The KCC Foundations Board invites KCC departments to propose a course for inclusion in the AA Degree Foundations category. The Foundations Board will review all proposals to ensure that approved courses meet Foundations Hallmarks. If clarification is needed, a Board member will contact the department chair. If the Foundations Board approves the proposal, all sections of the course will be designated as satisfying the requirement for five years.

Department Chairs should submit this form and accompanying materials directly to the Foundations Board Chair.

Deadlines: New course proposals can be submitted at any time, although the proposer should allow approximately one month for review by the Board and be mindful of publication deadlines for inclusion in the semester they would like the designation to take effect.

REQUESTED INFORMATION

1. **Course information.** Subject **BUS** Course number **250** (e.g., "ANTH")
   
   If the course is cross listed, please provide the cross-listing: Subject ______ Course # ______
   
   Course title: **Applied Math in Business**

2. **Foundations area requested.** Check one.
   
   _____Written Communication  __X__Symbolic Reasoning  _____Global & Multicultural Perspectives

3. **Official course description.** Submit a copy of the course description from the current Catalog. The course description must be consistent with the Hallmarks of the Foundations area (see page 2).
   
   If the course is new or being modified to reflect the Hallmarks, the proposer must also follow the appropriate Curriculum Approval process.

4. **Course Outline.** Submit the Course Outline approved by the Curriculum Committee and course syllabus. If multiple instructors teach the course and use varying texts and/or assignments, include representative syllabi.

5. **Assessment.** Provide a brief explanation of how the department will demonstrate in five years that this course has been meeting the Foundations Hallmarks.

6. **Application questions.** Provide the requested information for the Foundations area (see page 2).

7. **Signatures.** Department chair’s signature is required.

---

Rosemae Harrington

Department chair’s printed name  Department chair’s signature  date

roseh@hawaii.edu  4303 Diamond Head  734-9143

Dept. chair’s email  campus address  campus phone
Foundations Hallmarks & Application Questions

WRITTEN COMMUNICATION (FW)

1. Students are introduced to different forms of college-level writing, including, but not limited to, academic discourse, and are guided in writing for different purposes and audiences. What forms of writing are taught in the course? What purposes and what audiences will students address?

2. Students get guided practice of writing processes (planning, drafting, critiquing, revising, and editing) and making effective use of written and oral feedback from the faculty instructor and from peers. How will the instructors guide students and help them make effective use of instructor and peer feedback?

3. Instructors help students develop information literacy by teaching search strategies, critical evaluation of information and sources, and effective selection of information for specific purposes and audiences. Instructors also teach appropriate ways to incorporate such information, acknowledge sources and provide citations. How will instructors help students develop information literacy? How will students learn to incorporate and acknowledge sources appropriately?

4. Instructors help students read texts and make use of a variety of sources in expressing their own ideas, perspectives, and/or opinions in writing. What reading strategies will be taught? How will students learn to make effective use of sources in their own writing?

5. Student complete at least 5000 words of finished prose—equivalent to approximately 20 typewritten pages. How many pages of finished prose will each student complete?

SYMBOLIC REASONING (FS)

1. Students will be exposed to the beauty, power, clarity and precision of formal systems. How will the course meet this hallmark?

2. Instructors will help students understand the concept of proof as a chain of inferences. How will instructors help students understand this concept?

3. Instructors will teach students how to apply formal rules or algorithms. How will instructors meet this hallmark?

4. Students will be required to use appropriate symbolic techniques in the context of problem solving, and in the presentation and critical evaluation of evidence. What symbolic techniques will be required and in what contexts? How will presentations and evaluations of evidence be incorporated into the course?

5. The course will not focus solely on computational skills. What reasoning skills will be taught in the course?

6. Instructors will build a bridge from theory to practice and show students how to traverse this bridge. How will instructors help students make connections between theory and practice?

GLOBAL AND MULTICULTURAL PERSPECTIVES (FG)

1. From multiple perspectives, the course analyzes the development of human societies and their cultural traditions through time and throughout the world, including Africa, the Americas, Asia, Europe, and Oceania. Which human societies and cultural traditions are analyzed? What perspectives are employed? What time periods are covered?

2. The course offers a broad, integrated analysis of cultural, economic, political, scientific, and/or social development that recognizes the diversity of human societies and their cultural traditions. Which of these aspects of development are analyzed? How does the course recognize diversity? In what ways are analyses integrated?

3. While recognizing diversity, the course also examines processes of cross-cultural interaction and exchange that have linked the world's peoples through time. What processes of cross-cultural interaction are examined?

4. The course includes at least one component on Hawaiian, Pacific, and Asian societies and their cultural traditions. What components of Hawaiian, Pacific, and Asian societies and their cultural traditions are included in the course?

5. The course engages students in the study and analysis of writings, narratives, texts, artifacts, and/or practices that represent the perspectives of different societies and cultural traditions. List the items that students will analyze and briefly explain what perspectives they represent.

