

Proposal for “BA in Physics: Quantitative Finance Option” 10/14/13

Prof. Gregory W. Brown
Sarah Graham Kenan Distinguished Scholar of Finance
Kenan-Flagler Business School

Prof. Reyco Henning
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Who is this for?

Many of the analytical models used in financial engineering are derived from mathematical methods used in physics. For example, the Nobel Prize winning Black-Scholes option pricing model is based on the heat equation. In addition, the types of numerical methods developed for solving problems in physics have direct applications in finance. Consequently, there are natural synergies between the areas. Top financial institutions regularly employ students with backgrounds in math and physics so there is an established career path for students from this program. Kenan-Flagler sees a potential spill-over benefit for other programs because of the potential for new recruiter interest and an enhanced reputation of UNC with firms that currently recruit at UNC. The Department of Physics and Astronomy sees an opportunity to diversify its current portfolio of degree options and appeal to a broader community of students. It will also provide more career opportunities for physics majors.

This major is for students with a strong mathematical background and an interest in quantitative finance, financial engineering, or economics. Career paths include: Quantitative Finance, Derivatives Trader, Risk Analysis and Management, Portfolio Manager, Patent Law, Analyst, Actuarial Science, Tech Consultant, Tech Business Management, Management Consulting, and Technical Project Management. The business school already coordinates closely with on-campus recruiting services that will provide these students with access to top companies. Student will be made aware of this option during freshman orientation, introductory physics courses, and business school “gateway” courses.

We have conducted informal clicker and email polls of about 300 students in the introductory physics classes, PHYS 116 and 117, during Fall 2013. In this poll we asked students if they would be “very”, “somewhat”, or “not” interested in this proposed program. We found that 20 students said that they would be “very” interested and about 60 said they would be “somewhat” interested. We also performed an email poll of the current BSBA students, of which 15 expressed that they would be very interested in this proposal and 6 said that they would be somewhat interested. Using this information we conservatively estimate that we can have a class size of 20-30 students per year in this program.

Core Requirements (gateway + 25 credits)

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PHYS 118 (gateway course)

PHYS 119, 201 or 301, 211 or 311, 281L, and 331

PHYS 341 or CHEM 481

Six additional credits chosen from PHYS (numbered above 200), MATH (numbered above 200), and BSBA (numbered above 400)

Additional Requirements (30 credits)

BUSI 408, 580, 588, 589, 600, 688

CHEM 101 and 102

MATH 231, 232, 233, 383

Course Descriptions:

CHEM 101 General Descriptive Chemistry (4)

CHEM 102 Advanced General Descriptive Chemistry (4)

PHYS 118 Intro Mechanics (4)

PHYS 119 Intro Electromagnetism (4)

PHYS 201/301 Mechanics 1 (3)

PHYS 211/311 Electromagnetism 1 (3)

PHYS 281L (2)

PHYS 331 Mathematical Methods (Finance-related Project) (4)

MATH 231, 232, 233 Calculus 1-3 (3x3)

MATH 383 Differential Equations 1 (3)

PHYS 341 or CHEM 481 Thermodynamics (3)

BUSI 408 Corporate Finance (3.0)

BUSI 580 Investments (3.0)

BUSI 588 Introduction to Derivative Securities & Risk Management (1.5)

BUSI 589 Fixed Income (1.5)

BUSI 600 Risk Management (1.5)

BUSI 688 Applied Derivatives (1.5)

Sample schedule:

Year	Fall		Spring	
1	MATH 231	3	MATH 232	3
	CHEM 101	4	PHYS 118	4
			CHEM 102	4
2	MATH 233	3	MATH 383	3
	PHYS 119	4	PHYS 331	4
3	PHYS 201/301	3	PHYS 211/311	3
	BUSI 408	3	BUSI 580	3
	PHYS 341	3	PHYS 281L	2
4	BUSI 588	1.5	BUSI 688	1.5
	BUSI 589	1.5	BUSI 600	1.5
	Elective	3.0	Elective	3.0

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- PHYS 341 or CHEM 481
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Additional Requirements

- BUSI 408, 580, 588, 589, 600, and 688
- CHEM 101 and 102
- MATH 231, 232, 233, and 383



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October 9, 2013

Prof. Reyco Henning
Associate Professor
Department of Physics and Astronomy
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Chapel Hill, NC 27599

Dear Prof Henning,

I am writing to affirm the participation of the Kenan-Flagler Business School in the joint program with the Physics and Astronomy Department. As we have discussed the Quantitative Finance program will be available to undergraduate physics majors with an interest in applied finance.

We are happy to participate in the program by:

1. Allowing enrollment for students in the required courses:
 - a. BUSI 408, Corporate Finance
 - b. BUSI 580, Investments
 - c. BUSI 588, Introduction to Derivative Securities & Risk Management
 - d. BUSI 589, Fixed Income
 - e. BUSI 688, Applied Derivatives
 - f. BUSI 600, Risk Management
2. Providing faculty resources for mentoring of class projects and career counseling.

Many thanks for all of your efforts to get this program up and running.

Sincerely,

Gregory Brown

Gregory W. Brown