STATE UNIVERSITY OF NEW YORK AT BUFFALO

DEPARTMENT OF BIOSTATISTICS

GRADUATE STUDENT HANDBOOK

Updated 8/11/2016
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BIOSTATISTICS AT THE UNIVERSITY AT BUFFALO

The Department of Biostatistics’ roots at the University at Buffalo stem from the Department of Statistics, which has had a continuous stream of students since September 1, 1963. During the early 1970’s, there were 13 tenure-track faculty. At that time, the Department had a world-class reputation, being considered among the top 10 in the country. Over time, certain members were attracted elsewhere. One left to establish the renowned Department of Biostatistics at Harvard; one became Dean of the School of Statistics at Minnesota, etc. Since the middle 1990’s the long-range plan of the Administration was to develop a full featured department of biostatistics. As part of that plan the administration transferred all its resources into the Department of Social and Preventive Medicine in the School of Medicine and Biomedical Sciences on 9/1/1998, creating the Division of Biostatistics.

On 7/1/2003 the Administration converted the Division of Biostatistics into a full featured Department of Biostatistics. The Department of Biostatistics was established as part of the master plan for the newly formed School of Public Health and Health Professions at UB. A strong Department of Biostatistics is essential towards the goal of accreditation in the area of public health. In a 2002 memorandum of understanding with the State University of New York (SUNY), the development of the biostatistics program at UB was listed as a top research priority. The PhD program in Biostatistics at UB serves as one of the three mandatory PhD programs utilized in our School’s public health accreditation application.

This new organization allowed for the development of graduate programs in biostatistics and for a more centralized coordination research activities of applied and theoretical instruction. The Department includes from faculty members from the Department of Biostatistics at Roswell Park Cancer Institute and from the Gynecologic Oncology Group. These affiliations, in addition to collaborations with researchers in the Center of Excellence in Bioinformatics, the College of Dentistry, the College of Medicine and Biomedical Sciences, the College of Nursing, the School of Pharmacy and the School of Public Health and Health Professions, provide a rich environment for the education and training of biostatisticians. In addition to their classroom studies, the Department’s students have opportunities to gain practical training through mentored, hands-on data analyses in the context of exciting biological and health science research projects. It is an exciting environment and an exciting time for biostatistics at the University at Buffalo.

MISSION OF THE DEPARTMENT

The mission of the Department of Biostatistics is to educate and train biostatistical scientists; to collaborate with researchers in the clinical and public health sciences; to conduct methodological
research; to collaborate with local, state, or national health institutions; and to serve our University and the statistics and public health professions.

TEACHING AND TRAINING PHILOSOPHY

Our philosophy of education is that students best learn what they apply and what they teach. Practical training requirements are included in both the MPH, MA and PhD programs. The Department seeks to provide opportunities for students to communicate their knowledge to others, either through classroom presentations, student seminars, or assignment to teaching assistantships.

Faculty bring a philosophy to the classroom and to their mentoring that is consistent with the Department’s goals to promote and extend the proper use of statistics in the health sciences, to contribute substantively and methodologically to the advancement of knowledge in health related disciplines, and to aid the advance of evidenced-based medicine, healthcare, public health practice and policy making. This emphasis brings a high degree of relevance to the classroom and enhances students’ opportunities to work as apprentices with faculty. Faculty and students together work with collaborators in the School of Public Health and Health Professions, the School of Medicine and Biomedical Sciences, and at the Roswell Park Cancer Institute. Students receive practical training in these environments in parallel to their formal coursework.

We believe in a holistic approach to education. The Department is dedicated to providing a wide variety of educational, research, and collaborative opportunities to students in a friendly, respectful, nurturing, and stimulating environment that promotes intellectual and professional development.

RESEARCH ACTIVITIES

The Departmental faculty engage in theoretical, methodological, and applied statistical research. This work is often motivated by their collaborations with health science researchers. There is ongoing involvement in medical informatics and bioinformatics, cancer research, maternal and child health, research on addictions, and epidemiology. Projects span a wide range of topics such as biosurveillance, metabonomics, microarray data analysis, pattern recognition and classification, proteomics, statistical genetics, clinical trials to assess the efficacy of cancer treatments, epidemiologic studies of environmental risk factors, and outcomes research.

PERSONNEL

Department Phone Number: 829-3690
706 Kimball Tower – South Campus
FACULTY

Interim Chair and Professor

Gregory E. Wilding, PhD  
University of Rochester  
Vice-Chair of Biostatistics at Roswell Park Cancer Institute and Co-Director of the Biostatistics Shared Resource  
Research interests: clinical trial design, permutation tests, resampling techniques, goodness-of-fit tests, distributional characterizations, copulas, tests of independence, biostatistics.

Associate Chair, Graduate Program Director and Professor

Lili Tian, PhD  
University of Rochester  
Research interests: goodness-of-fit testing; skewed data analysis; order-restricted inference; inverse Gaussian models; design of clinical trials; longitudinal data analysis; survival analysis; analysis of medical expenditure data; generalized variable approach; statistical genetics; cancer research; behavioral studies; health policy studies.

Professor

Marianthi Markatou, PhD  
Pennsylvania State University  
Statistical Sciences (Statistics and Biostatistics): Problems in model assessment and selection, robustness, mixture models, statistical distances, biomarker development and ROC analysis, high dimensional data analysis, large databases data analysis, surveillance in large databases, methods for the analysis of observational data. Interdisciplinary: Machine learning and data mining, text data mining, biomedical informatics, emerging safety sciences relevant to health, study of dependence in microarrays and proteomics data, comparative safety and comparative effectiveness research.

Research Professor

John Blessing, PhD  
University at Buffalo  
Clinical trials, Biostatistics Data Center Administration

Mark Brady, PhD  
University at Buffalo  
Clinical Trials, drug development, time to failure analyses, screening trials
Alan D. Hutson, PhD. University of Rochester
Biostatistics, clinical trials design, epidemiological modeling, Bioinformatics, computational methods and order statistics

Dietrich Kuhlmann, PhD University of Missouri

Calyampudi Radhakrishna Rao, PhD - National Medical of Science Winner
PhD received at ScD at Cambridge University
Recipient of 27 honorary doctoral degrees in 16 countries

David Tritchler, PhD University of Toronto
Statistical Analysis of DNA microarrays, statistical genomics, design & analysis of genetic studies, graphical models, casual inference, Bayesian networks, meta-analysis, statistical computation.

Research Associate Professors

Kathleen Darcy, PhD
Translational research science - Gynecologic Oncology Group, Roswell Park Cancer Institute

Song Liu, PhD University at Buffalo
Vice-Chair of Roswell Park Cancer Institute Dept. of Bioinformatics
Research interests: developing computational and statistical methods to discover genetic risk factors and biomarkers for predicting some human diseases such as cancer using integrative analysis of multi-dimensional data from biomedical science such as microarray, high throughput sequencing, etc.

Michael Sill, PhD University of Pittsburgh
Adaptive designs and inference, Phase I and II clinical trial development, exact methods for small sample sizes, translational research, differences between Bayesian & frequentist methods

Associate Professors

Chang-Xing Ma, PhD Nankai University
MPH Concentration Co-Director
Statistical genetics and experimental design

Jeffrey Miecznikowski, PhD Carnegie Mellon University
MS Program Co-Director
Research interests: bio-technical image analysis, array comparative genomic hybridization (aCGH) analysis, microarray analysis, nonparametric statistics, bootstrap methods, and software development

Albert Vexler, PhD Hebrew University of Jerusalem, Israel
Research interests: receiver operating characteristic curves analysis; measurement error; optimal designs; regression models; censored data; change point problems; sequential analysis; statistical epidemiology; biostatistics; applications of Bayesian approaches to tests; asymptomatic methods of statistics; forecasting; sampling; optimal testing; nonparametric tests; empirical likelihoods; renewal theory; tauberian theorems; time series; categorical analysis; multivariate analysis; multivariate testing of complex hypotheses; factor and principal component analysis

Jihnhee Yu, PhD Texas A & M University
Research interests: stochastic processes and small clinical trials

Assistant Professors

Daniel P. Gaile, PhD Texas A&M University
Research interests: Biomarker identification, array comparative genomic hybridization (aCGH) analysis, expression analysis via array, NGS and bead-based technologies, proteomics, normalization methods for data generated by high throughput biotechnologies, non-parametric statistics, bootstrap methods, exact methods, linear combinations of order statistics, sparse matrix approaches, finite mixture models, statistical computing, software development.

Rachael Hageman Blair, PhD Case Western University
Research interests: mathematical biology, optimization, numerical analysis, inverse problems, statistics and scientific computing, methodology development for mathematical modeling and simulation of metabolic and genetic networks, data analysis including microarray and quantitative trait loci.

Jiwei Zhao, PhD University of Wisconsin-Madison

Research Assistant Professors

Kristopher Attwood, PhD University at Buffalo
Research interests: Clinical, observational and diagnostic studies, decision theory, research operations, and statistics education.

William Brady, PhD University at Buffalo
Research interests: statistical methods research focuses primarily on phase I and II clinical trial design and the application of exact methods to binary data.

Wei Deng, PhD  
Gynecologic Oncology Group  
University at Buffalo

Kevin Hasegawa Eng, PhD  
University of Wisconsin-Madison  
Research interests: Translational genomics in ovarian cancer; Biomarker development and validation; and statistical genomics algorithms for personalized medicine

Virginia Filiaci, PhD  
Gynecological Oncology Group, Roswell Park Cancer Institute  
University at Buffalo

Terry Mashtare, Jr., PhD  
University at Buffalo

Yoram Shotland, PhD  
Hebrew University of Jerusalem, Israel

Jianmin Wang, PhD  
Iowa State University  
Roswell Park Cancer Institute

Austin Miller, PhD  
University at Buffalo  
Research interests: The design and analysis of experimental, clinical and observational studies, measurement error models and structural equations modeling

Lei Wei, PhD  
Roswell Park Cancer Institute  
University at Buffalo

Qianqian Zhu, PhD  
Roswell Park Cancer Institute  
University at Buffalo

Professors Emeriti

Randolph L. Carter, PhD  
Iowa State University
Research interests: measurement error models, structural equation models, longitudinal data methods, risk assessment, biostatistics, radiation effects, epidemiological modeling, maternal and child health epidemiology

Manavala M. Desu  
University of Calcutta

Adjunct Professor

Leonid Khinkas, PhD  
Voronezh State Univ., Voronezh, USSR

Peter Rogerson, PhD  
University at Buffalo  
Spatial Statistics and GIS Analysis

Enrique E. Schisterman, PhD  
University at Buffalo  
Senior Investigator at NICHD, Washington, DC

Adjunct Research Professor

Calyampudi Radhakrishna Rao, PhD  
Purdue University

Adjunct Associate Professor

Joseph Lucke, PhD  
University of Kansas  
Research Institute on Addictions, Buffalo, NY

Adjunct Assistant Professor

Zihua Hu, PhD  
University of Iowa  
Center for Computational, Buffalo, New York

Tao Liu, PhD  
Institute of Bioinformatics, Chines Academy of Sciences

Pinaki Sarder, PhD
Lara Sucheston, PhD  
Case Western University  
Research interests: molecular and genetic causes for complex diseases and the methodology used to find these mechanisms.

Yijun Sun, PhD  
University of Florida

Li Yan, PhD  
University of Rochester PhD in Physics and University at Buffalo PhD in Biostatistics

STAFF  
Amy Barczykowski – Data Manager  
Nancy M. Barczykowski – Assistant to the Chair  
Noreen D. McGuire – Graduate Program Coordinator  
Teresa Sikorski – Department Secretary
GRADUATE STUDENT ASSISTANTSHIPS AND BENEFITS

General information about financial support is available from the graduate School website for current students: http://grad.buffalo.edu/Current_Students.html

TYPES OF ASSISTANTSHIPS AVAILABLE

The Department of Biostatistics at the University at Buffalo supports graduate student education through teaching and research assistantships for qualified students. The types of assistantships available are: instructor/teaching assistant (TA) and research assistant (RA).

Instructors are appointed half-time and are fully responsible for courses they teach. Experienced students with excellent teaching records are considered for half-time instructor positions.

Teaching assistants are appointed half-time or one third-time depending on the assigned duties. Half-time TAs typically teach recitation sessions, hold office hours, and serve as graders. One third-time TAs typically serve as graders and hold a limited number of office hours. One third-time TAs are encouraged to develop the skill set required of half-time TAs, and half-time TAs are encouraged to develop a record of classroom excellence qualifying them for a half-time instructor position. Those who do will be considered for promotion.

Graduate research assistantships are offered to the most qualified students who seek experience in the applications of statistics. RA positions are designed to provide consulting or data analysis services to researchers in the health sciences, while providing students with on-the-job training under the supervision of a Biostatistics faculty mentor. Typically, students have completed at least one year of graduate level coursework before being assigned to a research assistantship. Most students who serve as an RA will be appointed half-time (20 hours/wk) or one third-time (13 hours/wk). After a year of experience as an RA, students can be promoted to Senior Research Assistant based on an evaluation by their faculty supervisor and the project’s principal investigator. PhD students will not be funded more than five years.

A GPA of at least 3.0 and satisfactory performance of assistantship duties are required for reappointment. Outstanding performance may be rewarded through pay raises within level or through promotion, when funding allows.

OTHER BENEFITS

GRADUATE STUDENT TRAVEL AWARD
The graduate student travel provides funding to students requesting financial assistance to present their research at professional. Students may submit a written request to the Department’s Student Travel Committee. Since funds for student travel are limited, and the travel award must be approved PRIOR to submitting an abstract, it is important to submit requests for funding well in advance of abstract submission deadlines.

**Important:** Original receipts are required to receive reimbursement. All students should see the Secretary to the Chair prior to incurring expenses to discuss and understand the University and Departmental policies regarding travel. The department cannot cover items such as tax, liquor, or upgrades (hotel, air, transportation). Each student will be required to meet with the Secretary to the Chair to review policies.

Funding is NOT guaranteed and depends on availability of funds in the department and the number of requests received in any one year.

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**Student Travel Request Application Checklist**

- ✓ One request per student per academic year (July 1 – June 30).
- ✓ Students must present either a poster or oral presentation.
- ✓ Presentations must be related to research associated with the student’s degree while in the Department of Biostatistics.
- ✓ Students must submit an application in writing to the Student Travel Committee PRIOR to submitting an abstract. The application must include:
  - ✓ Name
  - ✓ Co-authors
  - ✓ Title and abstract
  - ✓ Mentor name (mentor needs to co-sign the request or send support letter)
  - ✓ Meeting details (conference, location, dates)
  - ✓ Meeting/abstract information website
  - ✓ List of expected expenses

- ✓ Funds can be used to cover meeting registration, transportation, hotel accommodations and per diem according to the rules/regulations set forth by the University at Buffalo.

- ✓ All presentations and posters should be acknowledged (UB EEH logo). EEH should be the primary affiliation listed (along with RPCI when applicable).
All presentations and posters must be approved by the student’s faculty mentor before presenting.

A copy of the presentation or poster must be submitted to the department (small color version).

Richard Schmidt Award

The Richard Schmidt Award was established through the generosity of Professor Emeritus Richard Schmidt and has received continuous support through charitable donations by alumni, faculty and colleagues of Dr. Schmidt. The award was established in 2004 to honor outstanding PhD performance and is awarded annually at the SPHHP Spring ceremony.

