Robert S. Welch Center for Graduate and Professional Studies
Teachers' Institute
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Syllabus   Preparing Students for the Advanced Placement Calculus AB: Revised
                 AP 507.100   June 19-23, 2017

                 8:30 AM – 4:00 PM   MTWTh
                 8:30 AM – 1:00 PM   F

Instructor: Dr. Gail Kaplan
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General Description: The primary goal of this class is for the student to begin to acquire the techniques necessary to successfully teach Advanced Placement Calculus at the secondary level. This course will focus on classroom strategies that encourage teachers not only to enjoy teaching calculus, but also to learn how to creatively engage students in mathematical investigations that enable the students to "discover" the major concepts. We will examine a variety of strategies and skills that can be used to explore the fascinating world of teaching AP Calculus. Each student will be expected to take an active role in all parts of the class. The assignments and activities both in and out of class are designed to enhance your understanding, appreciation, and practical experience of a student centered classroom for calculus.

The primary goal of this class is to help teachers effectively teach an AP Calculus AB course and prepare their students for success on the AP examination. The course will focus on classroom strategies that encourage teachers not only to enjoy teaching calculus, but also to learn and experience how to creatively engage students in mathematical investigations that enable the students to "discover" the major concepts. Participants will review the content, themes, and structure of the AP Calculus AB curriculum and focus on effective teaching strategies and learning activities that will lead to their students' success on the examination. Calculus AB is primarily concerned with developing the students' understanding of the concepts of calculus and providing experience with its methods and applications. The course emphasizes a multi-representational approach to calculus, with concepts, results, and problems being expressed graphically, numerically, analytically, and verbally. Through the use of the unifying themes of derivatives, integrals, limits, approximation, and applications and modeling, the course becomes a cohesive whole. With the upcoming changes (2016-2017) in the revised AP Calculus AB curriculum, this course will provide information and strategies that help teachers prepare their students to perform well on the redesigned examination.

Objectives: This course is intended for to provide appropriate training for the new AP Calculus teacher by providing opportunities to
   1. Refresh, solidify, and expand your theoretical understanding of the calculus,
   2. Become familiar with the level of knowledge required for student success on the AP Calculus Examination
   3. Gain expertise in the creation and use of appropriate assessment vehicles, including technology, to analyze the level of success of students in your classroom,
   4. Connect pedagogical theory to practice in the AP classroom, and
   5. Give and receive encouragement during the challenging experience of mastering the art of teaching AP Calculus.

Course Content

We will use the following outline from the College Board as a guide to our intensive review of Calculus AB material.

I.   Functions, graphs, and limits
Analysis of graphs
Limits of functions
Asymptotic and unbounded behavior
Continuity as a property of functions

II.   Derivatives
Concept of the derivative
Derivative at a point
'Derivative as a function
Second Derivatives
Applications of derivatives
Computation of derivatives

III.   Integrals
Interpretations and properties of definite integrals
Applications of integrals
Fundamental Theorem of Calculus
Techniques of anitdifferentiation
Applications of antidifferentiation
Numerical approximations to definite integrals

The philosophy of the College Board and the test development committee along with materials that relate to the AP Exam will be discussed and provided.

Suggestions for structuring and scheduling the high school AP Calculus AB course will be offered. The Reading of the recent AP examinations will be presented in detail along with practice applying the rubrics used.

Homework and Projects

Assignments will be made and generally due the next day.

Technology

TI-84 or similar graphing calculator required

Grading*

Attendance all five days, 8:30 am to 4:00 pm, Monday through Thursday and 8:30 am to 1 pm on Friday is required for a passing grade.

The following criteria will be used for the course grade. Numbers 1 and 2 will together be approximately 2/3 of the evaluation and number 3 will be approximately 1/3 of the final evaluation.

1. Quizzes, taken individually or in a group/partner setting, will be given on Calculus AB material.
2. Projects and Classwork
3. Final project: The final project will consist of two parts, one part to be done individually and one part to be done in a group setting. It will include AP type questions to be answered and/or graded.

*Please note this applies only to students taking the course for credit.

Instructions to access grades/request a transcript for credits earned after the completion of the course:

Goucher College does not issue grade reports. If taking the course for graduate credit, you can obtain your grade approximately 3 weeks after concluding the course by going to the myGoucher website (myGoucher) and following the prompts to receive your grade. If you have misplaced your password, please contact the help desk (helpdesk@goucher.edu) and they will help you through this procedure.

If you need a paper copy of grades for tuition reimbursement, you will need to request a transcript in writing. You can fax your request to Student Administrative Services (SAS) at 410-337-6504 or mail to SAS at:

Goucher College, SAS
1021 Dulaney Valley Road
Baltimore, MD 21204

There is no charge for this request. Please allow 3-5 working days to process. To access the transcript request form, please go to http://www.goucher.edu/x1891.xml

Questions? Please call Shelley Johnson or Barbara Bisset at 410-337-6200.