6. In combination, a student's two FG courses will provide a large-scale analysis of human development and change over time from prehistory to the present. Each FG course will be placed into one of three groups: (A) content primarily before 1500 CE, (B) content primarily after 1500 CE, or (C) pre-history to present. Students must take two courses from different groups. Where does your course best fit in this scheme (Group A, B, or C)?
Request for BUS 250 Applied Math in Business as a New FS course

Kapi‘olani Community College, Fall 2006

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18 Suggested Course Syllabus

Prepared by Alfred J. Seita
Business Education/ICS Faculty
alfreds@hawaii.edu
KCC campus extension: x9458
Course Description (from Course Outline)

COURSE INFORMATION:

**BUS 250 Applied Math in Business (3)  AA/FS**
3 hours lecture per week
Prerequisite(s): A grade of “C” or higher in MATH 103, or a grade of “C” or higher in MATH 27, or qualification for MATH 135.

BUS 250 covers the algebra and geometry of linear, quadratic, exponential, and logarithmic functions as applied to the mathematics of finance – annuities, perpetuities, present value. Bus 250 also covers derivatives, graphical analysis, and mathematical models as applied to business, with selected coverage of algebra, geometry, and calculus emphasizing business applications and decision-making. This course satisfies the Business Math requirement for UH Manoa’s College of Business Administration.

COURSE OBJECTIVES/COMPETENCIES:

Upon successful completion of BUS 250, the student should be able to:

- Solve linear, quadratic, exponential and logarithmic equations – with applications to business like solving for interest rate(s) and solving for various terms of investment.
- Describe the derivative of a function, and apply rules for differentiation.
- Apply derivatives in curve sketching with applications to business as in solving for marginal revenue/cost, marginal tax rate, minimum cost, and maximum profit.
- Calculate present and future values (PV and FV) of simple and compound interest.
- Apply formulas for interest to solve problems involving installment buying and credit card purchases.
- Apply formulas for interest to solve problems involving debt consolidation and rescheduling of debt payments.
- Apply formulas for interest to solve problems involving issuing and discounting promissory notes, and government/corporate bonds.
- Solve for PV, FV, payment, interest, and duration of ordinary/due simple annuities, general annuities, deferred annuities, sinking funds, and constant growth annuities.
- Solve for PV, payment, and interest rate for ordinary and due perpetuities.
- Describe the various types of mortgage loans; use amortization schedules, and calculate the various components of mortgage payment(s)
- Apply amortization tables to calculate the various components of mortgage payments(s), and refinancing options.
- Master the use of financial calculator(s) and Excel to formulate, analyze, and interpret mathematical models in business, and to develop models to solve TVM problem
II  How the course meets the Hallmarks

**Hallmark 1.** Expose students to the beauty, power, clarity and precision of formal systems.

The breadth of material utilizes numerous symbolic techniques such as Functions, Logarithmic and Exponential Equations, Limits, Continuity, and the Derivative to illustrate concepts and to serve as a foundation for understanding and solving quantitative problems in business applications. The Business Education faculty will introduce real world business examples from relevant topics through lectures and/or group activities. These examples will serve as a starting point to derive general quantitative rules, shown symbolically, and to introduce proofs of theorems that form the basis for solving applied problems. This logical progression from the specific to the general helps illustrate the beauty of formal systems. The theoretical underpinning will be reinforced through quiz exercises and project activities that are specifically selected to show students the power and precision of formal systems.

Below is sample material (Tan, S.T. Applied Mathematics for the Managerial, Life and Social Sciences. Belmont: Thomson Brooks/Cole., 2007. 194) that a lecture/group activity would be based on to derive/prove (via Mathematical induction) the formula for the compound Interest Formula (Accumulated Amount).

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In contrast to simple interest, earned interest that is periodically added to the principal and thereafter itself earns interest at the same rate is called **compound interest.** To find a formula for the accumulated amount, let’s consider a numerical example.

The interval of time between successive interest calculations is called the **conversion period.**

If interest at a nominal rate of \( r \) per year is compounded \( m \) times a year on a principal of \( P \) dollars, then the simple interest rate per conversion period is

\[
i = \frac{r}{m}
\]

where \( m \) is the number of conversion periods per year.

To find a general formula for the accumulated amount when a principal of \( P \) dollars is deposited in a bank for a term of \( t \) years and earns interest at the (nominal) rate of \( r \) per year compounded \( m \) times per year, we proceed as before, using (1) repeatedly with the interest rate \( i = r/m \). We see that the accumulated amount at the end of each period is

First period: \( A_1 = P(1 + i) \)

Second period: \( A_2 = A_1(1 + i) = [P(1 + i)](1 + i) = P(1 + i)^2 \)

Third period: \( A_3 = A_2(1 + i) = [P(1 + i)^2](1 + i) = P(1 + i)^3 \)

...  

\[ A_n = A_{n-1}(1 + i) = [P(1 + i)^{n-1}](1 + i) = P(1 + i)^n \]

But there are \( n = mt \) periods in \( t \) years (number of conversion periods times the term). Therefore, the accumulated amount at the end of \( t \) years is given by

\[
A = P(1 + i)^n
\]

**Compound Interest Formula (Accumulated Amount)**

\[
A = P(1 + i)^n
\]

where \( i = \frac{r}{m} \), \( n = mt \), and

- \( A \) = Accumulated amount at the end of \( n \) conversion periods
- \( P \) = Principal
- \( r \) = Nominal interest rate per year
- \( m \) = Number of conversion periods per year
- \( t \) = Term (number of years)
**Hallmark 2.** Help students understand the concept of a proof as a chain of inferences.