Sidney Addelman Award

The Sidney Addelman award was established in 2004 from an endowment from the former Department of Statistics. Dr. Sidney Addelman was a Professor in the Department of Statistics at UB prior to his retirement. The award was established in 2004 to honor outstanding Master’s performance and is awarded annually at the SPHHP Spring ceremony.

M. Mahamunulu Desu Outstanding Student Paper Award

Given annually to a student annually in honor of Professor emeritus M. Mahamunulu Desu for outstanding research.

Randolph L. Carter, PhD Award Fund

Established 2015 by a former student of Dr. Carter’s in honor of Professor Emeritus and Fulbright-Nehru Academic & Professional Excellence Award winner Randolph L. Carter given to a graduate student who has demonstrated academic excellence and research potential in biostatistics. This award is given annually.

Tuition Scholarships

Doctoral students receiving a graduate assistantship, or doctoral students appointed as graduate assistants on grant funds paid through UB or the Research Foundation, may be eligible for a tuition scholarship. Students eligible for tuition scholarship will have the **Graduate Student Scholarship Verification Form** completed by the Graduate Program Coordinator for the applicable semesters. The scholarship covers only those courses required for the degree. The scholarship does not cover credit hours taken during the summer semester or courses that are repeated. Students are
responsible for all comprehensive and activity fees and also for waiving the university health insurance, if they are covered by an outside carrier.

Those students who are not New York residents but who can become residents are required to so as soon as possible, no later than one year after their initial appointment.

**Student Employee Health Insurance.** Students receiving graduate assistantships are eligible to enroll in the State Student Employee Health Insurance Plan (SEHP). Domestic students who meet eligibility requirements may choose between the University’s mandatory student health insurance plan or the SEHP. FI visa holders must enroll in the state sponsored plan. Students choosing to enroll in SEHP must enroll within 30 days of the effective date of their appointment. Enrollment sessions are held each Fall semester.

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**Tuition Scholarship Checklist:**

- enroll in SEHP and attend health insurance orientation (if applicable)

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**ADVISEMENT AND SUPERVISION**

Each student is able to meet with the Director of Graduate Studies or their academic advisor to assist in planning a program to meet his/her educational goals and to answer questions relating to graduate studies.

Students are expected to consult with the advisor or the Director of Graduate Studies prior to registration each semester. Failure to do so could result in a student’s program not meeting the requirements necessary for graduation, which may delay or prevent degree conferral.

Administrative questions should be directed to the Department’s Director of Graduate Studies or the Graduate Program Coordinator.

If a student wishes to change advisors, he/she should submit a request in writing to the Director of Graduate Studies. Changes will be made with the approval of the new advisor and the Director of Graduate Studies. The department will try to accommodate all student requests.

**GRADUATE PROGRAMS IN BIOSTATISTICS**

**MASTER OF ARTS DEGREE**

Coursework leading to a Master of Arts degree in Biostatistics typically takes two years to complete. A minimum of 30 credit hours is required. The student must pass two written comprehensive exams on the first-year applied and theoretical core course sequences. In addition, practical data analysis experience is required at a level commensurate with master’s degree coursework. A practical training project is required. The student must prepare a paper for his/her
committee and pass a final oral exam, which is a presentation and defense of their practical training project report.

**Core Course Requirements**

- STA 503 Regression Analysis (3)
- STA 504 Analysis of Variance (3)
- STA 521 Introduction to Theoretical Statistics I (3)
- STA 522 Introduction to Theoretical Statistics II (3)

Students are also required to have the following public health and epidemiology courses:

- CHB 550 Public Health and Population Well Being (3) **AND**
- EEH 501 Principles of Epidemiology (4)

- **All full time students are required to register for Department seminar STA 782 (0 credits) for each semester. You are considered full time if you have an Application to Candidacy on file and full time status approved with the graduate school.**

Completion or demonstrated knowledge of the material in STA 511 (Mathematical Analysis for Biostatistics) is a prerequisite for STA 522. Students who have not satisfied this prerequisite must take STA 511 in their first semester in the program. Three semesters of calculus and linear algebra are required before entry into the program.

Full time Masters and PhD students must also register for STA 782 (0 credits) which is our department seminar held on Thursday afternoon. MPH students have a separate seminar requirement.

**All students are required to attend the weekly departmental seminar**

To be more specific:

1) Attendance for all full-time students is mandatory at our 4pm Thursday seminar. Seminars scheduled outside that timeslot are optional. However, all students are strongly urged to attend. Full-time students include PhD students currently working on their dissertations.
2) An attendance sheet will be administered at the beginning of each seminar that you will be required to sign in order to register your attendance.

3) You are expected to attend 80% of the seminars each semester. Failure to do so may delay your graduation date until seminar attendance is deemed adequate. TAs who fail to attend the seminar may lose their assistantships.

**Elective Requirements**

Students must take at least 12 hours of master’s electives (ME ). The following is a list of courses offered by the Department that can be used to satisfy this requirement:

- STA 506 Intro to Statistical Computing (3)
- STA 509 Statistical Genomics (3)
- STA 511 Advanced Statistical Computing (formerly Mathematical Analysis for Biostatistics (3)
- STA 515 Distribution-Free Inference (3)
- STA 517 Categorical Data Analysis (3)
- STA 525 Statistics for Bioinformatics (3)
- STA 526 Design and Analysis of Clinical Experiments (3)
- STA 531 Theory and Methods of Sample Surveys (3)
- STA 536 Statistical Design and Analysis (3)
- STA 537 Sequential Analysis (3)
- STA 545 Data Mining I (3)
- STA 546 Data Mining II (3)
- STA 551 Stochastic Processes (3)
- STA 561 Longitudinal Data Analysis and Time Series Analysis (3)
- STA 567 Bayesian Analysis (3)
- STA 571 Special Topics in Statistics (3)
- STA 575 Survival Analysis (3)
- STA 581 Multivariate Data Analysis (3)

(Note: STA 502 and STA 527 do not count toward the MA degree.) Six credits hours of either STA 600 or of coursework from outside the Department of Biostatistics can be taken to satisfy elective requirements provided the courses are relevant to the student’s training as a biostatistical scientist and are approved by the student’s advisor and the Director of Graduate Studies. Depending on the content, STA 600 Independent Study might or might not qualify. Also, any STA course that satisfies a requirement of the Department’s PhD program can be used as a Master’s elective. If a PhD course is used as a Master’s elective, that course cannot be used subsequently to satisfy a PhD requirement without also taking an additional course to satisfy the Master’s requirement retrospectively.
Practical Training Requirement/Data Analysis Project

Biostatistics Master’s students are required to have at least one semester of practical training that involves the application of methods from their master’s degree coursework to real data. This requirement can be satisfied by working under a faculty member in a consulting or collaborative research setting, by participating in an internship that has been approved by the student’s advisor/committee. The student must submit a detailed written report of a data analysis project to their supervisory committee for evaluation at the final oral exam. The presentation of this report must be given to the committee in the form of a seminar announced to all faculty and students of the Department of Biostatistics.

Master’s Exams

Students must pass two written exams on applied (503, 504) and theoretical (521, 522) core courses. These exams typically are taken in August at the end of the first year of study after completion of the core courses. The department’s examination committee will determine if each student’s performance is satisfactory. Students not passing the applied exam must sit for the final exams of 503 and 504. Students not passing the theory exam must sit for the final exams of 521 and 522. The examination committee will determine if the student’s performance is satisfactory on these tests. Any student that does not pass these follow up exams will be dismissed from the program. Toward the end of their second year, students must pass a final oral exam, which is a presentation and defense of their practical training project (see previous section.)

Supervisory Committee

The student’s MA supervisory committee must be appointed prior to the third semester of study. This committee will advise the student, check on qualifications and progress, evaluate the student’s written report and oral presentation satisfying the practical training requirement, and conduct the final oral exam. This committee must include at least three members with faculty appointments within Department of Biostatistics. Students are strongly encouraged to add an additional committee member from outside the department in their second year, ideally one associated with their practical training project.

Thesis Option

A student who wishes to complete the master’s thesis option may substitute up to six research hours (STA 700) for two master’s elective courses or for the practical training requirement, provided they complete at least 12 credits of STA master’s elective courses. A Master’s thesis with general content pre-approved by the student’s advisory committee is required. To replace practical training hours the thesis must include an in-depth analysis of data from the health or biological sciences. An oral presentation of the thesis must be given to the supervisory committee at a seminar announced to all faculty and students of the Department of Biostatistics. Two bound copies of the thesis must be submitted to the Graduate School and one bound copy to
the Department. Copies should be bound in boards covered with blank imitation leather, with the title and author’s name embossed, not printed, on the front in gold and the author’s last name, degree and year of conferral of the degree on the spine (also in gold). See the section entitled Dissertation and Final Defense for Guidelines for Thesis Preparation.

ADMINISTRATIVE REQUIREMENTS

These can be found at http://grad.buffalo.edu/Academics/Policies-Procedures.html (see University policy)

Time Limit to Complete the Degree. The time limit for obtaining the master’s degree is four years from the date of matriculation in the department, not counting official leaves of absence. Students unable to complete the master’s program within the time limit must petition the Graduate School for an extension of time to complete the degree. Students must provide a detailed description of work completed to date as well as a timeline for completion of the thesis/degree. Normally, extensions are approved for a maximum of one year. A total of more than two years will not be approved. Requests for extensions should be made at least two weeks prior to the start of the semester. Graduate Student Petition Forms are available at http://grad.buffalo.edu/Academics/Forms-for-Students.html. Be sure to indicate the dates of the extension, the reason for the request, and the intended date of degree completion. The Graduate School will not approve an extension for ‘personal reasons’. You must be specific and present strong justification for your request.

Application to Candidacy. [www.grad.buffalo.edu/policies/ATC.php] The Application to Candidacy is a document that includes a summary of courses to be applied toward a degree and usually is completed after three semesters. All ATC forms must include an abstract of the student’s research. The ATC is available at http://grad.buffalo.edu/Academics/Forms-for-Students.html. Once the ATC has been approved, a student is not required to enroll for 12 credits (or 9 credits if supported on an assistantship) to be considered full-time for tuition scholarship or student loan purposes. To be certified full time, the Graduate Program Coordinator will submit a Certification of Full-Time Status Form. (See section on Certification of Full-Time Status).

*Read Carefully: The Application to Candidacy (ATC) form must be submitted to the Department a minimum of FOUR weeks before the Graduate School deadline. If the ATC form is not submitted one month prior to the deadline, we cannot guarantee that it will be reviewed and approved in time for the student to graduate as planned.

The Application to Candidacy should be submitted to the department with an unofficial UB transcript and, if applicable, a description of Informal Graduate Coursework Form for any independent study coursework, (i.e. STA 600).
**M-Form.** The *M-form* (Multi-Purpose) is prepared by the Graduate Program Coordinator and given to the student after all degree requirements have been completed. You must provide the title and abstract of your project or thesis to the Graduate Program Coordinator. This form must be signed by the major professor, committee members, and the Director of Graduate Studies to certify that the student has satisfactorily completed ALL academic requirements for the degree. A copy of the *M-Form* is placed in the student’s file. The original must be received at the Graduate School by the following deadlines:

- Friday before spring classes for a February 1 degree conferral
- Last day of spring exams for a June 1 degree conferral
- Friday before fall classes for a September 1 degree conferral

**CHECKLIST FOR M.A. DEGREE CONFERRAL**

- At least 30 graduate credit hours (including STA core courses public health requirement and epidemiology course) are completed with at least an overall ‘B’ (3.0) average
- Satisfactory completion of MA exams (Theory, Applied, and Data Analysis Project).
- Satisfactorily complete the public health course requirement.
- Satisfactorily complete the epidemiology course requirement.
- Continuous registration from the date of matriculation (unless on an approved leave of absence).
- If beyond the four-year time limit for completion of degree, an approved petition for extension of time to complete the degree is on file in the Graduate School.
- An approved *Application to Candidacy* is on file in the Graduate School with all necessary attachments, including original transcripts.
- *M Form* submitted to the Graduate School within the established deadlines with all necessary attachments.

**PhD DEGREE**

To earn a PhD in Biostatistics, a student must pass the written Master's exams, complete coursework requirements, pass PhD qualifier exams, and complete a dissertation on a biostatistical
topic approved by his/her supervisory committee. In addition, data analysis experience at a level commensurate with coursework is required.

A minimum of 72 credits beyond the bachelor's degree is required. All credits earned in fulfillment of the Master of Arts in Biostatistics degree at the University at Buffalo count toward this requirement. No more than 36 hours of approved courses can be transferred from another institution. Students who transfer into the Biostatistics Program with a Master’s degree and have not taken STA 503, STA 504, STA 521, and STA 522, or the equivalent, are required to take these courses and the credits earned will be accounted for as transferred hours. Other coursework requirements are given below.

The remainder of the required 72 credits may be earned through enrollment in the PhD program’s core courses, approved electives that have not been counted to satisfy the requirements of the Master’s degree, and STA 700 (Thesis Research). Students may begin receiving credit for doctoral research hours in the semester after passing the qualifying exams.

**Core Course Requirements**

The following core courses are required for all Biostatistics PhD students:

- STA 621 Theory of Statistical Inference (3)
- STA 622 Limit Theory (3)
- STA 641 Theory of Linear Models (3)
- STA 642 Topics in Advanced Modeling (3)

Students are **also required** to have the following public health and epidemiology courses:

- CHB 550 Public Health and Population Well Being (3) AND
- EEH 501 Principles of Epidemiology (4)

Students who earned a master’s degree from an accredited school of public health and have taken one of these courses may seek a waiver from the Director of Graduate Studies.

*Full time Masters and PhD students must also register for STA 782 (0 credits) which is our department seminar held on Thursday afternoon.*

**All students are required to attend the weekly departmental seminar**

To be more specific:
1) Attendance for all full-time students is mandatory at our 4pm. Thursday seminar. Seminars scheduled outside that timeslot are optional. However, students are strongly urged to attend. Full-time students include PhD students currently working on their dissertations.

2) An attendance sheet will be administered at the beginning of each seminar that you will be required to sign in order to register your attendance.

3) You are expected to attend 80% of the seminars each semester. Failure to do so may delay your graduation date until seminar attendance is deemed adequate. TAs who fail to attend the seminar may lose their assistantships.

**Elective Requirements**

Students must take at least three PhD electives (PE). At least two must come from the following list of advanced Biostatistics courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>STA 609</td>
<td>Advanced Statistical Genetics (3)</td>
</tr>
<tr>
<td>STA 612</td>
<td>Advanced Clinical Trial/Design Analysis (3)</td>
</tr>
<tr>
<td>STA 617</td>
<td>Advanced Categorical Data Analysis (3)</td>
</tr>
<tr>
<td>STA 661</td>
<td>Advanced Topics in Large Sample Theory (3)</td>
</tr>
<tr>
<td>STA 667</td>
<td>Advanced Bayesian Inference (3)</td>
</tr>
<tr>
<td>STA 671</td>
<td>Advanced Special Topics in Statistics (3)</td>
</tr>
<tr>
<td>STA 675</td>
<td>Advanced Survival Analysis (3)</td>
</tr>
<tr>
<td>STA 681</td>
<td>Multivariate Theory (3)</td>
</tr>
<tr>
<td>STA 745</td>
<td>Topics in Design and Analysis of Observational Studies (3)</td>
</tr>
</tbody>
</table>

The third elective may be an approved course from outside the Department of Biostatistics. If the non-major elective option is chosen, prior approval of the course by the student's supervisory committee and the Director of Graduate Studies is required. Non-major electives must be graduate level courses on topics that complement the student's education in biostatistics.

