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# ECE 230L - LAB 6

## MOSFET SIMULATION WITH PSPICE

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### Contents

1 Objectives of this Laboratory	2
Grading Rubric	3

### List of Figures

# 1 Objectives of this Laboratory

The objectives of this laboratory session are as follows:

- Measure the static and switching characteristics of discrete (transistors, resistors, and capacitors) MOS inverter circuits,
- Determine experimentally the truth tables of CMOS integrated-circuit gates,
- Measure the static voltage-transfer characteristics of CMOS NOR and NAND gates, and
- Measure the switching characteristics of CMOS NOR and NAND gates

Table 1: ECE 230L Laboratory 6 Grading Rubric

Criteria	Points Possible
<b>Circuit Schematic used to simulate MOSFET</b>	<b>10</b>
<b>Verification of ZETEK BS170 Plots</b>	<b>8</b>
<b>Extracted BS170 parameter simulation</b>	<b>15</b>
Plot of $I_{DS}$ vs $V_{DS}(V_{GS})$	15
<b>Class average BS170 parameter simulation</b>	<b>20</b>
Average Calculation	5
Plot of $I_{DS}$ vs $V_{DS}(V_{GS})$	15
<b>Manufacturer specified BS170 parameter simulation</b>	<b>15</b>
Plot of $I_{DS}$ vs $V_{DS}(V_{GS})$	15
<b>Compare values of <math>V_{TH}</math>, <math>K_p</math>, and <math>\lambda</math> for all three simulations</b>	<b>15</b>
<b>Comment on the effects of <math>V_{TH}</math>, <math>K_p</math>, and <math>\lambda</math> on the graphs</b>	<b>10</b>
<b>Extension</b>	<b>7</b>
<b>Total</b>	<b>100</b>