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HANDBOOK FOR MAJORS AND MINORS

Contents

I. INTRODUCTION

We would like to congratulate you on your acceptance to the University of Vermont and on your decision to consider mathematics or statistics as your major. The Department of Mathematics & Statistics is pleased to welcome you to the University and invites you to join the mathematical community of UVM. All of us are aware of the growing importance of the mathematical sciences in our technological society and many of our courses are

prove valuable (business, operations research, public health, psychology, etc.). The courses and curricula are administered through the Statistics Program Steering Committee, which includes faculty from Statistics, the College of Medicine Biostatistics Facility, Psychology, Natural Resources, and the Agricultural Experiment Station. Students are encouraged to undertake special projects to gain experience in data analysis, design, and statistical computing. Also, experience can be gained with local industry and other organizations for those interested in such areas as

There are no blanket recommendations that can be made here, but several considerations that will go into your decision can be discussed. First, you will have the results of the mathematics readiness test as a guide. The course placement recommendation is based upon your score on this test, but you may, after consulting with your advisor, begin with a different course if you feel that your test score is not an accurate measure of your mathematical background. However, you should discuss your decision with the instructor in the course to let him or her know of your situation. Finally, note that MATH 1021.5

compute and use derivatives and definite integrals, and in linear algebra on finding the inverse or determinant or eigenvalues of a matrix. Occasionally you will work at "problem solving", applying the concepts that have been learned to solve a word problem. In these courses, you will also be engaged in conceptual learning that involves definitions, hypotheses, counterexamples, and the like. In the calculus sequence, you will [illegible]

timely fashion whenever you have questions. Remember that your instructor and

many computer science courses as possible. Careers in industry and teaching will benefit greatly from a foundation in the physical sciences and a facility in computing.

III.

(Math 283) and writing an honors thesis (Math 293 or Stat 293). Most graduate schools require GRE (Graduate Record Examinations) results, so you should plan to take these in your senior year.

Premedical Training: The mathematics major provides excellent credentials for a student who plans to apply to

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Additional Requirements

In addition to the Basic Requirements, candidates for the degree of Bachelor of Science in mathematics must complete the following requirements A, B, C, and D.

A. Major Courses

Mathematics: A minimum of 21 additional hours in mathematics, statistics, or computer science courses numbered 100 or above. At least 12 hours

to satisfy this requirement.

C. Humanities and Social Science Courses (Courses used in B may not be used here.)

English 1, and 21 hours of courses selected from categories I, II, and III listed below. These 21 hours must be distributed o

areas. Selecting courses from different areas helps you achieve breadth in the major, while focusing several courses in the same area assures a depth of concentration in the major. Courses of particular importance in an area are marked with an asterisk. Furthermore, students earning a mathematics major can minor in statistics by earning an additional 15 statistics credits. See the "Minor in Statistics" for details.

Recommendations for Major Courses

In consultation with your advisor, you should choose an area of interest within the mathematics major and plan a coherent program that addresses your interests. This area might be one of those listed below, or it might be one you suggest. If you are interested in one of the areas listed, you would typically take at least three courses in that area, including all of the courses marked with an asterisk. In addition, you should take courses from at least two other areas.

mathematics, number theory, engineering, and the physical, biological and natural sciences. In these areas, mathematics provides a formulation for the rules governing the systems under study. Computational mathematics provides useful methods for making comprehensive predictions about these systems.

Many physical problems can be simulated on computers, with computational experiments complementing physical experiments so that expensive and dangerous procedures are minimized. Computational mathematics provides the methods and, in some cases, a valuable conceptual framework for these simulations.

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linear algebra, probability, statistics, differential equations, combinatorics, and graph theory. Furthermore, mathematical modelsc0 0 1 428.11 707.16 Tm -0 BT 1 0 0 1 170.048

management, finance, economics, computer science, speech and writing are also recommended.

All entry level positions require a B.S. degree in mathematics or statistics or B.A. degree with substantial coursework in mathematics and statistics. Many also require a minimum GPA of 3.0 and successful completion of one or two of the actuarial examinations. Summer intern programs are sometimes available for qualified junior level students.

7. Probability and Statistical Theory. Probabilistic reasoning is often a critical component of practical mathematical analysis or risk analysis and can usefully extend classical deterministic analysis to include models with random components. It also provides a basis for statistical theory, which is concerned with how inference can be drawn from real data in any of the social or physical sciences. It opens the door to the theory of statistical methods for the interpretation of scientific and technological data. Courses in this area include: Math 222, 241, 242 (Stat 151 or Math 207)*, Stat 241*, 252a, 252b, 261, 262, 270.

