

# 2012-2013 LONG SIGNATURE SHEET



Proposal Number: FINN 10-04-12

**UNC CHARLOTTE**

Proposal Title: Major Changes to PhD Program of Study and Course Description

Originating Department: Finance

TYPE OF PROPOSAL: UNDERGRADUATE \_\_\_\_\_ GRADUATE  UNDERGRADUATE & GRADUATE \_\_\_\_\_  
 (Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
10/04/2012	10/04/2012	10/05/2012	Approved	<u>DEPARTMENT CHAIR</u>  [print name here:] Tao-Hsien Dolly King
10/5/2012	11/5/2012	11/8/2012	Approved	<u>COLLEGE CURRICULUM COMMITTEE CHAIR</u>  [print name here:] Steven Clark
11/27/2012	12/7/2012	12/10/2012	Approved	<u>COLLEGE FACULTY CHAIR (if applicable)</u>  [print name here:] Rob Roy McGregor
11/27/2012	12/7/2012	12/10/2012	Approved	<u>COLLEGE DEAN</u>  [print name here:]
			Approved	<u>GENERAL EDUCATION</u> (if applicable; for General Education courses) [print name here:]
			Approved	<u>UNDERGRADUATE COURSE &amp; CURRICULUM COMMITTEE CHAIR</u> (for undergraduate courses only)
12-10-12	1-15-13	1-17-13	Approved	<u>GRADUATE COUNCIL CHAIR</u> (for graduate courses only)  Rob Roy McGregor
				<u>FACULTY GOVERNANCE ASSISTANT</u> (Faculty Council approval on Consent Calendar)
				<u>FACULTY EXECUTIVE COMMITTEE</u> (if decision is appealed)



# UNC CHARLOTTE

## **LONG FORM COURSE AND CURRICULUM PROPOSAL**

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\*To: Belk College Graduate Council

From: Department of Finance

Date: October 4, 2012

Re: Revision of PhD Program of Study and Course Description

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The Long Form is used for major curriculum changes. Examples of major changes can include: creation of a new major, creation of a new minor, creation of a new area of concentration, or significant changes (more than 50%) to an existing program (Note: changing the name of an academic department does not automatically change the name(s) of the degree(s). The requests must be approved separately by the Board of Governors.)

Submission of this Long Form indicates review and assessment of the proposed curriculum changes at the department and collegiate level either separately or as part of ongoing assessment efforts.

**University of North Carolina at Charlotte**

**Revised Graduate Program of Study and Course Description**

**Proposal from: Department of Finance**

**Title: Major Changes to the PhD in Business Administration - Finance Concentration  
Program of Study and Course Description**

**I. PROPOSAL**

**A. PROPOSAL SUMMARY AND CATALOG COPY**

**1. Summary**

The Department of Finance proposes several changes to the program of study for the Finance Concentration of the PhD in Business Administration Degree. In addition, the Department of Finance proposes a revised course description for BPHD 8130 Econometrics II.

**1.1 Changes to Business Core**

Remove the following courses from the Business Core section:

MBAD 5112/5113 Economics (3 credits)

MBAD 5121 Business Information Systems (3 credits)

MBAD 5131 Accounting and Financial Management (3 credits)

Change one sentence in the last paragraph of the Business Core section:

From: "For the 5000-level courses listed above, graduate or undergraduate courses may count as equivalent courses."

To: "Students who lack sufficient preparation in accounting, economics, or information systems may, at the discretion of the Program Director, be required to complete one or more 5000-level business courses in these disciplines."

Add one sentence at the end of the last paragraph of the Business Core section:

"However, students may, at the discretion of the Program Director, be permitted to take other 6000-level or higher-level courses in place of those listed above if the student's background indicates that this would benefit the student."

**1.2 Changes to Mathematics Prerequisites**

Add one paragraph in the Mathematics Prerequisites section:

"Students who lack strong computer programming skills may be advised to take programming courses offered by the College of Informatics. Specifically, the Program Director may advise a student to take ITCS 1212 Introduction to Computer Science (C++) or other similar courses after reviewing the student's background and prior programming experience."

### 1.3 Changes to Finance Major Courses

Modify course titles and course descriptions of BPHD 8200 and BPHD 8220

From: BPHD 8200 Financial Economic Theory

**BPHD 8200. Financial Economic Theory. (3)** Prerequisites: Admission to Ph.D. in Business Administration or Permission of Instructor. Studies the main themes of financial economics using discrete-time models. Topics include risk measurement, choice under uncertainty, portfolio selection, capital asset pricing model (CAPM), Arrow-Debreu pricing, options and market completeness, the Martingale measure, the arbitrage pricing theory, consumption-based CAPM, and financial structure and firm evaluation. *(Fall)*

To: BPHD 8200 Financial Economic Theory I

**BPHD 8200. Financial Economic Theory I. (3)** Prerequisites: Admission to Ph.D. in Business Administration or Permission of Instructor. Studies the main themes of financial economics using discrete-time models. Topics include mean-variance analysis, risk management principle, capital asset pricing model (CAPM), linear factor model, the arbitrage pricing theory, market completeness, consumption-based CAPM, multiperiod consumption and portfolio choice, market equilibrium, and contingent claim pricing. *(Fall)*

From: BPHD 8220 Asset Pricing

**BPHD 8220. Asset Pricing. (3)** Prerequisites: BPHD 8210. Introduction to multi-period models in finance, mainly pertaining to optimal portfolio choice and asset pricing. The course begins with discrete-time models for portfolio choice and security prices, and then moves to a continuous-time setting. The topics then covered include the Black-Scholes model of asset pricing and some of its extensions, models of the term structure of interest rates, valuation of corporate securities, portfolio choice in continuous-time settings, and finally, general-equilibrium asset pricing models. *(Fall)*

To: BPHD 8220 Financial Economic Theory II

**BPHD 8220. Financial Economic Theory II. (3)** Prerequisites: BPHD 8210. Introduction to asset pricing and portfolio choice theory. The course begins with discrete-time models, and then moves to a continuous-time setting. The topics covered include arbitrage, stochastic discount factors, beta pricing models, factor models, dynamic programming, derivative securities and models of the term structure of interest rates. *(Fall)*

### 1.4 Change the Course Description of BPHD 8130 Econometrics II

BPHD 8130 Econometrics II (3 credits)

From:

**BPHD 8130. Econometrics II. (3)** Prerequisite: BPHD 8120. Advanced course in time series econometrics. The course focuses on time series methods that have become popular and are widely used in applied economics. The course focuses on estimation of univariate and multivariate models (VAR, FAVAR, ECM, and SEM), estimation of dynamic factor models, construction of optimal forecasts and their properties, combination of forecasts. Issues of nonstationarity, cointegration are also examined. *(Spring)*.

