10-Week Curriculum with Daily Book Focus, Theorems, and Problem Sets

Week 1: Probability (Asimow & Maxwell Ch. 1-2) + Newtonian Mechanics (Halliday Vol. 1 Ch. 4)

Daily Focus:

- Counting principles (Ch. 1)

- Permutations & combinations (Ch. 2)

- Newton's Laws (Ch. 4, H&R)

Theorems & Key Ideas:

- Addition Rule - A&M Ch. 1

- Multiplication Rule - A&M Ch. 1

- F = ma - H&R Ch. 4

Problems to Practice:

- A&M: 1.5, 1.8, 2.7

- H&R: 4.8, 4.10

Week 2: Independent Events (A&M Ch. 3) + Projectile Motion (H&R Ch. 5) + CAD Intro

Daily Focus:

- Independence (Ch. 3)

- Projectile motion (Ch. 5, H&R)

- Sketching basics (Inventor Tutorial 1)

Theorems & Key Ideas:

- $P(A \text{ and } B) = P(A)*P(B)$ - A&M Ch. 3

- $x = v_0 t + 1/2at^2$ - H&R Ch. 5

Problems to Practice:

- A&M: 3.5, 3.7

- H&R: 5.3, 5.5

- Inventor: Sketch and constrain shapes

Week 3: Root-Finding (Burden Ch. 2) + Circular Motion (H&R Ch. 6)

Daily Focus:

- Bisection, Newton's method - Burden Ch. 2

- Circular dynamics - H&R Ch. 6

Theorems & Key Ideas:

- Intermediate Value Theorem - Burden Ch. 2

- Centripetal acceleration - H&R Ch. 6

Problems to Practice:

- Burden: 2.3, 2.7

- H&R: 6.4

- Python: Bisection example

Week 4: Integration (Burden Ch. 4) + Electrostatics (H&R Ch. 23) + Quantum States (Griffiths Ch. 1)

Daily Focus:

- Trapezoid/Simpson Rule - Burden Ch. 4

- Electric fields - H&R Ch. 23

- Wavefunction basics - Griffiths Ch. 1

Theorems & Key Ideas:

- Fund. Thm of Calculus - Burden Ch. 4

- Coulomb's Law - H&R Ch. 23

- Normalization - Griffiths Sec. 1.2

Problems to Practice:

- Burden: 4.1

- H&R: 23.5

- Griffiths: 1.1, 1.4

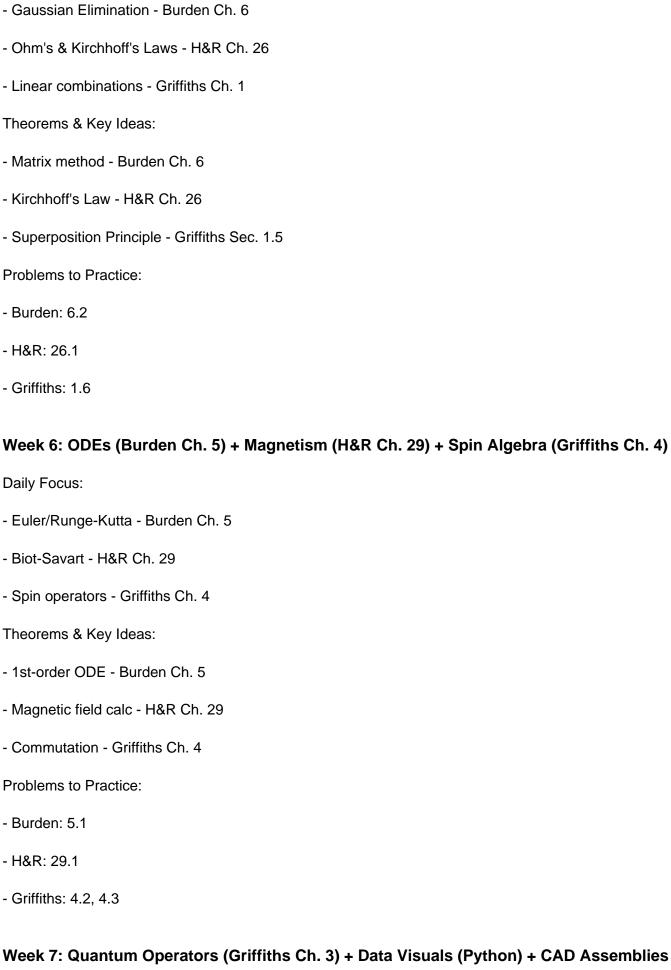## Week 5: Linear Systems (Burden Ch. 6) + Circuits (H&R Ch. 26) + Superposition (Griffiths Ch. 1)

Daily Focus:

- Gaussian Elimination - Burden Ch. 6

- Ohm's & Kirchhoff's Laws - H&R Ch. 26

- Linear combinations - Griffiths Ch. 1

Theorems & Key Ideas:

- Matrix method - Burden Ch. 6

- Kirchhoff's Law - H&R Ch. 26

- Superposition Principle - Griffiths Sec. 1.5

Problems to Practice:

- Burden: 6.2

- H&R: 26.1

- Griffiths: 1.6

Week 6: ODEs (Burden Ch. 5) + Magnetism (H&R Ch. 29) + Spin Algebra (Griffiths Ch. 4)

Daily Focus:

- Euler/Runge-Kutta - Burden Ch. 5

- Biot-Savart - H&R Ch. 29

- Spin operators - Griffiths Ch. 4

Theorems & Key Ideas:

- 1st-order ODE - Burden Ch. 5

- Magnetic field calc - H&R Ch. 29

- Commutation - Griffiths Ch. 4

Problems to Practice:

- Burden: 5.1

- H&R: 29.1

- Griffiths: 4.2, 4.3

Week 7: Quantum Operators (Griffiths Ch. 3) + Data Visuals (Python) + CAD Assemblies

Daily Focus:

- Hermitian operators - Griffiths Ch. 3

- Matplotlib visualizations

- CAD joints and assemblies

Theorems & Key Ideas:

- Operator algebra - Griffiths Sec. 3.1

- Inner product spaces - Griffiths 3.3

Problems to Practice:

- Griffiths: 3.2, 3.4

- Python: Line and scatter plots

- Inventor: Assembly 1

Week 8: Optimization (SciPy) + Electromagnetic Induction (H&R Ch. 31) + Final CAD

Daily Focus:

- Gradient descent - SciPy

- Faraday's Law - H&R Ch. 31

- CAD gear mechanism

Theorems & Key Ideas:

- Gradient Method - Applied

- Faraday's Law - H&R Ch. 31

Problems to Practice:

- Python: minimize()

- H&R: 31.2

- Inventor: gears/constraints

Week 9: Regression (Python/Pandas) + Quantum Spin (Griffiths Ch. 4)

Daily Focus:

- Linear regression - NumPy/Pandas

- Spin-1/2 system - Griffiths Ch. 4

Theorems & Key Ideas:

- Normal Equations - DS

- Spin Operators - Griffiths Ch. 4

Problems to Practice:

- Python: sklearn.LinearRegression

- Griffiths: 4.5

Week 10: Review & Capstone Integration

Daily Focus:

- Multi-discipline review

- Project synthesis

- CAD simulation integration

Theorems & Key Ideas:

- Recap of key theorems & visual workflows

Problems to Practice:

- Create final project PDF & presentation