Recommendations for Allied Field Courses

If you select the Mathematics option you should also discuss Allied Field courses with your advisor and then choose those courses that complement your mathematical interests. For the mathematical interests listed below, you should take at least six hours in courses numbered 100 or above in one of the designated fields.

Applied Mathematics: Allied Field (1), (2), (3), (4), (6), (9), (10) or (11).
Computational Mathematics: Allied Field (4) or (5).
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Mathematics majors may choose from the two concentrations listed below. Students interested in any of these should consult an advisor in the Mathematics and Statistics Department.

Mathematics: Math 21, Math 22, Math 121, Math 52, and Math 124, plus 18 additional credits in mathem

MATHEMATICS HONORS THESIS PROGRAM

If you would enjoy the freedom to explore a particular topic in depth, and if you would appreciate the challenge, satisfaction and recognition that come from working closely with a faculty member to produce a mathematical exposition which is uniquely your own, then you should consider writing a

deeply involved in a particular research project, consider doing an Honors Thesis. Typically, you would register for Stat 293 in the Fall of your senior year (3 credits) and Stat 294 in the Spring of your senior year (3 credits), but the credits can be split other ways at your convenience to total 6 credits. Also you may begin your research in the summer preceding your senior year. Satisfactory completion of 293 would fulfill your practicum requirement of the major.

Potential topics are numerous, and are not just restricted to "pure" statistical research. Some past theses have been done in collaboration with professors in other departments (e.g. business and clinical medicine). If you think you may be interested, please contact the Director of the Statistics Program. You must choose a statistics advisor for your thesis. Your thesis committee will contain at least two statisticians, but can contain other faculty of the university as well.

The best time to consider the thesis is at pre-registration time in the spring semester of your junior year. You prepare a proposal for approval during the first few weeks of your senior year. To be eligible for the thesis program, the College of Engineering and Mathematical Sciences requires that you have at least a 3.0 cumulative GPA for your sophomore and junior years, while the College of Arts and Sciences requires a 3.2 cumulative

Note for Mathematics Majors in the College of Arts and Sciences:

It is possible for you to major in mathematics and minor in statistics; however you can only double count one 3 credit course in your major and minor (CAS rule). Thus you must earn

can be combined. When you inform the Dean's Office that you are changing your major, that office will inform the Department of Mathematics & Statistics. At that time you will be assigned a

TAKING A COURSE PASS/NO PASS

The rules for taking a course under the PASS/NO PASS option are as follows:

1. You must be a degree student.
2. You must be at least a sophomore.
3. You cannot be on academic trial.
4. You cannot take more than six courses using this option.
5. The course must be a free elective. This means that it is not being used to fulfill any requirement except attaining th

TRANSFER CREDIT FOR COURSES TAKEN AT ANOTHER INSTITUTION

The Office of Transfer Affairs (36 man, Ext. 60867) coordinates transfer activities, but, ultimately, each depa termines if a transfer course is equivalent to one in its depa ment.

If you transfer to UVM from anot ool, the Office of Transfer Affairs will coordinate which courses transfer. If y e questions about their decisions, discuss them with your advisor. It is sometime ssible to get changes made if you provide additional information.

If you plan to take courses at another titution after you have entered UVM (e.g., summer courses), get approval for thes courses before you take them. The Dean's Office has a form which, upon completion, guarantees transfer credit if you finish the course satisfactorily. Getting prior approval will eliminate many problems which might occur about the transfer of credit. If you take a course without prior authorization, saving the course syllabus, notes and exams will be helpful in gaining transfer approval.

REPEATING A COURSE

You may repeat a course at any time for any reason. The most common reasons for repeating a course are to improve your grade in the course

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V. SUPPORT AND EMPLOYMENT

The guiding philosophy of building a strong relationship with your advisor applies as well to instructors in your courses. An integral part of the educational experience, especially in demanding technical courses such as those in mathematics or statistics, is a one-on-one or small group interaction during your instructor's office hours. Make sure that you take advantage of these opportunities for personalized learning outside the classroom. As we said earlier, both your instructor and your advisor want you to succeed, and they are an invaluable source of information. Getting to know them, and other faculty as well, will enhance your experience at UVM.