To:

**BPHD 8130. Econometrics II. (3)** Prerequisite: BPHD 8120. Advanced course in cross-sectional and panel data methods. The focus is on specification, estimation, and testing of standard microeconomic models. Introduces a variety of extensions of conventional linear models for cross-sectional and panel data, including panel data models, instrumental variables models, simultaneous equations models, and qualitative response models. (*Spring*).

### 1.5 Changes to Research Support Courses

From three required Mathematics Courses:

MATH 8202 Partial Differential Equations for Finance (3 credits)

MATH 8203 Stochastic Calculus for Finance (3 credits)

MATH 8204 Numerical Methods for Financial Derivatives (3 credits)

To a choice of three of the following five Mathematics/ Economics Courses:

MATH 8202 Partial Differential Equations for Finance (3 credits)

MATH 8203 Stochastic Calculus for Finance (3 credits)

MATH 8204 Numerical Methods for Financial Derivatives (3 credits)

ECON 6257 Applied Computational Economics (3 credits)

MATH 6205 Financial Computing (3 credits)

### 2. Proposed Catalog Copy (see attachment)

#### **B. JUSTIFICATION**

##### 1.1 Changes to Business Core

All 5000-level courses in the MBA curriculum are preparatory courses that MBA students are expected to complete in an online, self-study format. Doctoral students are almost always waived out of these low-level courses. More importantly, the material covered in these courses overlaps with that covered in other business courses that the doctoral students are required to take: MBAD 6152 (Financial Management), BPHD 8100 (Microeconomic Theory I), and BPHD 8230 (Theory of Corporate Finance). Thus MBAD 5112/5113, MBAD 5121, and MBAD 5131 are largely redundant.

The accompanying changes in the text serve two purposes. The first is to allow the Program Director to require students who are deemed to have inadequate preparation in economics, accounting, and/or information systems to take any of the removed courses. The second is to give the Program Director additional flexibility in tailoring the curriculum to the background of the student by permitting the substitution of other courses for the 6000-level core courses if the student's background indicates that this would benefit the student.

##### 1.2 Changes to Mathematics Prerequisites

The paragraph added to the existing text addresses the need for strong computer programming skills. The Program Director will work with students closely to identify cases in which courses in computer programming will be of benefit and make recommendations accordingly.

### 1.3 Changes to Finance Major Courses

The new titles and course descriptions of BPHD 8200 and BPHD 8220 are designed to more accurately reflect the content of the courses, highlight the connection between the courses, and emphasize that the courses should be taken in sequence. BPHD 8200 Financial Economic Theory I covers asset pricing in the discrete-time setting. BPHD 8220 Financial Economic Theory II covers asset pricing in the more mathematically-sophisticated, continuous-time setting.

### 1.4 Change the Course Description of BPHD 8130 Econometrics II

The revised description for BPHD 8130 Econometrics II more accurately reflects the current content of the course.

### 1.5 Changes to Research Support Courses

The current research support course requirement specifies that three courses from the Department of Mathematics are required. Depending on the dissertation topic chosen by a student, it may be beneficial for the student to take a combination of Mathematics and Economics courses. Accordingly, we provide a menu of five such courses, and allow the students to choose the three courses that are most valuable for their research.

## C. IMPACT

### 1. What group(s) of students will be served by this proposal?

The changes will impact Finance Doctoral students.

### 2. What effect will this proposal have on existing courses and curricula?

#### a. When and how often will added course(s) be taught?

We are not proposing new courses.

#### b. What is the anticipated enrollment in course(s) added (for credit and auditors)?

We are not proposing new courses.

#### c. What is the anticipated enrollment in courses added (for credit and auditors)?

We are not proposing new courses.

#### d. How will enrollment in other courses be affected?

There may be 1-2 more students enrolled in ITCS 1212 each year. There may be fewer students enrolled in MATH 8202, MATH 8203, or MATH 8204. There may be more students enrolled in MATH 6205, ECON 6257, MATH 8120, or MATH 8143. We expect the impact on all of these courses to be minimal because the finance doctoral program has 3 students per cohort on average.

#### e. If course(s) has been offered previously under special topics numbers, give details of experience including number of times taught and enrollment figures.

We are not proposing new courses.

#### f. Identify other areas of catalog copy that would be affected, e.g., curriculum outlines, requirements for the degree, etc.

No other areas will be affected.

## **II. RESOURCES REQUIRED TO SUPPORT PROPOSAL**

### **A. PERSONNEL**

No new faculty needed.

### **B. PHYSICAL FACILITY**

Current facilities are adequate.

### **C. EQUIPMENT AND SUPPLIES**

Current equipment and supplies are adequate.

### **D. COMPUTER**

Current computer resources are adequate.

### **E. AUDIO -VISUAL**

Current audio and visual resources are adequate.

### **F. OTHER RESOURCES**

Not applicable.

### **G. SOURCES OF FUNDING**

Not applicable.

## **III. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS OR UNITS**

### **A. LIBRARY CONSULTATION**

We are not proposing new courses, so library consultations are not needed.

### **B. CONSULTATION WITH OTHER DEPARTMENTS OR UNITS**

We have consulted with the Department of Mathematics and Statistics regarding possible enrollment of Finance Doctoral students in MATH 6205, MATH 8120, and MATH 8143. We have consulted with the Department of Economics about possible enrollment of Finance Doctoral students in ECON 6257.

