NEW COURSE FORM

Signature Routing Log

General Information:

Course Prefix and Number: MA 514

Proposal Contact Person Name: Carl Lee Phone: 257-1405 Email: lee@ms.uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

received 12/8/10

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Math Faculty	Dec. 7, 2010	Zhongwei Shen / 7-3470 / zshen2@uky.edu	
		/ /	
		/ /	

A&S Ed. Policy Cmte. 11/8/11 G. Murthy, Nat. Sci. / 7-4729 / ganpathy.murthy@uky.edu

A&S Dean Anna Bosch, Associate Dean / 7-6689 / bosch@uky.edu

External-to-College Approvals:

GC and UGC 12/1/11

Council	Date Approved	Signature	Approval of Revision[6]
Undergraduate Council	2/15/2011	Sharon Gill Digitally signed by Sharon Gill DN: cn=Sharon Gill, o=Undergraduate Education, ou=Undergraduate Council, email=sgill@uky.edu, c=US Date: 2011.02.21 12:14:41 -05'00'	
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

[6] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

NEW COURSE FORM

1.	**General Information.**						
a.	Submitted by the College of:	Arts and Sciences			Today's Date:	November 23, 2010	
b.	Department/Division:	Mathematics					
c.	Contact person name:	Carl Lee	Email:	lee@ms.uky.edu	Phone:	257-1405	
d.	Requested Effective Date:	☒ Semester following approval	OR	☐ Specific Term/Year[1]:	_____		
2.	**Designation and Description of Proposed Course.**						
a.	Prefix and Number:	MA 514					
b.	Full Title:	Combinatorial Structures and Techniques					
c.	Transcript Title (if full title is more than 40 characters):	_____					
d.	To be Cross-Listed[2] with (Prefix and Number):	_____					
e.	Courses must be described by <u>at least one</u> of the meeting patterns below. Include number of actual contact hours[3] for each meeting pattern type.						
	3 Lecture	_____ Laboratory[1]	_____ Recitation	_____ Discussion	_____ Indep. Study		
	_____ Clinical	_____ Colloquium	_____ Practicum	_____ Research	_____ Residency		
	_____ Seminar	_____ Studio	_____ Other – Please explain:	_____			
f.	Identify a grading system:	☒ Letter (A, B, C, etc.)	☐ Pass/Fail				
g.	Number of credits:	3					
h.	Is this course repeatable for additional credit?				YES ☐	NO ☒	
	If YES:	Maximum number of credit hours:	_____				
	If YES:	Will this course allow multiple registrations during the same semester?			YES ☐	NO ☐	
i.	Course Description for Bulletin:	An introduction to fundamental structures and techniques in combinatorics, including such topics as graphs, trees, colorings of graphs, extremal graphs, bipartite matchings, partially ordered sets, extremal set theory, flows in networks, and the principle of inclusion/exclusion.					
j.	Prerequisites, if any:	MA 322 and one additional upper division math course or consent of instructor.					
k.	Will this course also be offered through Distance Learning?				YES[4] ☐	NO ☒	
l.	Supplementary teaching component, if any:	☐ Community-Based Experience	☐ Service Learning	☐ Both			
3.	**Will this course be taught off campus?**				YES ☐	NO ☒	
4.	**Frequency of Course Offering.**						

[1] Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

[2] The chair of the cross-listing department must sign off on the Signature Routing Log.

[3] In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, represents at least two hours per week for a semester for one credit hour. (from *SR 5.2.1*)

[4] You must *also* submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.

NEW COURSE FORM

a.	Course will be offered (check all that apply):	☒ Fall	☐ Spring	☐ Summer
b.	Will the course be offered every year?	YES ☒	NO ☐	
	If NO, explain:	_____		
5.	**Are facilities and personnel necessary for the proposed new course available?**	YES ☒	NO ☐	
	If NO, explain:	_____		
6.	**What enrollment (per section per semester) may reasonably be expected?**	10		
7.	**Anticipated Student Demand.**			
a.	Will this course serve students primarily within the degree program?	YES ☒	NO ☐	
b.	Will it be of interest to a significant number of students outside the degree pgm?	YES ☒	NO ☐	
	If YES, explain:	Possibly students in sciences that use combinatorial techniques, such as statistics, computer science, and biology		
8.	**Check the category most applicable to this course:**			
	☒ Traditional – Offered in Corresponding Departments at Universities Elsewhere			
	☐ Relatively New – Now Being Widely Established			
	☐ Not Yet Found in Many (or Any) Other Universities			
9.	**Course Relationship to Program(s).**			
a.	Is this course part of a proposed new program?	YES ☐	NO ☒	
	If YES, name the proposed new program:	_____		
b.	Will this course be a new requirement[5] for ANY program?	YES ☐	NO ☒	
	If YES[5], list affected programs:	_____		
10.	**Information to be Placed on Syllabus.**			
a.	Is the course 400G or 500?	YES ☒	NO ☐	
	If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in ***10.b***. You must include: (i) identification of additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See *SR 3.1.4.*)			
b.	☒ The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from ***10.a*** above) are attached.			

[5] In order to change a program, a program change form must also be submitted.