Here are some study strategies that foster positive learning experiences. Keep up with your mathematics and statistics courses, including homework assignments, on a daily basis. It is difficult, sometimes impossible, to "cram" for exams in subjects as demanding as mathematics. When you have questions, get them answered as soon as possible, either by the instructor, by knowledgeable classmates, or by other Department faculty. Mathematical learning is often sequential, and unfilled gaps in one's knowledge can hurt later on. The importance of group learning should also be emphasized. Mathematical learning is not a competitive event, but a shared activity, and you should feel free to organize study sessions with your classmates. Some additional sources of support, as well as employment opportunities, are indicated below. In seeking help, remember that your first approach should be via your instructor during his/her office hours, or by making an appointment.

WALK-IN TUTORING & HELP SESSIONS

Throughout the semester, the department runs help sessions Monday through Thursday in the early evening. These sessions offer walk-in help for anyone enrolled in a mathematics course from Math 1 through Math 22. No appointment is

WORK-STUDY

Besides the grading job, there is an additional opportunity open to you if you have work-study hours. You can work as a student assistant (answering phones, delivering mail, etc.) in the Mathematics & Statistics Department office. In general, work-study students develop close personal relationships with faculty and staff that last long after graduation. Call 656-2940 for details. In addition, there are ongoing campus research projects that could use you as a research assistant particularly if you have programming, computing and statistical skills. See the Statistics Program Director if you are interested in being a statistical research assistant.

For more information about undergraduate research, visit http://www.uvm.edu/ugresearch and http://www.uvm.edu/~honcoll/?Page=research.html&SM=felmenu.html

DEPARTMENTAL TUTORING

The Department maintains a list of students who are willing to do private tutoring in mathematics and statistics. If you would like to receive private tutoring, contact the department office or check on the website bulletin board for a tutor.

LEARNING COOPERATIVE

The Learning Cooperative is located in 244 Commons Living/Learning. All tutoring and special sessions are run by peers. A study skills session is available which offers advice about test- taking, taking notes, and attending lectures. The session is free for all students. There is also a writing center for reviewing papers.

If you are interested in becoming a tutor, you should fill out an application with the Learning Cooperative and obtain a recommendation from a professor in the subject in which you want to tutor.

VI. CAREERS,

CAREER SERVICES

Career Services provides a number of career related services and resources to undergraduates, including career counseling and advising, job search workshops, a career information library, and job postings. Also, Career Services offers mock interviews to help you prepare for employment or graduate school interviews. A complete listing and detailed description of all the Career Services functions can be found in the University of Vermont Placement Manual which can be obtained at their office at the Living/Learning Center.

ON-CAMPUS INTERVIEWS

Numerous representatives visit the University of Vermont each year to interview graduating students for full-time employment.

SUMMER RESEARCH

About 20 colleges and universities throughout the nation including several in neighboring states, conduct summer research programs for undergraduates in the mathematical sciences. These programs provide students an opportunity to explore particular areas of mathematics in depth and to become involved in research methodology. For more information consult the department office or your advisor.

STUDY ABROAD

Studying abroad for a semester or a full year can provide you with a unique experience during your UVM career. There are many programs available. Consult your advisor to decide which courses to take to ensure fulfillment of graduation requirements. The Office of International Educational Services provides all study abroad inform

geological sciences (estimating risk of earthquakes and locating oil reserves); social, psychological, and educational research; biomedical investigations dealing with such diverse problems as cancer, cardiovascular disease, sudden infant death syndrome, and AIDS; epistemologies studies; evaluation of new compounds within the biopharmaceutical industry; health care review and quality improvement; insurance; telecommunications; meteorological modeling and hurricane prediction.

According to the Bureau of Labor Statistics, the demand for statisticians is currently strong and is expected to increase through the end of the decade. Statisticians become involved with a diverse group of professionals and problems, and typically report high levels of satisfaction with their work. Salaries and advancement opportunities continue to be excellent.

The ASA is one of the oldest professional organizations in the United States and is the chief assembly for statisticians in this country. Students may affiliate with the ASA at reduced rates. Benefits of membership include subscriptions to Amstat News and STATS: the

Society, here at UVM. The qualifications for election to membership are given in Appendix 1. Mathematics or statistics majors are eligible for consideration.

DEPARTMENT EVENTS

Fall Picnic. Each year, the entire department gathers with friends and family members for a potluck picnic to welcome everyone back from summer activities and kick off the new academic year. On a weekend close to Labor Day, we spend an afternoon in the park picnicking, playing volleyball, and socializing.

Fall Hike. On a weekend in September or October students, faculty, family and friends hit the trails for a local day hike.