## **IV. INITIATION, ATTACHMENTS AND CONSIDERATION OF THE PROPOSAL**

### **A. ORIGINATING UNIT**

PhD Program Committee, Belk College of Business, University of North Carolina at Charlotte. The committee members, including Lloyd Blenman, Steven Clark, Dolly King, Chris Kirby, Dmitry Shapiro, and Weidong Tian, recommended this proposal on April 19, 2012.

### **B. ATTACHMENTS**

1. Consultation: Departmental consultations are attached.
2. Proposed catalog copy is attached.

3. There are no changes to any Academic Plan of Study.
4. There are no changes to the Student Learning Outcomes (SLOs).



## King, Dolly

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**From:** Kohut, Gary  
**Sent:** Wednesday, September 26, 2012 3:36 PM  
**To:** King, Dolly  
**Subject:** RE: MBA program committee feedback about PhD program changes

Dolly,

The MBA Program Committee met on September 21, 2012 and voted unanimously to endorse the change in 5000-level MBA courses within the PhD program.

Gary

Gary F. Kohut, PhD | Professor of Management  
Director of the MBA Program  
UNC Charlotte | Belk College of Business  
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**From:** King, Dolly  
**Sent:** Wednesday, September 26, 2012 2:27 PM  
**To:** Kohut, Gary  
**Subject:** MBA program committee feedback about PhD program changes

Hi Gary,

Just wanted to check if you had some feedback about the change in the PhD program that is related to the 5000 level MBA courses. Thanks!

Dolly

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Tao-Hsien Dolly King, Ph.D. | Rush S. Dickson Professor of Finance  
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**Memorandum**

**To:** Dr. Dolly King, Chair, Department of Finance

**From:** Dr. Jennifer Troyer, Chair, Department of Economics

**Subject:** Consultation Regarding Inclusion of ECON 6257 in the Ph.D. in Business Administration – Finance Concentration Program Revisions

**Date:** September 14, 2012

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Thank you for consulting with the Department of Economics on the inclusion of ECON 6257 (Applied Computation Methods) among the list of potential Research Support Courses for the Ph.D. in Business Administration – Finance Concentration. As you know, we received final approval to offer ECON 6257 in May 2012. We have not yet scheduled this course to be offered.

I asked the Department of Economics Graduate Advisory Committee to consider your request for a consultation. All five members of the Committee support your proposal. As Chair of the Department of Economics, I am also supportive of this change.

Please let me know if I can be of further assistance.



**UNC CHARLOTTE**

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Chairman  
Department of Mathematics  
704/687-4556

### Memorandum

**To:** Dr. Dolly King, Chair, Department of Finance

**From:** Dr. Yuanan Diao, Chair, Department of Mathematics and Statistics

**Subject:** Consultation Regarding Some Changes in Math Course Requirements in the Ph.D. in Business Administration – Finance Concentration Program Revisions

**Date:** September 28, 2012

Thank you for consulting with the Department of Mathematics and Statistics on the following proposed changes in the mathematics course requirements in your Ph.D. program in Business Administration – Finance Concentration Program Revisions.

From three required Mathematics Courses:

MATH 8202 Partial Differential Equations for Finance (3 credits)

MATH 8203 Stochastic Calculus for Finance (3 credits)

MATH 8204 Numerical Methods for Financial Derivatives (3 credits)

To three out of five Mathematics or Economics Courses:

MATH 8202 Partial Differential Equations for Finance (3 credits)

MATH 8203 Stochastic Calculus for Finance (3 credits)

MATH 8204 Numerical Methods for Financial Derivatives (3 credits)

ECON 6257 Applied Computational Economics (3 credits)

MATH 6205 Financial Computing (3 credits)

After consulting the relative faculty members in our department, I am writing to let you know that our department fully support this proposed change. The proposed change does not require any additional resource from our department hence will not cause any difficulties for us. Please let me know if you need further assistance.

## **PH.D. IN BUSINESS ADMINISTRATION**

### **Website**

phd-business.uncc.edu

### **Program Coordinator**

Dr. Chris Kirby

The Ph.D. in Business Administration is a research-oriented program designed to prepare graduates for teaching and research careers in academia. The program includes core courses covering all business specialties combined with an in-depth study in both theoretical and empirical aspects of the major and minor field. Students also receive training in pedagogy. Students are expected to demonstrate mastery of the existing body of knowledge in their major field and to develop new knowledge through original independent research. With the educational background provided by the program, graduates are qualified for tenure-track professor positions at both national and international research and teaching universities and other educational institutions.

### **Additional Admission Requirements**

All applicants seeking admission into the Ph.D. in Business Administration must fulfill the University's general requirements for graduate admission at the Ph.D. level. Additional requirements for admission into the program are listed below.

- 1) A baccalaureate or master's degree in Business, Economics, or a related field with a minimum undergraduate GPA of 3.5 (A=4.0) overall. In the case a candidate presents a master's degree at application, a minimum graduate GPA of 3.25 (A=4.0) on all graduate coursework is required.
- 2) A GMAT score of at least 650 or GRE scores with scores on the quantitative section of at least 700 and on the verbal section of at least 500.
- 3) For non-native speakers of English that do not hold degrees from a US university, a score of 220 on the computer-based TOEFL, a score of 557 on the paper-based TOEFL, or 85% on the MELAB.
- 4) Non-native speakers of English may be required, at the discretion of the Graduate School or the Program Director for the Ph.D. in Business Administration, to enroll in English as a Second Language (ESL) courses at the English Language Training Institute.
- 5) Three positive letters of recommendation, one of which must be from a former professor.
- 6) A Statement of Purpose from the applicant explaining why they wish to pursue a Ph.D. in Business Administration and why they wish to study the specific area to which they are applying.
- 7) To ensure their preparation for doctoral coursework, students may be required to take additional undergraduate or graduate courses, as determined by the Ph.D. in Business Administration Program Committee and the Program Director. Such courses will be specified at the time of admission into the program and may include courses in finance, economics, accounting, marketing, management, operations management, management information systems, mathematics, or statistics.

