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**Graduate Programs—COURSE CHANGE REQUEST**

<b>DEPARTMENT NAME:</b> MATHEMATICAL SCIENCES	<b>COLLEGE OF:</b> CHARLES E. SCHMIDT COLLEGE OF SCIENCE
<b>COURSE PREFIX &amp; NUMBER:</b> MAD 6206	<b>CURRENT COURSE TITLE:</b> COMBINATORICS 1

**CHANGE(S) REQUESTED**

<p>SHOW "X" IN FRONT OF OPTION</p> <p>CHANGE CREDITS FROM _____ TO: _____</p> <p>CHANGE GRADING FROM _____ TO: _____</p> <p>CHANGE PREREQUISITES TO: _____</p> <p>PERMISSION OF THE INSTRUCTOR _____</p> <p>CHANGE MINIMUM GRADE TO: _____</p> <p>CHANGE COREQUISITES TO: _____</p> <p>CHANGE OTHER REGISTRATION CONTROLS TO: _____</p> <p>OTHER _____</p>	<p>SHOW "X" IN FRONT OF OPTION</p> <p>CHANGE PREFIX FROM _____ TO: _____</p> <p>CHANGE COURSE NO. FROM _____ TO: _____</p> <p>CHANGE TITLE TO: _____</p> <p>ENUMERATIVE COMBINATORICS</p> <p>CHANGE DESCRIPTION TO: _____</p> <p>Introduction to enumeration. Sets and multisets, permutations, sieve methods, partially ordered sets, lattices, incidence algebra, Moebius inversion, and generating functions.</p>
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<b>CHANGES TO BE EFFECTIVE (TERM):</b>	<b>Attach syllabus for ANY changes to current course information.</b>
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Will the requested change(s) cause this course to overlap any other FAU course(s)? If yes, please list course(s). YES                                      NO                                      X	Any other departments and/or colleges that might be affected by the change(s) must be consulted. List entities that have been consulted and attach written comments from each.
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**TERMINATE COURSE, EFFECTIVE (GIVE LAST TERM COURSE IS TO BE ACTIVE):**

Faculty Contact, Email, Complete Phone Number:  
 Heinrich Niederhausen, niederha@fau.edu, (561) 297-3237

**SIGNATURES**

**SUPPORTING MATERIALS**

<p><b>Approved by:</b></p> <p>Department Chair: _____</p> <p>College Curriculum Chair: _____</p> <p>College Dean: _____</p> <p>UGPC Chair: _____</p> <p>Dean of the Graduate College: _____</p>	<p><b>Date:</b></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p><b>Syllabus</b>—must include all criteria as detailed in UGPC Guidelines.</p> <p>Go to: <a href="http://graduate.fau.edu/gpc/">http://graduate.fau.edu/gpc/</a> to access Guidelines and to download this form.</p> <p><b>Written Consent</b>—required from all departments affected.</p>
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## Course Syllabus -- Enumerative Combinatorics

### 1. Course title/number, number of credit hours

Enumerative Combinatorics, MAD 6206, 3 credit hours

### 2. Course prerequisites

- a. Permission of the instructor

### 3. Course logistics

- a. Term – Fall 2010
- b. Notation if online course – N/A
- c. Class location and time (if classroom-based course) – To be determined

### 4. Instructor contact information

- a. Instructor's name – Heinrich Niederhausen
- b. Office address – Science & Engineering Bldg, SE43, Room 214
- c. Office hours – To be determined
- d. Contact telephone number – office (561) 297-3237, fax (561) 297-2436
- e. E-mail address – niederha@fau.edu

### 5. TA contact information (if applicable)

N/A

### 6. Course description

Introduction to enumeration. Sets and multisets, permutations, sieve methods, partially ordered sets, lattices, incidence algebra, Moebius inversion, and generating functions.

### 7. Course objectives/student learning outcomes

The course introduces the student to the concept of enumeration. Students completing the course will have seen the basic concepts associated with inclusion-exclusion, permutation enumeration, and generating functions. They will be familiar with a good text on enumeration, like Stanley's "Enumerative Combinatorics I".

### 8. Course evaluation method

There will be graded homework assignments accounting for 20% of the student's cumulative performance, in-class presentations for 30% of the student's cumulative performance, a midterm exam, accounting for 25% of the student's cumulative performance, and a final exam that accounts for 25% of the cumulative performance. The overall grade in the course is derived from the cumulative performance according to the following table.

### 9. Course grading scale (optional)

Cumulative Performance	Grade
>94%	A
>90% - 94%	A-
>87% - 90%	B+
>83% - 87%	B
>80% - 83%	B-
>75% - 80%	C+
>65% - 75%	C

>60% - 65%	C-
>57% - 60%	D+
>53% - 57%	D
>50% - 53%	D-
<50%	F

### 10. Policy on makeup tests, late work, and incompletes

If a student cannot attend an exam or hand in a homework project on time due to circumstances beyond their control then the instructor may assign appropriate make-up work. Students will not be penalized for absences due to participation in University-approved activities, including athletic or scholastics teams, musical and theatrical performances, and debate activities. These students will be allowed to make up missed work without any reduction in the student's final course grade. Reasonable accommodation will also be made for students participating in a religious observance. Also, note that grades of Incomplete ("I") are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances. A grade of "I" will only be given under certain conditions and in accordance with the academic policies and regulations put forward in FAU's University Catalog. The student must show exceptional circumstances why requirements cannot be met. A request for an incomplete grade has to be made in writing with supporting documentation, where appropriate.

### 11. Special course requirements (if applicable)

N/A

### 12. Classroom etiquette policy (if applicable)

University policy on the use of electronic devices states: "In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions."

### 13. Disability policy statement

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodation due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) -- in Boca Raton, SU 133 (561-297-3880); in Davie, MOD 1 (954-236-1222); in Jupiter, SR 117 (561-799-8585); or at the Treasure Coast, CO 128 (772-873-3305) – and follow all OSD procedures.

### 14. Honor Code policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001 at [http://www.fau.edu/regulations/chapter4/4.001\\_Honor\\_Code.pdf](http://www.fau.edu/regulations/chapter4/4.001_Honor_Code.pdf).

### 15. Required texts/readings

Richard P. Stanley, *Enumerative Combinatorics*, Cambridge University Press, 1997

### 16. Supplementary/recommended readings

a. Herbert S. Wilf, *generatingfunctionology*, A.K. Peters, Ltd., 2006.

- b. Charalambos A. Charalambides, *Enumerative Combinatorics*, Chapman&Hall/CRC, Boca Raton (2002)
- c. I.P. Goulden and D.M. Jackson, *Combinatorial Enumeration*, Dover, 1983.

## 17. Course topical outline

<b>Week</b>	<b>Topic</b>
1 -2	How to count; sets and multisets
3-4	Cycles and inversions; alternating permutations
5	Euler numbers, and the cd-index of $S_n$
6	Partition identities; The Twelfefold Way
7	The sieve method; inclusion-exclusion
8	Permutations with restricted positions; Ferrers boards
9	Mid-term; involutions; determinants
10	Partially ordered sets; new posets from old
11	Distributive lattices and their Moebius algebras
12	Eulerian posets
13	Rational power series in one variable
14	Quasi-polynomials
15	Transfer matrix
Final exam	