Recreational Sports Teams. Mathematics and statistics undergraduates, graduate students and faculty members often join together to form volleyball, basketball, and softball teams. Table tennis is a popular

outside UVM. Many talks are directed specifically at undergraduates. Information on these colloquia is distributed by e-mail as well as listed on the department homepage.

VIII. ACCELERATED MASTER'S PROGRAMS

ACCELERATED MASTER'S DEGREE PROGRAMS IN MATHEMATICS

The Accelerated 0 D V W H U ' H J U H H Program (AMP) in mathematics is designed so that students with strong ability and motivation can complete a bachelor's degree in mathematics, science or engineering, as well as a master's degree in mathematics within five years. The first four years of this AMP consist of an undergraduate program that includes the core requirements for a minor in mathematics together with other courses that lay a solid mathematical foundation; this portion culminates in a bachelor's degree. During the fifth year, students take courses that complete the requirements for the master's degree in mathematics. The Accelerated Masters Program is specially designed to integrate the undergraduate and graduate portions so that students in it receive both the breadth and depth they would achieve had they completed the two degrees separately. Moreover, they experience a profound appreciation for the depth, beauty, and applicability of mathematics, which comes from being steeped in the rich course of study this program entails.

Requirements for Admission

The Accelerated 0 D V W H U ' H J U H H Program in mathematics is designed for students who are mathematics majors, or who are majors in science or engineering with a minor in mathematics. A student must declare his/her wish to enter the Accelerated Master's Program in mathematics in writing to the Department Chair before the end of the sophomore year, and before taking Math 241.

Students will take the sequence Math 241, 242 after they have completed this notification and met with the Director. They normally complete this sequence during their junior year, but may complete it earlier provided the notification described above has been followed. (The notification is to ensure that AMP students are subjected to the

student's admissions essay must specifically address why the student wishes to HQWHU WKH $FFHOHUDWHG 0DVWHU¶V Program. GRE need not be completed until the fall semester of the applicant's senior year.

In addition to the above, applicants must achieve the following by the end of their junior year:

1. Completion of the mathematics core (Math 21, 22, 52, 121, 124, and either 241 or 251) and an overall GPA of 3.0 or higher,

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2. Completion of Math 241 and Math 242 with grades of B+ or better in each, and

3. Completion of a least two additional 200-level mathematics

level ematics

Program students advance to candidacy upon successful completion of Math 241 and 242.] See the graduate mathematics major handbook for more details.

Requirements for Completion of the Ma V W HDeg[ee/ Portion of the Program

As noted above, before advancing to candidacy the students must complete: (i) their bachelor's program, normally by the end of their fourth year, (ii) Math 241 and 242, both of which may be counted for credit towards the M.S., and (iii) Math 333, which contributes four credits towards the M.S. Thus a total of 20 credit hours remain to be completed, normally within two semesters.

Students must now complete the additional course/thesis requirements of the M.S. program as paraphrased from the (revised) graduate catalogue:

Students must already have or must

select from Stat 200, 221 or 241. You must also acquire sufficient breadth in statistics before graduation by taking Stat 201 and one or two other 200 level elective statistics courses (e.g. Stat 225, 229, 233, 237, 252a, 252b, 253, 281, 295). The number of selected breadth courses (1 or 2) matches the number of concurrent credit courses you want to include (1 or 2). After graduation with your B.A. or B.S. degree you would become a candidate for the M.S. degree.

APPENDIX 1: AWARDS

Each year, the Department of Mathematics & Statistics presents a number of awards at the Honors Day celebrations in both the College of Engineering and Mathematical Sciences and the College of Arts and Sciences. Thanks to a generous gift from the late Sang Kil Nam, an internationally prominent businessman and philanthropist, each year two students, typically one majoring in mathematics and one in statistics, receive a Sang Kil Nam Scholarship to further their educations. These awards may go to either an undergraduate or graduate student. The outstanding major in the B.A. degree program also receives an award at the College of Arts and Sciences Honors Day ceremony; and the outstanding sophomore, junior, and senior majors in the B.S. degree program receive an award and recognition from the College

APPENDIX 2: FACULTY AND INTERESTS

Merrill, Katherine, M.S. Lecturer	2009	Statistics Education	Katherine.Merrill@uvm.edu
Mickey, Ruth, Ph.D. Professor	1985	Categorical Data, Epidemiology, Biostatistics	Ruth.Mickey@uvm.edu
Ojala, Susan, M.Ed Research Associate Professor	2007	Mathematics Education	Susan.Ojala@uvm.edu
Read, Helen, M.S. Senior Lecturer	1988	Utilizing Computers and Calculators in Mathematics Instruction	Helen.Read@uvm.edu
Rogers, Thomas, M.S.	2002	Mathematics Education	

APPENDIX 3: COURSE DESCRIPTIONS

A. Description of Mathematics Elective Courses

The following are expanded course descriptions that instructors have provided. The official course descriptions

This course is invaluable for anyone interested in computer science, statistics, or the teaching of mathematics. Most students find this to be an enjoyable (and challenging) course. We have had many students return years after taking this course to tell us of its usefulness in their everyday work.