**Practical Training Requirement**

Biostatistics PhD students are required to complete practical training that involves the application of PhD level methods to the health or biological sciences. Students can satisfy this requirement by working under a faculty member in a consulting or collaborative research setting or by participating in an approved external internship program.
Students must submit a detailed written report of their work to their supervisory committee for evaluation. An oral presentation of this report must be given to the committee in the form of a seminar that is announced to all faculty and students of the Department of Biostatistics.

**Responsible Conduct of Research (RCR) Training Requirement**

All students admitted to a PhD program are required to document successful completion of “Responsible Conduct of Research” (RCR) training when they submit their Application to Candidacy (ATC) for their PhD degree. This training requirement may be fulfilled by either: (1.) enrolling in and passing PHI 640 *Graduate Research Ethics* or RPN 541 *Ethics and Conduct of Research*; or (2.) completing the Collaborative Institutional Training Initiative (CITI) online Responsible Conduct of Research course with a score of 80% or higher. Students opting to complete the CITI online course must supply documentation of its successful completion with their Application to Candidacy.

**Online Program in Responsible Conduct of Research**

The University at Buffalo has an institutional membership in the CITI online RCR program. That online program can be accessed through the following website: [http://www.citiprogram.org](http://www.citiprogram.org). Initially, the student needs to register and choose a password, which allows the program to be entered and reentered as many times as needed. Also, the student is asked, at the time of initial registration, to enter his/her name, mailing address, phone number, e-mail address, and UB person number. A database of UB participants is created using that information. There are four versions of the CITI online RCR course from which the student should choose the version most appropriate for his/her area of doctoral study: Biomedical Sciences, Social and Behavioral Sciences, Physical Sciences, or Humanities. The RCR program is comprised of a series of modules, each of which consists of readings and case studies and ends with a quiz covering the material. The program allows the student to enter and exit at any point and to re-take the quiz associated with each section. A minimum total score of 80% is required to pass the online course. Assistance is available online at the CITI website if any technical difficulties are encountered. Once the student has successfully completed the appropriate version of the CITI RCR program with a passing grade of 80% or higher, he/she must print the “Completion Report” from within the CITI program as documentation of successful completion and submit it with the PhD degree Application to Candidacy.

Students who enter the PhD program must demonstrate a course successfully taken in epidemiology and public health course during their master’s degree study. If no epidemiology or public health course can be shown, students will need to take an epidemiology course and public health course approved by the Director of Graduate Studies to satisfy these requirements.

**Qualifying Exams**
To be admitted to candidacy for the PhD degree, students must pass three qualifying exams: two written and one oral.

The written exams, which are called Part I Qualifiers, cover applied and theoretical topics. The applied exam covers the topics taught in STA 641 and 642, while the theoretical exam covers STA 621 and 622. Students are allowed a maximum of two attempts to pass each Part I exam. Any student failing an exam twice will be dismissed from the program.

The oral exam, called the Part II Qualifier, can be taken after passing both Part I Qualifiers. The Part II exam is an oral defense of the student's proposed dissertation project. The dissertation proposal must be submitted in writing to members of the student's supervisory committee at least two weeks prior to the oral exam. This exam is conducted by the supervisory committee, but may be attended by any member of the faculty. Immediately after the Part II oral exam the supervisory committee will decide whether the student is qualified to continue work toward a PhD degree.

Upon successful completion of Part I and II exams, the student may apply for admission to candidacy for the PhD degree according to the rules of the University.

**Supervisory Committee**

A student's PhD supervisory committee is selected by the student with the approval of the Director of Graduate Studies and the Department Chair. The committee must consist of a major professor and at least two additional committee members, all of whom must be Members of the UB Graduate Faculty. An outside reader is not required but is recommended.

The committee's responsibilities include:

1. Reviewing and approving the student’s program of study. This should be done soon after appointment of the committee;
2. Conducting the student's Part II oral exam and, thereby, discuss and approve or deny the student's dissertation proposal and plans to carry it out;
3. Approving or denying the student for candidacy into the PhD program;
4. Evaluating the student's progress on the dissertation soon after half of the work has been completed and making suggestions for completion;
5. Conducting the final oral exam. For the student to pass this exam, committee members must unanimously agree that the student has successfully defended the dissertation as independent, original research that furthers the knowledge of biostatistics. Final approval of the dissertation usually follows a successful performance on this oral exam. The committee, however, may pass the student and, in addition, require revisions to the dissertation in form or content. All committee members must indicate their final approval by signing the dissertation and the requisite University forms.

**Dissertation and Final Defense**
The student must submit his/her dissertation to the committee at least one month prior to his/her final defense. The presentation of the dissertation must be given to the committee at the final oral exam in the form of a seminar announced to all faculty and students of the Department of Biostatistics and, more generally, throughout the University.

A booklet entitled *Guidelines for Graduation and Thesis and Dissertation Preparation* is available on the web at [www.grad.buffalo.edu](http://www.grad.buffalo.edu) or from the Graduate School Office of Student Services. Be sure to refer to this document before preparing your thesis/project/dissertation.

Several style manuals are available, including Strunk and White (1995), Turabian (1996) and the University of Chicago Press (1993), which will answer a host of questions regarding the technical aspects of preparing the thesis or dissertation.

One unbound copy of the dissertation must be submitted to each of the Graduate School (submitted electronically), the Department, and to the student’s major professor.

**ADMINISTRATIVE REQUIREMENTS**

**Time Limit to Complete the Degree.** The time limit for completing the PhD degree is seven years from the date of matriculation in the department, not counting official leaves of absence. Students unable to complete the PhD program within the time limit must petition the Graduate School for an extension of time to complete the degree provided there exists adequate reason to justify such a request. Students must provide a detailed description of work completed to date as well as a timeline for completion of the dissertation/degree. Normally, extensions are approved for a maximum of one year. A total of more than two years will not be approved. Requests for extensions should be made at least two weeks prior to the start of the semester. *Graduate Student Petition Forms* are located on the web at [http://grad.buffalo.edu/Academics/Forms-for-Students.html](http://grad.buffalo.edu/Academics/Forms-for-Students.html). Be sure to indicate the dates of the extension, the reason for the request, and the intended date of degree completion. The Graduate School will not approve an extension for ‘personal reasons,’ you must be specific and present strong justification for your request.

**CHECKLIST FOR PhD DEGREE CONFERRAL**

- 72 graduate credit hours are completed with an overall ‘B’ (3.0) average (a minimum of 60 credit hours of graduate course work including public health and epidemiology course requirement plus 12 credit hours of dissertation credit).

- Continuous registration from the date of matriculation (unless on an approved leave of absence).

- If beyond the seven-year time limit for completion of degree, an approved petition for extension of time to complete the degree is on file in the Graduate School.
• An approved *Application to Candidacy* is on file in the Graduate School with all necessary attachments, including original transcripts.

• Satisfactory completion of Qualifying Exams.

• Satisfactorily completion of the public health course requirement and epidemiology course requirement.

• Successful completion and defense of the dissertation.

  *M-Form* and electronic submission of the dissertation to the Graduate School within the established deadlines.

• *Survey of Earned Doctorates Form* submitted to the Graduate School.

• Successful completion of the Responsible Conduct of Research (RCR) Training Requirement.

• One bound copy of the dissertation delivered to the Department and to each member of the student’s committee.

**MASTER OF PUBLIC HEALTH (MPH)**

The MPH degree requires a minimum of 45 credit hours (unless a student is waived from required course work). Students must maintain a minimum overall GPA of at least 3.0 and a minimum grade of ‘B’ (3.0) in all required courses. Note: B- (2.67) is below the minimum grade for required courses.

**Courses and Competencies**

• Core required MPH courses
• Concentration courses
• Field training
• Integrative project
• Seminar requirement
Core Required MPH Courses (28 credits)

The required core courses taken by all MPH students are as follows. They address competencies established by the Association of Schools of Public Health (ASPH) for the five core areas of the MPH degree: biostatistics, environmental health sciences, epidemiology, health policy and management, and social and behavioral sciences.

- CHB 501 Study of Health Behaviors (3 credits)
- EEH 501 Epidemiology Principles (4 credits)
- EEH 530 Introduction to Health Care Organization (3 credits)
- STA 502 Intro to Statistical Inference (3 credits) (replaced STA 527)
- EEH 531 Administrative Theory and Practice (3) (formerly EEH 530)
- EEH 520 Biological Basis of Public Health (3) (formerly EEH 535)
- EEH 550 Environmental Health (3) (formerly EEH 549)
- EEH 590 Public Health Seminar (0 credits; 2 semesters of EEH 590) MPH students are required to take EEH 590 for two academic years or 4 semesters; part-time students and those who have already taken two semesters of EEH 591 can either be present in class or view the seminars on-line (on iTunes U).

**NOTE:** EEH 501, STA 502 and STA 503 must be taken in the first semester of a student's program. (In extenuating circumstances, students can request a waiver to the first semester requirement from their concentration area director but the courses must be taken by the second year of the program.)

Concentration Courses  Required courses (6 credits)

- STA 503 Regression Analysis (3) **MUST BE TAKEN IN THE FIRST SEMESTER**
- STA 504 Analysis-of-Variance (3) (new course name – same content as Statistical Comparison & Association)

**Students take four of the following elective courses (12 credits);** STA 527 is not allowable as an elective.

- STA 506 Intro to Statistical Computing (3)
- STA 509 Statistical Genetics (3)
- STA 511 Advanced Statistical Computing (formerly Math Analysis for Statisticians) (3)
- STA 515 Distribution-Free Inference (3)
• STA 517 Categorical Data Analysis
• STA 521 Introduction to Theoretical Stats (3)
• STA 522 Introduction to Theoretical Statistics II (3)
• STA 525 Statistics for Bioinformatics
• STA 526 Design and Analysis of Clinical Experiments
• STA 531 Theory and Methods of Sample Surveys
• STA 536 Statistical Design and Analysis (3)
• STA 537 Sequential Analysis
• STA 545 Data Mining I
• STA 546 Data Mining II
• STA 551 Stochastic Processes
• STA 561 Longitudinal Data Analysis and Time Series Analysis
• STA 567 Bayesian Statistics
• STA 571 Special Topics in Statistics
• STA 575 Survival Analysis
• STA 581 Multivariate Data Analysis

Field Training (STA 544, 3 credits)

The purpose of the supervised field training experiences is to allow students to synthesize the knowledge and skills developed during the academic portion of their program in a practical setting. The field training is both a learning experience for the student and contributes to the work undertaken by the field training site. The expectation is that the field training will provide learning opportunities unavailable in a classroom setting. More information can be found at: http://sphhp.buffalo.edu/mph/program/field_training_guidelines.php.

Integrative Project (STA 630, 2 credits)

In addition to the required and elective courses, all MPH students must complete an integrative project.

The purpose of the integrative project is for Master of Public Health students to integrate core public health knowledge and skills. It takes the form of a paper prepared during the last semester of the students’ program. Registration ordinarily is only during the last semester of the student’s MPH program. Students can begin on their project before their last semester in the program, for example, during their field training if the project is an extension of something first encountered during the field training.
These instructions can be modified by individual faculty depending upon a student's particular project. Obviously, parts that are not modifiable include the ATC and M-Form, hard and digital copies of a properly formatted project paper for MPH Program records, and the seminar presentation. Our department will require submission of an abstract describing what the student proposes to do for his or her integrative project. More information can be found at: http://sphhp.buffalo.edu/mph/program/project_instructions.php

**Project Committee.** With the advice of their advisor the student will select a project committee which includes a major professor who is a member of the UB Graduate Faculty (a list of eligible Graduate Faculty is available at the Graduate School website http://grad.buffalo.edu/Academics/Graduate-Faculty-Roster.html and one committee member who holds the rank of assistant, associate or full professor at the University to supervise work on their integrative project. The initial supervision of a student's program is exercised by a faculty member appointed as an advisor by the major department. This advisor assists the student in planning his/her program until the student chooses a major professor under whose supervision he/she will work on the final thesis, project or portfolio. **THE THESIS, PROJECT OR PORTFOLIO SUPERVISOR MUST BE EITHER A MEMBER OR AN ASSOCIATE MEMBER OF THE UB GRADUATE FACULTY.**

**ADMINISTRATIVE REQUIREMENTS**

These can be found at www.grad.buffalo.edu/policies (see University policy)

**Time Limit to Complete the Degree.** The time limit for obtaining the master’s degree is four years from the date of matriculation in the department, not counting official leaves of absence. Students unable to complete the master’s program within the time limit must petition the Graduate School for an extension of time to complete the degree. Students must provide a detailed description of work completed to date as well as a timeline for completion of the thesis/degree. Normally, extensions are approved for a maximum of one year. A total of more than two years will not be approved. Requests for extensions should be made at least two weeks prior to the start of the semester. **Graduate Student Petition Forms** are available at http://grad.buffalo.edu/Academics/Forms-for-Students.html. Be sure to indicate the dates of the extension, the reason for the request, and the intended date of degree completion. The Graduate School will not approve an extension for ‘personal reasons’. You must be specific and present strong justification for your request.

**Application to Candidacy.** [www.grad.buffalo.edu/policies/ATC.php]

The Application to Candidacy is a document that includes a summary of courses to be applied toward a degree and usually is competed after three semesters. All ATC forms must include an abstract of the student’s research. The ATC is available at http://grad.buffalo.edu/Academics/Forms-for-Students.html. Once the ATC has been approved, a student is not required to enroll for 12 credits (9 credits if supported on an assistantship) to be considered full-time for tuition scholarship or student loan purposes. To be certified full time, the
Graduate Program Coordinator must submit a Certification of Full-Time Status Form. (See section on Certification of Full-Time Status)

*Read Carefully*: The Application to Candidacy (ATC) form must be submitted to the Department a minimum of FOUR weeks before the Graduate School deadline. If the ATC form is not submitted one month prior to the deadline, we cannot guarantee that it will be reviewed and approved in time for the student to graduate as planned.

The Application to Candidacy should be submitted to the department with an unofficial UB transcript.

**M-Form.** The M-Form (Multi-Purpose Form) is prepared by the Graduate Program Coordinator and is brought by the student to the presentation of their integrative project. This form is signed by the major professor, committee member and submitted to the Director of Graduate Studies after successful presentation of the project to certify that the project has been approved by the Department in partial fulfillment of the requirements for the degree. No M-Forms will be forwarded to the Graduate School without an Abstract of Research Form. The M-Form must be received at the Graduate School by the following deadlines:

- Friday before spring classes for a February 1 degree conferral
- Last day of spring exams for a June 1 degree conferral
- Friday before fall classes for a September 1 degree conferral

**M Form Checklist:**

- ✓ notify the Graduate Program Coordinator of the date and title for the integrative project presentation (a copy of the prepared M-Form will be placed in the major advisor’s mailbox for signatures the day of the presentation)

**CHECKLIST FOR MPH DEGREE CONFERRAL**

- 45 graduate credit hours are completed with an overall ‘B’ (3.0) average or better
- A minimum grade of B (3.0) in all required course work.
• Completed four semesters of seminar attendance (The MPH seminar, not Biostatistics).

