Graduate Affairs Committee
May 25, 2004
3:30 p.m. - 5:00 p.m.
UL 1126

AGENDA

1. Approval of the minutes for April 27, 2004 ....Brenner

2. Vice Chancellor's Report..Brenner

3. IU Dean's Report………………………………………………………..…………Slattery

4. Purdue Dean's Report ....Story

5. Graduate Office Report.. Koerner
   a. Hooding Ceremony

6. GSO Report..Reuille

7. Committee Business...
   a. Fellowship Subcommittee
   b. Curriculum Subcommittee

8. Proposals..
   a. Ph.D. Minor in Medical Biophysics / Biomolecular Imaging
   b. Certificate in Survey Research
   c. Ph.D. in Informatics

9. Discussion..
   a. Dual Degree – M.A. in Applied Statistics / M.A. in Economics
   b. Ph.D. Minor in Philosophy – Revisions
   c. Drop/Add Policy
   d. Dr. Brenner Review Committee

9. New Business…………………………………….

10. Next Meeting (August 24) and adjournment

Graduate Affairs Committee
May 25, 2004
Minutes

Present: Margaret Adamek, Darrell Bailey, William Bosron, Mark Brenner (co-chair), David Ford, Ain Haas, Marvin Kemple, Michael Klemsz, Michael Kowolik, Doug Perry, Martel Plummer, Kristi Reuille, Sharon Sims, John Slattery, Jon Story, Joanne Warner, Kathryn Wilson

Staff: Monica Henry
                David Koerner

Approval of the minutes - Dr. Queener
Minutes from the April 27, 2004 meeting were approved.

Vice Chancellor's Report – Dr. Brenner
Dr. Brenner deferred to Dr. Slattery.

IU Dean's Report – Dr. Slattery
Dr. Slattery presented his summary of the Graduate School Task Force report which was presented to President Herbert.

Purdue Dean's Report – Dr. Story
Dr. Story noted that a new Graduate School Dean has been selected. The decision will be approved by the Board of Trustees on June 4th.

The Inter-Campus Task Force met with the Provost the week prior to the GAC meeting and received authorization to move forward with the concept of having the departments/schools on non-West Lafayette campuses communicate new programs or curriculum items directly with the Graduate School as apposed to going through their steward department. This routing process will not be implemented for Ph.D. programs at this time.

An Office of Interdisciplinary Graduate Programs has been approved by the Provost and will be housed in the Graduate School. Dr. Brenner noted that fostering interdisciplinary programs is important to research on the IUPUI campus as well.

Dr. Brenner offered to give a presentation this fall on the sources of fellowship funding and how those funds are spent.

Graduate Office Report – David Koerner
The Hooding Ceremony was a big success, with approximately 550 participants of which 112 were students. David Koerner asked the GAC to send comments regarding the ceremony to him via. email.

GSO Report – Kristi Reuille
Dr. Brenner noted that this was the second year that the GSO contributed to the Hooding Ceremony. He hopes that the GSO will continue playing a role in not only supporting the event, but helping to plan it.

Kristi Reuille introduced herself as the newly elected GSO President. Kristi is a Ph.D. student in the School of Nursing. Kristi noted that the GSO is looking at restructuring the Educational Enhancement Grants (EEG) so that it is a competitive process.   A committee will meet over the summer to rework the application and criteria for the EEG.

Committee Business
> **Curriculum Subcommittee – Monica Henry**

Four Course Change requests and seven New Course requests were approved at the last Curriculum Subcommittee.

Program Approval
> **Ph.D. Minor in Medical Biophysics / Biomolecular Imaging**

The proposal and one review were made available to the GAC prior to the meeting. The reviewer recommended to accept the proposal without revision. Dr. Brenner asked the committee if they had any questions. Dr. Bosron noted that the minor is made up of three core courses from the Ph.D. program. The Indiana Center for Biological Microscopy, the Center for Structural Biology and the Nanoscale Imaging Center will all support this minor. The committee approved the proposal.

> **Certificate in Survey Research**

The proposal, two reviews, and an informal response from Brian Vargus were made available to the GAC prior to the meeting. Dr. Brenner asked the committee if they had any questions. This certificate will pull together resources from across the IUPUI campus. The committee approved the proposal.

> **Ph.D. in Informatics**

The IUPUI proposal, a review, and the Graduate Council discussion were made available to the GAC prior to the meeting. Dr. Perry and Dr. Bailey were available for questions and comments. Dr. Brenner noted that the Ph.D. in Informatics proposal has been approved by the Graduate Council, but that it is still appropriate for the GAC to discuss and review the proposal. There was some concern about the proposal going to the Graduate Council prior to the GAC. The last Graduate Council meeting of the academic year met in April, and Dr. Slattery did not want the Ph.D. in Informatics to be held until fall. Dr. Slattery stated that the current approval process will be revisited. Dr. Perry noted that this will be a school-wide Ph.D. The proposal that was presented to the Graduate Council has been revised for the GAC in an effort to highlight IUPUI's resources. The main addition to the IUPUI version is the media informatics subdiscipline or track. Dr. Perry distributed the original proposal that was presented to the Graduate Council and a response to the GAC review. Dr. Bailey asked the committee for approval of the original Ph.D. in Informatics proposal that was approved by the Graduate Council as well as approval of the campus specific implementation plan including the media informatics track, which was circulated to the GAC prior to the meeting. Dr. Slattery noted that the approval for the tracks

should happen administratively since the tracks will have a common core. Dr. Brenner asked if the School wished to have the tracks show up on student transcripts, if so formal approval may be needed at a later date. Dr. Perry noted that the school had not yet considered whether or not they would like the track to appear on the student's transcript. Martel Plummer noted that on page 15 Herron School of Art should be added under **"Impact on Other Instructional, Research or Service Programs at IUB and IUPUI".** As Herron builds their Master in Fine Arts there may be some overlap. Dr. Bailey noted that the school does have the required faculty needed to implement this program. Dr. Bailey also stated that the School of Informatics would come back at a later date with the School of Medicine to propose a scientific Ph.D. in Bioinformatics. The committee approved both the original proposal that was approved by the Graduate Council and the IUPUI implementation including the new media informatics track.

Dr. Slattery noted that he would like to take up the issue of how programs are approved and followed up upon next academic year.

Discussion
Dual Degree: M.A. in Applied Statistics / Economics
The M.A. in Applied Statistics and the M.A. in Economics are both existing degrees. The proposal is to combine the two degrees and offer them jointly. Dr. Sims commented that this proposal could be used as a model for others seeking to offer dual degrees.

Ph.D. Minor in Philosophy – Revisions
This proposal is to revise the minor in Philosophy from 13 to 12 credit hours.

Drop/Add Policy
Dr. Brenner noted that People Soft is the driver for a revision of the Drop/Add Policy. In the past if a student dropped three credit hours and added three credit hours after the 100% refund period, a new bill and refund would not be issued because the transaction would be considered a wash. With People Soft a refund will be issued, as will a new bill, meaning that the student would receive only the refund associated with the time period that they dropped (100%, 75%, 50%, etc.). The student would be required to pay the full tuition and a late fee for the course added. This was announced as new policy. Dr. Slattery stated that in Bloomington, if there is an administrative issue that pushes the drop/add, fees would be waived by the Bursar. There may also be academic issues that may force a drop/add that should also be reviewed. If the needs are the same on the IUPUI campus an agreement from the Bursar would be needed. Dr. Brenner noted that the next step would be to have discussions with the Bursar and then the decision would be at the school level.

New Business
The Dr. Brenner Review Committee met with the GAC after adjournment.

Next meeting date
August 24, 2004

Meeting adjourned at 5:05 PM

COURSE CHANGE REQUESTS
School of Medicine
PHSL   F710   Physiology of Membranes   2 Credits
Change name to: Cellular Physiology: from molecules to cells
Change credit hours fixed at: 4 Credits
Change lecture contact hours fixed at: 4
Change description to: Graduate-level course providing the essentials of cellular and molecular physiology necessary for understanding cell and organ function, including cellular and membrane architecture, membrane transport, signal transduction, gene expressions, growth and development, cell excitability and contractility. Four 1 hr lectures per week. Education background in biochemistry and cell biology recommended.

Justification: No current graduate course exists that provides a comprehensive survey of cellular physiology within the School of Medicine.

Department of Public Health
PBHL   P501   Public Health Project Development/Program Management
**   Seminar / LAB   1 Credit**
Change credit hours to: Variable from .5 to 3

Justification: To better reflect the contact hours of the course

PBHL   P502   Issues in Public Health   1 Credit
Change credit hours to: Variable from .5 to 3

Justification: To better reflect the contact hours of the course

PBHL   P503   Public Health Community Project   1 Credit
Change credit hours to: Variable from .5 to 3

Justification: To better reflect the contact hours of the course

NEW COURSE REQUESTS
School of Informatics
INFO   I505   Informatics Project Management   3 Credits
This is a professional introduction to informatics project management and organizational implementation of integrated information solutions. The target audience is informatics project team members likely to pursue informatics project manager roles as well as members not likely to do so. Through reading, lecture, discussion, practice, and targeted projects, student gain historical perspective, current awareness, and proficiency with informatics project management terminology, techniques and technologies.

Justification: Essential core course for all informatics graduate programs.

School of Liberal Arts
GEOG   G588   Applied Spatial Statistics   3 Credits
Extension of Traditional Statistical analysis to spatial data. Spatial means and spatial variances, the examination of differences in samples over space, spatial autocorrelation, nearest neighbor analysis, map comparison techniques. Emphasis in practical applications. Prerequisite: consent of instructor.

Justification: Required course in Master of Science in Geographic Information Science (MS GIS) curriculum.

GEOG   G845   Research Papers in Geography   3 Credits
Research papers under the supervision of faculty. Graduate students in the MS in Geographic Information Science program who choose the Research Papers option will develop two research papers under the guidance of their graduate advisor (IUPUI Faculty Member) and two other faculty members chosen in consultation with the advisor. The research paper topics will be related to the field of Geographic Information Science in their focus and methods.

Justification: Justification: Required course in Master of Science in Geographic Information Science (MS GIS) curriculum.

GEOG   G850   Masters Thesis   Variable 3 – 6 Credits
Directed research and writing under the supervision of a faculty committee.

Justification: Justification: Required course in Master of Science in Geographic Information Science (MS GIS) curriculum.

PHST   P602   Qualitative Methods for Third Sector Research   3 Credits
This course will examine the organization, design, and execution of multi-method, qualitative research with a special emphasis on third sector contexts. Specific tools for research, such as observation, interview, case study design, and document analysis will be examined through course readings, discussion, and the conduct of student projects.