Math 230 Ordinary Differential Equations. This course develops elementary theory of differential equations with emphasis on methods of solution that are useful in a wide variety of applications. Many problems directly from engineering and science are studied. For example, if a mass is attached to a coiled spring, pulled down an

problems occurring in engineering and science, such as describing the motion of an oscillating pendulum and the flow of air over a thin airfoil. Computer algorithms which implement these methods are studied. Topics include: Runge Kutta methods for initial-value problems; multistep methods; stability; stiff differential equations; the shooting method for boundary-value problems; finite difference and finite element methods.

Math 240 Fourier Series and Integral Transforms. The purpose of the course is to study integral operators and related Fourier series expansions which are essential in solving initial and boundary-value problems for differential equations. Topics covered include Green's functions for initial and boundary value problems, Laplace transfor

Rubik's cube with the operation of composition. The term "abstract algebra" refers to the fact that the concepts studied in this course are general enough to apply to a multitude of situations, thereby introducing algebraic structure. Because of the breadth of its usefulness, and the beautiful introduction to the deve

electromagnetic processes; fluid dynamics; and special and general relativity.

Math 266 Chaos, Fractals, and Dynamical Systems. What does it mean for an object to have non-integer dimension? Under what circumstances do small changes in the initial state of a system lead to large changes in the future state? For how long can we expect to be able to predict any natural phenomenon? This course explores the incredible breadth of nonlinear dynamics through careful study of discrete dynamical systems, sensitive dependence on initial conditions, chaos, bifurcations, fractals and chaotic attractors. Each topic is described using examples from the physical and natural world, and explored using computer programs.

Math 268: Mathematical Biology and Ecology. Mathematical biology and ecology is a very fascinating and fast growing interdisciplinary field. It entails the use of mathematical modeling techniques to solve problems in the ecological, life and biomedical sciences. In this course, mathematical models, which suggest possible mechanisms that may underlie specific biological processes, are developed, analyzed and validated. With each topic discussed, the modeling scenario consists of: (i) development of the mathematical model and assessment of its realism; (ii) mathematical analysis of the model and clues to numerical computations; (iii) biological interpretation of the results, and model predictions. The course places emphasis on the use of models to predict what may follow under tested and untested conditions. The goals of this course are: (i) critical understanding of the use of differential equation methods in mathematical biology and ecology, and (ii) exposure to specialized mathematical and computational techniques which are required to study differential equations that arise in mathematical biology and ecology. Popular topics that are covered in this course include population dynamics modeling, dynamics of infectious diseases, enzyme kinetics, wave phenomena in biology, reaction-diffusion mechanisms, and biological pattern formation. By the end of this course students will be able to derive, solve, understand, interpret, discuss, and critique discrete and differential equation models of biological and ecological systems. Prerequisite: Math 124, Math 230 or permission of Instructor.

Math 272 Applied Analysis. The first part of this course discusses the solution of equations of wave motion, heat flow, and electric potential by Fourier and Fourier-Bessel series via separation of variables and "eigenfunction series." Applications include: the motion of vibrating strings and membranes; one and two dimensional heat flow; and the Dirichlet problem. The second part of the course discusses functions of a complex variable, including differentiation, integration, and evaluation of integrals around closed paths. Important results are: the Cauchy integral theorem and formula; Taylor and Laurent series; the calculus of residues; conformal mapping; and Schwarz-Christoffel mappings.

Math 273 Combinatorial Graph Theory. A graph is a collection of points together with lines joining pairs of these points. Graphs are used to model a wide variety of situations. For example, the points may represent microprocessors with the lines representing communication channels. When can we lay out the computer circuit without crossing wires? Or perhaps the points of a graph represent people and the

lines indicate friendships. When can we pair together the people so that everyone is with a friend? Or perhaps the points are airports and the lines are flights. How can a traveler arrange her schedule to minimize the total cost of her trip? These and other topics are explored in Math 273, Combinatorial Graph Theory. The questions above are respectively special cases of graph planarity, matching theory, and the Hamilton cycle problem. You will also study paths and trees in graphs (connection problems), Eulerian cycles (postman problems), and point and line colorings (storage and scheduling). Finally, what does all this have to do with the five Platonic solids and the thirteen semiregular polyhedra? Take the course and find out!