• Continuous registration from the date of matriculation (unless on an approved leave of absence).

• If beyond the four-year time limit for completion of degree, an approved Graduate Student Petition Form for extension of time to complete the degree is on file in the Graduate School.

• An approved Application to Candidacy is on file in the Graduate School with all necessary attachments, including original transcripts.

• Review unofficial transcript and address any “I” or “J” grades.

• Successful completion and presentation of the integrative project.

• Abstract of Research and M Form are received by the Graduate School within the established deadlines (the Graduate School does not require copies of a project).

Copy of the integrative project submitted to the Department.

**One Year Accelerated MPH Degree**

For highly qualified applicants, we offer an accelerated 12-month course of study that culminates with an MPH degree with a biostatistics concentration.

Applicants must have a terminal degree (MD, PhD, JD, etc.) or significant post-baccalaureate public health work experience to be considered for the accelerated program.

Our rigorous program is geared towards those applicants who can devote 12 consecutive months to intensive public health course work and related field placement and integrative project requirements.

The accelerated MPH requires a minimum of 43 credits completed over 12 consecutive months. Up to 6 credits may be waived and up to 9 credits may be transferred based on previously taken graduate coursework. Regardless of any waivers/substitutions, a minimum of 43 credits must be completed.

**Fall Courses**

**Required courses:**
- CHB 501 Study of Health Behavior
- EEH 501 Principles of Epidemiology (4 credits)
- EEH 530 Introduction to Health Care Organization
- EEH 590 Public Health Seminar (0 credits)
- STA 502 Introduction to Statistical Inference
- STA 503 Regression Analysis
- Elective course/s*

*A total of four elective courses, which can be taken in fall, spring or summer, are required to graduate.

**Spring Courses**

All courses are 3 credit hours unless otherwise indicated.

**Required Courses**

- EEH 531 Administrative Theory and Practice for Public Health Practitioners
- EEH 520 Biological Basis of Public Health
- EEH 550 Environmental Health
- EEH 590 Public Health Seminar (0 credits)
- STA 504 Analysis of Variance
- Elective course/s*

*A total of four elective courses, which can be taken in fall, spring or summer, are required to graduate.

**Summer Courses**

**Field Training**

Through the supervised field training experience, you will apply your skills and knowledge learned in the classroom and engage in the practice of public health. This hands-on experience will take place at a public health site of your choosing.

- STA 544 MPH Field Training (3-6 credits)

**Integrative Project**

With your integrative project, you will incorporate what you have learned from the program coursework and your field training into a paper that addresses a specific public health issue.

- STA 630 MPH Integrative Project (2-3 credits)
Combined degrees

Master of Public Health (MPH) and Professional Degree (MD)

Through this five-year program, you will earn an MPH degree in biostatistics and a Doctor of Medicine (MD) degree.

This collaborative program prepares you to incorporate a public health approach with your medical practice or research—providing care for individuals as well as communities.

Curriculum

Our MPH curriculum will provide a comprehensive understanding of public health philosophy, as well as the practical knowledge and skills needed to address current and emerging public health problems. You’ll complete 43 credits, including coursework, three to six credits of field training and two credits for an integrative project.

The MD curriculum provides a general medical professional education that permits you to learn the fundamental principles of medicine, to acquire skills of critical judgment based on education and experience and to develop an ability to use principles and skills wisely in solving problems of health and disease.

Each degree will be conferred separately upon completion of program requirements.

Course of Study

First and Second Year

- Follow the School of Medicine curriculum schedule.

Third Year

- The third year is devoted to the MPH program. For both the fall and spring semesters, refer to the biostatistics concentration of the MPH curriculum.

Fourth Year

- Follow the School of Medicine curriculum schedule.

Fifth Year--Fall

- Follow the School of Medicine curriculum schedule.
Fifth Year--Spring

- STA 544 Field Training
- STA 630 Integrative Project
- Any remaining concentration area courses in the MPH program

ADVANCED (GRADUATE) CERTIFICATE IN APPLIED BIOSTATISTICS
(New Offering beginning Fall 2015)

The Department of Biostatistics at SUNY at Buffalo is offering an advanced (graduate) certificate in “Applied Biostatistics”. This certificate program will provide an intensive training on biostatistical methodology and data analysis skills. Upon completion, students will be equipped with statistical knowledge and programming techniques needed for analyzing data from a variety of sources such as clinical trials, observational studies and laboratory studies. This certificate program is targeted towards people who have already obtained their terminal degree, e.g. MD or PhD, and would like additional professional development outlets.

Curriculum

Coursework leading to an Advanced Certificate in Applied Biostatistics consists of one required course and four elective courses. A minimum overall cumulative GPA 3.0 will be required to earn this advanced certificate.

Required Core Course (3 credits)

STA 502: Introduction to Statistical Inference (3 credits)
Or equivalent courses (e.g. STA 521 or STA 522)

Elective Courses (12 credits)
Choose any 4 courses from the following list (all the courses are 3 credits):

- STA 503 Regression Analysis
- STA 504 Analysis of Variance
• STA 509 Statistical Genetics
• STA 511 Advanced Statistical Computing (formerly Math Analysis for Statisticians)
• STA 515 Distribution-Free Inference
• STA 517 Categorical Data Analysis
• STA 521 Introduction to Theoretical Statistics I
• STA 522 Introduction to Theoretical Statistics II
• STA 525 Statistics for Bioinformatics
• STA 526 Design and Analysis of Clinical Experiments
• STA 531 Theory and Methods of Sample Surveys
• STA 537 Sequential Analysis
• STA 545 Data Mining I
• STA 546 Data Mining II
• STA 551 Stochastic Processes
• STA 561 Longitudinal Data Analysis and Time Series Analysis
• STA 567 Bayesian Statistics
• STA 571 Special Topics in Statistics
• STA 575 Survival Analysis
• STA 581 Multivariate Data Analysis

**Advanced Certificate Conferral Requirements**

Depending on the particular Advanced Certificate program in question and its admission/eligibility requirements, a graduate student may be authorized to pursue that advanced certificate program on a "stand-alone" basis or in conjunction with an existing graduate level degree program. When a graduate student who is pursuing an Advanced Certificate program has completed or nearly completed the requirements for the Advanced Certificate in question (i.e., is currently enrolled in the last needed requisites), the student is responsible for filing the appropriate Advanced Certificate Program of Study Approval form with his/her department to enable timely review of the student's record. Each Advanced Certificate Program of Study Approval form must be approved by the faculty member in charge of that certificate program and must be forwarded to the Graduate School by the relevant application to candidacy deadline as published on the Graduate School website.
ADVANCED (GRADUATE) CERTIFICATE IN BIOSTATISTICAL INFORMATICS
(New Offering beginning Fall 2015)

The Department of Biostatistics at SUNY at Buffalo is offering an advanced (graduate) certificate in Biostatistical Informatics. Develop your knowledge and skills in biostatistical informatics, the study of high-dimensional data in biomedical and public health research. Biostatistical informatics is the study of high-dimensional data in biomedical and public health research. This certificate program will enhance a student’s ability to properly evaluate and utilize a wide variety of advanced statistical methods. Students will receive in-depth training in the statistical foundations and methods of analysis of genetic data, including genetic mapping, quantitative genetic analysis, design and analysis of medical genetic studies and data mining.

Biostatistics majors pursuing this certificate will benefit from specialized training that will more readily qualify them for employment and/or conducting research in the certificate subject areas.

Scientists working in areas outside of Biostatistics will obtain a level of quantitative literacy that will greatly improve their abilities to properly identify, evaluate, and utilize statistical methods that are relevant to their particular subject matter.

Curriculum

Coursework leading to an Advanced Certificate in Biostatistical Informatics consists five courses (15 credits). A minimum GPA 3.0 will be required to earn this advanced certificate.

Requirements and Curriculum

The Advanced Graduate Certificate in Biostatistical Informatics requires 15 credits (five courses) with a minimum GPA of 3.0 in all courses.

Core Required Courses - 15 credits

All courses are 3 credit hours.

- STA 502 Introduction to Statistical Inference
- STA 509 Statistical Genetics
- STA 525 Statistics for Bioinformatics
Advanced Certificate Conferral Requirements

Depending on the particular Advanced Certificate program in question and its admission/eligibility requirements, a graduate student may be authorized to pursue that advanced certificate program on a "stand-alone" basis or in conjunction with an existing graduate level degree program. When a graduate student who is pursuing an Advanced Certificate program has completed or nearly completed the requirements for the Advanced Certificate in question (i.e., is currently enrolled in the last needed requisites), the student is responsible for filing the appropriate Advanced Certificate Program of Study Approval form with his/her department to enable timely review of the student's record. Each Advanced Certificate Program of Study Approval form must be approved by the faculty member in charge of that certificate program and must be forwarded to the Graduate School by the relevant application to candidacy deadline as published on the Graduate School website.


**EXAMPLE PROGRAMS OF STUDY (Beginning Fall 2016)**

**Master of Arts Degree**

*Note that the sample* program of study for the Master of Arts Degree is meant for students who are receiving partial and/or full tuition stipends and are required to take 9 credit hours per semester. Those students who are not on stipend are required to take 12 credit hours per semester in order to be considered full-time and may complete the degree program sooner.

<table>
<thead>
<tr>
<th>Year 1: Fall Semester</th>
<th>Year 1: Spring Semester</th>
<th>Year 1: Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>STA 503 Regression Analysis (3)</td>
<td>STA 504 Analysis-of-Variance (3)</td>
<td>Masters Exam</td>
</tr>
<tr>
<td>STA 521 Introduction to Theoretical Statistics I (3)</td>
<td>STA 522 Introduction to Theoretical Statistics II (3)</td>
<td>Practical Training (PT)</td>
</tr>
<tr>
<td>STA 511 Advanced Statistical Computing (formerly Mathematical Analysis for Biostatistics (3) (highly suggested to all MA students)</td>
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<td></td>
</tr>
<tr>
<td>Public Health Course (3)</td>
<td>Master’s Elective (3)</td>
<td></td>
</tr>
<tr>
<td>STA 782 Departmental Seminar (0)</td>
<td>Master’s Elective (3)</td>
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<td></td>
<td>STA 782 Departmental Seminar (0)</td>
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<table>
<thead>
<tr>
<th>Year 2: Fall Semester</th>
<th>Year 2: Spring Semester</th>
<th>Year 2: Summer</th>
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</thead>
<tbody>
<tr>
<td>Masters Elective (3)</td>
<td>Masters Elective (3)*a</td>
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</tr>
<tr>
<td>Epidemiology Course (4)</td>
<td>Practical Training Report and Seminar</td>
<td></td>
</tr>
<tr>
<td>Practical Training (PT)</td>
<td>STA 782 Departmental Seminar (0)</td>
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</tr>
<tr>
<td>STA 782 Departmental Seminar (0)</td>
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</tbody>
</table>

*this elective may be used for the purpose of preparing the practical training report and seminar under the course number STA 600.
<table>
<thead>
<tr>
<th>Year 1: Fall Semester</th>
<th>Year 1: Spring Semester</th>
<th>Year 1: Summer</th>
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<tbody>
<tr>
<td>STA 621 Theory of Statistical Inference (3)</td>
<td>STA 622 Limit Theory (3)</td>
<td>PhD Qualifying Exam</td>
</tr>
<tr>
<td>STA 641 Theory of Linear Models (3)</td>
<td>STA 642 Topics in Advanced Modeling (3)</td>
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</tr>
<tr>
<td>Public Health course (3)***</td>
<td>STA PhD elective (3)</td>
<td></td>
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<tr>
<td>PhD Elective (3)</td>
<td>STA PhD elective (3)</td>
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<tr>
<td>STA 782 Departmental Seminar (0)</td>
<td>STA 782 Departmental Seminar (0)</td>
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<thead>
<tr>
<th>Year 2: Fall Semester</th>
<th>Year 2: Spring Semester</th>
<th>Year 2: Summer</th>
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<tbody>
<tr>
<td>STA 781 Reading &amp; Research</td>
<td>STA 781 Reading &amp; Research</td>
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<tr>
<td>STA PhD Elective (3)</td>
<td>STA PhD Elective (3)</td>
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<tr>
<td>STA PhD Elective (3)</td>
<td>STA 782 Departmental Seminar (0)</td>
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<tr>
<td>Epidemiology Course (4)***</td>
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<tr>
<td>**RPN 541 or ** PHI640 or CITI course online</td>
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<tr>
<td>STA 782 Departmental Seminar (0)</td>
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<tr>
<th>Year 3: Fall Semester</th>
<th>Year 3: Spring Semester</th>
<th>Year 3: Summer</th>
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<tbody>
<tr>
<td>Part II Exam (Thesis Proposal)</td>
<td>STA 700 Thesis Guidance</td>
<td></td>
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<tr>
<td>STA 782 Departmental Seminar (0)*</td>
<td>STA 782 Departmental Seminar (0)*</td>
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<tr>
<th>Year 4: Fall Semester</th>
<th>Year 4: Spring Semester</th>
<th>Year 4: Summer</th>
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<tbody>
<tr>
<td>STA 700 Thesis Guidance</td>
<td>STA 700 Thesis Guidance</td>
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<tr>
<th>Year 5</th>
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<tbody>
<tr>
<td>STA 700 Thesis Guidance</td>
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<tr>
<td>Dissertation Defense</td>
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</tbody>
</table>
* Full time students are required to attend 80% of seminars (includes those who filed their ATC and have full time status from the graduate school)
**PhD students must fulfill the ethics requirement by the end of the third year. Those who opt for the online course must show proof of satisfactory completion to the Graduate School.
*** For those students who did not graduate with a master’s degree from an accredited school of public health and have not completed these requirements.
**EXAMPLE TWO YEAR COURSE SEQUENCE BY CONCENTRATION AREA**

**BEGINNING FALL 2016**

<table>
<thead>
<tr>
<th>MPH WITH BIOSTATISTICS CONCENTRATION (45 CREDITS)</th>
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<tbody>
<tr>
<td><strong>Year 1: Fall Semester (13)</strong></td>
</tr>
<tr>
<td>EEH 501 Epidemiology Principles (4)*</td>
</tr>
<tr>
<td>STA 502 Intro to Stat Inference (3)*</td>
</tr>
<tr>
<td>STA 503 Regression Analysis (3)*</td>
</tr>
<tr>
<td>EEH 530 Introduction to Health Care Organization (3)</td>
</tr>
<tr>
<td>EEH 590 Public Health Seminar (0 credits)</td>
</tr>
<tr>
<td><em>must be taken in the first semester</em></td>
</tr>
</tbody>
</table>

| **Year 2: Fall Semester (12)**                   | **Year 2: Spring Semester (8)**                |
| CHB 501 Study of Health Behaviors (3)            | EEH 531 Administrative Theory and Practice (3) |
| STA 544 Field Training (3)                       | STA 630 Integrative Project (2)               |
| One biostatistics elective (3)                   | One biostatistics elective (3)                |
| One biostatistics elective (3)                   |                                                 |
| EEH 590 Public Health Seminar (0 credits)        | EEH 590 Public Health Seminar (0 credits)      |

STA 511 provided the background in special topics in mathematics required to succeed in the biostatistics electives, and thus STA 511 is a recommended elective for students who have not had an advanced calculus and/or matrix algebra and/or computing skills.