Proof using a chain of inferences will be presented to help students understand the logical validity of theorems and formulas, and why they have meaning or value in their direct use in solving problems.

An example activity is to first derive the formula for sum of terms in a Geometric Progression.

\[
\frac{ar^{n+1} - a}{r - 1} \quad \text{when } r \neq 1
\]

This formula will then be proved through mathematical induction.

Students are assigned problems that derive formulas. The following is a finance example.

Suppose an initial investment of $P$ grows to an accumulated amount of $A$ in $t$ years. Show that the effective rate (annual effective yield) is

\[
r_{eff} = (A/P)^{1/t} - 1
\]

Listed below are some proof problems from various mathematical topics to be covered in lecture, group, and/or assigned as homework.

1. Use the definition of a logarithm to prove that: \( \log_b mn = \log_b m + \log_b n \)

2. Prove that a polynomial function \( y = P(x) \) is continuous at every number \( x \).

3. Prove the power rule of differentiation for special case \( n = 3 \).
Hallmark 3. Teach students how to apply formal rules of algorithms.

Students are also introduced to the formalism of rules used in solving formulas. Examples are numerous in the Calculus portion of the course.

Below is the material (Tan, S.T. Applied Mathematics for the Managerial, Life and Social Sciences. Belmont: Thomson Brooks/Cole., 2007. 603) that a lecture/group activity would be based on to work on formal rules of algorithm.

Discussion/assigned problems to illustrate the use of the formal process.

I. Find the slope of the tangent line to the graph of \( f(x) = 3x + 5 \) at any point \((x, f(x))\).

II. Let \( f(x) = x^2 \)
a. Find $f'(x)$.
b. Compute $f'(2)$ and interpret your result.

III. The management of Titan Tire Company has determined that the weekly demand function of the Super Titan tires is given by

$$p = f(x) = 144 - x^2$$

where $p$ is measured in dollars and $x$ is measured in units of a thousand.

Find the average rate of change in the unit price of a tire if the quantity demanded is between 5000 and 6000 tires, between 5000 and 5100 tires, and between 5000 and 5010 tires.
Hallmark 4. Require students to use appropriate symbolic techniques in the context of problem solving, and in the presentation and critical evaluation of evidence.

The use of symbolic techniques in the context of problem solving, and in the presentation and critical evaluation of evidence are essential parts of this course. Symbolic techniques are used to precisely capture the essence of quantitative relationships that would be difficult to represent in words. In a real world context, students will do project work that requires an evaluation of available, and often conflicting or spurious, evidence and distill what is meaningful and relevant into a logical, meaningful symbolic representation. This will require distinguishing between factual statements and superfluous sentences, relevant and irrelevant information, and constructing formal representation of meaningful argument.

The varied real problems assigned throughout the course provides for the necessary coverage of mathematical symbolic techniques. Some examples are listed below.

I. The owner of the Rancho Hawaii has 3000 yards of fencing with which to enclose a rectangular piece of grazing land along the straight portion of Manoa Stream. Fencing is not required along the river. Find a function \( f \) giving the area of grazing land if the owner uses all of the fencing.

II. If exactly 200 people sign up for a charter flight. Maui Pleasure for You Travel Agency charges $300 per person. However, if more than 200 people sign up for the flight (assume this is the case), then each fare is reduced by $1 for each additional person. Find a function giving the revenue realized by the company.

III. The membership of the Fitness Center, which opened a few years ago, is approximated by the function

\[
N(t) = 100(64 + 4t)^{2/3} \quad (0 \leq t \leq 52)
\]

where \( N(t) \) gives the number of members at the beginning of week \( t \).

a. Find \( N'(t) \).
b. How fast was the center’s membership increasing initially \( (t = 0) \)?
c. How fast was the member increasing at the beginning of the 40\(^{th}\) week?
d. What was the membership when the center first opened? At the beginning of the 40\(^{th}\) week.

IV. The total loans outstanding at all Japanese banks have been declining in recent years. The function

\[
L(t) = 4.6e^{-0.04t} \quad (0 \leq t \leq 6)
\]

gives the approximate total loans outstanding from 1998 \( (t=0) \) through 2004 in trillions of dollars.

a. What were the total loans outstanding in 1998? In 2004?
b. How fast were the total loans outstanding declining in 1998? In 2004?
Hallmark 5. Not focus solely on computational skills.