Math 274 Numerical Linear Algebra. In a first course in linear algebra you learn things like how to solve systems of linear equations, invert matrices when possible, find eigenvalues, do orthogonal projections. All of these are important in applied mathematics and sciences that use mathematics, but all of them require special care when done on a large scale, using floating point arithmetic. Small errors, such ailt

Math 195 and 295 Special Topics. Math 195 and 295 add variety to the schedule of course offerings by providing for the study of different topics each semester upon the initiative of students or of faculty members. A student or group of students interested in pursuing a particular topic may request to enroll in one of these courses for this purpose. They may approach a particular faculty mem

Stat 151 Applied Probability (Fall, Spring, Summer). According to the great probabilist Bruno di Finetti, "Probability does not exist!" Probability is a construct of the human mind and, as such, is used to quantify our beliefs. This course involves the study of random phenomena. The notion of probability is developed from an experimental as well as a theoretical perspective. Some typical areas of inquiry include: system reliability, false positive and false negative errors in drug testing, distribution of lunar boulders at the Apollo landing site, maximizing expected profit in business, jury selection, traffic flow, life expectations for humans and manufactured products, the risk posed to the Hubble Telescope by orbiting man-made debris, and computer generation of pseudo random numbers. You will have an opportunity to use some of the skills acquired in other mathematics courses, especially in the areas of: elementary set theory, combinatorics, infinite series, exponential and logarithmic functions, and definite integral evaluation. This is a good preparation for 200 level statistics courses, particularly 251. Stat 151 and 141 are both introductory and can be taken in any order.

Stat 191 Special Projects (Fall, Spring). The projects that the students have taken on in this course have typically been done in order for them to gain practical experience in some area of statistical application or statistical software. You may work with a statistics professor or other researchers on campus helping them with data entry, software development, and statistical analysis of their data. A paper would be written summarizing some aspect of the research experience. Such a project could also be set up with quality control personnel in various organizations in the region, so that you could get experience in measurement, inspection, quality control, or experimental design issues. The course credit varies with the hours per week committed to the project. The Program Director should be consulted if such work experience appeals to you.

Stat 200 Medical Biostatistics and Epidemiology (Fall). This class provides an overview of the design and analysis of medical studies. Emphasis is placed on human investigations. At the beginning of the semester, concepts of incidence, prevalence and risk, rate and odds ratios are introduced. Observational studies (case control and cohort) and experimental studies (clinical trials) are described in detail. Recent articles from journals such as the NEW ENGLAND JOURNAL OF MEDICINE are read and discussed to illustrate different design and analysis strategies. Emphasis is placed on interpretations rather than on calculations. A basic understanding of the statistical concepts of estimation and hypothesis testing is assumed. This is an excellent course for pre-medical students and others interested in the health sciences.

Stat 201 Statistical Analysis via Computer (Fall, Spring). This course is designed to give students practical experience using SAS statistical software to perform data analysis. This is a critical skill needed by all scientists. Probably you have already been exposed to the statistical methodology in Stat 141 (or Stat 211), which allows this course to focus on the application of these methods to real world data. Problems encountered in the process of data collection, coding, keypunching, and data screening are discussed in detail. You will learn how to decide between the use

of parametric and nonparametric procedures based upon examining the statistical assumptions. You are required to do a class project that involves analyzing a data set supplied either by the student or the instructor.

Stat 211 Statistical Methods I (Fall, Spring, Summer). There is no statistics prerequisite for this course, although many students in the course will have taken Stat 141 first. If you are already a Junior or Senior, you can take this course with no statistics background. If you did extremely well in Stat 141, you may decide to pass over Stat 211 and take other more advanced statistics courses instead. The emphasis in Stat 211 is on statistical methods, and less on their probabilistic foundations. More advanced methods (at a greater depth) are covered in Stat 341 and Stat 342. Graduate students

analysis of such data. A variety of case study applications are analyzed with statistical software.

Stat 237 Nonparametric Statistical Methods (Fall). Some types of data (categorical or ordinal) require the use of nonparametric statistical methods. A variety of procedures for interval estimation and hypothesis testing are covered. Related methods are also used with quantitative data in order to avoid specific distributional assumptions that would otherwise need to be made. Computer-intensive tests, such as exact tests for categorical and rank data, and randomization or bootstrapping, are illustrated.