STA 502 replaced STA 521 and is designed specifically for MPH in biostatistics for better preparing for biostatistics electives.
Example one year course sequence by concentration area 
Beginning Fall 2016

<table>
<thead>
<tr>
<th>MPH with Biostatistics Concentration (43 credits)</th>
</tr>
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<tbody>
<tr>
<td><strong>Year 1: Fall Semester (19)</strong></td>
</tr>
<tr>
<td>EEH 501 Epidemiology Principles (4)</td>
</tr>
<tr>
<td>CHB 501 Study of Health Behaviors (3)</td>
</tr>
<tr>
<td>EEH 530 Introduction to Health Care Organization (3)</td>
</tr>
<tr>
<td>STA 502 Intro to Stat Inference (3)</td>
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<tr>
<td>STA 503 Regression Analysis (3)</td>
</tr>
<tr>
<td>One biostatistics elective (3)</td>
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<tr>
<td>EEH 590 Public Health Seminar (0 credits)</td>
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<tr>
<th><strong>Year 2: Fall Semester (6)</strong></th>
<th><strong>Year 2: Spring Semester (8)</strong></th>
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</thead>
<tbody>
<tr>
<td>STA 544 Field Training (3-6)</td>
<td></td>
</tr>
<tr>
<td>STA 630 Integrative Project (2)</td>
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</tr>
</tbody>
</table>
COURSE DESCRIPTIONS (courses are 3.0 credits unless otherwise noted)

* Indicates a course that is not available for credit toward a MA or PhD degree in biostatistics. Unless otherwise specified, courses are 3 credit courses.

CHB 501 STUDY OF HEALTH BEHAVIORS
Designed to provide you with a graduate-level overview of the role of the social and behavioral sciences in understanding and addressing public health problems. Three general topics are covered. First, we examine how psychological, social, and environmental factors influence people’s health and wellbeing. Second, we explore factors that influence health behavior, including individual, social, and environmental/community influences. Third, we explore how understanding behavior and social/environmental influences on health informs public health approaches to improving health and preventing disease. The course prepares public health students to satisfy MPH competencies in social and behavioral sciences.

EEH 501 EPIDEMIOLOGY PRINCIPLES (4 credits)
Introduction to the basic principles, methods and uses of epidemiology.

EEH 520 BIOLOGICAL BASIS FOR PUBLIC HEALTH
Intended for students with little or no background in the biological sciences and health professions. The course provides a broad overview of public health topics related to human health and disease focusing on disease etiology with particular emphasis on parasitic and microbial infections plus a review of the anatomy, physiology, and pathology of selected major organ systems and associated diseases of public health importance.**

EEH 530 INTRODUCTION TO HEALTH CARE ORGANIZATION
Introduces students to the historical development, structure, operation, and current and future directions of the major components of the American health care delivery system. It examines the ways in which health care services are organized and delivered, the influences that impact health care public policy decisions, factors that determine priorities in financing health care services and the relationship of health care costs to measurable benefits. The course enables students to assess the role of organized efforts to influence health policy formulation, and the contributions of medical technology, research findings, and societal values to the evolving U.S. health care delivery system. Class time is also devoted to exploring emerging policy, ethical and legal dilemmas resulting from medical and technological advances.**

EEH 531 ADMINISTRATIVE THEORY AND PRACTICE
Introduces students to the historical development, structure, operation, and current and future directions of the major components of the American health care delivery system. It examines the ways in which health care services are organized and delivered, the influences that impact health
care public policy decisions, factors that determine priorities in financing health care services and the relationship of health care costs to measurable benefits. The course enables students to assess the role of organized efforts to influence health policy formulation, and the contributions of medical technology, research findings, and societal values to the evolving U.S. health care delivery system. Class time is also devoted to exploring emerging policy, ethical and legal dilemmas resulting from medical and technological advances.**

**EEH 550 ENVIRONMENTAL HEALTH**
Introductory course that explores the role of environmental factors in health with an emphasis on characterization, assessment, and control of environmental hazards. Topics include application of toxicologic and epidemiologic methods in assessing risk and setting exposure limits; the nature of and control of hazards associated with food, water, air, solid and liquid waste, occupation, and radiation; risk communication and management, environmental justice; and environmental laws. The course concludes by examining the impact of human activity, such as energy use and pollution, on the environment and how human-induced environmental change, in turn, impacts public health and that of the planet as a whole.**

**EEH 590 PUBLIC HEALTH SEMINAR (0 credits)**

**STA 502 STATISTICAL INFERENCE**
*May not be used as credit for Masters students in biostatistics*
Introduces basic principles of probability and distribution theory and statistical inference. Topics include axioms of probability theory, independence, conditional probability, random variables, discrete and continuous distributions, functions of random variables, moment generating functions, central limit theorem, point and interval estimation, maximum likelihood methods, tests of significance, and the Neyman-Pearson theory of testing hypotheses.**

**STA 503 REGRESSION ANALYSIS**
Regression analysis and introduction to linear models. Topics: Multiple regression, analysis of covariance, least square means, logistic regression, and non-linear regression. This course includes a one hour computer lab and emphasizes hands-on applications to datasets from the health sciences. LEC/LAB
*Prerequisite: MTH 142 or second course in calculus or permission of instructor.*

**STA 504 Analysis-of-Variance**
Advanced presentation of statistical methods for comparing populations and estimating and testing associations between variables. Topics: Point estimation, confidence intervals, hypothesis testing, ANOVA models for 1, 2, and k way classifications, multiple comparisons, chi-square test of homogeneity, Fisher’s exact test, McNemar’s test, measures of association, including odds ratio, relative risks, Mantel-Haenszel tests of association, and standardized rates, repeated measures ANOVA, simple regression and correlation. This course includes a one hour
computing lab and emphasizes hands-on applications to datasets from the health related sciences.
LEC/LAB
*Prerequisite:* STA 503

**STA 506 INTRODUCTION TO STATISTICAL COMPUTING**
The purpose of this course is to familiarize students with PC-based statistical computing applications for public health. It is a comparison course for EEH 505: Introduction to Biostatistics. The course will develop basic skills in the use of a statistical package through classroom demonstrations and independent lab assignments that will complement the material covered in EEH 505. The course will emphasize data definition, verification, descriptive and inferential statistics and graphical presentation. The course should familiarize the students with the use of a statistical package and give them the skills needed for effective data management, data manipulation, and data analysis at a basic level.
*NOTE:* Concurrent registration in prerequisite is permissible. *Prerequisite:* STA 505 or STA 527 or permission of instructor

**STA 509 STATISTICAL GENOMICS**
Statistical tools for analyzing experiments involving genomic data. Topics: Basic genetics and statistics, linkage analysis and map construction using genetic markers, association studies, Quantitative Trait Loci analysis with ANOVA, variance components analysis and marker regression (including multiple and partial regression), QTL mapping with interval mapping and composite interval mapping, LOD test, supervised and unsupervised methods for gene expression microarray data across multiple conditions. LEC
*Prerequisites:* STA 505 or STA 527 or STA 503

**STA 511 ADVANCED STATISTICAL COMPUTING**
This course provides the background in special topics in mathematics required to succeed in the biostatistics graduate programs and is required for students who have not had an advanced calculus and/or matrix algebra course. The basic mathematical concepts relevant to statistical studies will be discussed. Topics: convergence of sequences of sets, numbers, and functions, convergence of series, uniform convergence, power series, term by term integration and differentiation, matrix algebra, and other topics as time permits. LEC
*Prerequisite:* MTH 241. (Third semester calculus) or permission of instructor.

**STA 515 DISTRIBUTION-FREE INFERENCE**
Introduces alternate methods for designing and analyzing comparative studies that may be used when some or all of the assumptions underlying the usual parametric method are questionable. Topics: 1-, 2-, and k-sample location problems, randomized block and repeated measures designs, the independence problem, rank transformation tests, randomization tests, the 2-sample dispersion problem, and other topics as time permits. LEC
Prerequisite: Undergraduate Probability and Statistics course.

STA 517 CATEGORICAL DATA ANALYSIS
This course provides students with useful methods for analyzing categorical data. Topics: Cross-classification tables, tests for independence, log-linear models, Poisson regression, ordinal logistic regression, and multinomial regression for the logistic model. LEC
Prerequisite: STA 504 and STA 522. Concurrent registration in prerequisites is admissible.

STA 521 INTRODUCTION TO THEORETICAL STATISTICS I
Provides student with probability and distribution theory necessary for study of statistics. Topics: axioms of probability theory, independence, conditional probability, random variables, discrete and continuous probability distributions, functions of random variables, moment generating functions, Law of Large Numbers and Central Limit Theorem. LEC
Prerequisite: MTH 431 (Advanced calculus) or concurrent enrollment in STA 511

STA 522 INTRODUCTION TO THEORETICAL STATISTICS II
Introduces principles of statistical inference. Classical methods of estimation, tests of significance, and Neyman-Pearson Theory of testing hypotheses, maximum likelihood methods, and Bayesian statistics are introduced and developed. LEC
Prerequisite: STA 521.

STA 525 STATISTICS FOR BIOINFORMATICS
Since the completion of the human genome project, there is a burgeoning field of new applications for statistics involving high throughput experiments designed to gather large amounts of information on biological systems. This course is focused on discussing the wide array of approaches and technologies implemented to gather this information and the statistical issues involved from initial data processing steps to end stage research objectives. Specifically, time permitting, the technologies we will examine include two dimensional protein gel electrophoresis, protein mass spectrometry, and several flavors of microarray experiments. We will use the text "Bioinformatics and Computational Biology Solutions Using R and Bioconductor". Much of the work for the course will involve analyzing data sets from class and from the text using the R language

STA 526 DESIGN AND ANALYSIS OF CLINICAL EXPERIMENTS
Introduction to fundamental principles and planning techniques for designing and analyzing statistical experiments. Recommended for students in applied fields. Topics: Justification for randomized controlled clinical trials, methods of randomization, blinding and placebos, ethical issues, parallel groups design, crossover trials, inclusion of covariates, determining sample size, sequential designs, interim analyses, repeated measures studies. LEC
Prerequisite: STA 505 and STA 506, or STA 504 or permission of instructor.

STA 527 INTRODUCTION TO MEDICAL STATISTICS
(4 CREDITS)
Topics: Descriptive statistics, probability concepts (independence, conditional probability), probability distributions of random variables, sampling distributions, estimation, confidence intervals,
hypothesis testing, analysis of variance procedures, linear regression, nonparametric methods. Computers and statistical packages will be used throughout the course. No extensive computer experience is required. LEC/REC. Cannot be used as an elective for MA, PhD or MPH students. 

Prerequisite: one Semester of calculus. May not be used for credit for MA or MPH with concentration in Biostatistics students.

**

STA 531 THEORY AND METHODS OF SAMPLE SURVEYS
Introduction to theory and practice of sample surveys involving collection of statistical data from planned surveys. LEC

Prerequisite: STA 503 or permission of instructor

STA 536 STATISTICAL DESIGN AND ANALYSIS OF EXPERIMENTS
Introduces factorial experiments, fractional factorial experiments, confounding, lattice designs, various incomplete block designs, efficiency of experimentation, and problems of design construction. LEC

Prerequisite: STA 504 or permission of instructor.

STA 537 SEQUENTIAL ANALYSIS
Deals with statistical methods for estimation and testing hypotheses when samples are observed and analyzed sequentially. LEC

Prerequisite: STA 522.

STA 545 DATA MINING I
This course presents the topic of data mining from a statistical perspective, with attention directed towards both applied and theoretical considerations. An emphasis will be placed on supervised learning methods. Topics include: linear and logistic regression, discriminant analysis, shrinkage methods, subset selection, dimension reduction techniques, classification and regression trees, ensemble methods, neural networks, and random forests. Model selection and estimation of generalization error will be emphasized. Considerations and issues that arise with high-dimensional (N<<p) applications will be highlighted. Applications will be presented in R to illustrate methods and concepts.

Prerequisite: STA 511

STA 546 DATA MINING II
This course presents the topic of data mining from a statistical perspective, with attention directed towards both applied and theoretical considerations. An emphasis will be placed on unsupervised learning methods, especially those designed to discover and model patterns in data. Applications to high-dimensional data (N<<p) and big data (N>>p) will be highlighted. Topics include: Market basket analysis, hierarchical and center-based clustering, self-organizing maps, factor analysis, computer vision, eigenfaces, data visualization, graphical models. Applications will be presented in Matlab and R to illustrate methods and concepts.

Prerequisite: STA 511
STA 551 STOCHASTIC PROCESSES
For graduate students who have had an introduction to probability theory and advanced calculus. Concepts, properties, basic theory, and applications of stochastic processes. LEC
Prerequisite: STA 521 or permission of instructor.

TA 561 LONGITUDINAL DATA ANALYSIS AND TIME SERIES
Introduction to methods for analyzing longitudinal and time series data. Topics: Random coefficient regression models, growth curve analysis, hierarchical linear models, general mixed models, autoregressive and moving average models for time series data, and the analysis of cross-section time series data. LEC
Prerequisite: STA 504

STA 567 BAYESIAN STATISTICS
The Bayesian approach to statistical design and analysis can be viewed as a philosophical approach or as a procedure-generator. The use of Bayesian design and analysis is burgeoning. In this introduction to Bayesian methods, we consider basic examples of Bayesian thinking and formalism on which more complicated and comprehensive approaches are built. These include adjusting estimates using related information, the use of Bayes Factors in testing of hypotheses, the relationship of the prior and posterior distributions, and the key steps in a Bayesian analysis. We consider the Bayesian approach that requires a data likelihood (the sampling distribution) and a prior distribution. From these, the posterior distribution can be computed and used to inform statistical design and analysis. Applications of this technique are presented. LEC
Prerequisite: STA 521

STA 571 SPECIAL TOPICS IN STATISTICS
Special topics courses provide regular classroom instruction in evolving areas of biostatistics. They are used to educate students on topics that have not yet been included in permanent course offerings. LEC
Prerequisite: permission of instructor.

STA 575 SURVIVAL ANALYSIS
Provides an advanced course on the use of life tables and analysis of failure time data. Topics: Use of Kaplan-Meier survival curves, use of log rank test, Cox proportional hazards model, evaluating the proportionality assumption, dealing with non-proportionality, stratified Cox procedure, extension to time-dependent variables, and comparison with logistic regression approaches. LEC
Prerequisite: STA 504 and 522.

STA 581 MULTIVARIATE DATA ANALYSIS
Presents methods for analyzing multiple outcome variables simultaneously, and classification and variable reduction. Topics: Multivariate normal distribution, simple, partial, and multiple correlation; Hotelling’s T-squared, multivariate analysis of variance, and general linear hypothesis, and discriminant analysis, cluster analysis, principal components analysis, and factor analysis.  