Students are admitted to the program by the Dean of the Graduate School based on the recommendation of the Belk College of Business Doctoral Program Director, in consultation with the Belk College of Business Doctoral Program Committee. Recommendations are based on the assessments of the Program Director and the Program Committee of the candidate's ability to complete the program, as supported by the application materials. The Program Director, in consultation with the Program Committee, may waive certain requirements if they judge the candidate to be capable of completing the program. If there are more candidates than can be accommodated, candidates are recommended in order of their perceived ability, promise of success, and suitability to the program.

### **Degree Requirements**

The degree of Doctor of Philosophy in Business Administration is awarded for completion of scholarly research that advances knowledge in the field of research. Evidence of this is demonstrated by a successful dissertation defense. Additionally, recipients of this degree must demonstrate mastery of the body of knowledge within their major field and potential for success in future teaching and research.

Students that enter the program must work with the Program Director to develop a Plan of Study during their first two semesters in the program. This Plan of Study will determine the exact coursework that the student must meet in order to be eligible to take the Qualifying Examination. The Plan of Study must meet all Graduate School and Belk College of Business requirements. The Graduate School requires that any student earning a Ph.D. must complete at least 72 post-baccalaureate semester-hours, including at least 18 hours of dissertation credit. Some of these graduate credit hours may include courses

taken while enrolled in other graduate programs. It is a Belk College of Business requirement that any program of study within the Ph.D. in Business Administration must contain at least 42 semester-hours of doctoral coursework, regardless of other graduate hours that the student may have previously earned. These 42 semester hours are in addition to the minimum 18 hours of dissertation credit that the Graduate School requires. The Plan of Study must contain a minimum of 18 hours in the major field, a minimum of 15 hours in the minor field, and a minimum of 9 hours in research-support courses.

In addition to the general requirements above, if a student enters the program without a Master's degree, the Plan of Study must include an additional 30 hours of coursework. This coursework must be taken at the graduate level and will generally include courses that are part of the Master of Accountancy, Master of Business Administration, Master of Science in Economics, or Master of Science in Mathematical Finance programs. These 30 hours of additional coursework are subject to the approval of the Program Director.

To ensure that all students are ready for doctoral courses in Business Administration, the program has two distinct sets of prerequisites. First, students entering the program must either demonstrate or attain proficiency in each of the business specialties. Second, students must also demonstrate or attain mathematical proficiency. Students entering the program will be evaluated for these proficiencies by the Program Director. If a student is found to be deficient then the Plan of Study must include appropriate courses, as determined by the Program Director, from the Business Core and Mathematical prerequisites listed below. These courses are in addition to the major, minor, and research support courses.

### **Business Core**

To ensure their preparation for doctoral level coursework in all business specialties, students ~~most~~ **must** demonstrate proficiency in the Business Core. Students may satisfy this requirement either by taking the following courses or by having previously taken equivalent courses:

~~MBAD-5112/5113—Economics (3)~~  
~~MBAD-5121—Business Information Systems (3)~~  
~~MBAD-5131—Accounting & Financial Management (3)~~  
MBAD 6152 Financial Management (3)  
MBAD 6171 Marketing Management (3)  
MBAD 6194 Global Strategic Management (3)

~~For the 5000-level courses listed above, graduate or undergraduate courses may count as equivalent courses. Students who lack sufficient preparation in accounting, economics, or information systems may, at the discretion of the Program Director, be required to complete one or more 5000-level business courses in these disciplines. For the 6000-level courses listed above, only graduate courses may count as equivalent courses. However, students may, at the discretion of the Program Director, be permitted to take other 6000-level or higher-level courses in place of those listed above if the student's background indicates that this would benefit the student.~~

### **Mathematics Prerequisites**

The only major available to students enrolled in the Ph.D. in Business Administration program is finance, and all finance students must minor in economics. Finance and economics are mathematically intensive fields. To ensure that students are prepared for doctoral level coursework they are required to have had, at the graduate or undergraduate level, the equivalent of the following courses:

MATH 1241 Calculus I (3)  
MATH 1242 Calculus II (3)  
MATH 2164 Linear Algebra (3)  
MATH 2241 Calculus III (3)  
MATH 3122/3123 Probability & Statistics (3)

Students lacking these mathematics courses will generally be allowed to take those courses at either the graduate or undergraduate level. At the Program Director's discretion, a student may be permitted to take combined courses to meet multiple prerequisites.

Although unlikely, it is possible that a student may enter the program without having taken a specific prerequisite or business core course but has, nevertheless, acquired the same skill and technical abilities that the course would convey. In such cases, the Program Director may waive the course.

Students who lack strong computer programming skills may be advised to take programming courses offered by the College of Informatics. Specifically, the Program Director may advise a student to take ITCS 1212 Introduction to Computer Science (C++) or other similar courses after reviewing the student's background and prior programming experience.

### **Finance Major Courses**

The Plan of Study for the finance major must consist of a minimum of six courses in finance. Normally these courses are:

- BPHD 8200 Financial Economic Theory I (3)
- BPHD 8210 Investments and Portfolio Theory (3)
- BPHD 8220 ~~Asset Pricing~~ Financial Economic Theory II (3)
- BPHD 8230 Theory of Corporate Finance (3)
- BPHD 8240 Derivatives (3)
- BPHD 8650 Advanced Seminar in Finance (3)

Two of these courses, BPHD 8200 and BPHD 8240, are cross-listed with courses that are part of the Master of Science in Economics and the Master of Science in Mathematical Finance programs. Ph.D. students in these cross-listed courses will be required to complete the master's level requirements of the course and in addition, will be required to take separate exams, prepare a research paper, and complete additional readings. Students that have taken those equivalent courses may, at the discretion of the Program Director, substitute additional sections of BPHD 8650 on their Plan of Study for those courses. In addition, the Program Director may require a student to list BPHD 8650 more than once in their Plan of Study as topics change.

### **Economics Minor Courses**

The Plan of Study for an economics minor must consist of five courses in economics. These courses are:

- BPHD 8100 Microeconomic Theory I (3)
- BPHD 8110 Microeconomic Theory II (3)
- BPHD 8120 Econometrics I (3)
- BPHD 8130 Econometrics II (3)
- BPHD 8140 Econometrics III (3)

Exceptions to the economics minor courses may only be made with the permission of the Ph.D. Program Director.