This course utilizes symbolic techniques to understand and evaluate real world problems. While problem solving skills are taught throughout, the instructor will expose students to their appropriate and inappropriate uses and the limitations and implications of the results produced. The process of developing models and selecting appropriate symbolic techniques will also be detailed. For example, part of this course will involve the development of models to solve Time Value of Money (TVM) problems.

A lecture, such as the concept of Mathematical Modeling, is introduced that will be the basis for students to developing quantitative relationships, analyzing problems and finding their solutions. The process is illustrated in the following figure (Tan, S.T. Applied Mathematics for the Managerial, Life and Social Sciences. Belmont: Thomson Brooks/Cole., 2007. 140).

Appropriate problems will be assigned on group, quiz, and project assignments. A representative problem is concerning a Mathematical Model is given below: (Tan, S.T. Applied Mathematics for the Managerial, Life and Social Sciences. Belmont: Thomson Brooks/Cole., 2007. 142-143)
**Hallmark 6.** Build a bridge from theory to practice and show students how to traverse this bridge.

This course is primarily application oriented. Real problems are used to lead to the derivation of theories (formulas) used to solve similar problems. Examples like the one given in Hallmark 1 provide a first step in bridging theory and application. The instructor will complete the bridging process by walking through problems with students in class and through appropriate quiz and project assignments.

Example quiz problems involving finance are listed below.

I. Find how much money should be deposited in a bank paying interest at the rate of 8.5%/year compounded quarterly so that at the end of 5 years the accumulated amount will be $40,000.

II. Maxwell started a home theater business in 2002. The revenue of his company for that year was $240,000. The revenue grew by 20% in 2003 and 30% in 2004. Maxwell projected that the revenue growth for his company within the next 3 years will be at least 25%/year. How much does Maxwell expect his minimum revenue to be for 2007?

III. Online retail sales stood at $23.5 billion for the year 2000. For the next 2 years, they grew 33.2% and 27.8% per year respectively. For the next 6 years, online retail sales are projected to grow at 30.5%, 19.9%, 24.3%, 14.0%, 17.6% and 10.5% per year respectively. What are the projected online sales for 2008?

IV. Investment A offers a 10% return compounded semiannually, and investment B offers a 9.75% return compounded continuously. Which investment has a higher rate of return over a 4-year period?

V. Hawaiian Veggies Cooperative had sales of $1,000,000 in its first year of operation. If sales increased by 6% per year thereafter, find Hawaii Veggies Cooperative’s sales in the seventh year and its total sales over the first seven years of operation.
III. Course Outline

KAPI'OLANI COMMUNITY COLLEGE
University of Hawai'i

COURSE OUTLINE (Form: 02/02/02)

BUS 250 Applied Math in Business


BUS 250 Applied Math in Business (3) KCC AA/FS and KCC AS/ML

3 hours lecture per week

Prerequisite(s): A grade of “C” or higher in MATH 103, or a grade of “C” or higher in MATH 27, or qualification for MATH 135.

Recommended Preparation: Qualification for ENG 100 or ESL 100; ICS 100 or ICS 101

BUS 250 covers the algebra and geometry of linear, quadratic, exponential, and logarithmic functions as applied to the mathematics of finance – annuities, perpetuities, present value. BUS 250 also covers derivatives, graphical analysis, and mathematical models as applied to business, with selected coverage of algebra, geometry, and calculus emphasizing business applications and decision making.

2. COURSE OBJECTIVES/COMPETENCIES:

Upon successful completion of BUS 250, the student should be able to:

... Solve linear, quadratic, exponential and logarithmic equations – with applications to business like solving for interest rate(s) and solving for various terms of investment.

... Describe the derivative of a function, and apply rules for differentiation.

... Apply derivatives in curve sketching with applications to business as in solving for marginal revenue/cost, marginal tax rate, minimum cost, and maximum profit.

... Calculate present and future values (PV and FV) of simple and compound interest.

... Apply formulas for interest to solve problems involving installment buying and credit card purchases.

... Apply formulas for interest to solve problems involving debt consolidation and rescheduling of debt payments.

... Apply formulas for interest to solve problems involving issuing and discounting promissory notes, and government/corporate bonds.

... Solve for PV, FV, payment, interest, and duration of ordinary/due simple annuities, general annuities, deferred annuities, sinking funds, and constant growth annuities.

... Solve for PV, payment, and interest rate for ordinary and due perpetuities.

... Describe the various types of mortgage loans; use amortization schedules, and calculate the various components of mortgage payment(s)
… Apply amortization tables to calculate the various components of mortgage payments(s), and refinancing options.

… Master the use of financial calculator(s) and Excel to formulate, analyze, and interpret mathematical models in business, and to develop models to solve time value of money (TVM) problems.