Justification: To meet research skill requirements

SOC   S659   Qualitative Methods in Sociology   3 Credits
Methods of obtaining, evaluating, and analyzing qualitative data in social research. Methods covered include field research procedures, participant observation, interviewing, and audio-video recording of social behavior in natural settings.

Justification: This course is central to the applied nature of our M.A. program and may also be useful to majors and minors in other disciplines as well.

Proposal for a Ph.D. Minor in Medical Biophysics/Biomolecular Imaging

Indiana University School of Medicine

Rationale: Imaging plays a central role in advancing modern biomedical science. Imaging reveals the three dimensional structures of proteins and nucleic acids, and with new methods is increasingly able to analyze dynamic structural alterations. New methods in light microscopy reveal the dynamic nature of cells and aspects of organ physiology and pathophysiology that cannot be studied by conventional physiological techniques. Indeed, it is increasingly the case that major advances in cell and molecular biology, physiology and the understanding of human disease are driven by the development and application of new imaging methods. The Ph.D. Minor in Medical Biophysics/Biomolecular Imaging draws on the resources of the interdisciplinary Ph.D. Program in Biomolecular Imaging to train students in the biomedical sciences in the fundamentals of modern imaging methodologies, with the intent of making these powerful tools as widely available as possible, so that students can understand where imaging may be a valuable approach to aid the progress of their current and future research. The Program in Biomolecular Imaging provides the faculty for the Minor, and has developed and runs the courses for the Minor, which also serve as core courses for the Ph.D. program. We propose a rigorous, highly focused nine-credit hour curriculum for the Minor.

Objectives: Establishment of the Minor is intended to give students in a variety of disciplines in biomedical science sufficient grounding in the theory and practice of modern imaging techniques that they will be able to *1)* determine the appropriateness of particular techniques for answering a given scientific question; *2)* gain sufficient understanding of imaging methods to properly apply them in their own research; *3)* be able to evaluate data in the scientific literature obtained using these methodologies; *4)* through studying imaging techniques, be exposed to a range of disciplines in biomedical science outside their own field. It should be noted that imaging methodologies are increasingly an important component of research and development in the pharmaceutical industry, providing new opportunities for pre-clinical testing of new products, so the Minor will be of benefit for those students whose career path lies outside the academy. Further benefits that will accrue from the establishment of this minor include strengthening interactions between faculty in the Biomolecular Imaging Program and faculty in other disciplines, and increased awareness among faculty and students of the outstanding facilities and expertise available on campus for studies using imaging, resulting in better utilization of these technologies. A future goal is to seek training grant support from the National Institute for Biomedical Imaging and Bioengineering for the Minor and Ph.D. program to provide fellowship support for students in these areas.

Students: The Minor offers the opportunity to draw together students from all the graduate programs in the Biomedical Sciences. We anticipate that the Minor would be especially appropriate for students in Cellular and Integrative Physiology, Biochemistry and Molecular Biology, the interdisciplinary Neuroscience Program, Microbiology and

Immunology, Pathology and Pharmacology and Toxicology in the School of Medicine. The interdisciplinary nature of the Minor also makes it relevant for students in Chemistry, Biology and Physics (IUB). Based on enquiries already received, we anticipate that this minor will enjoy strong support from other programs.

Faculty: Faculty preceptors for the Minor will be the same as for the Ph.D. Program in Biomolecular Imaging. Simon Atkinson, Ph.D. serves as Graduate Advisor and Director of the Program. Program oversight is provided by a steering committee (Dr. Atkinson, William Bosron, Ph.D., Ken Dunn, Ph.D., Tom Hurley, Ph.D. and Christoph Naumann, Ph.D.). The list below reflects changes since the approval of the revised Ph.D. program.

Simon Atkinson, Ph.D.
Department: Medicine (Nephrology), Biochemistry
Rank: Associate Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

Robert Bacallao, M.D.
Department: Medicine (Nephrology)
Rank: Associate Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

Robert Berbari, Ph.D.
Department: Engineering
Rank: Professor
Specialization: Cellular
Graduate Faculty: Full member, Purdue University

Glenn Bohlen, Ph.D.
Department: Physiology
Rank: Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

William Bosron, Ph.D.
Department: Biochemistry
Rank: Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

Ricardo Decca, Ph.D.
Department: Physics
Rank: Assistant Professor
Specialization: Cellular/Molecular
Graduate Faculty:

Kenneth W. Dunn, Ph.D.
Department: Medicine (Nephrology)
Rank: Associate Professor
Specialization: Cellular
Graduate Faculty: Associate member, Indiana University

Jeffrey Elmendorf, Ph.D.
Department: Physiology
Rank: Assistant Professor
Specialization: Cellular
Graduate Faculty: Associate member, Indiana University

Shiaofen Fang, Ph.D.
Department: Computer and Information Science
Rank: Associate Professor
Specialization: Image Analysis
Graduate Faculty: "P" rating, Purdue University

Vincent Gattone, Ph.D.
Department: Anatomy and Cell Biology
Rank: Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

Thomas Hurley, Ph.D.
Department: Biochemistry and Molecular Biology
Rank: Professor
Specialization: Molecular
Graduate Faculty: Full member, Indiana University

Alonso Moreno, Doctor in Science
Department: Medicine (Cardiology), Physiology
Rank: Associate Professor
Specialization: Cellular
Graduate Faculty:

Christoph Naumann, Ph.D.
Department: Chemistry
Rank: Assistant Professor
Specialization: Molecular
Graduate Faculty: Associate member, Indiana University

Frederick Pavalko, Ph.D.
Department: Physiology
Rank: Associate Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

William Stillwell, Ph.D.
Department: Biology
Rank: Professor
Specialization: Cellular and Molecular
Graduate Faculty: Full member, Indiana University

Mihran Tuceryan, Ph.D.
Department: Computer and Information Science
Rank: Professor
Specialization: Image Analysis
Graduate Faculty: Full member, Indiana University & Purdue University

Wiltz Wagner, Ph.D.
Department: Anesthesia
Rank: Professor
Specialization: Cellular
Graduate Faculty: Full member, Indiana University

Millie Georgiatis, Ph.D.
Department: Biochemistry and Molecular Biology
Rank: Associate Professor
Specialization: Molecular

Hiroki Yokota, Ph.D.
Department: Biomedical Engineering, Anatomy & Cell Biology
Rank: Assistant Professor
Specialization: Molecular
Graduate Faculty: Full member, Indiana University

Weiming Yu, Ph.D.
Department: Medicine (Nephrology)
Rank: Assistant Professor
Specialization: Cellular
Graduate Faculty: Currently pursuing Indiana University membership

The faculty represent many centers of excellence in imaging on the Indianapolis campus, including the Indiana Center for Biological Microscopy, the Center for Structural Biology and the Nanoscale Imaging Center. Specialized equipment in these centers will be available for education activities (laboratories and demonstrations) associated with the Minor.

Academic Program: The curriculum for the nine credit hour minor in Biomolecular Imaging comprises three required courses (F592 Introduction to Biomolecular Imaging; G613 Advanced Cellular Imaging; G614 Advanced Molecular Imaging). We strongly believe that there are significant educational benefits to a highly focused minor requiring these three highly-integrated courses, and will fully realize the objectives of the Minor outlined above. This is the best approach to providing students with a rigorous grounding in the background and application of modern imaging technologies, without unnecessarily augmenting the coursework burden for the Ph.D. degree. Satisfactory completion of the requirements for the Minor will be monitored by the student's minor representative on the advisory committee.

Required Courses:

F592 Introduction to Biomolecular Imaging *(3 cr.) Tom Hurley, Ph.D., Course Director. Fall Semester.*
Prerequisites: undergraduate level calculus, physics, organic and inorganic chemistry or permission of the instructor.
Description: Introduction to key concepts common to all imaging modalities and exploration of how these concepts apply in the real world at the level of cell and molecular imaging through a survey of the principles and application of modern imaging methods.

G614 Advanced Molecular Imaging *(3 cr.) Christoph Naumann, Ph.D., Course Director. Spring Semester.*
Prerequisites: F592 Intro to Biomolecular Imaging.
Description: Imaging methods and concepts used in molecular structure and dynamics studies. General principles applied to ensemble and single molecules. Methodologies use light, x-rays, electrons, and atomic force mapping.

G613 Advanced Cellular Imaging *(3 cr.) Ken Dunn, Ph.D., Course Director. Fall Semester.*
Prerequisites: F592 Intro to Biomolecular Imaging.
Description: Introduction to the imaging methods and concepts used to study cell structure and function. General principles of light and electron microscopy and digital

imaging. The course includes six laboratory sessions that will demonstrate application of the methods covered.

Timetable: F592 (as revised with Biomolecular Imaging curriculum was offered for the first time in Fall 2003, and will be offered again for Fall 2004. G613 will be offered in Spring 2005, and G614 in Fall 2005. We are seeking approval for the Minor now, so that students could begin with F592 this Fall.

Outline for Reviewers Comments

Review of Proposal for …

Documents reviewed: Ph.D. Minor in Medical Biophysics / Biomolecular Imaging

Discussion:

I think that the proposed minor in Imaging looks very good. The three (required) courses appear to be rigorous, and should provide the students with a very nice overview of the field.

I realize that 9 hours is small for a minor, but the highly focused nature of the three courses should provide what we want a minor to be: a genuine broadening/deepening of the student's PhD education.

Recommendation:

Accept without revision

Proposal for a Graduate Certificate in Survey Research

Department of Political Science
School of Liberal Arts
Indiana University-Purdue University Indianapolis

March 2004

1: SUMMARY

This is a proposal for an Indiana University Graduate Certificate in Survey Research, to be housed in – and administered by - the Department of Political Science in the School of Liberal Arts at IUPUI.

Its main objective will be to provide students with interdisciplinary training in the evaluation of survey research data, and the implementation of survey research programs.

Students will be required to complete 15 credit hours of course work with a grade in each course of B- or better. They will be required to take two core courses in Political Science, and three electives chosen from among a variety of different departments.

Students will be admitted through the IUPUI graduate admissions process, and should have at least an appropriate bachelor's degree from an accredited institution (or an institution approved by the certificate program), and either a minimum undergraduate GPA of 3.0 or sufficient professional standing in employment to indicate their ability to handle the demands of the program. Upon completion of the program, students will receive an Indiana University certificate.