**Prerequisite:** MTH 142 (second semester calculus) and STA 505 or STA 527, or STA 503

**STA 589 STATISTICAL CONSULTING**  
(1 CREDIT per semester)  
Principles and practices of statistical and biostatistical consulting; supervised experience in consultation; report writing and other aspects of consulting; case studies; participation in discussion of actual cases.  
**Prerequisites:** STA 504 or permission of instructor

**STA 600 INDEPENDENT STUDY**  
(1-8 CREDITS per registration)  
TUT

**STA 609 ADVANCED STATISTICAL GENETICS**  
Issues involving whole-genome analysis, model selections for genetic architecture and advanced statistical pattern recognition tools. Topics: Bayesian modeling for genomic data; MCMC and non-parametric linkage analysis in pedigree analysis, genetic mapping of complex traits by the EM algorithm; HMM for DNA sequence analysis; Time course models and neural networks for microarray data and so on.  
**Prerequisites:** STA 509 and STA 522, or permission of instructor

**STA 612 ADVANCED CLINICAL TRIAL/DESIGN ANALYSIS**  
LEC  
**Prerequisite:**  
This course is designed to extend the principles and techniques for designing and analyzing data from clinical trials presented in an introductory course on the subject with a focus on the study of disease.

**STA 617 ADVANCED CATEGORICAL DATA ANALYSIS**  
Presents useful methods for analyzing categorical data that are not covered in STA 517. Topics: Exact conditional inference, conditional logistic regression, models for matched pairs, repeated measures, and multinomial regression based on general response functions, latent class models analysis, and mixed models for categorical data.  
**Prerequisite:** STA 517

**STA 621 THEORY OF STATISTICAL INFERENCE**  
This course provides students with an advanced theoretical foundation for statistical inference.  

**Prerequisites:** Decision theory, methods of point estimation and properties, interval estimation, tests of
hypotheses, and Bayesian inference. LEC

Prerequisite: STA 504 and STA 522

STA 622 LIMIT THEORY
Course presents a theoretical foundation for the development of asymptotic methods that often are employed in biostatistical research. Topics: Review of different modes of convergence, Cramer-Wold device, multivariate CLT, asymptotic theory of empirical distribution and sample quantiles, Bahadur’s representation, asymptotic theory of sample moments, delta method and its multiparameter generalization, U-statistics: asymptotic theory and its statistical applications, Hoeffding’s decomposition, asymptotic theory of maximum likelihood estimation, Wald’s consistency theorem for MLE, asymptotic normality and efficiency, asymptotic theory of GLRTs, and statistical applications such as asymptotic theory for categorical data, linear models, and generalized linear models. LEC
Prerequisites: STA 621 or permission of instructor

STA 641 THEORY OF LINEAR MODELS
This course provides theoretical justification for ANOVA, regression, and covariance analyses. It is meant to provide the student with a deep and unified knowledge of linear models analysis. Topics: Matrix algebra, multivariate normal distribution, distribution of quadratic forms, least squares, generalized least squares, Gauss-Markov Theorem, tests of general linear hypotheses, less than full-rank models, estimable functions, testable hypothesis, balanced and unbalanced data, Type I, II, III, and IV sum of squares and tests, Reparametrization, general linear mixed model. LEC
Prerequisite: STA 522 and STA 504

STA 642 TOPICS IN ADVANCED MODELING
This course covers advanced methods of modeling that are highly useful in practice but are not covered in earlier courses. Topics: Fitting of generalized linear models, diagnostics, asymptotic theory, over-dispersion, estimating equations, mixed models, generalized additive models, smoothing, and other topics chosen by the instructor. LEC
Prerequisite: STA 641

STA 661 ADVANCED TOPICS IN LARGE SAMPLE THEORY
LEC Prerequisite: STA 621 and STA 622
This course aims to serve as a bridge between STA 622 and real-world statistical research by presenting a collage of advanced topics on large sample theory.

STA 667 ADVANCED BAYESIAN INFERENCE
LEC
The Bayesian approach to statistical design and analysis can be viewed as a philosophical approach or as a procedure-generator. The use of Bayesian design and analysis is burgeoning. In this introduction to Bayesian methods, we consider basic examples of Bayesian thinking and formalism on which more complicated and comprehensive approaches are built. These include adjusting estimates using related information, the use of Bayes Factors in testing of hypotheses, the relationship of the prior and posterior distributions, and the key steps in a Bayesian analysis. We consider the Bayesian approach that requires a data likelihood (the sampling distribution) and a prior distribution. From these, the posterior distribution can be computed and used to inform statistical design and analysis. Applications of this technique are presented. 

Prerequisite: STA 567 and STA 641, or permission of instructor.

STA 671 ADVANCED SPECIAL TOPICS IN STATISTICS
LEC
Advanced special topics courses provide regular classroom instruction at the PhD level in evolving areas of biostatistics. They are used to educate students on advanced topics that have not yet been included in permanent course offerings. LEC

Prerequisite: Permission of instructor.

STA 675 ADVANCED SURVIVAL ANALYSIS
LEC
This course explores the Martingale approach to the statistical analysis of counting processes, with an emphasis on applications to the analysis of censored failure time data. Topics: Martingales, counting processes, log-rank test, Cox regression, weak convergence, Martingale central limit theorem, applications to survival analysis.

Prerequisite: STA 575 and STA 561

STA 681 MULTIVARIATE THEORY
LEC
Theoretical presentation of multivariate methods. Topics: Canonical correlation, principal components, distribution of the roots of a determinantal equation, classification and discrimination methods, and Bayesian approach to multivariate analysis. LEC

Prerequisite: STA 581 and STA 641. Concurrent registration in STA 641 is admissible.

STA 699 SUPERVISED TEACHING
(1 CREDIT per semester)
TUT

Prerequisite: permission of instructor.

STA 700 THESIS GUIDANCE
(1-16 CREDITS per semester)
TUT

Prerequisite: permission of instructor.
STA 745 TOPICS IN DESIGN AND ANALYSIS OF OBSERVATIONAL STUDIES
LEC
Evidence-generation methods from observational data will be studied. Topics include: concept of evidence, aspects of design and analysis of observational data, engaging the issue of bias—topics in quantitative bias analysis, uncertainty in clinical medicine, generalizing randomized clinical trial results to broader populations, detecting treatment effect heterogeneity and subgroup identification. 
Prerequisite: Course is designed for PhD students who have passed both parts of the qualifying exams.

STA 781 READING AND RESEARCH
(1-8 CREDITS per semester)
TUT
Prerequisite: permission of instructor.

STA 782 DEPARTMENTAL SEMINAR
(0 CREDIT per semester)
Study of recent research of faculty and visiting speakers. All graduate students in the Department are required to attend except MPH students. The MPH program has a separate seminar designed for the MPH students.

UNIVERSITY REGULATIONS
http://grad.buffalo.edu/study/progress/policies.html
It is the student’s responsibility to check with the graduate school for any updates.

TRANSFER CREDIT
Each graduate program determines the applicability of graduate courses offered for transfer credit. Only those graduate courses completed with a minimum grade of ‘B’ (3.0) are eligible as transfer credit. Courses with ‘S’ or ‘P’ grades are not transferable unless the transcript specifically states they are equivalent to a ‘B’ grade or higher. Credits earned in correspondence or undergraduate courses may not be transferred.

Students requesting approval for transfer credit should make their request in writing to the Director of Graduate Studies at the first opportunity after admission to the program and within the first semester of study. A copy of the course outline and description should also be provided. A maximum of 6 credit hours of graduate work may be transferred for the MA and MS, and a maximum of 30 credit hours acquired in master’s degree training may be transferred to the PhD. Thesis guidance and research credits are not transferable.

AGE LIMIT FOR PRIOR COURSEWORK
All coursework (whether transfer or UB credits) more than 10 years old must be petitioned at the of admission to the program. If these credits were included in an approved extension of time limit petition, they are valid only until the expiration date of that petition. Any further extension of the approved time limit for degree completion will require, concurrently, a re-petition for approval of these older courses. Requests for approval of courses more than 10 years old must be petitioned through the Graduate School by completing the Graduate Student Petition Form located on the web at http://grad.buffalo.edu/study/progress/forms.html. Appropriate justification of how the course(s) relate to the student’s program and how the student has kept current with the subject matter of each course must be provided.

Prior Coursework Checklist:

- Complete form for prior coursework toward a degree program
- Include letter stating how student has maintained the knowledge gained from these courses,
- Include CV or resume
- Sign the form
- Present to the Director of Graduate Studies for approval (do not send directly to the graduate school)

REGISTRATION

All students are required to consult their advisor prior to registration, and to register before the beginning of each Fall and Spring semester while matriculated in the program according to the procedures and within the deadlines established by the Office of Records and Registration. This includes semesters in which formal courses are taken, and also semesters in which a student is working on their thesis/dissertation/project. No credit will be allowed for work done without proper registration. It is important that students verify their registration.

Registration Deadlines. The registration timetable, course offerings and class schedules are posted on the University’s web site at http://registr.buffalo.edu/schedules/index.php. Continuing students may take advantage of early registration by registering in November for the Spring semester and April for the Fall semester. Registration is continuous through the last day of drop/add. It is financially advantageous to register before the University’s first billing in the third week of July (for Fall) and the third week in December (for Spring).

Registration Checklist:

- Verify registration before the add/drop deadline each semester

REQUIREMENTS FOR FULL-TIME REGISTRATION
Full-time registration is defined as 12 credit hours per semester for students without an assistantship, or 9 credit hours per semester for those students with an assistantship or grant support.

Full-time registration is a necessary condition of appointment for an assistantship and/or tuition waiver.

International students must maintain full-time registration as a condition of their student visa.

CONTINUOUS REGISTRATION AND LEAVES OF ABSENCE

Both full-time and part-time students must register each Fall and Spring semester for a minimum of one credit hour until all degree requirements are met (including the final defense of the thesis/dissertation/project). A zero credit course does not fulfill the requirement for continuous registration.

Students must register for a minimum of one credit hour in the semester following an approved leave of absence and in the semester of degree conferral.

Students must be registered in the semester they defend their thesis/dissertation. They may not be on a leave during the semester the degree is conferred. If a leave of absence terminates at the end of the spring semester, registering for a minimum of one credit hour for the summer session is required for a September degree conferral.

If continuous registration is not possible at any time, the student must secure a leave of absence at least two weeks prior to the start of the semester in which the leave is to begin. Approval for a leave of absence must be petitioned through the Graduate School by completing the Graduate Student Petition Form located on the web at http://grad.buffalo.edu/content/dam/www/graduate/documents/students/pet_loa.pdf

Requests for Leaves of Absence must be negotiated through the chair or director of graduate studies of the student's major department using a Petition for Leave of Absence: http://grad.buffalo.edu/study/progress/forms.html. The form must then be forwarded to the Graduate School for review by the end of the first week of the semester in which the Leave is to begin. Normally, Leaves are granted for a maximum of one year, but may be extended for up to one additional year if circumstances warrant. Each department may establish its own policies within the limits of these guidelines. All Leave requests must be supported by adequate documentation.

Students approved for a Leave of Absence remain liable for any outstanding tuition and fee charges.

International students are advised to consult with International Student and Scholar Services, 210 Talbert Hall, North Campus, (716) 645-2258, prior to applying for a Leave of Absence.
Failure to register for classes or secure a Leave of Absence by the end of the first week of the semester in which the leave is to begin, will result in the student losing his/her access to register for classes in a future semester. To regain registration access within a subsequent five-year period, the student's home academic department must file a semester record activation request on behalf of the student (see the Returning Student Semester Record Activation and Associated Fee section immediately below for more details).

- The Graduate School will not approve a leave of absence for ‘personal reasons,’ you must be specific and present strong justification for your request.
- The Graduate School will not approve a leave of absence if a student is not in good academic standing.
- Students may not petition for a leave of absence after the leave has occurred.
- Students returning from a leave of absence are considered re-entering students and must be re-instated in the department in order to register (see section on Re-Entry.)

It should be noted that, normally, leaves are approved for a maximum of one year. A total of more than two years will not be approved. Students who are not on a leave of absence and fail to register for a semester are considered having left the University and must reapply to the department in order to reenter. The department reserves the right to accept or deny readmission, and to decide what prior course work can be applied to the degree. Therefore, it is important to maintain continuous registration.

NOTE: No credit will be allowed for work done without proper registration.

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**Leave of Absence Checklist:**

- ✓ complete Graduate Student Petition for A Leave of Absence
- ✓ complete Reason for Leave
- ✓ sign the form
- ✓ forward to the Department (do not send directly to the Graduate School)

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**RE-ENTRY**

When a student returns from an approved leave of absence, he/she must request to have their status reactivated by the Department. This request should be made a minimum of two weeks before the start of the semester.

Academic departments may file a semester record activation request for graduate students who were previously admitted into an academic program through GrAdMIT, and had a break in attendance of no more than five (5) years, and had neglected to secure an approved Leave of Absence from the Graduate School. Once reviewed and approved by the Vice Provost for Graduate Education, a new semester record will be created with exactly the same academic career, program, and plan as recorded for the last semester in which the student attended UB. At the time of semester
record activation, the student will be assessed a non-refundable record activation fee (currently $350).

It is the prerogative of the academic department to decide whether or not to process/endorse a former student’s request for Semester Record Activation and return to graduate study as described in the previous paragraph. The department also determines how much of the previously completed work may be applied toward the graduate degree program, within established Graduate School guidelines.

Any graduate student who has had an enrollment lapse of more than five (5) years must reapply through the graduate program’s regular application process.

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**Re-entry Checklist:**

- ✓ request the Department file a semester record activation request

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**GRADUATE COURSE CREDIT**

**Graduate Courses for Graduate Credit** is granted only for 500, 600 and 700 level courses provided proper registration requirements are met.

**Undergraduate Courses for Graduate Credit** requires prior petition and approval by the Dean of the Graduate School. **Graduate Student Petition Forms** are located on the web at [http://registrar.buffalo.edu/pdfs/OutsideofCareerPetition.pdf](http://registrar.buffalo.edu/pdfs/OutsideofCareerPetition.pdf)

Undergraduate courses may be taken by graduate students as appropriate prerequisites to their chosen field of study but may not be used to satisfy graduate program requirements or carry graduate credit. Exceptions are possible for some 400-level courses subject to approval in advance by the Graduate School. In order to obtain approval, the student must file a **Petition for Course Credit Outside Your Primary Career** that must include:

a.) Justification for taking an undergraduate course for graduate credit. (For example: that the course curriculum is important to the student's program and not offered in a graduate course.)

b.) The signature of the course instructor, who must be a UB tenured or tenure-track faculty member, with a brief description of the nature and extent of the extra work to be assigned graduate students.

c.) The signature of the department chair or director of graduate studies of the student's graduate program.
A student may file a maximum of two petitions for up to eight credit hours of this nature while pursuing a graduate degree.

All such petitions must be filed prior to the end of the official add/drop period of the semester of registration. The student must officially register for the course during the designated registration period. The petition must be submitted to the department prior to the start of the semester in which the student will enroll in the course; no requests for retroactive approval will be considered.