### **Research Support Courses**

The Ph.D. in Business Administration requires that students have at least nine hours of research support courses in their Plan of Study. For the finance major, these research support courses must come from the Department of Mathematics and Statistics or Department of Economics. Students are required to choose three courses from the following list of courses:

~~These courses are:~~

- MATH 8202 Partial Differential Equations for Finance (3)
- MATH 8203 Stochastic Calculus for Finance (3)
- MATH 8204 Numerical Methods for Financial Derivatives (3)
- ECON 6257 Applied Computational Economics (3)
- MATH 6205 Financial Computing (3)

Some of the~~The~~ research support courses are cross-listed with courses used in the Master of Mathematical Finance program. Students that have taken those equivalent courses may, at the discretion of the Program Director, take other mathematics, statistics, economics, finance or related courses in place of the courses specified above.

### **Grades**

A student is expected to earn an A or B in all courses included in the program of study and must have at least a 3.0 GPA to graduate. The dissertation is graded on a Pass/Unsatisfactory basis and, therefore, will not be included in the cumulative average. An accumulation of more than two marginal (C) grades will result in suspension of the student's enrollment in the program. If a student earns a grade of U in any course, their enrollment will be suspended and the student cannot take further coursework without being readmitted to the program. Readmission to the program requires approval of the Dean of the Graduate School upon the recommendation of the Program Director.

### **Teaching Mentor and Pedagogy Training**

To ensure that graduates of the program are prepared for a career in both teaching as well as in research, a formal system of pedagogical training is required. Students that enter the program without prior teaching experience will be assigned a faculty Teaching Mentor and will be required to attend a teaching workshop. Most students entering the program will also initially be employed as teaching assistants. Normally after one year in the program students will begin to teach their own sections of undergraduate courses. The combination of mentoring, apprenticeship training through the teaching assistantships, formal pedagogy, and actual instructor experience will allow students in the program to develop their teaching skills along with their research skills.

### **Diagnostic Evaluation**

Students entering the program will take a diagnostic evaluation at the end of their first full year in the program. The diagnostic examination will be administered by the Program Director, in consultation with the Program Committee. The format of the diagnostic examination will be determined by the Committee, but might consist of a review of the student's work in classes, a written exam, or an oral exam. The purpose of the diagnostic evaluation will be to determine whether the student is making sufficient progress toward the degree. Students that are determined not to be making satisfactory progress toward the degree will be suspended from the program.

### **Dissertation Advisor and Advisory Committee**

Every student in the program must have a Dissertation Advisor and an Advisory Committee prior to being admitted to Candidacy. The student should select a dissertation advisor before the end of the second year of residency. The student and the dissertation advisor jointly determine the advisory committee. The Dissertation Advisor serves as Chair of the Advisory Committee and must be a member of the Graduate Faculty of UNC Charlotte. Normally the Dissertation Advisor for a student majoring in finance will be a member of the Department of Finance. A student may petition the Program Director to allow a member of another department within the Belk College, or a member of the Department of Mathematics and Statistics, to serve as their Dissertation Advisor. The advisory committee must have at least four members, three of which are chosen by the student. Normally two members will be from the student's major field, and one from the student's minor field. A student may petition the Program Director to allow a member of another department within the Belk College, or a member of the Department of Mathematics and Statistics to serve on the Committee. The fourth member of the committee will be the Graduate Faculty representative to the Committee. That member will be appointed by the Dean of the Graduate School. All members of the Committee must be members of the UNC Charlotte Graduate Faculty.

### **Qualifying Examination**

Upon completion of all required coursework on their Plan of Study, a student must take the Qualifying Examination. The Qualifying Examination is held twice per year. Students that have completed their Program of Study must take the qualifying examination the first time that it is offered. The Comprehensive Exam will be a written exam consisting of two four-hour sessions, administered on consecutive days. The intent of the Qualifying Examination is to test the student's mastery of the body of knowledge in their major, and to demonstrate their familiarity with current research in the field. The qualifying exam will, therefore, cover topics addressed during doctoral coursework, seminars, and in the recent scholarly literature. The Qualifying Examination will be written and graded by an Examination Committee appointed by the Program Director. This committee will normally consist of faculty from the student's major, minor, and research support fields.

If a student fails the Qualifying Examination at the first attempt, they must retake the exam the next time it is offered. During the interim period, the student may be required to retake courses in which, in the eyes of the Examination Committee, they have a deficiency. It is Graduate School policy that a student who fails the Qualifying Examination twice will be terminated from the program.

### **Admission to Candidacy**

The dissertation topic may be proposed after the student has passed the Qualifying Examination. Pursuant to Graduate School rules, a doctoral student advances to candidacy after the student's Advisory Committee and the Dean of the Graduate School approve the dissertation topic. Further pursuant to Graduate School rules, candidacy must be achieved at least six months before the degree is conferred.

### **Dissertation**

The student must complete and defend a dissertation based on a research program approved by the student's Dissertation Advisor and Advisory Committee which results in a high-quality, original and substantial piece of research. The student must orally present and defend the dissertation before the Advisory Committee in a defense that is open to the University Community. A copy of the dissertation must be made available to the Graduate Faculty of the Belk College at least three

weeks prior to the public defense. While the defense is open to the University Community, the deliberations of the Advisory Committee are held in Executive Session. The dissertation will be graded on a pass/unsatisfactory basis by the Advisory Committee and the Dean of the Graduate School.

The dissertation defense is the final examination. It is a Graduate School requirement that a student that fails the final examination twice will be terminated from the program.

#### **Residency Requirement**

The Ph.D. in Business Administration is a full-time program. Normally students must enroll for at least nine credit hours during each semester of the regular academic year (i.e., fall and spring) and at least six hours in the summer semester. Students may petition the Program Director for permission to enroll in less than nine semester hours (six semester hours in summer) in cases of hardship or other emergencies. Students that have passed their Qualifying Examinations must enroll in BPHD 8999 – Doctoral Dissertation Research for at least 9 hours during the fall and spring semester and 6 hours during the summer semester. It is a Graduate School requirement that a student must enroll in at least 18 total hours of Dissertation Research in order to graduate from the program.