In keeping with the guidelines laid down by Graduate Affairs at IUPUI (February 20, 2000), this program is a focused collection of (mainly pre-existing) courses that will afford students a record of coherent academic accomplishment in the discipline of survey research. It consists of a well-defined sequence of coursework offering a clear educational objective. There are no comparable existing or proposed undergraduate or graduate certificates at IUPUI, nor in the state of Indiana.

2: RATIONALE

The use of survey data, in all its various formats, has grown exponentially in the past two decades. Even now, new developments in the use of the Internet for surveys are expanding the types and forms of data collected. The use of this data is interdisciplinary.

- *Medical researchers* use survey data in epidemiological studies and during evaluation components of various activities, and medical professionals rely on surveys to indicate the potential for delivery of medical services and planning preventative medicine activities.
- *Researchers in public health* use data to assess behavioral risks for disease and injury. The best example of this is the set of surveys done via the Center for Disease Control's annual BRFSS (Behavioral Risk Factors Surveillance Survey).
- *Criminal justice researchers* use it in a variety of ways such as assessing the impact of public safety campaigns, and the evaluation of programs such as the "Click It or Ticket" campaign by the Indiana Criminal Justice Institute, sponsored by the National Highway Traffic Safety Administration.

- *Urban planners and public administrators* use it for estimating attitudes about use of new transportation systems, satisfaction with public services, and possible zoning changes.
- *Educational leaders* use surveys for activities as diverse as marketing by universities and internal research on bus schedules by local school districts
- *Financial leaders* probe the Consumer Confidence Index - a quarterly survey.
- *Governmental leaders* look at measures of citizen satisfaction with matters as mundane as sewers and as complex as traffic planning, while *public officials* develop programs that are required to have survey components that "ask" their constituencies how they are doing and whether their collective or public actions appear to meet perceived public needs.
- *Attorneys and legal professionals* look for measures of matters such as rules for jury selection or trust in local and/or national courts.
- *Business leaders* decide on product development or marketing strategies based on such data.
- *Not-for-profit agencies* estimate the potential for volunteering and charitable donations and evaluate the usefulness of the programs they fund.

Of course, beyond applied uses, political scientists, sociologists, economists and a host of others have used survey data to study many phenomena ranging from voting to investment risk-taking behavior. For example, recent developments in economics – following the work of Nobel Prize winner Daniel Kahneman - recognize the need to use survey data, in part, to assess perceived risk in order to predict matters such as consumer behavior and investment activity.

Although many people use survey data, few are trained in the twin goals of survey research: evaluation of survey research data, and the implementation of survey research programs. The main objective of this graduate certificate program will be to provide students with such training through an interdisciplinary approach to all aspects of survey research. It will provide skills to evaluate and commission survey research, both in terms of the integrity of survey data and in terms of the possible needs and uses appropriate for a survey research application. It will also train students to know when they need a survey, how a survey can and ought to be undertaken, how to evaluate the various methods used in survey research, and how to evaluate the final product of a survey.

3: NEED FOR THE PROGRAM

The program will fill a need that is not currently met within Indiana, nor even very widely within the United States. According to the American Association for Public Opinion Research Web site (www.aapor.org), there are only eleven graduate programs in survey research in North America: three in Canada, two in Ohio, and one each in Connecticut, Maryland, Michigan, Nebraska, New York and Washington DC. These are all certificates or specializations, so our proposed certificate would both be the first program of its kind in Indiana, and would be following a format typically adopted by those other universities and colleges with such a program.

The proposed program will also increase the diversity of graduate education options for students at IUPUI, and play an important complementary role to the needs of other programs in which skills in survey research are useful; these include public health and public administration.

We have strong anecdotal evidence of the demand for training in survey research, and state agencies regularly look for consultants to help them evaluate both survey requests and the results of surveys. Program evaluation is an important aspect of the work of most state and local agencies, and few of the staff who undertake such evaluation have had exposure to survey research.

The proposed program will also take advantage of the presence on the IU campus of the Indiana University Public Opinion Laboratory (POL), a well-established resource with a long and productive track record in survey research. Students in the certificate program will be introduced to the resources and procedures of POL, and will have the opportunity to participate in its activities.

4: TARGET AUDIENCE

We anticipate that most students in the certificate program will be part-time and live in Central Indiana, since it will aim at people already employed in several types of organizations that routinely use data generated through survey research.

We anticipate the strongest demand from employees in the social sciences, public health, public administration, non-profit organizational studies, nursing, business, education, and law. Representatives from all these groups have either used survey data by contracting with public and private groups or have expressed an interest in expanding student exposure to this aspect of public and private policy development.

We believe that a number of IUPUI graduate students (e.g. political science, public and environmental affairs (SPEA), sociology, public health, business, etc.) will find it advantageous to enroll in the program. Some of these will be attracted by the strong interdisciplinary qualities of the program. We also feel that a large group of non-degree graduate students will be attracted to the program because they are working in government, not-for-profits, or businesses that use this data and they want more formal training in how to evaluate and use complex survey data. This is particularly relevant in the Indianapolis metropolitan area with its concentration of large governmental agencies and numerous not-for-profit organizations. Many such potential students have little or no exposure to the techniques of data collection and evaluation in their current training. They do not seek a full graduate degree, but they do desire skills in how to evaluate, and perhaps generate, survey data.

We anticipate that the certificate program will have a positive impact on enrollments in several departments within (primarily) Liberal Arts, and on SPEA, because it will bring new students into a coordinated program of study that exploits existing courses and faculty expertise. Furthermore, the academic training provided by the program may lead some students to pursue a PhD or another advanced degree in one of a variety of fields in which survey data is used.

We expect that cooperation with several schools and programs will be desirable because of the interdisciplinary nature of the program. We have consulted with the schools and programs involved, and letters of support are attached to this proposal (Appendix I).

5: ENROLLMENT PLAN

We propose to launch the program in the Spring semester of 2005. Thus the Program Committee will be appointed, courses will be scheduled, publicity for the program will be circulated, and invitations will be issued for applications from students. We plan to start with the admission in the Fall semester of 2005 of no more than five students, and then to expand through promotion to target organizations/agencies and interdisciplinary and inter-school listing of courses to a steady state of 20-30 students in the program at any time. Steady state enrollment should be reached by the beginning of the fourth year of the program (Fall 2008). Initial target populations include students either currently enrolled or considering enrollment in IUPUI programs in public health, health administration, public and environmental affairs, philanthropic studies, political science, sociology, and informatics.

6: NEW RESOURCES

No new resources are needed for this program. The existence of the IU Public Opinion Laboratory provides an important resource for the program, all the elective courses for the certificate already exist, and proposals for the two core courses have been submitted for consideration. Most of the courses are already being taught, and certainly enough of the electives are being taught to give students a broad enough selection from which to choose. Several of the political science options have been cross-listed with undergraduate research courses, and while this may continue to be an option in the short-term, we anticipate that these courses will quickly become stand-alone graduate courses.

The only significant costs will be (a) compensation for the occasional part-time faculty members who may be recruited to teach selected graduate courses, and (b) compensation for any part-time faculty who may be recruited to teach undergraduate courses that would otherwise have been taught by full-time faculty who are instead teaching graduate courses. That compensation will be met out of tuition income. Note: We are confident that full-time faculty will be able to offer the majority – if not all – of the courses.

7: PROGRAM ADMINISTRATION

The certificate program will be directed by a three-person Program Committee headed by a Director. The Director and at least one other member of the Committee will be full-time political science faculty. The third member may be a political scientist, or may be a full-time faculty member from another department within the School of Liberal Arts, or from another school at IUPUI. We anticipate that the first Director will be Prof. Brian Vargus, who was until 2003 Director of the Indiana University Public Opinion Laboratory, and is currently Professor of Political Science.

The Director will be responsible for submitting an annual report to the IUPUI Graduate Affairs Committee outlining the number of students enrolled, the number of certificates awarded

annually, and – for each student – the date of admission, details of any degree programs to which the student has been admitted at IUPUI, and the number of credits completed toward fulfillment of certificate requirements. The Director will also be responsible for certifying completion of certificate requirements by students enrolled in the program.

8: PROGRAM FACULTY

The full-time faculty at IUPUI that will be most centrally involved with the program include – but are not limited to - the following:

Prof. Brian Vargus, Political Science. CV attached (Appendix II).

Prof. Robert Aponte, Sociology.
Prof. Wan-Ning Bao, Sociology.
Prof. Bill Blomquist, Political Science.
Prof. Margaret Ferguson, Political Science.
Prof. David Ford, Sociology.
Prof. Johnny Goldfinger, Political Science.
Prof. Ain Haas, Sociology.
Prof. Linda Haas, Sociology.
Prof. Gregory Steele, Public Health
Prof. Sue Steinmetz, Sociology.
Jim Wolf, Director, IU Public Opinion Laboratory.
Prof. Eric Wright, Sociology.
Prof. Terry Zollinger, Medicine, Associate Director of the Bowen Research Center.

In addition, some departments may occasionally employ suitably qualified part-time faculty to teach courses as needed.

We do not anticipate strong short-term prospects for using distance education approaches in delivering the certificate program.

9: ADMISSION REQUIREMENTS

Students will be admitted through the normal IUPUI admissions process. In general, admitted students must have at least an appropriate bachelor's degree from an accredited institution or an institution approved by the certificate program. They should also have a minimum undergraduate GPA of 3.0 or have achieved sufficient professional standing in employment that clearly confirms their ability to handle the demands of an interdisciplinary graduate program.

For applicants whose native language is not English and who have not received a degree from a certified American university, a minimum TOEFL score of 550 or its equivalent is required. Students already admitted into an Indiana University or Purdue University graduate program are automatically eligible to earn a certificate.

Applications will be reviewed by an Admissions Committee made up of three members: one from the Department of Political Science, one from the Department of Sociology, and a rotating third member from another department or School. The Graduate Record Examination will be required of applicants, and the Committee will look particularly closely at the scores of applicants in the quantitative portion of the GRE.

10: PROPOSED CURRICULUM

University guidelines require that students in certificate programs take at least 12 hours of coursework and no more than half the credits necessary for a related master's degree, and that at least half the courses should be at the 500 level or above. In accordance, the Certificate will be granted to any student who completes 15 hours of course work with a grade of B- or higher, and with a cumulative GPA of at least 2.7. All required and elective courses will be at the 500- or 600-level, no more than three credit hours may be transferred from another institution, and no undergraduate level courses may be used toward the Certificate.