<table>
<thead>
<tr>
<th>Undergraduate Courses for Graduate Credit Checklist:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ complete Petition For Course Credit Outside Your Primary Career Graduate Credit</td>
</tr>
<tr>
<td>✓ provide description of additional work required of the student</td>
</tr>
<tr>
<td>✓ obtain signature of course instructor</td>
</tr>
<tr>
<td>✓ complete justification</td>
</tr>
<tr>
<td>✓ sign</td>
</tr>
<tr>
<td>✓ forward to the Department (do not send directly to the Graduate School)</td>
</tr>
</tbody>
</table>

GRADING

- Students are expected to maintain at minimum a ‘B’ average (3.0)
- Students receiving two or more ‘C’ (or lower) grades may be dismissed from the program.
- Students electing to receive an S/U grade for a course must inform the instructor in writing by the fourth week of the semester, or the letter grade system will prevail. If the instructor approves the request, a copy of the approval should be sent to the department for the student’s file. An ‘S’ grade will be awarded only in those instances where a student’s letter grade would be ‘C’ or better.
- ‘S’ grades are not acceptable for required courses.
- ‘L’ grades are assigned for thesis/dissertation courses where continuing work is to be indicated instead of a final grade. ‘L’ grades automatically convert to ‘S’ grades at degree conferral.

‘J’ grades denote an invalid grade. Students should immediately consult with the professor to validate their grade or the ‘J’ will revert to a grade of ‘F’ at the end of the following semester.

REPEATING REQUIRED COURSES
http://grad.buffalo.edu/study/progress/policies.html
Per the Graduate School policy, if a graduate student repeats a course that is not normally "repeatable" ("repeatable" courses include dissertation, research, thesis, project or portfolio guidance; independent study; directed readings, etc.), only the highest grade earned in the course will be counted toward the degree and used to calculate the grade point average associated with the graduate degree program requirements. However, the student's official graduate transcript will record all courses attempted (including repeated courses). All resulting grades earned are calculated in the cumulative GPA reflected on the students' final official transcript. Also note that:

- Students who repeat a course must officially register for it.
- Students are responsible for the tuition for repeated courses even if they are currently receiving a tuition waiver.

**INCOMPLETE GRADES**

- A grade of ‘Incomplete’ (‘I/U’) may be assigned only when the student has been unable to complete all the assigned projects and/or examinations in a course. Such circumstances must be communicated to the faculty member as soon as known, but no later than the end of the semester during which the course is taken.
- A grade of ‘Incomplete’ (‘I/U) is not available to students who have not performed a “C” or better in the course material completed.
- If an ‘I’ is given, a letter grade must be assigned within two semesters (May 31st for the Spring semester and December 31st for the Fall semester.) If the course requirements are not completed by the deadline, the ‘Incomplete’ will automatically default to an ‘Unsatisfactory’ ‘U’ or ‘F’ grade.

Individual instructors may set their own conditions for removing ‘I’ grades providing the time limit is no longer than specified by the University. The instructor may set an earlier deadline for completion of the course requirements. If an earlier date for completion is set, the instructor shall inform the student thereof in writing. **A student may not re-register for any course in which the student has an interim ‘IU’ grade.**

<table>
<thead>
<tr>
<th>Incomplete Grade Checklist:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Be sure to verify the change of grade has been made in the Office of Records and Registration</td>
</tr>
</tbody>
</table>

**STUDENT GENERAL PROGRESS REPORTS**
The academic progress of each student is reviewed by their advisor at the end of the Spring semester. This review is designed to develop a program most suitable for each student, to discuss their coursework and plans for upcoming registration, and to advise a student of any deficiency in their progress toward degree conferral.

**PROGRAM PROBATION**

Students who receive a grade of ‘U’, ‘D’ or ‘F’ in any course required for their degree, or whose cumulative GPA falls below 3.0 will have immediate academic review and may be placed on academic probation. Students placed on probation will be notified in writing the terms of the probation and its removal. Students not meeting the written terms of their academic probation may be dismissed from the University. MPH students are required to obtain a grade of “B” or better in each course. Those courses earning less than a “B” must be repeated.

**COURSE RESIGNATIONS**

Graduate Students have the prerogative to resign any course for which they have registered without Q.P.A. penalty through the end of the 11 week of the fall or spring term. All course resignations processed during the permissible dates (as published in the Class Schedule available through the Office of the Registrar) will be indicated as officially resigned courses by the notation 'R' on all grade reports, transcripts, and other official University documents. Resignation from all courses should be done through the HUB Student Center, which students may access through the MyUB portal. There are no quality points attached to an ‘R’ designation.

All course resignations processed within the official deadlines will be indicated as officially resigned by the notation ‘R’ on grade reports, transcripts, and other official University documents.

<table>
<thead>
<tr>
<th>Course Resignation Checklist</th>
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<tbody>
<tr>
<td>✓ process resignation of course thorough MyUB Portal.</td>
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</tbody>
</table>

**AUDITING COURSES**

A student wishing an “Audit” (N) grade in a course must officially register for the course. The student must also submit a written request to the instructor by the fourth week of class. The instructor’s decision will be final and will be transmitted to the student in writing. A copy of the approval must also be forwarded to the department for the student’s file. The instructor's decision is final and must be communicated to the student in writing in a timely manner. A student may repeat a previously audited course and receive a weighted grade and academic credit.

**INDEPENDENT STUDY (STA 600)**
This course is available as an elective when appropriate to the student’s educational goals. Students must receive approval from both their supervising faculty and the Director of Graduate Studies before registering. Students must provide their supervising faculty with a course description for signature. This will be signed by both faculty and student and forwarded to the Director of Graduate Studies for approval. A copy of the approved description is attached to the Application to Candidacy when filed (see section on Application to Candidacy.)

**Independent Study Checklist:**
- brief summary of the goals and objectives of the independent study
- syllabus outlining activities to be carried out
- tangible mechanism for assessing student performance, e.g., test, term paper or a grant proposal
- ability to demonstrate that the independent study includes an amount of effort equivalent to the number of credits requested.

**CERTIFICATION OF FULL-TIME STATUS**

Students who are required to maintain full-time status for the purpose of tuition assistantship/scholarship, loan deferral or immigrant status may be certified as full time when registering for less than 12 graduate credit hours (or 9 if receiving a graduate assistantship) if the following conditions have been met:

- all coursework has been completed
- registration will include a minimum of one credit hour per semester
- student is engaged in full-time research on their thesis/dissertation/project
- the Application to Candidacy form has been completed and signed by all committee members

NOTE: It is not required that the proposal be defended at this time. The *Certification of Full-Time Status* form is located on the web at [http://grad.buffalo.edu/study/progress/forms.html](http://grad.buffalo.edu/study/progress/forms.html)

Students must be registered for the semester in which they are filing.

**Certification of Full-time Status Checklist:**
- complete (type) the *Certification of Full-Time Status Form*
- obtain signature of academic advisor
- attach photocopy of the ATC form signed by all committee members
- forward to the Department (do not send directly to the Graduate School)

**ADDITIONAL INFORMATION ABOUT GRADUATE STUDIES AT UB**
ACADEMIC HONESTY

ACADEMIC INTEGRITY

Academic integrity is a fundamental university value. Through the honest completion of academic work, students sustain the integrity of the university while facilitating the university's imperative for the transmission of knowledge and culture based upon the generation of new and innovative ideas.

When an instance of suspected or alleged academic dishonesty by a student arises, it shall be resolved according to the procedures set forth herein. These procedures assume that many questions of academic dishonesty will be resolved through consultative resolution between the student and the instructor.

It is recommended that the instructor and student each consult with the department chair, School or College dean, or the Graduate School if there are any questions regarding these procedures.

Examples of Academic Dishonesty

Academic dishonesty includes, but is not limited to, the following:
• **Previously submitted work.** Submitting academically required material that has been previously submitted -- in whole or in substantial part -- in another course, without prior and expressed consent of the instructor.

• **Plagiarism.** Copying or receiving material from any source and submitting that material as one's own, without acknowledging and citing the particular debts to the source (quotations, paraphrases, basic ideas), or in any other manner representing the work of another as one's own.

• **Cheating.** Soliciting and/or receiving information from, or providing information to, another student or any other unauthorized source (including electronic sources such as cellular phones and PDAs), with the intent to deceive while completing an examination or individual assignment.

• **Falsification of academic materials.** Fabricating laboratory materials, notes, reports, or any forms of computer data; forging an instructor's name or initials; resubmitting an examination or assignment for reevaluation which has been altered without the instructor's authorization; or submitting a report, paper, materials, computer data, or examination (or any considerable part thereof) prepared by any person other than the student responsible for the assignment.

• **Misrepresentation of documents.** Forgery, alteration, or misuse of any University or Official document, record, or instrument of identification.

• **Confidential academic materials.** Procurement, distribution or acceptance of examinations or laboratory results without prior and expressed consent of the instructor.

• **Selling academic assignments.** No person shall sell or offer for sale to any person enrolled at the University at Buffalo any academic assignment, or any inappropriate assistance in the preparation, research, or writing of any assignment, which the seller knows, or has reason to believe, is intended for submission in fulfillment of any course or academic program requirement.

• **Purchasing academic assignments.** No person shall purchase an academic assignment intended for submission in fulfillment of any course or academic program requirement.
Consultative Resolution

Step 1. If an instructor has reason to believe that a student may have committed an act of academic dishonesty, the instructor shall notify the student suspected of academic dishonesty by e-mail to the student's UB IT address with receipt requested, by certified mail return receipt requested, or by written notice delivered in person with a copy countersigned by the student and retained by the instructor within 10 academic days of discovery of the alleged incident.

Once the alleged incident has occurred, the student may not resign from the course without permission of the instructor.

The instructor shall meet and consult with the student within 10 academic days of the date of notification. If the student fails to attend the consultative meeting, the instructor has the authority to reach a decision and to impose a sanction (if appropriate) without the student consultation.

At consultation, the instructor shall inform the student of the allegations relating to the specific infringement, and the student shall be given a copy of the Academic Integrity Policy and Procedures.

At the request of either or both parties, the consultation may be recorded. A departmental note-taker (a staff or faculty member, but not a teaching assistant) may record consultation proceedings. The student must agree to the presence of the note-taker, and the student may also have a note-taker in attendance.

Step 2. If, after consultation with the student, the instructor believes the student did not commit an act of academic dishonesty, no sanctions may be imposed. The instructor will orally inform the student of that finding and, if the student so requests, will provide the student with a written statement confirming that finding. Procedures end.
If, after consultation with the student, the instructor believes the student did commit an act of academic dishonesty, the instructor has the authority to impose one or more of the following sanctions:

1. **Warning.** Written notice to the student that he/she has violated a University academic integrity standard and that the repetition of the wrongful conduct may be cause for more severe sanctions.

2. **Revision of Work.** Requiring the student to replace or revise the work in which dishonesty occurred. (The instructor may choose to assign a grade of "I" [Incomplete] pending replacement or revision of the work.)

3. **Reduction in Grade.** With respect to the particular assignment/exam or final grade in the course.

4. **Failure in the Course.** To be indicated on the transcript by a grade of "F" without comment.

5. **Such other reasonable and appropriate sanction(s) as may be determined by the instructor (or Committee at later levels of review) with the exception of those subsequently described under #6.**

6. **Recommendation of any of the following University sanctions** (these require approval at the department, College/School, and Graduate School levels).
   
   1. **Failure in the Course with Citation of Academic Dishonesty:** To be indicated by an "F" on the transcript with the notation that the grade of "F" was assigned for reason of academic dishonesty. Only the Dean of the Graduate School or his or her designee may impose this sanction.
   
   2. **Suspension from the University:** For a definite term upon stated conditions. Only the University President or his/her designee may suspend a student from the University.
   
   3. **Expulsion from the University:** With comment on the transcript. Only the University President or his/her designee may expel a student from the University.
Step 3. The instructor shall provide the student with a copy of the decision, sanction(s) imposed, and the student's right to appeal that decision. The instructor's decision letter shall be sent to the student (via certified, return receipt mail), the department chair, and the Dean of the Graduate School within 10 academic days\(^1\) of the date of the consultation meeting. This statement of decision shall be included in the student's confidential file maintained in the Graduate School. The student shall have access to this file.

University Sanctions. If the sanctions imposed at the instructor level include recommendation of University sanctions (as listed in Step 2.6), departmental level procedures are required, and shall be initiated within 10 academic days\(^1\) of the department chair's receipt of the statement of decision.

Right to Appeal. The student may appeal the instructor's findings. The student's request for an appeal, including specification of the grounds for appeal, must be submitted in writing to the instructor and to the department chair no later than 10 academic days\(^1\) after the instructor has notified the student of his or her decision.

Departmental Level Procedures

Step 1. The instructor and student have no more than 10 academic days\(^1\) following the filing of the request for the initiation of departmental proceedings to deliver evidentiary materials to the department chair. The instructor and student shall each provide the department chair with a written statement of evidence supporting his or her position, any relevant documentation, and the names of potential witnesses.

If the department chair is the faculty member who has brought the academic dishonesty charge against the student, or if a department is unable to assemble a committee because of a limited number of faculty or students, direct consideration at the college or school level may be requested.
Pending resolution, the instructor shall temporarily assign a grade of "I" (Incomplete). This "I" grade can only be adjusted by resolution of the case.

**Step 2.** Upon review of relevant materials (including all evidence and statements communicated during consultation), if the department chair does not deem it necessary to consider further the circumstances of the case, the department chair will notify the student (via certified, return receipt mail), the instructor, the cognizant academic dean, and the Dean of the Graduate School of his or her decision within 20 academic days of receipt of the student's appeal or instructor's recommendation. If the sanctions imposed at this stage include recommendation of University sanctions (as listed in Consultative Resolution Step 2.6), decanal level procedures are required (see "Decanal Level Procedures").

Alternatively, if the department chair deems it necessary to consider further the circumstances of the case, he or she shall convene the Departmental Adjudication Committee within 20 academic days of the date the department office received the request for initiation of departmental proceedings (see Appendix A).

The department office shall convey all evidentiary materials to the Departmental Adjudication Committee, the student, and the instructor at the time the notice of the hearing is delivered. The student and the instructor shall be given at least 72 hours notice of the hearing.

At hearing(s), the Departmental Adjudication Committee shall provide sufficient opportunity for both principals to present their positions and shall allow each principal the right to question the presentation(s), written or verbal, of those who contribute information to the committee.

The hearing(s) shall be conducted in a fair and expeditious manner, but shall not be subject to the rules governing a legal proceeding. Each principal shall have the right to be present (under unusual circumstances, if either party is considered to pose a physical threat to the other or to the committee, the chair of the committee may request that either the student or instructor participate by phone) and to have one advisor present at all hearings. In no such
case will the advisor be an attorney, unless he or she is a member of the UB faculty who is not acting in a legal capacity on behalf of a principal. An advisor may not speak on behalf of or advocate for a principal or otherwise address members of the hearing committee.

The technical and formal rules of evidence applicable in a court of law are not controlling, and the committee may hear all relevant and reliable evidence that will contribute to an informed result. The Departmental Adjudication Committee shall only consider evidence presented at hearing(s). Discussion of a student's formerly alleged or documented academic misconduct shall not be admissible as evidence to determine whether the student is responsible for breaching the university's academic integrity code in the current case, although such history may be introduced and considered during the sanctioning phase. Hearings shall be confidential (see Appendix B).