Students that have completed all degree requirements, including the Dissertation Defense, may enroll once in BPHD 9999 – Doctoral Degree Graduate Residency Credit in order to meet Graduate School Residency requirements.

#### **Assistantships**

A number of graduate assistantships are available each year for qualified applicants. The Graduate School also has a limited number of fellowships available for highly qualified applicants.

#### **Language Requirement**

The program has no foreign language requirement.

#### **Transfer Credit**

Only courses with grades of A or B from an appropriate doctoral program at an AACSB accredited school may be accepted for transfer credit. Transfer credit must be approved by the Program Director, and cannot exceed the limit set by the Graduate School.

#### **Time Limit for Degree Completion**

The student must achieve candidacy for the Ph.D. degree within six years of enrolling in the program, and the student must complete all degree requirements within eight years of enrolling in the program. All courses listed on the Plan of Study must also meet Graduate School time requirements.

#### **Application for Degree**

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

#### **DOCTORAL COURSES IN BUSINESS ADMINISTRATION (BPHD)**

**BPHD 8100. Microeconomic Theory I. (3)** Prerequisite: Admission to Ph.D. in Business Administration or Permission of Instructor. Theories of the firm, of the consumer, and of resource owners; determination of prices under different market structures; general equilibrium analysis and welfare economics. (*Fall*)

**BPHD 8110. Microeconomic Theory II. (3)** Prerequisite: BPHD 8100. Study of game theory, its applications in microeconomic theory and finance, and topics on market equilibrium and market failure. The topics cover simultaneous-move games, dynamic games, analysis of competitive markets, market power, adverse selection and the principal-agent problem. (*Spring*)

**BPHD 8120. Econometrics I. (3)** Prerequisites: Admission to the Ph.D. in Business Administration or Permission of Instructor. Advanced study of the theory and application of statistics to economic problems. Topics include the derivation of least squares estimators, maximum likelihood estimation, and problems of multicollinearity, heteroskedasticity, and autocorrelation. (*Fall*)

~~**BPHD 8130. Econometrics II. (3)** Prerequisite: BPHD 8120. Advanced course in time series econometrics. The course focuses on time series methods that have become popular and are widely used in applied economics. The course focuses on~~



~~estimation of univariate and multivariate models (VAR, FAVAR, ECM, and SEM), estimation of dynamic factor models, construction of optimal forecasts and their properties, combination of forecasts. Issues of nonstationarity, cointegration are also examined. (Spring).~~

**BPHD 8130. Econometrics II. (3)** Prerequisite: BPHD 8120. Advanced course in cross section and panel data methods. The focus is on underlying assumptions regarding the population, specification, estimation, and testing of microeconomic models. Students will become acquainted with a variety of extensions of conventional linear models for cross-sectional and panel data, including panel data models, instrumental variables models, simultaneous equations models, and qualitative response models. (Spring).

**BPHD 8140. Econometrics III. (3)** Prerequisite: BPHD 8130. Advanced study of the econometric methods applicable to financial economic modeling. Examines the predictability of stock market returns, the event study methodology, single factor and multifactor models, basic principles of portfolio theory and portfolio evaluation. The course also covers topics on volatility modeling and fixed-income securities. (Fall)

~~**BPHD 8200. Financial Economic Theory. (3)** Prerequisites: Admission to Ph.D. in Business Administration or Permission of Instructor. Studies the main themes of financial economics using discrete-time models. Topics include risk measurement, choice under uncertainty, portfolio selection, capital asset pricing model (CAPM), Arrow-Debreu pricing, options and market completeness, the Martingale measure, the arbitrage pricing theory, consumption-based CAPM, and financial structure and firm evaluation. (Fall)~~

**BPHD 8200. Financial Economic Theory I. (3)** Prerequisites: Admission to Ph.D. in Business Administration or Permission of Instructor. Studies the main themes of financial economics using discrete-time models. Topics include mean-variance analysis, risk management principle, capital asset pricing model (CAPM), linear factor model, the arbitrage pricing theory, market completeness, consumption-based CAPM, multiperiod consumption and portfolio choice, market equilibrium, and contingent claim pricing. (Fall)

**BPHD 8210. Investments and Portfolio Theory. (3)** Prerequisites: BPHD 8200. Detailed introduction to modern investment and portfolio theory, including asset pricing. Covers standard and non-standard CAPM analysis, APT, stochastic dominance, efficient frontier analysis, optimal portfolio selection, fixed income and bond portfolios, options, futures pricing and evaluation of portfolio performance. The goal of the course is to provide a solid foundation in investments for students who will take further advanced courses in asset pricing. (Spring)

~~**BPHD 8220. Asset Pricing. (3)** Prerequisites: BPHD 8210. Introduction to multi-period models in finance, mainly pertaining to optimal portfolio choice and asset pricing. The course begins with discrete-time models for portfolio choice and security prices, and then moves to a continuous-time setting. The topics then covered include the Black-Scholes model of asset pricing and some of its extensions, models of the term structure of interest rates, valuation of corporate securities, portfolio choice in continuous-time settings, and finally, general equilibrium asset pricing models. (Fall)~~

**BPHD 8220. Financial Economic Theory II. (3)** Prerequisites: BPHD 8210. Introduction to asset pricing and portfolio choice theory. The course begins with discrete-time models, and then moves to a continuous-time setting. The topics covered include arbitrage, stochastic discount factors, beta pricing models, factor models, dynamic programming, derivative securities and models of the term structure of interest rates. (Fall)

**BPHD 8230. Theory of Corporate Finance. (3)** Prerequisites: BPHD 8200. The course covers the theory and evidence concerning major corporate financial policy issues including capital structure, payout policy, security design and issuance, capital budgeting, mergers and acquisitions, agency theory and financial contracting, and the market for corporate control. (Spring)

**BPHD 8240. Derivatives. (3)** Prerequisites: BPHD 8200. Theory and practice of financial derivatives markets including forwards, futures, options and interest rate markets. Topics include the economics of derivatives markets, pricing models for instruments in these markets, strategies for hedging and speculation, as well as regulatory and governance issues. Special attention is placed on the development of pricing models and advanced analytic techniques. (Fall)