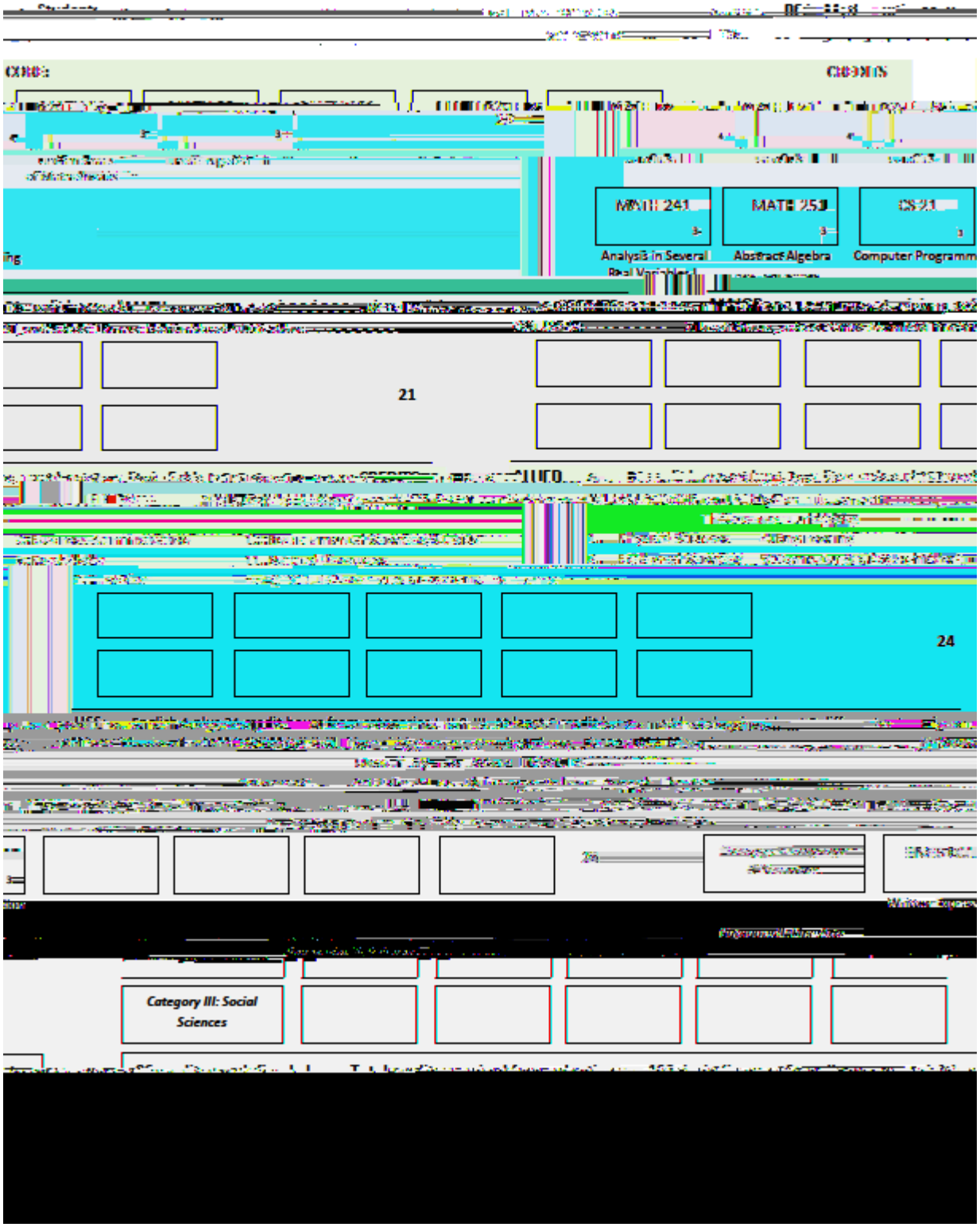
Stat 241 Statistical Inference (Spring). This is a basic course in mathematical statistics with some review of needed probability results. It is required for statistics majors. This is a good follow-up course to Stat 151 for mathematics majors; but you may get more out of it if you wait and take this after having had some applications courses as well.

