MATH 301 — Introduction to Linear Algebra

BSU Spring 2026 | Section 001 | Tim Palacios (timpalacios)

This repository contains course materials, Python calculation notebooks, and midterm study notes for MATH 301 at Boise State University. Source materials are the weekly quiz and WebWork PDFs from Weeks 1–7, plus Jupyter notebooks used for in-class and homework calculations.

Exam Dates

Exam	Date	Time
Midterm Written	Tuesday, March 3, 2026	12:00–1:15 pm
Midterm WeBWorK	Thursday, March 5, 2026	12:00–1:15 pm
Final Exam (both portions)	Tuesday, May 5, 2026	12:00–2:00 pm

Allowed on both midterm portions: One 8.5"×11" sheet of notes (two-sided) + scratch paper. **WeBWorK portion also allows:** Python for calculations. **Not allowed:** Calculators, any electronic devices (other than exam computer for WeBWorK).

Repository Contents

Course Materials (`pdfs/`)

File	Description
`Week 01 Quiz.pdf`	Linear equations, solution counts

File	Description
`Week 01 WebWork.pdf`	Solving systems, verifying solutions
`Week 02 Quiz.pdf`	Augmented matrices, EROs, RREF
`Week 02 WebWork.pdf`	Row reduction, Gauss-Jordan elimination
`Week 03 Quiz.pdf`	Vectors, linear combinations, subspaces
`Week 03 WebWork.pdf`	Vector arithmetic, subspace tests
`Week 04 Quiz.pdf`	Independence, span, basis
`Week 04 WebWork.pdf`	Pivot method, representations w.r.t. basis
`Week 05 Quiz.pdf`	Fundamental subspaces, rank-nullity
`Week 05 WebWork.pdf`	col(A), row(A), null(A) computations
`Week 06 Quiz.pdf`	Linear transformations
`Week 07 Quiz.pdf`	ERO matrices, invertibility
`Exam info from Professor.pdf`	Official exam rules, dates, Respondus browser info

Python Notebooks (`python-material/`)

Jupyter notebooks used for calculations throughout the course. The WeBWorK midterm allows Python.

File	Description
`01 - Using Python in Linear Algebra.ipynb`	NumPy vs SymPy intro; exact fractions with `S()`
`04 - Using Python to find RREF.ipynb`	`rref()[0]`, decimal rounding bug, `Rational` fix, `evalf()`
`Solving Linear Systems.ipynb`	`linsolve()` — augmented matrix and equation styles
`Conceptual Quiz.ipynb`	RREF applied to null space / conceptual problems
`Week 1 WeBWork - Problem 9.ipynb`	Week 1 homework calculation
`Week 2 Group Work.ipynb`	

File	Description
	`linsolve()` examples from group activity
`Week 2 WebWork.ipynb`	Week 2 homework solved with `linsolve()`
`Week 3 WebWork.ipynb`	Week 3 homework solved with `linsolve()`
`Week 4 WebWork.ipynb`	Decimal matrix RREF with `Rational` fix
`Week 5 Webwork.ipynb`	Fundamental subspaces via `rref()`

See `pdfs/08-python-linear-algebra.pdf` for a full study guide covering all notebook material.

Study Notes (`pdfs/`)

Generated from the course materials above. All study note PDFs are in the `pdfs/` folder.

File	Topic	Week
`00-cheat-sheet.pdf`	**Print-ready exam sheet** (9pt, front+back)	All
`01-linear-systems.pdf`	Linear equations; solution count rules	1
`02-row-operations.pdf`	Augmented matrices; valid EROs; RREF	2
`03-vectors-subspaces.pdf`	Vectors; linear combos; 3-condition subspace test	3
`04-independence-span-basis.pdf`	Independence; span; basis; pivot method	4
`05-fundamental-subspaces.pdf`	col(A), row(A), null(A); rank-nullity	5 *
`06-linear-transformations.pdf`	T: Rn to Rm; linearity; kernel; image	6 *
`07-invertibility-ero-matrices.pdf`		7 *

File	Topic	Week
	ERO matrices; invertible transformations	
`08-python-linear-algebra.pdf`	SymPy/NumPy tools for WeBWorK exam	All

- = highest priority for midterm (Weeks 5–7 are hardest)

Recommended Study Order

1. `05-fundamental-subspaces.pdf` — rank-nullity trap tested on every quiz
2. `06-linear-transformations.pdf` — computing T of a linear combo is the key skill
3. `07-invertibility-ero-matrices.pdf` — ERO matrix entry placement; invertibility logic
4. `04-independence-span-basis.pdf` — foundation for everything in weeks 5–7
5. `03-vectors-subspaces.pdf` — subspace 3-condition test
6. `01-linear-systems.pdf` + `02-row-operations.pdf` — earlier material, quick review
7. `08-python-linear-algebra.pdf` — review before the WeBWorK exam (Thursday 3/5)
8. `00-cheat-sheet.pdf` — read the night before; **print and bring to the exam**

Printing the Cheat Sheet

`pdfs/00-cheat-sheet.pdf` is designed to fit on **one sheet of paper** (front and back):

- Font: **9pt**
- Margins: **0.5 inches** all sides
- Layout: double-sided
- Print directly from the PDF

This sheet is allowed on both the Written and WeBWorK portions of the midterm.