3. GENERAL EDUCATION AND RELATIONSHIP TO OTHER COURSES:

BUS 250 is a course that if approved will be included in the proposed Associate in Arts with a Concentration in Business Administration (AACBA) Degree program. BUS 250 is the same course offered by the Shidler College of Business at UH Manoa. It is an alternative to MATH 203. BUS 250 provides students with the proper skills in mathematics to support the course requirements in the Shidler College of Business at UH Manoa. BUS 250 is a course on the formulation, analysis, and interpretation of mathematical models in finance and interest theory. BUS 250 is a lecture course that meets in a computer room with Internet access. BUS 250 will give students lecture directed hands-on experience in developing and solving their own models. Applications to "real-world" problems in interest theory, including the development of general annuity models, will be emphasized.

The prerequisite MATH 27, MATH 103, or qualification of Math 135 is required to ensure that students have the basic algebra and the exposure to functions required to successfully work on the new material presented in BUS 250.

The recommended preparation of the qualification of ENG 100 or ESL 100 provides the foundation for the student to understand the business problems and to clearly explain the business math solutions.

BUS 250 makes use of computers in the classroom. The recommended preparation of ICS 100 or ICS 101 will provide students with extensive use of computers which would be beneficial to any student taking BUS 250.

This course supports the following college competency areas:

Computation and communication abilities

Quality of life as affected by technology and science

Problem-solving and decision-making abilities

This course also satisfies the following Associate in Arts degree competencies:

AA - Critical Thinking

Critical thinking, an analytical and creative process, is essential to every content area and discipline. It is an integral part of information retrieval and technology, oral communication, quantitative reasoning, and written communication. Upon completion of an A.A. degree, the student should be able to:

• Identify and state problems, issues, arguments, and questions contained in a body of information.

• Identify and analyze assumptions and underlying points of view relating to an issue or problem.

• Formulate research questions that require descriptive and explanatory analyses.

• Recognize and understand multiple modes of inquiry, including investigative methods based on observation and analysis.

• Evaluate a problem, distinguishing between relevant and irrelevant facts, opinions, assumptions, issues, values, and biases through the use of appropriate evidence.
• Apply problem-solving techniques and skills, including the rules of logic and logical sequence.

• Synthesize information from various sources, drawing appropriate conclusions.

• Communicate clearly and concisely the methods and results of logical reasoning.

• Reflect upon and evaluate their thought processes, value systems, and worldviews in comparison to those of others.

AA - Quantitative Reasoning

Quantitative reasoning can have applications in all content areas and disciplines. Upon completion of an A.A. degree, the student should be able to:

• Apply numeric, graphic, and symbolic skills and other forms of quantitative reasoning accurately and appropriately.

• Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.

• Communicate clearly and concisely the methods and results of quantitative problem solving.

• Formulate and test hypotheses using numerical experimentation.

• Define quantitative issues and problems, gather relevant information, analyze that information, and present results.

This course also satisfies the following Associate in Science degree competencies:

AS

· Employ skills and understanding in language and mathematics essential to fulfill program requirements.

· Recognize effects of technology and science on the natural and human environments.

· Demonstrate proficiency in conceptual, analytical, and critical modes of thinking.

· Demonstrate competence in a selected program of study.

BUS 250 satisfies the following departmental and/or program competencies:

Upon completion of an A.A. degree, the student should be able to:

· Reason mathematically and understand mathematical concepts.

· Apply mathematical reasoning and concepts in a study of the relationship of mathematics to the modern world.

4. COURSE CONTENT:

I. Equations with applications to business (9 hours)

    Linear
II. Derivatives of functions (6 hours)

Differentiation

Curve sketching

III. Interest (6 hours)

Present and future Value

Time value of money

Installment buying and credit card purchases

IV. Annuities and perpetuities (9 hours)

Present and future (as appropriate) values

V. Amortization (3 hours)

Schedules

Tables

VI. Mastery of financial calculator(s) (6 hours)

VII. Mastery of spreadsheets (6 hours)

5. POSSIBLE TEXTS:


Supplies and equipment: A financial calculator.

6. METHODS OF INSTRUCTION:

This is a lecture course that meets in a computer room with Internet access on the formulation, analysis, and interpretation of mathematical models in finance and interest theory. BUS 250 will give students lecture directed hands-on experience in developing and solving their own models. Applications to "real-world" problems in interest theory, including the development of general annuity models, will be emphasized.

7. METHOD OF EVALUATION:

A student's grade in the course is determined by computing an average of the semester's course work, including:
<table>
<thead>
<tr>
<th>group and individual projects</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>unit exams</td>
<td>30%</td>
</tr>
<tr>
<td>cumulative final</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

In the Business Education Department grades are assigned according to the following scale:

90 - 100% = A
80 - 89% = B
70 - 79% = C
60 - 69% = D
less than 60% = F

Whatever method of evaluation is used, it is understood that the instructor reserves the right to make necessary and reasonable adjustments to the evaluation policies outlined.

8. JUSTIFICATION:

A. This curriculum addition offers an alternative to MATH 203. The course focus is on the mathematical competencies required for success in upper level Business courses in a Business Administration program. The Shidler College of Business at UH Manoa currently accepts BUS 250 as an alternative to MATH 203. BUS 250 qualifies as another option for system-wide students, especially community college students, to gain the necessary theory and practice in using symbolic techniques and quantitative methods in problem solving as they apply to problems in business and management.