A: Required Courses (6 cr.) – Students must take both the following two courses:

1. POLS Y567 – *Public Opinion: Approaches and Issues* (3 cr). An introductory seminar that will discuss all the key approaches, issues and concepts in the field of survey research, allowing students to identify more specific interests that may be further explored in their elective courses. One element of this course will be a hands-on introduction to the facilities and methods of the IU Public Opinion Laboratory. (The course is numbered Y567 in order to cluster it with an existing group of Political Science "Approaches and Issues" courses, ranging from Y557 to Y569.)

2. POLS Y590 – *Seminar in Survey Research* (3 cr). A capstone seminar designed to examine current issues in the application of survey research to public policy. Students will be encouraged to take this course at the end of their program of study. They will be encouraged to share with other students their particular applications to increase the interdisciplinary nature of the seminar.

Note: Neither Y567 nor Y590 currently exists, but new course proposals have been submitted for both; copies are attached (Appendix III).

B: Electives (9 cr.) – Students will be required to complete nine additional hours, chosen from a group of Primary Courses or Alternates. This list is designed to maximize the flexibility of a program that meets an interdisciplinary demand. They are offered with varying regularity, but the curriculum allows each discipline to adapt its courses to fit student needs in its area.

1. POLS Y575 - *Political Data Analysis I* (3 cr). Introduces students to quantitative research methods for studying politics, focusing on topics that are statistical in content or that must be addressed for statistics to make sense. Students who complete the course will achieve a level of statistical competency that will enable them to enroll in courses concerned with multivariate statistical techniques, and will acquire the basic skills of data analysis that are indispensable to the practice of quantitative political science.

Alternates: Sociology R551 – *Sociological Research Methods*
                Public Affairs V506 – *Statistical Analysis for Effective Decision Making*
                Psychology P600 – *Statistical Inference*
                Public Health S528 – *Mathematical Statistics*

                Or any other graduate course that includes inferential statistics through regression analysis, and is accepted by the Program Committee.

2. POLS Y576 - *Political Data Analysis II* (3 cr). Builds on Y575 by familiarizing students with more advanced research methods, such as regression analysis and techniques for dealing with categorical and limited dependent variables. Models to be covered include logit, probit, multinomial logit, ordered probit, duration models and survival analysis. Attention will be directed at the application of these methods to political phenomena and the presentation of the results.

Alternates: Sociology R559 – *Intermediate Sociological Statistics*
                Public Affairs V507 – *Data Analysis and Modeling for Public Affairs*
                Public Health P600 - *Epidemiological Research Methods*

                Or any other graduate course that includes log linear analysis and modeling techniques, and is accepted by the Program Committee.

3. POLS Y580 - *Research Methods* (3 cr). This course surveys the major techniques for investigating current political problems. It emphasizes the relationship between theory and practice in understanding and conducting research. It will examine issues in field research essential to a full understanding of a research problem.

Alternates: Sociology R551 – *Sociological Research Methods*
                Sociology R653 – *Public Opinion: Research and Analysis*
                Health Administration H518 – *Statistical Methods for Health Services*
                Public Health P601 - *Advanced Epidemiology*
                Public Affairs J502 – *Research Methods in Criminal Justice and Public Affairs*
                Public Affairs V562 – *Public Program Evaluation*

                Or any other comparable graduate course accepted by the Program Committee.

Note: All these elective courses currently exist, so no new course proposals are needed.

C: Internship Option (3 cr.) – As an alternative to one of the electives, students may – with the approval of the Program Committee – substitute an internship experience for one of the elective courses. They would have to work with an approved faculty member in completing a research project arising out of placement with an approved research organization or the IU Public Opinion Laboratory, involving a commitment of at least 8 hours per week for one full semester. They would enroll for credit in Y585 – *Internship in Survey Research*, or a comparable internship course in another department or school, subject to approval by the Program Committee.

The program is designed to be flexible and interdisciplinary, and the Program Committee will work to ensure that all schools with existing courses that could be proposed as alternates are given appropriate equivalent status.

It is anticipated that, because most of the enrollees will be non-traditional students, two years (including at least one Summer Session) will be the normal time to complete the Certificate, with a maximum of five calendar years allowed.

Granting of the Certificate will be audited by the program staff with certification of completion of credits to lay with the Program Committee Director, in consultation with the chair of Political Science. Notification of completion of the certificate will be made to the Indiana University Graduate School, and the award of the certificate will be made jointly by the School of Liberal Arts and the IU Graduate School. Diplomas will be awarded at the normal times when degrees are awarded.

11: FINANCIAL ASSISTANCE

We anticipate that most students in the program will be enrolled part-time, and will either be meeting their own tuition costs, or will find assistance from their employers. However, we are in the fortunate position to be able to offer some financial assistance out of funds set aside in 2001 under the Survey Research Award. This will provide one-time awards of up to $1250 for as many as two students who have completed at least six hours of courses in the certificate program, and who have been adjudged to have produced work of a quality that is superior to other students in the program.

12: EVALUATION

The Certificate Program will undergo an initial review at the end of its third year, and thereafter will be evaluated periodically as part of the Political Science departmental program review process.

In addition, there will be a community Advisory Committee that will meet periodically to review the program and its components. This committee will be constituted from survey researchers active in the professional, educational, business and government sectors that the program is designed to serve. Possible candidates include Dr. Ron Anderson, Professor of Marketing in the Kelley School of Business; Dr. Gregory Steele, Epidemiologist in the Department of Public Health; Mr. Stephen Walker of Walker Information Systems; Mr. Fred Bingle of Bingle Associates; Associate Dean Greg Lindsey of the School of Public and Environmental Affairs; and others from local marketing research, survey research firms, government agencies, and relevant specialties in academia.

A NOTE ON THIS PROPOSAL: The first draft of the proposal was drawn up by Prof. Brian Vargus. An advanced draft was drawn up by Prof. John McCormick. It was reviewed by Jim Wolf, Director of the IU POL, and by Profs. Robert Aponte and Ain Haas of the Department of Sociology, and amended in response to comments. It has also been shared with faculty in the Department of Political Science, with faculty in the School of Public and Environmental Affairs, and discussed with SLA Acting Dean Robert White, and with (now former) Associate Dean for Graduate Program William Schneider.

APPENDICES

I	Letters of support from other schools and departments.
II	CV for Prof. Brian Vargus.
III	New course proposals for Y567 and Y590.

Outline for Reviewers Comments
Review of Proposal for a Graduate Certificate in Survey Research

Documents reviewed: Proposal for a Graduate Certificate in Survey Research, March 2004

Summary:

This proposal is for a 15-credit hour interdisciplinary graduate certificate in survey research offered primarily by the Department of Political Science. The certificate program would be open to graduate non-degree students as well as graduate students in IUPUI degree programs. There are 2 required core courses in political science (these are new courses seeking approval) and 3 electives to be chosen from a target list of courses. The proposal states that only 11 other such certificates or specializations in survey research exist in the U.S. The curriculum will focus on training students in 1) the evaluation of survey research data, and 2) the implementation of survey research programs.

Recommendation:

Accept

Discussion: As the proposal states, survey research is a widely used approach for collecting and analyzing data and is used in numerous fields. Given the pervasiveness of survey research, it is interesting that so few schools offer similar certificates or specializations--- could it be because survey research is generally covered in research courses in multiple disciplines without being elevated to its own "discipline?" I think the connection with the IU Public Opinion Laboratory is a strong feature of the proposed certificate program along with the possibility of an internship. The plan for a community advisory committee is also a noteworthy aspect of this proposal.

A few questions:

1. Does the "implementation" focus of the program include both the design of surveys and the collection of data?
2. Is the certificate program open to or intended for doctoral students as well as masters and post-undergraduate students?
3. Is it possible that the certificate could serve as an external minor for doctoral students? Doctoral students in Nursing and Social Work at IUPUI might be interested in a certificate program in Survey Research.
4. What courses will cover the essential content of research ethics & human subjects review approval?
5. Is the GRE necessary as an admissions criterion? Could this requirement serve as a deterrent for graduate non-degree students?
6. Since the course description for the first required course (POLS Y567: *Public Opinion: Approaches and Issues)* focuses on the basics of survey research, shouldn't "survey research" be a part of the course title? Certainly, surveys gather data about more than public opinion.
7. Is the design of a survey a required assignment in either of the core courses?

Outline for Reviewers Comments

Documents reviewed: Proposal for a Graduate Certificate in Survey Research

Summary:

   This proposal is for a graduate certificate in survey research housed in and offered by the Department of Political Science in the School of Liberal Arts at IUPUI. The objective of the program is to " provide students with interdisciplinary training in the evaluation of survey research data, and the implementation of survey research programs." Students will be required to complete 15 credit hours, all of which are at the 500 or 600 level.

Recommendation:
   Revisions prior to acceptance

Discussion:

   Although this is a timely proposal, this reviewer would request several changes and/or clarifications prior to acceptance.

1. The summary states that students " should have at least an appropriate bachelor's degree from an accredited institution **(or an institution approved by the certificate program)**. This second part (in bold) runs contrary to the guidelines and should be removed or clarified.

2. The summary also states that students should have " either a minimum undergraduate GPA of 3.0 or **sufficient professional standing in employment to indicate their ability to handle the demands of the program**." How is this going to be determined? What criteria will be used?

3. Under admissions requirements, the proposal states that students will take the GRE, but no specific guidelines are listed. This should be defined to allow evaluation by the graduate faculty and the applicants.

4. Under proposed curriculum, it states that " the Certificate will be granted to any student who completes 15 hours of course work with a grade of B- or higher, and with a cumulative GPA of at least 2.7." Since this certificate is through the graduate school, shouldn't students be required to have a cumulative GPA of 3.0 or better to graduate?

Curriculum Subcommittee of the Graduate Council

The first voting issue before the Graduate Council was the proposal for a new PhD degree in Informatics. Dean Michael Dunn and Associate Dean Christine Ogan were present and described the proposed degree program for the council. Following their presentation, discussion covered the proposed number of exams required for the degree, the absence of a master's degree in informatics as a prelude to the doctorate, the various possibilities for outside minors, and the need for mechanisms to correct "lopsided" development of the program at IUPUI and IUB. Dean Slattery noted that the School of Library & Information Science and the School of Informatics are working out the complementarity of their degree programs.

Responding to a question regarding how the Informatics PhD fits with other programs nationally, Dean Dunn replied that the proposed program is consistent with important national trends, and listed universities that have similar programs or departments, including Penn State, RPI, Georgia Tech, UC Irvine, UNLV, SUNY Buffalo, and Carnegie Mellon. A size of ten students per year is anticipated at present, he said, and placement will be in both academic and industrial contexts.

