

ELEC3509 – Lab 3 – Marking Scheme

The marks are generally weighted as follows:

- 50% for showing how you obtained your results
- 50% for explaining what your results mean

Prelab

The prelab is worth **5 marks** and must be completed for **Day 1**.

To receive prelab marks, you must present the following:

- Transistor Summary Table
 - Transistor Parameters / Terminal Voltages / Terminal Currents
 - Example Table (does **not** need to be exactly the same as this one)

Transistor	V_E	V_B	V_C	I_E	I_B	I_C	g_m	r_o	r_e	r_{π}

- Small Signal Models
 - Input Stage
 - Gain Stage
 - Output Stage
- Expressions for A_1 , A_2 and DC Open Loop Voltage Gain
- Input Common Mode Range
- Output Voltage Swing
- Calculations for C_1 value and slew rate

Checkout

The checkout is worth **5 marks** and must be completed for **Day 2**.

To receive checkout marks, you must present the following:

- All Parts:
 - Component Tables (Name, Design Value / Measured Value)
 - Data Tables (Name, Design Value / Measured Value)
- Part 1:
 - $V_o - V_d$ plot
 - Spice Parameter Output
 - $V_o - V_{cm}$ plot

- Part 2:
 - Time Domain Plot of Input and Output Waveforms
- Part 3:
 - Bode Plot (magnitude/phase)
 - Estimate of Unity Gain Frequency (f_u)

Report Marking Scheme

This table provides the minimum requirements and the total available marks for each. Completing only the minimum requirements is NOT sufficient to receive full marks.

Section	Min. Requirements	Available Marks
Introduction		5
Theory & Design		
	Pre-lab: Transistor DC Calculations	5
	Pre-lab: Gain Calculations	8
	Pre-Lab: Output Swing and Common Mode Range	3
	Design value for C_1 and Estimate of Slew Rate	6
	Pre-lab: Questions	5
Simulation		
	$V_o - V_d$ plot	5
	Common Mode Range Plot	3
	Comparison of Calculated v. Simulated DC Parameters	5
	Revised Gain Calculations	8
Results & Analysis		
	Frequency Response (Bode Plot)	3
	Slew Rate Plot	3
	Discussion of calculated f_u v. simulated f_u	6
Conclusion		5
Overall Writing and Organization		20
	TOTAL	90

Example Cover Page

Carleton University
Department of Electronics

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The 741 Operational Amplifier

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Submitted by:

Nancy Neutrino / 100123456
Jimmy Neutron / 100654321

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