**BPHD 8650. Advanced Seminar in Finance. (3)** Prerequisites: Permission of Instructor. This course covers advanced topics in Finance. Topics will vary. May be repeated for credit for different topics. (On demand)

**BPHD 8999. Doctoral Dissertation Research. (1-9)** Prerequisite: Admission to Candidacy for the Ph.D. in Business Administration. Each student will initiate and conduct an individual investigation culminating in the preparation and presentation of a doctoral dissertation. (*On demand*)

**BPHD 9999. Doctoral Degree Graduate Residency Credit. (1)** Meets Graduate School requirement for continuous enrollment during final term prior to graduation when all coursework has been completed. Pass/Unsatisfactory grading. Credit for this course does not count toward the degree. (*On demand*)

#### **RESEARCH SUPPORT COURSES (MATH)**

**MATH 8202. Partial Differential Equations for Finance. (3)** Cross-listed as MATH 6202. This course deals with those partial differential equations which are associated with financial derivatives based on factors such as equities and spot interest rates. (*Fall*)

**MATH 8203. Stochastic Calculus for Finance. (3)** Cross-listed as MATH 6203. An introduction to those aspects of partial differential equations and diffusion processes most relevant to finance, Random walk and first-step analysis, Markov property, martingales and semi-martingales, Brownian motion. Stochastic differential equations: Ito's lemma, backward and forward Kolmogorov equations, the Feynman-Kac formula, stopping times, Hull and White Models, Cox-Ingersoll-Ross Model. Applications to finance including portfolio optimization and option pricing. (*Spring*)

**MATH 8204. Numerical Methods for Financial Derivatives. (3)** Cross-listed as MATH 6204. This course will introduce students to numerical and computational techniques for solving both European- and American-style financial derivatives. The approach will be the finite difference method and the basic theoretical concepts will be introduced. Final projects will involve implementing the techniques on computers. Some spectral and Monte Carlo methods will also be discussed. (*Fall*)

**ECON 6257. Applied Computational Economics. (3)** Prerequisites: ECON 6201 and ECON 6202 or permission of the program coordinator. This course introduces computational approaches for solving economic models. Topics include: interpolation and approximation techniques, numerical optimization, numerical solutions to systems of nonlinear equations, quadrature formulas for numerical integration, Monte Carlo simulation, and basic solution algorithms for economic dynamics. (*On Demand*)

**MATH 6205. Financial Computing. (3)** This lab oriented course introduces the numerical methods needed for quantitative work in finance, focusing on derivative pricing and fixed income applications. Topics include: binomial and trinomial methods, Crank-Nicholson methods for various exotic options, treatment of discrete dividends, numerical methods for stochastic differential equations, random number generators, Monte-Carlo methods for European and American options. The computing course teaches theory and practice of numerical finance as well as the programming skills needed to build software systems in C/C++, Java, Javascript, and Mathematica/Matlab. (*Fall*)

**Course Number and Title:** BPHD 8130-001: Econometrics II

**Course Description:** Prerequisite: BPHD 8120. (3) Advanced course in cross section and panel data methods. The focus is on underlying assumptions regarding the population, specification, estimation, and testing of microeconomic models. Students will become acquainted with a variety of extensions of conventional linear models for cross-sectional and panel data, including panel data models, instrumental variables models, simultaneous equations models, qualitative response models, and hazard models. (*Spring*)

**Objectives of the course:** Students will understand the underlying assumptions regarding the population, specification, estimation, and testing of microeconomic models. In addition, they will become acquainted with a variety of extensions of conventional linear models for cross-sectional and panel data, including panel data models, instrumental variables models, simultaneous equations models, qualitative response models, and hazard models.

**Instructional Method:** This is primarily a lecture course.

**Means of Student Evaluation:** Your course grade will be determined by your performance on two in-class exams, a series of problem sets, and an empirical paper. These components, discussed below, will have the following weight in the calculation of your final grade:

<b>Midterm Exam</b>	<b>30%</b>
<b>Final Exam</b>	<b>35%</b>
<b>Problem Sets</b>	<b>10%</b>
<b>Empirical Paper</b>	<b>25%</b>

**Exams:** Makeup tests are administered only for extreme situations such as illness, death in the family, etc.

**Problem Sets:** Problem sets will be distributed with one week notice of the due date. You may work together on the problem sets. However, any programming statements for the problems involving estimation must be unique to each individual. In other words, do not turn in code with the same naming of variables and comment statements as someone else in the class. These problem sets may not be made up. Your grade will be discounted by 10 percent of the maximum grade for each day that it is late, with the first deduction taken when the assignment is not handed in by the end of class on the due date. Assignments not handed in by the class in which the problem set is returned will receive a grade of zero.

**Empirical Paper:** The objective of the empirical paper is for the student to conceptualize, conduct, and communicate research using one of the techniques covered in this course.

Following are the parameters for the paper:

1. The topic of the empirical paper may be of your choosing, but the paper must be solely written for this course. You should do a literature search to ensure that no one has conducted the exact empirical study that you are planning to do. In addition, I strongly suggest that you choose a topic that is consistent with your field of study.

