filter design

12.6 Multirate processing

☐☐☐ Multirate processing

12.7 Signal-processing project

☐☐☐ Signal-processing project