Questions were raised concerning the fact that the written doctoral exam covers work in only four courses. Dean Dunn responded that doctoral student will have only those four courses in common; the oral exam will be focused on each student's specialty. These matters will be revisited as the program evolves. It was also noted that a considerable amount of course work is required for the degree, and so early and consistent review of students' progress is advisable. Students will get feedback through a pre-qualifying exam taken during the third semester.

Dean Slattery suggested that with new degree programs in general, two persons outside the school should be invited to help in putting together and fine-tuning the program, that parallel approval tracks should be initiated with offices that are involved with funding and other matters, and that external "content experts" should be nominated as reviewers be for the program.

A vote was taken and the proposal for the PhD in Informatics was approved.

TABLE 3:
NEW ACADEMIC DEGREE PROGRAM PROPOSAL SUMMARY
28 April 2004

I. Prepared by Institution

Institution/Location: Indiana University-Purdue University Indianapolis
Program: Ph. D. in Informatics
Proposed CIP Code: tbd
Base Budget Year: 2004-05

	Year 1 2005-06	Year 2 2006-07	Year 3 2007-08	Year 4 2008-09	Year 5 2009-2010
Enrollment Projections (Headcount)	8	16	24	32	40
Enrollment Projections (FTE)	6	12	18	24	30
Degree Completion Projection	0	0	0	0	0
New State Funds Requested (Actual)	$ 0	$ 0	$ 0	$ 0	$ 0
New State Funds Requested (Increases)	$ 0	$ 0	$ 0	$ 0	$ 0

II. Prepared by Commission for Higher Education

New State Funds to be Considered for Recommendation (Actual)	$ _____	$ _____	$ _____	$ _____	$ _____
New State Funds to be Considered for Recommendation (Increases)	$ _____	$ _____	$ _____	$ _____	$ _____

CHE Code: Comment:
Campus Code:
County Code:
Degree Level:
CIP Code:

TABLE 1: PROGRAM ENROLLMENTS AND COMPLETIONS
Annual Totals by Fiscal Year (Use SIS Definitions)

	Year 1 2005-06	Year 2 2006-07	Year 3 2007-08	Year 4 2008-09	Year 5 2009-2010
A. Program Credit Hours Generated					
1. Existing Courses	96	168	264	360	480
2. New Courses	48	120	168	216	240
Total	144	288	432	576	720
B. Full-time Equivalents (FTEs)					
1. Generated by Full-time Students	0	0	0	0	0
2. Generated by Part-time Students	6	12	18	24	30
Total	6	12	18	24	30
3. On-Campus Transfers	0	0	0	0	0
4. New-to-Campus	6	12	18	24	30
C. Program Majors (Headcounts)					
1. Full-time Students	0	0	0	0	0
2. Part-time Students	8	16	24	32	40
Total	8	16	24	32	40
3. On-Campus Transfers	0	0	0	0	0
4. New-to-Campus	8	16	24	32	40
5. In-State	8	16	24	32	40
6. Out-of-State	0	0	0	0	0
D. Program Completions					

Campus: Indiana University-Purdue University Indianapolis
Program: Ph. D. in Informatics
Date: 28 April 2004

TABLE 2A:
TOTAL DIRECT PROGRAM COSTS AND SOURCES OF PROGRAM REVENUE

	Year 1		Year 2		Year 3		Year 4		Year 5	
	FTE	2005-06	FTE	2006-07	FTE	2007-08	FTE	2008-09	FTE	2009-2010
A. Total Direct Program Costs										
1. Existing Departmental Faculty Resources	0.0 $	0	0.0 $	0	0.0 $	0	0.0 $	0	0.0 $	0
2. Other Existing Resources		0		0		0		0		0
3. Incremental Resources (Table 2B)		50,100		100,100		150,200		200,300		250,300
TOTAL	$	50,100	$	100,100	$	150,200	$	200,300	$	250,300
B. Sources of Program Revenue										
1. Reallocation	$	0	$	0	$	0	$	0	$	0
2. New-to-Campus Student Fees		29,100		58,100		87,200		116,300		145,300
3. Other (Non-State)										
4. New State Appropriations										
a. Enrollment Change Funding		21,000		42,000		63,000		84,000		105,000
b. Other State Funds		0		0		0		0		0
TOTAL	$	50,100	$	100,100	$	150,200	$	200,300	$	250,300

Campus: Indiana University-Purdue University Indianapolis
Program: Ph. D. in Informatics
Date: 28 April 2004

TABLE 2B:
DETAIL ON INCREMENTAL OR
OUT-OF-POCKET DIRECT PROGRAM COSTS

| | Year 1 | | Year 2 | | Year 3 | | Year 4 | | Year 5 |
	FTE	2005-06	FTE	2006-07	FTE	2007-08	FTE	2008-09	FTE	2009-2010
1. Personnel Services										
a. Faculty	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
b. Support Staff	0.5	26,100	1.0	52,200	1.5	78,300	2.0	104,400	2.0	104,400
c. Graduate Teaching Assistants	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Personnel Services		26,100		52,200		78,300		104,400		104,400
2. Supplies and Expense										
a. General Supplies and Expense		5,000		9,900		14,900		19,900		50,900
b. Recruiting		0		0		0		0		0
c. Travel		0		0		0		0		0
d. Library Acquisitions		0		0		0		0		0
Total Supplies and Expense		5,000		9,900		14,900		19,900		50,900
3. Equipment										
a. New Equipment Necessary for Program										
b. Routine Replacement										
Total Equipment		0		0		0		0		0
4. Facilities		0		0		0		0		0
5. Student Assistance										
a. Graduate Fee Scholarships		19,000		38,000		57,000		76,000		95,000
b. Fellowships		0		0		0		0		0
Total Student Assistance		19,000		38,000		57,000		76,000		95,000
Total Incremental Direct Costs	$	50,100	$	100,100	$	150,200	$	200,300	$	250,300

Review of the 'Proposal for a Ph.D. in Informatics'

Overview: This reviewer supports the organization of a multicampus Ph.D. program in Informatics. However, I understand that the Informatics Ph.D. proposal has already been approved by the system-wide Graduate Council prior to review by the IUPUI Graduate Affairs Committee. This action of approval of the Informatics Ph.D. by the Graduate Council and Deans of the Graduate School simply reinforces a view that the Graduate Council effectively functions only for IUB and not IUPUI. It reinforces the opinion by Task Force members that the Graduate School should be abolished and approval for degrees should be made at the campus or school level. Given the fact that the degree is already approved, this reviewer will only address issues of implementation of the Informatics Ph.D. at IUPUI.

Recommendations for implementation of the Informatics Ph.D. at IUPUI

The current document that was prepared for IUPUI is basically identical with the document that was reviewed by the Graduate Council and will apparently go to the Trustees and Commission. It is a plan to develop an Informatics degree across the IUB and IUPUI campuses with specialties or tracks in six areas in Indianapolis: bioinformatics, chemical informatics, heath informatics, media informatics, human-computer interaction and social informatics. One degree with tracks has distinct administrative advantages. Moreover, it offers the student a greater degree of flexibility and diversity of curriculum than six separate Ph.D. programs could offer. The document indicates that these tracks will be phased in and new tracks added as the School grows. The problem is that there is no clearly developed time-table or sequence for development of the tracks. There is no indication of the numbers of support faculty currently in individual tracks and plans for recruitment of new faculty to develop tracks. There is no indication of the Graduate Faculty status in the participating faculty list. In particular, there is no indication how many students can be accommodated in research in various tracks. The course lists are the same in the IUB and IUPUI proposals. It is not clear how many are offered at IUPUI or whether there would be courses offered by interactive video, which may be an excellent idea for an Informatics degree.

The proposal indicates that the IUPUI program can be done part time or full time. In the spread sheet, only part time students are listed. The example curriculum involves 9 credits (3 standard academic courses) per semester for eight semesters (four years). It is unlikely that a student could handle this curriculum part time with a full-time job. An example of a curriculum for part-time should be included. If the Ph.D. is completed part time, how many years will it take and will the student be within the course time allowance for advancement to candidacy? When will the student take the qualifying exam? It looks like the exam will cover the 2 required and 4 elective core courses, so this appears to be at the end of the second year of a full time curriculum. Will the Dissertation Proposal be part of the Qualifying Exam and when will this be done in the full time and part time curricula? How will research and thesis writing be accommodated in a part time curriculum? I presume that students will try to do some research in the summers while taking courses. There is a mention of internships in the proposal. How will this be accommodated in the curriculum?

The distribution of 21-30 credits for research and 60-69 course credits may be the norm for an Informatics Ph.D. curriculum but is not normal for a Ph.D. in the basic health sciences at IUPUI and perhaps other science and engineering disciplines. Most of our basic science curricula require ~35-45 course credits and ~45-55 research credits. This Ph.D. in Informatics seems to be relatively light on research credits and in the example curriculum students would not be doing full time research until the 5th year.   Is this an appropriate preparation for a Ph.D. who wishes to do independent research in Informatics? How many total years will the Ph.D. take for full time and part time students?

In summary, it recommended that a specific plan for implementation of the Informatics Ph.D. at IUPUI be developed that would include:
1. A time table for development of six tracks in the program
2. The current IUPUI faculty and recruitment plan for faculty who will support the development of tracks
3. The IUPUI or IUB video courses that will support the development of tracks
4. Sample curricula for part time and full time students for the whole program including timing of the qualifying exam, thesis proposal, research and writing of the thesis
5. A justification of the course and research credit distributions for the Informatics training program
6. A time for initial review of the success of the program, perhaps after 5 years

Response to the Review of the 'Proposal for a Ph.D. in Informatics'

We thank the reviewer for his/her careful and thoughtful review. In fine, the reviewer supports the proposal for a Ph.D. in informatics offered on IUPUI (as well as IUB) campus, noting that

> *It is a plan to develop an Informatics degree across the IUB and IUPUI campuses with specialties or tracks in six areas in Indianapolis: bioinformatics, chemical informatics, health informatics, media informatics, human-computer interaction and social informatics. One degree with tracks has distinct administrative advantages. Moreover, it offers the student a greater degree of flexibility and diversity of curriculum than six separate Ph.D. programs could offer.*

The reviewer has good questions and suggestions relating to the implementation and support of this degree. We are happy to respond to each of these point by point. No comments calling for a response have been omitted. Please note that our responses pertain specifically to the IUPUI campus of the School of Informatics unless otherwise stated.

