Graduate Council Report
March 1, 2007

A611  BUSH 686  Russia in International Politics (3-0) Credit 3. Examines changes with Russia and its role in international politics since 1991, emphasizing the period of Vladimir Putin’s presidency. Will explore Putin’s approach to political, economic and social challenges facing Russia. This master’s level course is intended for individuals preparing for professional careers in the conduct of international affairs. Prerequisite(s): n/a

A612  MATH 615  Introduction to Classical Analysis (3-0) Credit 3. Set-theoretic preliminaries; Cantor-Schröder-Bernstein Theorem; review of sequences; limit inferior and limit superior; infinite products; metric spaces; convergence of functions; Dini’s Theorem, Weierstrass Approximation Theorem; Monotone functions; bounded variation; Helly’s Selection Theorem; Riemann-Stieltjes integration; Fourier series; Fejer’s Theorem; Parseval’s Identify, Bernstein’s Theorem on absolutely convergent Fourier series. Prerequisite(s): Math 409 or equivalent.
Texas A&M University  
Departmental Request for a New Course  
Undergraduate • Graduate • Professional  
Submit original form and 2 copies. Attach a course syllabus to each.

1. This request is submitted by the Department of Mathematics.

2. Course prefix, number and complete title: MATH 615 Introduction to Classical Analysis.

3. Course description (not more than 50 words): Set-theoretic preliminaries; Cantor-Schröder-Bernstein Theorem; review of sequences; limit inferior and limit superior; infinite products; metric spaces; convergence of functions; Dini's Theorem, Weierstrass Approximation Theorem; Monotone functions; bounded variation; Helly's Selection.

4. Prerequisite(s): MATH 409 or equivalent. Cross-listed with _________.

5. Is this a variable credit course? □ Yes ☐ No. If yes, from ________ to ________.

6. Is this a repeatable course? □ Yes ☐ No. If yes, this course may be taken ______ times. Will the course be repeated within the same semester/term? □ Yes ☐ No.

7. Has this course been taught as a 489/689? □ Yes ☐ No. If yes, how many times? 6 times. Indicate the number of students enrolled for each academic period it was taught: 01C-11, 02C-11, 03C-8, 04C-8, 05C-14, 06C-7.

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history).
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography).

M.S./Ph.D. MATH, M.S./Ph.D. STAT, M.S./Ph.D. ENGR.

9. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

10. Prefix | Course # | Title (exclude punctuation) |
      | MATH | 6 1 5 INTRO CLASICAL ANALYSIS |

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Approval recommended by: ___________________________ 1/25/07

Head of Department  Date  Chair, College Review Committee  1/29/07

Head of Department (if cross-listed course)  Date  Dean of College  1/29/07

Submitted to Coordinating Board by: ___________________________ 1/29/07

Director of Academic Support Services  Date  Effective Date

To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 847-8737.

OAR/AS-5/04
Theorem; Riemann–Stieltjes integration; Fourier series; Fejer's Theorem; Parseval's Identity; Bernstein's Theorem on absolutely convergent Fourier series.
Sample Syllabus

MATH 615, Introduction to Classical Analysis

Instructor:
Name: N. Sivakumar  Phone: 845–7337 (O), 846–0932 (H)
Office: 307 Milner Hall  E-mail: sivan@math.tamu.edu
URL: http://www.math.tamu.edu/~sivan

Prerequisites:
MATH 409 or equivalent

Text:
N. Sivakumar, The (he)art of an analyst: some tools and techniques of basic mathematical analysis; available at Notes-n-Quotes (located at the corner of University Drive and Nagle Street).

Examinations etcetera:
There will be two examinations (midterm and final), each of which will account for 50% of your grade. Letter grades will be at least as generous as the following (standard) scale:

- 60 → F;
- 60 < 70 → D;
- 70 < 80 → C;
- 80 < 90 → B;
- 90 → A.

Course Description:
The goal of this course is to introduce the student to some basic tools and techniques from classical mathematical analysis (primarily real variables), via a fairly broad, but selective, overview of this vast subject. We shall cover the following topics:

Chapter 1: Preliminaries involving set theory, equipotence, countability, partially ordered sets, Tarski’s Fixed-Point Theorem, Cantor-Schröder-Bernstein Theorem

Chapter 2: Some basic real-variable theory: brief review of sequences, followed by a detailed discussion of limit inferior and limit superior, a quick recollection of some notions from infinite series, and finally a short introduction to the theory of infinite products

Chapter 3: Metric spaces: definition, normed spaces, Hölder and Minkowski Inequalities, the spaces \( \ell^p, \ell^q, C[a, b] \), basic topology of metric spaces including the notion of convergence, Completeness, definition and important examples of Banach spaces, Banach’s Contraction Principle, Boundedness and Total Boundedness, Compactness, the Heine-Borel Theorem, Connectedness, Continuous Functions between metric spaces, the space \( C(K) \), Uniform Continuity, Convergence of functions, Dini’s Theorem, Bernstein Polynomials and Weierstrass’s Polynomial Approximation Theorem

Chapter 4: More detailed look at real variables: quick reprisal of Mean Value Theorems from calculus, example of a continuous, nowhere differentiable function, definition and basic properties of monotone functions, functions of bounded variation, Structure Theorem for functions of bounded variation, Helly’s Selection Theorem, the theory of Riemann-Stieltjes Integration, Cauchy Criterion, Integration-by-parts Theorem, and Riemann Criterion for Riemann-Stieltjes Integrals, Introduction to Fourier series (of continuous 2\( \pi \)-periodic functions), Dirichlet and Fejér kernels, Convolution, Fejér’s Theorem, Uniqueness Theorem for Fourier series, Riemann-Lebesgue Lemma, deducing the Weierstrass Polynomial Approximation Theorem from Fejér’s Theorem, Bessel’s Inequality and Parseval’s Identity for Fourier series, Absolutely Convergent Fourier Series, Bernstein’s Theorem on absolutely convergent Fourier series

Note: Time permitting, other topics will be discussed as well. As for a timeline, the first chapter is the shortest (about 7 pages in the book), whilst the second is longer (about 12 pages). The chapter on metric spaces covers about 27 pages in the book, and the final chapter, the longest, occupies approximately 45 pages. In addition to the (mostly routine) exercises given in the book,
several example sheets will be posted online regularly. Students should attempt as many questions as possible from these sheets (with my help as and when necessary), in order to gain a better understanding of the subject matter of the course. Some of these examples will also serve as a supplemental course, in that pertinent new concepts and notions will be defined through them.

■ Make-up policy:
University regulations state the following: To be excused the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident, or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class.

■ General remarks:
• Americans with Disabilities Act: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637.

• Academic Integrity: The Aggie Honor Code states the following: “An Aggie does not lie, cheat, or steal or tolerate those who do.” The Honor Council Rules and Procedures may be found here: http://www.tamu.edu/aggiehonor