

PH4911 - Simulation of Physical and Weapon Systems (3-2)

A. CATALOG DESCRIPTION: The role of computation physics in modern weapons development and combat simulations is studied. The programming language is C within the UNIX, Apple, or Windows operating systems. Applications emphasize physical principles of weapons development, systems engineering, and the use of graphics. Subject matter includes random number distributions, projectile and fragment dispersion, missile defense, free electron laser simulation, laser beam propagation in a turbulent atmosphere, thermal blooming, diffraction, rail guns, and numerical integration methods. Optional topics include chaos, and quantum mechanical wavefunctions.

PREREQUISITE: PH2911

B. RECOMMENDED TEXT: none

C. COURSE CONTENTS:

TOPICS	APPROX. HOURS
1. Review of the C programming language	1
2. Random number distributions in weapon systems simulations	3
3. Bullet Dispersion in a PHALANX Gun Missile Engagement	6
4. Missile Fragment Dispersion	3
5. Free Electron Laser Weapon System Simulation	6
6. Atmospheric Laser Beam Propagation, thermal blooming	6
7. Rail gun simulation	3
8. Quantum Mechanical Wave Functions (optional)	2
9. Logistic map and chaos (optional)	2

D. LABORATORY: COMPUTER SIMULATIONS and LAB REPORTS

E. FACULTY CONTACT: W. B. Colson, SP116, x2765

DGRE Revised: 1/03

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PREREQUISITE: PH2911.

B. RECOMMENDED TEXT: none

C. COURSE CONTENTS:

TOPICS	APPROX. HOURS
10. Review of the C programming language	2
11. Random number distributions in weapon systems simulations	2
12. Bullet Dispersion in a PHALANX Gun Missile Engagement	6
13. Missile Fragment Dispersion	5
14. Free Electron Laser Weapon System Simulation	6
15. Atmospheric Laser Beam Propagation, thermal blooming	6
16. Numerical integration methods for Physical Systems	5
17. Quantum Mechanical Wave Functions (optional)	4
18. Molecular Dynamics in Solids, Liquids, and Gases (optional)	6
19. Logistic map and chaos (optional)	3

D. LABORATORY: COMPUTER SIMULATIONS and LAB REPORTS

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DGRE Revised: 6/02