B. This is not an experimental course.

C. This course will not increase or decrease the number of required hours needed for a certificate or degree.

9. RESOURCE REQUIREMENTS:

A. This proposal requires the Business Education Department to find class time, space, and faculty to offer the course. After careful review, the Business Education chair has determined the Business Education Department is able to support the addition of this course.

B. This proposal may impact the Business Education Department’s offering of BUS 100. The Business Education Department will be able handle the resource requirements for both BUS 100 and BUS 250. This course may also be used by other programs who currently use MATH 203, such as the pre-TIM program.

A discussion with Math/Science department has occurred since BUS 250 may impact the enrollment of MATH 203.

C. Maximum enrollment per class section is 25. It is expected that demand for this course will be met by offering one section per semester for the foreseeable future.
10. ARTICULATION:
A. Similar courses at UH colleges:
KapCC: MATH 203, Calculus for Business and the Social Sciences, 3 credits
UH Manoa: NREM 203, Applied Calculus for Management, Life Sciences, and Human Resources, 3 credits.
UH Manoa: MATH 203, Calculus for Business and the Social Sciences, 3 credits.
UH Hilo: MATH 115, Applied Calculus, 3 credits.
Honolulu CC: QM 122, Mathematics for Decision Making, 3 credits.
Leeward CC: QM 122, Mathematics for Decision Making, 3 credits.
Maui CC: QM 252, Applied Math for Business, 3 credits.
Windward CC: MATH 203, Calculus for Business and the Social Sciences, 3 credits.

The prerequisites for Kapi‘olani’s BUS 250 differ from the listed courses above. UH Manoa’s BUS 250 and NREM 203 do not have prerequisites. Other courses such as QM 122, QM 252, and MATH 203 have higher prerequisites.

B. Is this course appropriate for articulation with the UH Manoa General Education Core Requirements?
This course is equivalent to BUS 250 offered by the Shidler College of Business at UH Manoa; therefore, it is appropriate for articulation with UH Manoa General Education Core under Symbolic Reasoning (FS).

C. Is this course appropriate for articulation with any other department or college requirements in the UH system?
This course is appropriate for articulation; it is equivalent to

IV. Suggested Course Syllabus

KAPI‘OLANI COMMUNITY COLLEGE
BUSINESS EDUCATION DEPARTMENT
BUS 250 Applied Math in Business
Sample Course Syllabus: Fall 2007

Instructor: Alfred J. Seita
Office: Kopiko 112
Office Telephone: 734-9458
Office Hours: 1pm–2pm Monday/Wednesday. Also by appointment at a mutually agreed time
Email: alfreds@hawaii.edu

Course Description:

BUS 250 covers the algebra and geometry of linear, quadratic, exponential, and logarithmic functions as applied to the mathematics of finance – annuities, perpetuities, present value. Bus 250 also covers derivatives, graphical analysis, and mathematical models as applied to business, with selected coverage of algebra, geometry, and calculus emphasizing business applications and decision-making. This course satisfies the Business Math requirement for UH Manoa’s College of Business Administration.

Prerequisites:
Grade of “C” or higher in MATH 103, or a grade of “C” or higher in MATH 27, or qualification for MATH 135.

Recommended Preparation:
Qualification for ENG 100 or ESL 100; Plane Geometry; ICS 100 or ICS 101

Required Texts:

Additional Materials:
A financial calculator
USB flash drive with a minimum capacity of 64MB

Course Competencies:

Upon successful completion of BUS 250, the student should be able to:

... Solve linear, quadratic, exponential and logarithmic equations – with applications to business like solving for interest rate(s) and solving for various terms of investment.

... Describe the derivative of a function, and apply rules for differentiation.
... Apply derivatives in curve sketching with applications to business as in solving for marginal revenue/cost, marginal tax rate, minimum cost, and maximum profit.

... Calculate present and future values (PV and FV) of simple and compound interest.

... Apply formulas for interest to solve problems involving installment buying and credit card purchases.

... Apply formulas for interest to solve problems involving debt consolidation and rescheduling of debt payments.

... Apply formulas for interest to solve problems involving issuing and discounting promissory notes, and government/corporate bonds.

... Solve for PV, FV, payment, interest, and duration of ordinary/due simple annuities, general annuities, deferred annuities, sinking funds, and constant growth annuities.

... Solve for PV, payment, and interest rate for ordinary and due perpetuities.

... Describe the various types of mortgage loans; use amortization schedules, and calculate the various components of mortgage payment(s)

... Apply amortization tables to calculate the various components of mortgage payments(s), and refinancing options.

... Master the use of financial calculator(s) and Excel to formulate, analyze, and interpret mathematical models in business, and to develop models to solve time value of money (TVM) problems.