Comment:

> *The document indicates that these tracks will be phased in and new tracks added as the School grows. The problem is that there is no clearly developed time-table or sequence for development of the tracks.*

Response:
Our implementation plan is as follows:
2005: Begin the bioinformatics track.
> Rationale: The Bioinformatics Graduate Program (M.S. in Bioinformatics) began in fall, 2001. With the exception of the New Media Graduate Program, the inception of which precedes the School of Informatics, the Bioinformatics Graduate Program is the most developed informatics graduate program at IUPUI. To date, we have already had six graduates, and 43 graduate students are currently enrolled. This is 326% of the growth predicted when the program was first approved. The necessary faculty members, including significant recent hires, are in place (see below), and the Center for Computational Biology and Bioinformatics, with which the School of Informatics has extremely close ties, is established and operational. New graduate courses in bioinformatics are currently being developed. This provides a firm basis to inaugurate the informatics doctoral program with the bioinformatics track.
2006: Begin the tracks in health informatics, human-computer interaction, and media informatics.
> Rationale: The Health Informatics Graduate Program (M.S. in Health Informatics) began in fall, 2001. This program currently has 27 graduate students, 180% of the initial growth prediction. Three new graduate courses were added last year to the existing health informatics courses. Recent hiring in this area complements the existing health informatics faculty (see below).
>   The Human-Computer Interaction (HCI) Graduate Program is a recent addition (fall, 2003) to the School of Informatics on the IUPUI campus, although this program

is well established on the IUB campus, which admitted the first HCI graduate students in fall, 2001. Interest in this program has been very high, and already 21 graduate students are enrolled. We will actively add to the HCI faculty to prepare the HCI track by 2006.

As mentioned above, the New Media Graduate Program (M.S. in Media Arts and Science) was founded before the School of Informatics, and to this day serves as the backbone of the school on the IUPUI campus. Since its inception in 1998, the graduate program has produced XXX graduates and currently is home to 83 graduate students. Two of the new media faculty have the MFA terminal degree, two have doctoral degrees, and we recently hired a doctorally prepared faculty member in the first phase of expanding in this area. At least two more faculty members will be recruited next year, 2005, in preparation for starting the media informatics track in 2006.

2007: Begin the chemical informatics and possibly the laboratory informatics tracks.

Rationale: Currently, the Chemical Informatics Graduate Program (M.S. in Chemical Informatics) has four graduate students and two more who have already graduated. While the potential for this program has yet to be realized, we will continue to develop this master's program in preparation for a track in the doctoral program.

The Laboratory Informatics Graduate Program, along with the HCI Graduate Program above, is a new arrival at the school, having opened its doors just this last fall (2003). Already, the program has 14 graduate students. Three new graduate courses laboratory informatics are now in the curriculum, with three additional new courses planned. We recently hired a new faculty member in this area and extended an offer to another (awaiting decision). We will expand the curriculum in three areas: clinical laboratory informatics, systems validation, and regulatory compliance, and will hire doctorally prepared individuals with expertise in these areas. Although not formally planned, it is likely that a doctoral track can be developed in this area by 2007.

Comment:

There is no indication of the numbers of support faculty currently in individual tracks and plans for recruitment of new faculty to develop tracks.

Response:
The numbers given here pertain to IUPUI only. All appointees have doctoral degrees unless otherwise stated.
Bioinformatics: Currently, four faculty members with major appointments (>0.5 FTE) in the School of Informatics, and three with minor (<0.5 FTE) appointments. No plans to hire more in this area at this time.
Chemical Informatics: Currently, one faculty member with major appointment. Plan to hire one more over next two years.
Health Informatics: Currently, four faculty members with major appointments (one just hired), and one with minor appointment. Plan to hire at least one more over next year.
Human-Computer Interaction: Currently, one faculty member (with MFA and working on PhD) with major appointment, and two with minor appointments. Plan to hire at least one more over next year.

<u>Laboratory Informatics</u>: Currently, two faculty members with major appointments and an offer pending for another major appointment. Plan to hire at least one more over next year.

<u>Media Informatics</u>: Currently, four faculty members (two with MFAs + two with doctoral degrees, including a recent hire) with major appointments, and one with minor appointment. Plan to hire two more doctorally prepared individuals over next two years.

Comment:

There is no indication of the Graduate Faculty status in the participating faculty list.

Response:
The School of Informatics is still a new school under active development. None of the existing graduate programs is offered by University Graduate School. For these two reasons, currently only one faculty member is on the Graduate Faculty. We will apply for either full or associate status for all of the above faculty members over next year.

Comment:

…there is no indication how many students can be accommodated in research in various tracks.

Response:
<u>Bioinformatics</u>: 16
<u>Chemical Informatics</u>: 6
<u>Health Informatics</u>: 13
<u>Human-Computer Interaction</u>: 10
<u>Laboratory Informatics</u>: 12
<u>Media Informatics</u>: 12

Comment:

The course lists are the same in the IUB and IUPUI proposals. It is not clear how many are offered at IUPUI or whether there would be courses offered by interactive video, which may be an excellent idea for an Informatics degree.

Response:
The following courses are or will be offered at IUPUI by classroom or lab:
- CHEM 696 (3 credits) Chemical Information Technology
- CSCI 548 (3 credits) Introduction to Bioinformatics
- I500 (3 credits) Fundamental Computer Concepts for Informatics
- I501 (3 credits) Introduction to Informatics
- I502 (3 credits) Information Management
- I503 (3 credits) The Social Impact of Information Technologies
- I505 (3 credits) Informatics Project Management
- I510 (3 credits) Data Acquisition and Lab Automation
- I511 (3 credits) Laboratory Information Management Systems
- I512 (3 credits) Scientific Data Management and Analysis
- I513 (proposed-3 credits) Clinical Laboratory Informatics

- I514 (proposed-3 credits) Informatics in Regulatory Compliance
- I515 (proposed-3 credits) Systems Validation
- I530 (1-3 credits) Seminar in Health Informatics
- I532 (1-3 credits) Seminar in Bioinformatics
- I533 (1-3 credits) Seminar in Chemical Informatics
- I534 (1-3 credits) Seminar in Human-Computer Interaction
- I535 (3 credits) Clinical Information Systems
- I540 (3 credits) Data Mining for Security
- I550 (3 credits) Legal and Business Issues in Informatics
- I575 (3 credits) Informatics Research Design
- I627 (proposed-3 credits) Seminar I for Bioinformatics Specialists
- I637 (proposed-3 credits) Seminar II for Bioinformatics Specialists
- I647 (proposed-3 credits) Seminar I for Chemical Informatics Specialists
- I657 (proposed-3 credits) Seminar II for Chemical Informatics Specialists
- I667 (proposed-3 credits) Seminar II for Health Informatics Specialists
- I626 (proposed-3 credits) Seminar I for Media Informatics Specialists
- I636 (proposed-3 credits) Seminar II for Media Informatics Specialists
- I624 (proposed-3 credits) Seminar I for HCI Specialists
- I634 (proposed-3 credits) Seminar II for HCI Specialists
- N500 (3 credits) Foundations of Digital Arts Production
- N501 (3 credits) Principles of Multimedia Technology
- N502 (3 credits) Digital Media Motion and Simulation Methods
- N503 (3 credits) Digital Media Application Design Processes
- N504 (3 credits) Advanced Interactive Design Applications
- N505 (3 credits) Internship in Media Arts and Technology
- N506 (3 credits) Media Arts and Technology Project
- N510 (3 credits) Web-Database Concepts

The following courses could be offered at IUPUI by classroom or interactive video:

- I585 (proposed-3 credits) Discovery and Application of Information
- I592 (Proposed-3 credits) Data Mining for Bioinformatics
- I600 (proposed-3 credits) Professionalism and Pedagogy in Informatics
- I601 (proposed-3 credits) The Informatics of Complex Systems
- I604 (proposed-3 credits) Human-Computer Interaction Design Theory
- I605 (proposed-3 credits) Social Foundations of Informatics
- I608 (proposed-3 credits) Cognitive Science for Human-Centered Informatics
- I610 (proposed-3 credits) Design, Technology, and Representation
- I611 (proposed-3 credits) Mathematics & Logical Foundations of Informatics
- I617 (proposed-3 credits) Science and Other Domain Informatics
- I629 (proposed-3 credits) Readings in Informatics

Comment:

> *The proposal indicates that the IUPUI program can be done part time or full time. In the spread sheet, only part time students are listed.*

Response:

We thank the review for pointing this out. Based on our experience with our master's informatics programs, we anticipate that, on the average, 80% of our graduate students will work on their degrees part-time. Table 1 in the appendix does not reflect this. The corrected table will read:

	Year 1 2005-06	Year 2 2006-07	Year 3 2007-08	Year 4 2008-09	Year 5 2009-10
Full-time Equivalents (FTEs)					
1. Generated by Full-time Students	2	4	6	8	8
2. Generated by Part-time Students	6	12	18	24	30
Total	8	16	24	32	38
Program Majors (Headcounts)					
1. Full-time Students	2	4	6	8	8
2. Part-time Students	8	16	24	32	40
Total	10	20	30	40	48

Comment:

The example curriculum involves 9 credits (3 standard academic courses) per semester for eight semesters (four years). It is unlikely that a student could handle this curriculum part time with a full-time job. An example of a curriculum for part-time should be included.

Response:

Semester One
I501　(3 credits) Introduction to Informatics
I585　(3 credits) Discovery and Application of Information

Semester Two
I502　(3 credits) Information Management
I519　(3 credits) Bioinformatics: Theory and Application

Summer
I627　(3 credits) Seminar in Bioinformatics I

Semester Three
I520　(3 credits) Algorithms for Bioinformatics
I600　(3 credits) Professionalism and Pedagogy of Informatics

Semester Four

I592   (3 credits) Data Mining for Bioinformatics
I611   (3 credits) Mathematical and Logical Foundations of Informatics

Summer
I637   (3 credits) Seminar in Bioinformatics II

Semester Five
L529   (3 credits) Bioinformatics in Molecular Biology and Genetics
I617   (3 credits) Science and Other Domain Informatics

Semester Six
I601   (3 credits) Complex Systems, Modeling, and Simulation
M467 (3 credits) Advanced Statistical Techniques

Summer
I552   (1-3 credits) Internship/Independent Study

Semester Seven
Z620   (3 credits) Topics in Informatics: Evolution of Genes and Genomes
M560 (3 credits) Applied Stochastic Techniques

Semester Eight
M467 (3 credits) Advanced Statistical Techniques
Z620   (3 credits) Genomics and Bioinformatics

Summer
I699   (3 credits) Topics in Informatics

Semester Nine
B480 (3 credits) Microbial and Molecular Genetics
M560 (3 credits) Applied Stochastic Techniques

Semester Ten
B581   (3 credits) Advanced Computer Graphics
L585   (3 credits) Molecular Genetics

Summer
I629   (3 credits) Informatics Readings

Semester Eleven
L600   (3 credits) Special Topics in Genetics
I629   (3 credits) Informatics Readings

Semester Twelve
Thesis continuation

Comment:

If the Ph.D. is completed part time, how many years will it take and will the student be within the course time allowance for advancement to candidacy?