The Departmental Adjudication Committee shall provide the department chair with a written statement of recommendations and reasons for recommendations within 10 academic days after the final meeting of the committee. Recommendations may include:

1. **Findings Overturned.** Finding that no academic dishonesty took place and that no sanctions should be imposed.

2. **Findings Sustained.** Finding that academic dishonesty occurred, and the committee is in agreement with the sanction(s) previously imposed or recommended.

3. **Finding of Different Sanction.** Finding that academic dishonesty occurred, but that the sanction(s) previously imposed or recommended are inappropriate and that greater or lesser sanction(s) should be imposed.

**Step 3.** The department chair considers the Committee's findings and recommendations and renders a final decision. The department chair's decision and the student's right to appeal that decision shall be submitted in writing from the department chair to the student (via certified, return receipt mail), the instructor, the cognizant academic dean, and the Dean of the Graduate School within 10 academic days after receiving the Departmental Adjudication Committee's statement of recommendations.
The department chair shall forward the record of the matter consisting of all written communications, all written evidence, an audiotape or other record of the hearing, and its statement of recommendations to the Dean of the Graduate School, where a confidential file will be maintained. The student shall have access to this file.

**University Sanctions.** If the sanction(s) imposed at the departmental level include recommendation of University sanctions (as listed in Consultative Resolution Step 2.6), decanal level procedures are required, and shall be initiated within 10 academic days\(^1\) of the dean's receipt of the statement of decision.

**Right to Appeal.** The student or the instructor may appeal the department chair's findings. The request for an appeal, including specification of the grounds for appeal, must be submitted in writing to the department chair and to the cognizant academic dean no later than 10 academic days\(^1\) after the department chair has notified the student of his or her decision.

**Decanal Level Procedures**

**Step 1.** The instructor and student have no more than 10 academic days\(^1\) following the filing of the request for the initiation of decanal level proceedings to deliver evidentiary materials to the cognizant academic dean. The instructor and student shall each provide the academic dean with a written statement of evidence supporting his or her position, any relevant documentation, and the names of potential witnesses.

Pending resolution, the temporarily assigned grade of "I" (Incomplete) will continue in place. This "I" grade can only be adjusted by final resolution of the pending case.

**Step 2.** Upon review of relevant materials (including all evidence and statements communicated during consultation), if the academic dean does not deem it necessary to consider further the circumstances of the case, the academic dean will notify the student (via certified, return receipt mail), the instructor, the department chair, and the Dean of the Graduate School of his or her decision within 20 academic days\(^1\) of receipt of the student's appeal or instructor's recommendation. If the sanctions imposed at this stage include
recommendation of University sanctions (as listed in Consultative Resolution Step 2.6), a hearing at the decanal level is required, and procedures below shall be initiated within 20 academic days\(^1\) of the academic dean's receipt of the department chair's statement of decision.

Alternatively, if the academic dean deems it necessary to consider further the circumstances of the case, he or she shall convene the Decanal Adjudication Committee within 20 academic days\(^1\) of the date which the academic dean received the request for initiation of decanal level proceedings (see Appendix C).

The academic dean's office shall convey all evidentiary materials to the Decanal Adjudication Committee, the student, and the instructor at the time the notice of the hearing is delivered. The student and the instructor shall be given at least 72 hours notice of the hearing.

At hearing(s), the Decanal Adjudication Committee shall provide sufficient opportunity for both principals to present their positions and shall allow each principal the right to question the presentation(s), written or verbal, of those who contribute information to the committee.

The hearing(s) shall be conducted in a fair and expeditious manner, but shall not be subject to the rules governing a legal proceeding. Each principal shall have the right to be present (under unusual circumstances, if either party is considered to pose a physical threat to the other or to the committee, the chair of the committee may request that either the student or instructor participate by phone) and to have one advisor present at all hearings. In no such case shall the advisor be an attorney, unless he or she is a member of the UB faculty who is not acting in a legal capacity on behalf of a principal. An advisor may not speak on behalf of or advocate for a principal or otherwise address members of the hearing committee.

The technical and formal rules of evidence applicable in a court of law are not controlling, and the committee may hear all relevant and reliable evidence that will contribute to an informed result. The Decanal Adjudication Committee shall only consider evidence presented at hearing(s). Discussion of a student's formerly alleged or documented academic
misconduct shall not be admissible as evidence to determine whether the student is responsible for breaching the university's academic integrity code in the current case, although such history may be introduced and considered during the sanctioning phase. Hearings shall be confidential (see Appendix B).

The Decanal Adjudication Committee shall provide the academic dean with a written statement of recommendations and reasons for recommendations within 10 academic days after the final meeting of the committee. Recommendations may include:

1. **Findings Overturned.** Finding that no academic dishonesty took place and that no sanctions should be imposed.

2. **Findings Sustained.** Finding that academic dishonesty occurred, and the committee is in agreement with the sanction(s) previously imposed or recommended.

3. **Finding of Different Sanction.** Finding that academic dishonesty occurred, but that the sanction(s) previously imposed or recommended are inappropriate and that greater or lesser sanction(s) should be imposed.

**Step 3.** The academic dean considers the Committee's findings and recommendations and renders a final decision. The academic dean's decision and the student's right to appeal that decision shall be submitted in writing from the academic dean to the student (via certified, return receipt mail), the instructor, the department chair, and the Dean of the Graduate School within 10 academic days from receiving the Decanal Adjudication Committee's statement of recommendations.

The academic dean shall forward the record of the matter consisting of all written communications, all written evidence, an audiotape or other record of the hearing, and its statement of recommendations to the Dean of the Graduate School, where a confidential file will be maintained. The student shall have access to this file.

**University Sanctions.** If the sanction(s) imposed at the decanal level include recommendation of University sanctions (as listed in Consultative Resolution Step 2.6),
Graduate School level procedures are required, and shall be initiated within 10 academic days\(^1\) of the Dean of the Graduate School's receipt of the statement of decision.

**Right to Appeal.** The student or the instructor may appeal the academic dean's findings, but only based on claims of limitations on, or violations of, applicable due process. Any such appeal request must describe the specific due process violation(s) claimed and must be submitted in writing to the academic dean and to the Dean of the Graduate School no later than 10 academic days\(^1\) after the academic dean has notified the student of his or her decision.

**Graduate School Level Procedures**

**Step 1.** The instructor and student have no more than 10 academic days\(^1\) following the filing of the request for the initiation of Graduate School level proceedings to deliver evidentiary materials to the Dean of the Graduate School. The instructor and student shall each provide the Dean of the Graduate School with a written statement of evidence supporting his or her position, any relevant documentation, and the names of potential witnesses.

Pending resolution, the temporarily assigned grade of "I" (Incomplete) will continue in place. This "I" grade can only be adjusted by final resolution of the pending case.

**Step 2.** Upon review of relevant materials (including all evidence and statements communicated during consultation), if the Dean of the Graduate School does not deem it necessary to consider further the circumstances of the case, the Dean of the Graduate School will notify the student (via certified, return receipt mail), the instructor, the department chair, and the cognizant academic dean of his or her decision within 20 academic days\(^1\) of receipt of the student's appeal or instructor's recommendation. If the sanctions imposed at this stage include recommendation of University sanctions (as listed in Consultative Resolution Step 2.6), the Dean of the Graduate School will pursue appropriate steps to implement or seek implementation of such sanction(s).
Alternatively, if the Dean of the Graduate School deems it necessary to consider further the circumstances of the case, he or she shall convene the Graduate School Adjudication Committee within 20 academic days\(^1\) of the date on which the Dean of the Graduate School received the request for initiation of Graduate School level proceedings (see Appendix D).

The Graduate School shall convey all evidentiary materials to the Graduate School Adjudication Committee, the student, and the instructor at the time the notice of the hearing is delivered. The student and the instructor shall be given at least 72 hours notice of the hearing.

At hearing(s), the Graduate School Adjudication Committee shall provide sufficient opportunity for both principals to present their positions and shall allow each principal the right to question the presentation(s), written or verbal, of those who contribute information to the committee.

The hearing(s) shall be conducted in a fair and expeditious manner, but shall not be subject to the rules governing a legal proceeding. Each principal shall have the right to be present (under unusual circumstances, if either party is considered to pose a physical threat to the other or to the committee, the chair of the committee may request that either the student or instructor participate by phone) and to have one advisor present at all hearings. In no such case shall the advisor be an attorney, unless he or she is a member of the UB faculty who is not acting in a legal capacity on behalf of a principal. An advisor may not speak on behalf of or advocate for a principal or otherwise address members of the hearing committee.

The technical and formal rules of evidence applicable in a court of law are not controlling, and the committee may hear all relevant and reliable evidence that will contribute to an informed result. The Graduate School Adjudication Committee shall only consider evidence presented at hearing(s). Discussion of a student's formerly alleged or documented academic misconduct shall not be admissible as evidence to determine whether the student is responsible for breaching the university's academic integrity code in the current case,
although such history may be introduced and considered during the sanctioning phase. Hearings shall be confidential (see Appendix B).

The Graduate School Adjudication Committee shall provide the Dean of the Graduate School with a written statement of recommendations and reasons for recommendations within 10 academic days after the final meeting of the committee. Recommendations may include:

1. **Findings Overturned.** Finding that no academic dishonesty took place and that no sanctions should be imposed.
2. **Findings Sustained.** Finding that academic dishonesty occurred, and the committee is in agreement with the sanction(s) previously imposed or recommended.
3. **Finding of Different Sanction.** Finding that academic dishonesty occurred, but that the sanction(s) previously imposed or recommended are inappropriate and that greater or lesser sanction(s) should be imposed.

**Step 3.** The Dean of the Graduate School considers the committee's findings and recommendations and renders a final decision. The Dean of the Graduate School's decision shall be submitted in writing to the student (via certified, return receipt mail), the instructor, the department chair, and the cognizant academic dean within 10 academic days from receiving the Graduate School Adjudication Committee's statement of recommendations.

The Dean of the Graduate School shall file the record of the matter consisting of all written communications, all written evidence, an audiotape or other record of the hearing, and statements of recommendations to the Dean of the Graduate School, in the confidential file located in and maintained by the Graduate School. The student shall have access to this file.

**University Sanctions.** If the sanction(s) imposed at the Graduate School level include implementation or recommended implementation of University sanctions (as listed in Consultative Resolution Step 2.6), implementation or recommended implementation of those sanctions shall be initiated within 10 academic days following the Dean of the Graduate School's decision in the matter.
No Right to Further Appeal. The decision of the Dean of the Graduate School is final, and no further appeal is available.

Note:

1 Academic days are defined as weekdays when classes are in session, not including the summer sessions.

Appendix A: Departmental Adjudication Committee Membership

The department chair or the chair of the departmental adjudication committee shall assemble, from a pool of individuals comprising the departmental Academic Integrity Pool, a Departmental Adjudication Committee comprised of no fewer than two faculty members and two graduate students or a larger number of participants maintaining this same ratio. The departmental Academic Integrity Pool shall be selected by the respective faculty and student constituencies in an appropriate democratic fashion, and in no case shall these representatives be appointed by the departmental or decanal administration. If deemed appropriate, the Departmental Academic Integrity Pool may also serve as the Departmental Grievance Pool.

The members of the Academic Integrity Pool and the Adjudication Committee shall be selected so that no member is involved in a disproportionate number of cases. Each principal to the dispute shall have the option of requesting, without stipulating a reason, the replacement of one member of the Committee appointed to hear the case. If any principal finds the replacement member inappropriate, the party shall transmit, within five academic days\(^1\) of the naming of the committee, a written statement of the grounds for this "challenge for cause" to the cognizant department chair who shall rule on the merits and either retain or replace the committee member so challenged. Each committee member selected shall have the option of disqualifying him/herself from the Committee by stipulating reasons why he or she feels unable to deal with the case in an unbiased fashion.
Appendix B: Confidentiality of Proceedings.

Once the department chair, college or school dean or the Dean of the Graduate School initiates an academic integrity hearing, principals and committee members shall have the obligation to maintain the confidentiality of the proceedings and of all materials or testimony presented in hearing proceedings, until a decision is formally transmitted to the principals involved in the case.

If a breach of confidentiality by either principal (as defined above) is formally brought to the attention of the Adjudication Committee, upon a majority vote of the committee, it may choose to consider this breach a case of possible misconduct. If a committee member is charged with a possible misconduct, such charge will be heard at the next highest level Adjudication Committee. Such consideration shall take precedence over the pending case, and a misconduct hearing shall be conducted, and findings shall be transmitted, in writing, to the principals and committee members, and shall be placed in a supplemental file of the case proceedings. Such findings may then be considered in the subsequent review of the case.

Appendix C: Decanal Adjudication Committee Membership

The cognizant college or school dean, or the chair of the school or college Adjudication Committee, shall assemble, from a pool of individuals comprising the college or school Academic Integrity Pool, a Decanal Adjudication Committee comprised of no fewer than two faculty members and two graduate students or a larger number of participants maintaining this same ratio. In those college/schools comprised of multiple academic departments, the Decanal Adjudication Committee shall not include representatives from the department(s) involved in the case. The college or school Academic Integrity Pool shall include two representatives, as appropriate, from each department: one faculty member and one graduate student. The departmental representatives in the Academic Integrity Pool shall be selected by the respective faculty and student constituencies in an appropriate democratic fashion, and in no case shall these representatives be appointed by the departmental or
decanal administration. If deemed appropriate, the Decanal Academic Integrity Pool may also serve as the Decanal Grievance Pool.

The members of the Academic Integrity Pool and the Adjudication Committee shall be selected so that no member is involved in a disproportionate number of cases. Each principal to the dispute shall have the option of requesting, without stipulating a reason, the replacement of one member of the Committee appointed to hear the case. If any principal finds the replacement member inappropriate, the party shall transmit, within five academic days of the naming of the committee, a written statement of the grounds for this "challenge for cause" to the cognizant academic dean who shall rule on its merits and either retain or replace the committee member so challenged. Each committee member selected shall have the option of disqualifying him/herself from the Committee by stipulating reasons why he or she feels unable to deal with the case in an unbiased fashion.

**Appendix D: Graduate School Adjudication Committee Membership**

The Graduate School Adjudication Committee shall be comprised of no fewer than two faculty members and two graduate students (all from outside the cognizant academic department[s]) or a larger number of participants maintaining this same ratio. The departmental representatives comprising the Graduate School Academic Integrity Pool shall be selected by the respective faculty and student constituencies in an appropriate democratic fashion, and in no case shall these representatives be appointed by the departmental or decanal administration. If deemed appropriate, the Graduate School Academic Integrity Pool may also serve as the Graduate School Grievance Pool.

The members of the Graduate School Academic Integrity Pool and the Graduate School Adjudication Committee shall be selected so that no member is involved in a disproportionate number of cases. Each principal to the dispute shall have the option of requesting, without stipulating a reason, the replacement of one member of the committee appointed to hear the case. If any principal finds the replacement member inappropriate, the party shall transmit, within five academic days of the naming of the committee, a written statement of the grounds for this "challenge for cause" to the Dean of the Graduate School.
who shall rule on its merits and either retain or replace the committee member so
challenged. Each committee member selected shall have the option of disqualifying
him/herself from the committee by stipulating reasons why he or she feels unable to deal
with the case in an unbiased fashion.

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