Stat 251 Probability Theory (Fall). This is a more advanced introduction to probability theory than Stat 151; and would be an

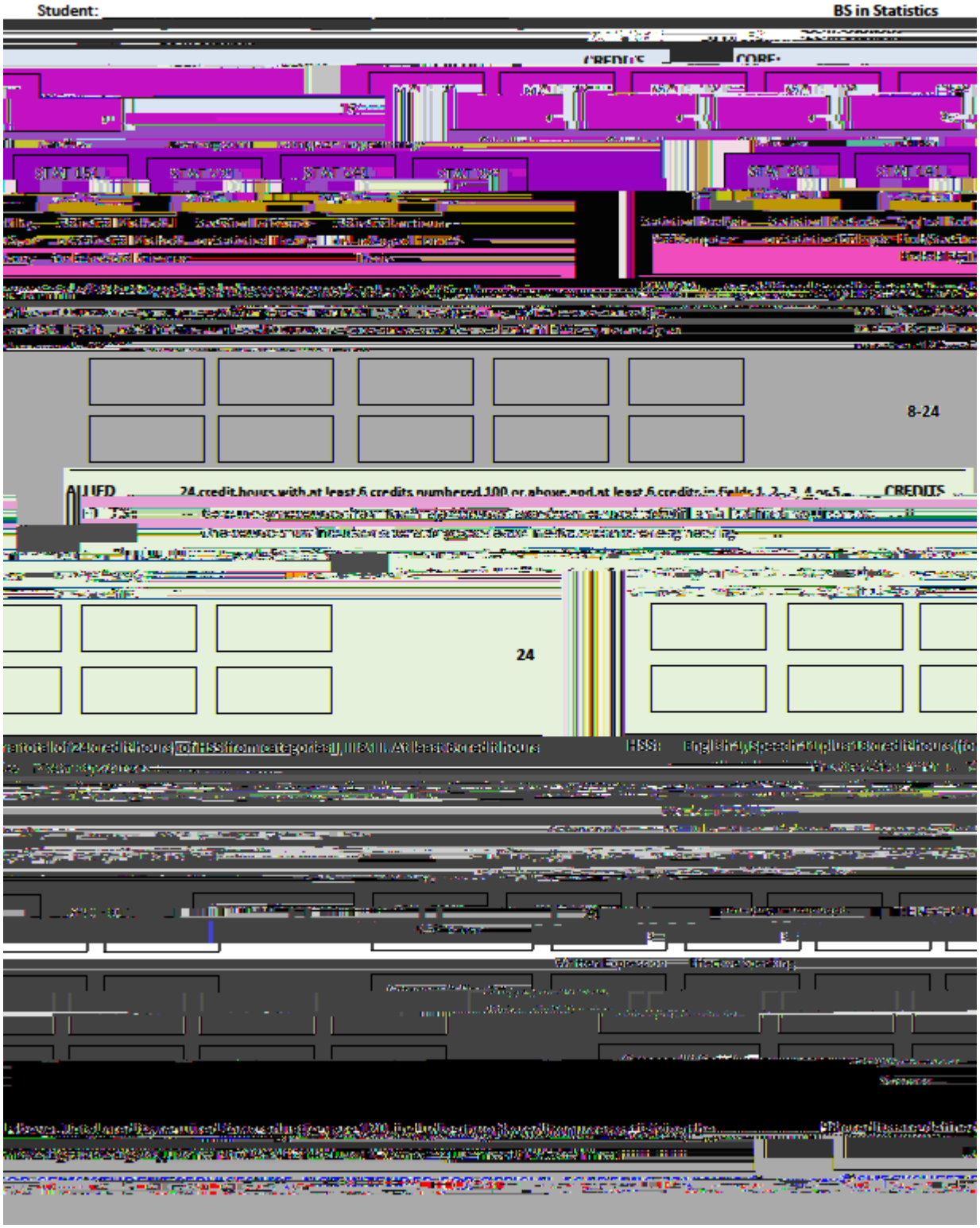
Stat 281 Statistics Practicum (Fall, Spring). This is a required course for statistics majors, but could be taken by other mathematics majors. You will work independently on a research-related project, which may have elements of an experimental design, observational study, clinical trial, sample survey, forecasting study, or computer simulation. The study generally has important applications for the company or research group that you are working with. The choice of project can be yours, or you can be matched to an on-going project of a UVM professor, or to a project of interest to a local company. The most important outcome of the course is a paper which summarizes the study and the data analysis you have done.

APPENDIX 4: CURRICULUM CHECKLISTS

A. BS in Mathematics



B. BS in Statistics



C. BA General/Distribu tion Requirements