Response:

If a part-time student takes two courses a semester and pursues summer studies, it will take at least six years to complete the Ph.D., well within the seven-year limit for advancement to candidacy. This assumes that no courses have been transferred in. If up to 30 credits are allowed for transfer (from, for example, the appropriate master's program), this time will be shortened considerably.

Comment:

When will the student take the qualifying exam? It looks like the exam will cover the 2 required and 4 elective core courses, so this appears to be at the end of the second year of a full time curriculum.

Response:

That is correct: the end of the second year of a full-time curriculum.

Comment:

Will the Dissertation Proposal be part of the Qualifying Exam and when will this be done in the full time and part time curricula?

Response:

The dissertation proposal will be part of the qualifying exam. This will be expected at the end of year two for full-time students and year four for part-time students.

Comment:

How will research and thesis writing be accommodated in a part time curriculum? I presume that students will try to do some research in the summers while taking courses.

Response:

Preliminary research and preparation of the dissertation proposal will occur throughout the year, with extra effort in this area expected in the summer.

Comment:

There is a mention of internships in the proposal. How will this be accommodated in the curriculum?

Response:

A major area of research in informatics involves the development, implementation, and evaluation of novel applications and technologies in industrial settings to solve real problems. Internships are perfectly suited for this. Where available and appropriate, we will incorporate internships as a venue for dissertation work.

Comment:

The distribution of 21-30 credits for research and 60-69 course credits may be the norm for an Informatics Ph.D. curriculum but is not normal for a Ph.D. in the basic health sciences at IUPUI and perhaps other science and engineering disciplines. Most of our basic science curricula require ~35-45 course credits and ~45-55 research credits. This Ph.D. in Informatics seems to be relatively light on research credits and in the example curriculum students would not be doing full time research until the 5th year. Is this an appropriate preparation for a Ph.D. who wishes to do independent research in Informatics?

Response:
Informatics strides the full spectrum of characteristics associated with other academic disciplines, from biomedical science (bioinformatics) to engineering (laboratory informatics) to social science (social informatics) to the arts (media informatics). This dynamic has already shown itself in our master's programs, reflected in the diversity of the master's theses. Research in informatics must strike a balance between these knowledge domains. The general curriculum of the doctoral program addresses this balance, while allowing enough flexibility for individual dissertations to conform to the expectations of a particular domain.

Comment:

How many total years will the Ph.D. take for full time and part time students?

Response:
Full-time: four years; part-time six years. The school wants to buck the trend of "year inflation" for completing doctoral degrees.

Comment:

In summary, it is recommended that a specific plan for implementation of the Informatics Ph.D. at IUPUI be developed that would include [specifics addressed above]*…and a time for initial review of the success of the program, perhaps after 5 years*

Response:
Review of the graduate degree programs at IUPUI is scheduled for 2012, as set by the Office of Planning and Institutional Improvement. We intend to review the doctoral program as part of this comprehensive review.

DUAL DEGREE GRADUATE PROGRAM

in

APPLIED STATISTICS
and

ECONOMICS

March 12, 2004

INTRODUCTION

Statistics is the science of collecting, organizing, and interpreting numerical facts, which are called data. Statistical methods and procedures enable rational decision-making in scientific, industrial and economic contexts, while statistical theory provides the mathematical foundations for such procedures.

Economics, as a social science, studies the implications of household, firm, and government behavior for how the resources of society are used. Economists study the social problem of scarcity from a scientific viewpoint that is built on a systematic exploration of economic theories and examination of data. To that end, mathematical modeling and statistical theories play a crucial role in modern economic inquiry.

The increasing use of modern statistical methodologies in economics dictates the growing need for economists who thoroughly understand the statistical procedures with which they work. Recognizing this, the Department of Mathematical Sciences and the Department of Economics at Indiana University Purdue University Indianapolis are jointly proposing a new and unique graduate program leading to a dual Master's degree: a Master of Arts in Economics and a Master of Science in Mathematics with a specialization in Applied Statistics. This new program will allow the prospective student to complete all degrees requirements with at least 45 credit hours of course work (compared to 60 credit hours of course work if the two Master's degrees are to be pursued separately).

While each of the two departments has its own thriving graduate program, the current reorganization of the graduate program in the Department of Economics provides an opportunity to work jointly with the Department of Mathematical Sciences to develop and design this new dual-degree program. Although the two departments reside in different IUPUI schools, the School of Liberal Arts and the School of Sciences, it is hoped that both the IUPUI Graduate School and the Purdue University Graduate School will favorably review the proposal. It has a structure similar to the Economics-Philanthropy dual-degree program that was approved by the IUPUI Graduate School some time ago.

THE PROGRAM

The new dual-degree program in Applied Statistics and Economics is designed with a twofold purpose. First, to provide a broad training in statistics and economics that is suitable for applications in the private, nonprofit and government sectors. The primary goal is to increase the student's analytical and quantitative skills in preparation for careers, in any professional environment, pursued after graduation. Second, the program also provides a superior foundation for those interested in acquiring or updating their skills in preparation for a Ph.D. in Economics.

Admission Process:

Application packets for admission to the program may be obtained from the **Graduate Secretary** of either department:

- Department of Mathematical Sciences
  IUPUI
  402 North Blackford Street
  Indianapolis, IN 46202-3216
  317-274-6918

OR

- Department of EconomicsIUPUI
  425 University Boulevard
  Indianapolis, IN 46202-5140
  317-274-4756

A completed application must include:

1. Completed application forms- Purdue University and Indiana University.
2. All official transcripts (in triplicate).
3. Three letters of recommendation.
4. Most recent GRE scores.

For foreign students, additional information is required as specified in the application packet. Applications received by February 15, will be considered for admission in the forthcoming academic year, beginning in the Fall semester. While the completed application is being processed, the prospective student may register for courses in the program as a temporary graduate student. This is done in

consultation with the program's graduate directors. A student is permitted to register in this status for up to 12 credit hours prior to admission to the program.

Any student wishing to be considered for an assistantship or fellowship in the Department of Economics must submit their application no later than January 15[th.]

For further information on any aspect of the dual-degree graduate program, please contact:

- Professor **Paul Carlin** at the Department of Economics
  (317) 997-6530, email: `pcarlin@iupui.edu`

- Professor **Krys Podgorski** at the Department of Mathematical Sciences
  (317) 274-8070, email: `kpodgorski@math.iupui.edu`

Admission Requirements:

Any applicant who has a suitable Bachelor's degree from an accredited institution and shows promise for successfully completing all dual-degree requirements will be considered for admission to the program. The minimal mathematics background is an undergraduate course sequence in univariate and multivariate calculus (equivalent to MATH 163, 164 and 261 given at IUPUI) and an equivalent to one of the linear algebra courses: MATH 351
or MATH 511. In addition, applicants should have had a calculus-based course in statistics (equivalent to STAT 511 given at IUPUI). The minimal economics background is an intermediate-level undergraduate course sequence in economic theory (equivalent to ECON 321, 322 given at IUPUI). Prospective applicants who do not have this background must acquire it prior to admission to the program. Applicants who lack only the linear algebra course may be admitted conditionally and then complete such a course as soon as practically possible.

DUAL-DEGREE REQUIREMENTS

To fulfill the dual-degree requirements for the MS in Applied Statistics and the MA in Economics, the student must complete a program of at least 45 credit hours of coursework. All course grades should be A or B; a maximum of two grades below B can be counted toward the degree. No grades below C can be counted towards the degree. The coursework must include the 15 credit-hours of statistics core curriculum and the 15 credit-hours of economics core curriculum as listed below:

STATISTICS	ECONOMICS
STAT 512	ECON 521
STAT 514	ECON 522
STAT 524	ECON 574
STAT 519	ECON 581 or 582
STAT 528	ECON 583

Further credits must conform to one of the following three options (see also Plans of Study, below). Finally, each student must take a written and an oral comprehensive examination.

- **Option I: No Thesis.** At least 6 credit hours must be taken in statistics coursework and at least 6 credit hours must be taken in economics coursework, beyond the core curriculum. The remaining credit hours may be taken in statistics, economics or related areas, subject to the approval of the academic advisors.

- **Option II: Statistics Thesis.** A 6-credit written thesis in statistics must be submitted for an oral defense. The thesis topic must be approved by the student's advisor. It is expected that the Statistics Thesis would have a strong component in economics. In addition, 3 credit hours must be taken in statistics coursework and 6 credit hours must be taken in economics coursework, beyond the core curriculum.

- **Option III: Economics Thesis.** A 6-credit written thesis in economics must be submitted for an oral defense. The topic for the thesis must be approved by the student's advisor. It is expected that the Economics Thesis would have a strong component in statistics. In addition, 3 credit hours must be taken in economics coursework and 6 credit hours must be taken in statistics coursework, beyond the core curriculum.

Plans of Study:

All graduate degree programs at IUPUI require that a plan of study be submitted and approved by the student's advisory committee and by the respective graduate schools. The plan of study lists all courses that apply towards the degree requirements. For the dual MS-MA degrees program in Statistics and Economics, the student must submit approved plans of study to Indiana University Graduate School (for the MA degree in Economics) and to Purdue University Graduate

School (for the MS degree in Statistics). These plans of study must minimally include the core courses.

COURSE DESRCIPTION

I. Economics Graduate Courses

ECON 504   **Mathematics for Economists**. Topics in mathematics which are particularly useful in the application of microeconomic theory and macroeconomic theory. Topics covered include: comparative static analysis, constrained optimization, and game theory.

ECON 514   **The Nonprofit Economy and Public Policy** The role of

nonprofit organizations (universities, churches, hospitals, orchestras, charities, day care, research, nursing homes). Public policy controversies such as regulation of fund raising, antitrust against universities, "unfair" competition with for-profit firms, and the tax treatment of donations.

ECON 521   **Microeconomic Theory**. Theory of consumer behavior, competitive exchange, theory of production; resource allocation; Pareto optimum; monopoly and monopsony; models of adverse selection and principal-agent problems.