**BUS 250 Course Policy**

**Attendance:**

1. Regular class attendance is expected. Always be present, alert, and observant for the entire class period. Please, don't be a zombie! Also, don't be late; otherwise, you will miss important parts of the lecture and hands-on computer activities. Some of the activities are cumulative in knowledge. This means that if you do not come to class, you will NOT likely understand the materials presented during the next class period.

2. If you are late or miss a class, you are still responsible for obtaining notes on the materials covered in class. You should obtain notes from your classmates and any handouts, assignments, and lectures material at http://starlite.kcc.hawaii.edu/aseita/BUS250. Also, check the class WebBoard discussion list at http://brtc.kcc.hawaii.edu:8080/~BUS.

3. Your instructor is not obligated to give you a private lecture for materials covered during the period in which you were absent for whatever reason.

**Exams:**

1. Makeup exams are rarely given. You must have a very good reason as determined by only the instructor.

2. The final exam is required to pass the course regardless of your average before the final.

3. The exams may consist of true/false, multiple-choice, matching, fill in the blank, definitions, essays, and/or problem solving type questions. The exam may also involve hands-on work with the computer. Materials for the exam will come from the textbook, lectures, handouts, quizzes, and projects.
Quizzes:
1. Most of the quizzes will involve a group activity in class. The remaining quizzes will be take-home. Quizzes are given throughout the semester.
2. There is no makeup for in class group activity quiz. You must be present and participating in class to earn points on a group quiz.
3. Quizzes may introduce new materials not covered in class!

Projects:
1. A project is due on the designated date and time. A project not submitted on time is considered at least a day late. A maximum of up to 10 percent may be deducted per day. After one week the project has no value.
2. Please start projects early, because no extensions will be granted for any unanticipated events, such as a power failure at the Business Education computing labs occurring on the day the project is due.
3. Some projects may introduce new materials not covered in class! Projects may require group participation.

Evaluating Electronically delivered assignments:
Due to the nature of electronic delivery, the instructor could receive many deliveries by each student trying to fulfill the requirements of a quiz or project. Because of the number deliveries, the instructor has the following rules:
1. All assignments delivered by the due date and times are considered on-time. The latest of these assignments will be saved and evaluated. Any updated assignment to what was delivered on-time will not be considered.
2. All assignments delivered after the due date and time are considered late. These assignments will be saved and evaluated. Any updated assignment to what was already saved and evaluated will not be considered.

What does this mean?
1. The instructor will only evaluate an assignment once.
2. You should not submit a project that is poorly done just to make the deadline. It would be better to have the point deduction. Be aware, that a quiz has no point value once it has been evaluated (i.e., the answers are out). Points will be deducted for late projects and quizzes.

Class Materials:
Students are responsible for class materials presented directly through lectures and indirectly through handouts, assignments, and other ancillary materials presented/distributed in class or posted on the class Website at http://starlite.kcc.hawaii.edu/aseita/BUS250 and on the class WebBoard discussion list at http://brtc.kcc.hawaii.edu:8080/~BUS.

Cheating and Plagiarism:
Any student, including collaborators, who cheats or plagiarizes on any quiz, exam, or project will receive an “F” for the course.

Students with Disabilities:
Extended time in a distraction-free environment is an appropriate accommodation based on the student's disability. If you do have a disability and have not voluntarily disclosed the nature of your disability and the support you need, you are invited to contact the Special Student Services Office, 734-9552, Ilima 105.
**Course Format:**
Lectures, discussions, demonstrations, group activities, quizzes, and projects will be used to present the course material. Questions and problems relating to each topic will be discussed in class as time permits. There is a good amount of hands-on work with the computer, but most of it will be done outside of class on the projects! The hands-on that is done in class is to demonstrate and observe certain important mathematical concepts and applications. The hands-on is controlled and not meant for the student to become proficient in the use of the computer on both the hardware and the software application. It is assumed that the student has the recommended computer preparation.

You cannot fully participate in hands-on activities without your USB flash drive. Always bring your flash drive to class.

**Professionalism:**
1. Unless specified otherwise, all computers are powered down while a lecture is in progress. There will be no printouts in the instruction lab before, during, or after a lecture. Please be considerate of others by returning computer equipment to its original state (e.g., keyboard on the table and not on the monitor).
2. There is NO eating in class.
3. Students who bring pagers or beepers to class are expected to put them on VIBRATOR mode. As a precaution, turn off your beeper and/or cellular phone before you enter the classroom.
4. Students are expected to behave. Behavior that disrupts or interferes with other student’s learning will not be tolerated.
5. All assignments are assumed to be done in a professional manner (e.g., used and/or scratch paper is inappropriate for any assignment submitted in this course). Deductions will occur for unprofessional assignments.