2. The paper must use techniques developed in this course and must use cross section or panel data (not time series data). You are encouraged to use a technique besides OLS for your paper.
3. You will be graded on your ability to present your ideas and findings in a written manner and on the appropriate application of the empirical methods used.
4. On XXXX, you must provide to me a written summary of your topic and source of data. If you would like to provide more detail regarding the paper, I will give you feedback.
5. Students must participate in the peer review of papers by submitting a draft of your paper to Moodle by XXXX. Each student will be assigned two papers to review electronically and peer evaluations will be due on XXXX. I will not use your peer's evaluation of your paper in assessing your paper's final grade. However, part of your final grade will depend on your participation in the peer evaluation process.
6. The final paper should be limited to no more than eight pages double-spaced pages, using a 12 point font, of text plus an additional two pages for tables. I will not read more than eight pages of text. While eight pages may sound short, I will not require a theoretical section or literature review, both of which are relatively lengthy and fundamental sections of most published academic papers. I will also not require a conclusion section in which you would generally discuss extensions for future work. I suggest the following structure:
  - a. Introduction (1 page): This is the section in which you clearly define the question that your paper will address and why we should care about this topic.
  - b. Empirical Model (2 pages): This section provides a formal presentation of the statistical model, including an equation or equations written in basic notation, a discussion of the properties of the variables used in estimation, and a statement about the error structure. You should also clearly indicate key hypotheses and your approach to testing them. Please write the key structure of the model in generic terms ( $Y$ ,  $X$ ,  $Z$ , etc.) using very simple notation (for example,  $P_{it}$  to indicate the performance of firm  $i$  year  $t$ ).
  - c. Data (2 pages): You should describe the data source and variables used in the analysis. You should also note where your data may not be ideal but can be accommodated given specific econometric techniques. Be sure to fully disclose how you arrived at the sample used for estimation.
  - d. Results (3 pages): All tables (tables may be single spaced) of results should be self explanatory, not requiring the reader to look up acronyms or abbreviated variable names. I suggest that you peruse some academic journals with empirical papers, such as *Review of Economics and Statistics*, *Journal of Finance*, or *Journal of Public Economics*, to get a sense of the appropriate format for tables. Note that the tables do not just look like tables of output from Stata. In the discussion of empirical results, it is common to discuss model fit, the extent to which signs and magnitudes match hypotheses, and any remaining specification issues.
7. You should provide the output and programming statements used in your analysis, as well as an electronic version of the final paper by uploading them to Moodle by XXXX. On XXXX, we will also meet in person to allow you submit hard copies of your final papers.

8. There will be a penalty for late submissions of the draft, final paper, and peer reviews.

**Text:** The lectures will be based material from three texts and several articles. Readings for each class period are noted on the syllabus below, and information about additional articles will be given as the semester progresses.

1. Required: Wooldridge, Jeffrey, (2010). Econometric Analysis of Cross Section and Panel Data, 2<sup>nd</sup> edition, MIT Press.

For Stata programs corresponding to examples in Wooldridge (1<sup>st</sup> edition) see:  
<http://www.ats.ucla.edu/stat/stata/examples/eacspd/default.htm>

For Stata data corresponding to examples in Wooldridge (1<sup>st</sup> edition) see:  
<http://www.stata.com/texts/eacsap/>

2. Recommended: Stock, James and Mark Watson, (2007). Introduction to Econometrics.

For Stata programs and data corresponding to examples in Stock and Watson see:  
[http://wps.aw.com/aw\\_stock\\_ie\\_2/0,12040,3332253-,00.html](http://wps.aw.com/aw_stock_ie_2/0,12040,3332253-,00.html)

3. Recommended: Greene, William, (2008) Econometric Analysis, 6<sup>th</sup> Edition, Prentice Hall.

**Software:** I will support Stata for use in econometric estimation in this course, but you are welcome to use other software for estimation. Stata is available in the public student computer labs in the Friday building. You may purchase Stata at a reduced rate through the Direct-ship GradPlan for UNC-Chapel Hill. Follow this link for more information:

<http://stata.com/order/new/edu/gradplans/gp-direct.html> In addition, the following text may be very helpful as you learn Stata: Cameron, A. Colin and Pravin K Trivedi, (2009). Microeconometrics Using Stata: <http://www.stata.com/bookstore/mus.html>

**Grading Scale:** Letter grades will be based on the following scale (in percentage terms):

- A 90 and above
- B 80-89.99
- C 70-79.99
- U Below 70

**Communication:** Communication with those outside of class while class is in progress is not acceptable. (In other words, turn off all communication devices prior to the start of class.) Students are expected to check their UNC Charlotte e-mail ([username@uncc.edu](mailto:username@uncc.edu)) accounts weekly for correspondence regarding the course.

**Statement on Diversity:** The Belk College of Business strives to create an inclusive academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

**Attendance:** Classroom attendance is strongly recommended. I expect you to be in class on time and stay for the duration. If you do not plan to attend the entire lecture, please see me in advance or refrain from coming to class.

**Academic Integrity:** Please note that academic misconduct (cheating) will **NOT** be tolerated. In addition, students have the responsibility to know and observe the requirements of The UNC Charlotte Code of Student Academic Integrity. This code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty. Academic evaluations in this course include a judgment that the student's work is free from academic dishonesty of any type; and grades in this course therefore should be and will be adversely affected by academic dishonesty. Students who violate the code can be expelled from UNC Charlotte. The normal penalty for a first offense is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases, the course grade is reduced to U. Copies of the code can be obtained from the Dean of Students Office. Standards of academic integrity will be enforced in this course. Students are expected to report cases of academic dishonesty to the course instructor. In addition, the following rule regarding conduct applies:

### **Proposed Course Outline:**

**Topic 1:** Introduction, Conditional Expectations, and Related Material (Wooldridge 1, 2)

**Topic 2:** Basic Asymptotic Theory (Wooldridge 3; Greene Appendix D; Stock and Watson 2.6, 17.2, 17.3)

**Topic 3:** Single Equation Linear Model and OLS Estimation Review (Wooldridge 4; Greene 2, 3, 4, 5)

**Topic 4:** Instrumental Variables (Wooldridge 5, 6; Greene 12; Stock and Watson 12, 13 (13.7))

### **Mid Term Exam**

**Topic 5:** Systems of Equations and Simultaneous Equations Models (Wooldridge 7, 8, 9; Greene 13; Stock and Watson 12)

**Topic 6:** Panel Data (Wooldridge 7, 10; Greene 9; Stock and Watson 10)

**Topic 7:** Estimation by Maximum Likelihood, Discrete Response Models (Wooldridge 13, 15; Greene 15, 16, 23; Stock and Watson 11, 18.7)

**Topic 8:** Estimating Average Treatment Effects and Sample Selection and Attrition (Wooldridge 19.9, 21; Greene 24)

**Topic 9:** Duration Analysis (Wooldridge 20, Greene 25)

### **Final Exam**