ECON 522   **Macroeconomic Theory**. Intensive study of intermediate income theory; emphasis on construction and empirical significance of aggregative economic models of the determination of income, employment, and price level.

ECON 528   **Economic Analysis of Health Care**. Applications of economic theory and econometric techniques to problems in various areas in health care. Topics include how physicians, institutions and consumers respond to economic incentives and what policies contribute maximally to efficiency and welfare.

ECON 570   **Econometrics**. Mathematical overview of statistics and econometrics at the graduate level. Topics covered include: probability and probability distributions, sampling distributions, tests of hypotheses, estimation, multiple regression, the generalized linear model and its applications, and simultaneous equation systems.

ECON 574   **Applied Econometrics and Forecasting**. This course acquaints the student with a variety of econometric topics in the areas of forecasting and time series analysis. Topics include forecast construction and evaluation, time series analysis, model development, estimation techniques for multi-equation models, and simulation. A portion of the course is devoted to recent developments in macro-econometrics such as Granger causality and unit root analysis.

ECON 581   **Applied Microeconomics I**. The course covers one of the following areas: labor markets, public sector economics, economic development, health economics. Apply economic theory and econometric analysis to understand problems in the relevant sub-discipline.

ECON 582   **Applied Microeconomics II**. The course covers one of the areas listed for E581. The tools of economic theory and econometric analysis are applied to problems in the relevant sub-discipline.

ECON 583   **Applied Macroeconomics**. The course covers one of the following areas: economic growth and development, monetary theory, macroeconomic policy

ECON 808   **Thesis.** Directed research, MA Thesis in economics.

II. Statistics Graduate Courses

STAT 511   **Statistical Methods I**. Descriptive statistics; elementary probability; random variables and their distributions; expectation; normal, binomial, Poisson, and hyper-geometric

distributions; sampling distributions; estimation and testing of hypotheses; one-way analysis of variance; correlation and regression. (3 cr.) P: MATH 164.

STAT 512   **Applied Regression Analysis.** Inference in simple and multiple linear regression, residual analysis, transformations, polynomial regression, model building with real data,

nonlinear regression. One-way and two-way analysis of variance. Use of existing statistical computing package. (3 cr.) P: STAT 511

STAT 513   **Statistical Quality Control**. Control charts and acceptance sampling, standard acceptance plans, continuous sampling plans, sequential analysis, statistics of combinations, and

some non-parametric methods. Use of existing statistical computing package. (3 cr.) P: STAT 511.

STAT 514   **Designs of Experiments**. Fundamentals, completely randomized design, randomized complete blocks. Latin squares, multi-classification, factorial, nested factorial, incomplete blocks, fractional replications, confounding, general mixed factorial, split-plot and optimum design. Use of existing statistical computing package.   (3 cr.) P: STAT 512.

STAT 515   **Statistical Consulting Problems**. Consultation on real world problems involving statistical analysis under the guidance of a faculty member. A detailed written report and an oral presentation are required.   (1-3 cr.) P: Consent of advisor.

STAT 516   **Basic Probability and Applications**. A first course in probability intended to serve as a foundation for statistics and other applications. Intuitive background; sample spaces and random variables; joint, conditional, and marginal distributions; special distributions of statistical importance; moments and moment generating functions; statement and application of limit theorems; introduction to Markov chains. (3 cr.) P:

MATH 262 or equivalent.

STAT 517   **Statistical Inference**. A basic course in statistical theory covering standard statistical methods and their applications. Estimation including unbiased, maximum likelihood, and

moment estimation; confidence intervals and regions; testing hypotheses for standard distributions and contingency tables; introduction to nonparametric tests and linear regression. (3 cr.) P: STAT 511 or STAT 516.

STAT 519   **Introduction to Probability**. Algebra of sets, sample spaces, combinatorial problems, conditional probability, independence, random variables, distribution functions, characteristic functions, special discrete and continuous distributions, distributions of function of random variables, limit theorems. (3 cr.) P: MATH 261.

STAT 520   **Time Series and Applications.** A first course in stationary time series with applications in engineering, economics, and physical sciences. Stationary, auto-covariance function and spectrum; integral representation of a stationary time series and interpretation; linear filtering; transfer function models; estimation of spectrum; multivariate time series. Use of existing statistical computing package. (3 cr.) P: STAT 519.

STAT 521   **Statistical Computing**. A broad range of topics involving the use of computers in statistical methods. Collection and organization of data for statistical analysis; transferring data between statistical applications and computing platforms; techniques in exploratory data analysis; comparison of statistical packages. (3cr.) P: STAT 512

STAT 522   **Sampling and Survey Techniques**. Survey designs, simple random, stratified and systematic samples, systems of sampling, methods of estimation, ratio and regression estimates, costs. (3 cr.) P: STAT 512 or

STAT 523   **Categorical Data Analysis**. Models generating binary and categorical response data, two-way classification tables, measures of association and agreement, goodness-of-fit tests, testing independence, large sample properties. General linear models, logistic regression, probit and extreme value models. Log-linear models in two and higher dimensions; maximum

likelihood estimation, testing Goodness-of-fit, partitioning Chi-square, models for ordinal data. Model-building, selection and diagnostics. Other related topics as time permits. Computer applications using SAS. (3 cr.) P: STAT 528 or equivalent, or consent of instructor.

STAT 524   **Applied Multivariate Analysis**. Extension of univariate tests in normal populations to the multivariate case, equality of covariance matrices, multivariate analysis of variance, discriminate analysis and misclassification errors, canonical correlation, principal components, factor analysis. Strong

emphasis will be placed on use of existing computer programs. (3 cr.) P: STAT 528 or equivalent, or consent of instructor.

STAT 525   **Intermediate Statistical Methodology**. Generalized linear

models, likelihood methods for data analysis, diagnostic methods for assessing model assumptions. Methods covered include multiple regression, analysis of variance for completely randomized designs, binary and categorical response models, and hierarchical log-linear models for contingency tables. (3 cr.) C: STAT 528 or equivalent or consent of instructor.

STAT 528   **Mathematical Statistics I**. Sufficiency and completeness, the exponential family of distributions, theory of point estimation, Cramer-Rao inequality, Rao-Blackwell Theorem with applications, maximum likelihood estimation, asymptotic distributions of ML estimators, hypothesis testing, Neyman-Pearson Lemma, UMP tests, generalized likelihood ratio test, asymptotic distribution of the GLR test, sequential probability ratio test. (3 cr.) P: STAT 519 or equivalent.

STAT 529   **Bayesian Statistics and Applied Decision Theory**. Foundation of statistical analysis, Bayesian and decision theoretic formulation of problems; construction of utility functions and quantification of prior information; methods of Bayesian decision and inference, with applications; empirical Bayes; combination of evidence; game theory and minimax rules, Bayesian design and sequential analysis. (3 cr.) P: A course in statistics. C: STAT 528 or equivalent.

STAT 532   **Elements of Stochastic Processes**. A basic course in stochastic models including discrete and continuous time

processes, Markov chains and Brownian motion. Introduction to topics such as Gaussian processes, queues and renewal processes and Poisson processes. Application to economic, epidemic models and reliability problems. (3 cr.) P: STAT 519, or equivalent.

STAT 533   **Nonparametric Statistics**. Binomial test for dichotomous data, confidence intervals for proportions, order statistics, one-sample signed Wilcoxon rank test, two-sample Wilcoxon test, two-sample rank tests for dispersion, Kruskal-Wallis test for one-way layout. Runs test and Kendall test for independence, one and two sample Kolmogorov-Smirnov tests, nonparametric regression. (3 cr.) P: STAT 519 or equivalent.

STAT 536   **Introduction to Survival Analysis**. Deals with the modern statistical methods for analyzing time-to-event data. Background theory is provided, but the emphasis is on the applications and the interpretations of results. Provides coverage of survivorship functions and censoring patterns; parametric models and likelihood methods, special life-time distributions; nonparametric inference, life-tables, estimation of cumulative hazard functions, the Kaplan-Meier estimator; one and two-sample nonparametric tests for censored data; semiparametric proportional hazards regression (Cox Regression), parameters' estimation, stratification, model fitting strategies and model interpretations. Heavy use of statistical software such as Splus and SAS. (3cr.) P: STAT 517

STAT 598   **Topics in Statistical Methods**. Directed study and reports for students who wish to undertake individual reading and study on approved topics. (1-3 cr.) P: Consent of advisor.

STAT 698   **Thesis**. Directed research.   M.S. Thesis in Applied Statistics (6 cr.) P: Consent of advisor.

To: School of Liberal Arts Graduate Curriculum Committee
          IUPUI
From: Michael B. Burke, Chair
          Department of Philosophy
          IUPUI
Date: March 1, 2004
Re: Revision of Doctoral Minor

The philosophy department wishes to revise the requirements for its doctoral minor.

The existing requirements include the following:

> 13 credits of graduate courses in philosophy, including three credits in the core course, P500, six credits in philosophical area and/or applied courses, and four credits in the culminating seminar, P730

Those requirements are to be replaced by the following:

> 12 credits of graduate courses in philosophy, including six credits in courses selected from the Philosophy Core

The *Philosophy Core*, in which students in our new master's program also must earn six credits, consists of these six 3-credit courses: P525 Topics in the History of Philosophy; P540 Contemporary Ethical Theories; P543 Contemporary Social and Political Philosophy; P553 Philosophy of Science; P560 Metaphysics; and P562 Theory of Knowledge.

The reasons for the proposed changes are as follows:

(1) Since all of our graduate courses except P730 are 3-credit courses, since we do not plan to offer P730 (for the reason indicated below), and since many or most Ph.D. minors require only 12 credits, we propose to reduce the number of credits required from 13 to 12.

(2) In our existing requirements, the role of P500, Philosophy Pro-Seminar, is to ensure that minors learn about central areas within philosophy and not select courses entirely within peripheral areas. Since we now have master's students, for whom P500 would be too sketchy, and since it's not practical for us to offer P500 for minors only, we propose for minors the same core requirement applicable to our master's students: two courses selected from the Philosophy Core.

(3) P730, Seminar: Contemporary Philosophy, is devoted to the writings of a twentieth-century philosopher. (Its title is somewhat odds with its description.) It was made a requirement for minors at a time when the department had more members interested in teaching it – and prior to the department's commitment to a master's program with tracks in bioethics and American philosophy. There are no current plans to offer P730. Anyway, we are proposing to increase the core requirement for minors from one course to two, and want the other two courses required of minors to be open electives.