**Student Evaluation:** Individual performance will be measured based on the following criteria.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Points</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Projects</td>
<td>3 x 100 = 300</td>
<td>30 %</td>
</tr>
<tr>
<td>10 Quizzes</td>
<td>10 x 20 = 200</td>
<td>20 %</td>
</tr>
<tr>
<td>3 Section Exams</td>
<td>3 x 100 = 300</td>
<td>30 %</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200</td>
<td>20 %</td>
</tr>
<tr>
<td>Total Points</td>
<td>1,000</td>
<td>100 %</td>
</tr>
</tbody>
</table>

**Final Letter Assignment:**

<table>
<thead>
<tr>
<th>Letter</th>
<th>Average</th>
<th>Letter Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100</td>
<td>Superior level of competence in the subject</td>
</tr>
<tr>
<td>B</td>
<td>80 - 89</td>
<td>High level of competence in the subject</td>
</tr>
<tr>
<td>C</td>
<td>70 - 79</td>
<td>Acceptable level of competence</td>
</tr>
<tr>
<td>D</td>
<td>60 - 69</td>
<td>Below Acceptable level of competence</td>
</tr>
<tr>
<td>F</td>
<td>0 - 59</td>
<td>Unacceptable level of competence</td>
</tr>
</tbody>
</table>

**Survivor Tips:**
Don't disappear and assume that the instructor has dropped you from the course. College policy prevents an instructor from dropping any student without his/her permission. Therefore, if you disappear, the instructor has no alternative but to give you an F. If for any reason you cannot complete the course, please obtain the necessary ADD/DROP form from the Admissions Office and have the instructor sign it.

**Incomplete:**
An incomplete is rarely given and then only upon extreme medical or personal hardship to the student.
Deadlines:
Be aware of administration deadlines. The Schedule of Classes has all the important dates such as the last day to withdraw without a “W,” last day for withdrawals, and the dates for the final exams. In addition, always be aware of important project and exam dates listed in this syllabus.

BUS 150 Web Site:
The URL is http://starlite.kcc.hawaii.edu/aseita/BUS150. This Website has the most updated weekly class schedule which includes the assignment and their due dates.

Special Computer Login Accounts:
There are several accounts (Class FTP and BUS 250 WebBoard) that will be established to support your activities for this class.

BUS 250 WebBoard Login Account: This account will allow access to the WebBoard for the purpose of conducting threaded Web discussions on the Internet. The discussions will be centered on the projects and quizzes.

There are two conferences set up for threaded Web discussions on the Internet for BUS 250. The WebBoard conferences can be accessed at the BUS 250 Website (http://starlite.kcc.hawaii.edu/aseita/BUS250) or directly through the URL http://brtc.kcc.hawaii.edu:8080/~BUS.

BUS 250 FTP Class Delivery Account: This account will be used by each student to deliver his/her projects to the Starlite FTP server.

Unique Code and Initials: A special student code and initials will be generated and assigned to each student. They are used to uniquely identify all delivered assignments.

Both accounts, unique code, and initials will be sent to each student no later than the second week of instruction via email from the instructor.

BUS 250 Class Schedule for Fall 2007
Presented here is a tentative schedule that is subject to change upon the discretion of the instructor. Before coming to class, always read each assigned chapter. The most updated and complete schedule is available at http://starlite.kcc.hawaii.edu/aseita/BUS250.

<table>
<thead>
<tr>
<th>Week</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chapter 1 Fundamental of Algebra</td>
</tr>
<tr>
<td>2</td>
<td>Chapter 2 Functions and Their Graphs</td>
</tr>
<tr>
<td>3</td>
<td>Chapter 3 Exponential and Logarithmic Functions</td>
</tr>
<tr>
<td>4</td>
<td>Chapter 3 Exponential and Logarithmic Functions continued Exam I</td>
</tr>
<tr>
<td>5</td>
<td>Chapter 4.1 &amp; 4.2 Compound Interest and Annuities</td>
</tr>
<tr>
<td>6</td>
<td>Chapter 4.3 &amp; 4.4 Arithmetic and Geometric Progressions</td>
</tr>
<tr>
<td>7</td>
<td>Applications of Chapter 4</td>
</tr>
<tr>
<td>8</td>
<td>Applications of Chapter 4 Continued Exam II</td>
</tr>
<tr>
<td>9</td>
<td>Chapter 9 Derivatives of Functions</td>
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<tr>
<td>10</td>
<td>Chapter 9 Continued</td>
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<tr>
<td>11</td>
<td>Chapter 10.3 Curve Sketching</td>
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<tr>
<td>Page</td>
<td>Title</td>
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<tr>
<td>------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>12</td>
<td>Exam III</td>
</tr>
<tr>
<td></td>
<td>Excel – Financial Functions</td>
</tr>
<tr>
<td>13</td>
<td>Excel – Financial Functions Continued</td>
</tr>
<tr>
<td>14</td>
<td>Computer Simulated Financial Calculator</td>
</tr>
<tr>
<td>15</td>
<td>Computer Simulated Financial Calculator</td>
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<tr>
<td></td>
<td>continued</td>
</tr>
<tr>
<td></td>
<td>Review for Final Exam</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam - Cumulative</td>
</tr>
</tbody>
</table>