University Senate Syllabi Guidelines

MA 514 recommends

General Course Information

- ☑ Full and accurate title of the course.
- ☑ Departmental and college prefix.
- ☑ Course prefix, number and section number.
- ☑ Scheduled meeting day(s), time and place.

Instructor Contact Information (if specific details are unknown, "TBA" is acceptable for one or more fields)

- ☑ Instructor name.
- NA ☐ Contact information for teaching/graduate assistant, etc.
- ☑ Preferred method for reaching instructor.
- ☑ Office phone number.
- ☑ Office address.
- ☑ UK email address.
- ☑ Times of regularly scheduled office hours and if prior appointment is required.

Course Description

- ☑ Reasonably detailed overview of the course.
- ☑ Student learning outcomes.
- ☑ Course goals/objectives.
- ☑ Required materials (textbook, lab materials, etc.).
- ☑ Outline of the content, which must conform to the Bulletin description.
- ☑ Summary description of the components that contribute to the determination of course grade.
- ☑ Tentative course schedule that clarifies topics, specifies assignment due dates, examination date(s).
- ☑ Final examination information: date, time, duration and location.
- ☑ For 100-, 200-, 300-, 400-, 400G- and 500-level courses, numerical grading scale and relationship to letter grades for *undergraduate* students.
- ☑ For 400G-, 500-, 600- and 700-level courses, numerical grading scale and relationship to letter grades for *graduate* students. (Graduate students cannot receive a "D" grade.)
- ☑ Relative value given to each activity in the calculation of course grades (Midterm=30%; Term Project=20%, etc.).
- ☑ Note that undergraduate students will be provided with a Midterm Evaluation (by the midterm date) of course performance based on criteria in syllabus.
- ☑ Policy on academic accommodations due to disability. Standard language is below:

  If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Course Policies

- ☑ Attendance.
- ☑ Excused absences.
- ☑ Make-up opportunities.
- ☑ Verification of absences.
- ☑ Submission of assignments.
- ☑ Academic integrity, cheating & plagiarism.
- ☐ Classroom behavior, decorum and civility.
- NA ☐ Professional preparations.
- ☑ Group work & student collaboration.

12/15/10 ZH

Sample Syllabus for MA 514
Combinatorial Structures and Techniques
Fall 2011

Course: MA514, Section XXX, MWF XX:XX–XX:XX, Room XXX.

Instructor: Carl Lee.

Office: 967 Patterson Office Tower.

Mailbox: 715 Patterson Office Tower.

Phone: 257-1405 (or 257-3336 to leave a message).

Email: lee@ms.uky.edu (preferred method for reaching me).

Office Hours: MWF XX:XX–XX:XX, and by appointment, since I realize that this time may not be convenient for everyone.

Text: J.H. van Lint and R.M. Wilson, *A Course in Combinatorics*, second edition, Cambridge University Press, 2001, ISBN-10: 0521006015, ISBN-13: 978-0521006019.

Course Web Page: XXX.

Course Description: An introduction to fundamental structures and techniques in combinatorics, including such topics as graphs, trees, colorings of graphs, extremal graphs, bipartite matchings, partially ordered sets, extremal set theory, flows in networks, and the principle of inclusion/exclusion.

Course Objectives: Content: Introduce combinatorial structures and techniques that are foundational and widely used. Practice: Increase experience with the mathematical habits of mind, such as analyzing and illustrating definitions and theorems, testing hypotheses, solving problems and proving theorems, seeking and understanding underlying unifying patterns, and communicating mathematics effectively.

Learning Outcomes: Students will demonstrate knowledge of fundamental structures and techniques in combinatorics. Students will solve problems and prove theorems using these

structures and techniques.

Course Schedule:

1. Graphs. Terminology of graphs and digraphs, Eulerian circuits, Hamiltonian circuits. (Chapter 1 of text.)
2. Trees. Cayley's theorem, spanning trees and the greedy algorithm, search trees, strong connectivity. (Chapter 2.)
3. Colorings of graphs and Ramsey's theorem. Brooks' theorem, Ramsey's theorem and Ramsey numbers, the Lovász sieve, the Erdős-Szekeres theorem. (Chapter 3.)
4. Turán's theorem and extremal graph theory. (Chapter 4.)
5. Systems of distinct representatives. Bipartite graphs, Hall's condition, SDRs, König's theorem, Birkhoff's theorem. (Chapter 5.)
6. Dilworth's theorem and extremal set theory. Partially ordered sets, Dilworth's theorem, Sperner's theorem, symmetric chains, the Erdős-Ko-Rado theorem. (Chapter 6.)
7. Flows in networks. The Ford-Fulkerson theorem, the integrality theorem, a generalization of Birkhoff's theorem, circulations. (Chapter 7.)
8. The principle of inclusion and exclusion. (Chapter 10.)
9. Other material as time permits.

Attendance and Participation: This class is designed for active involvement of the students. You will be actively supporting each other as you gain experience and understanding. Multiple ideas and points of view are important. You will benefit from hearing others' approaches to analysis and problem solving, and they will benefit from you. So attendance and active participation are expected. If you miss a class for any reason, please explain your absence in writing as soon as possible. Your absence will be excused if it is due to serious reason (such as illness, death in the family, or travel organized by UK—see the official list of excused absences in the "Student Right and Responsibilities," Section 5.2.4.2, www.uky.edu/StudentAffairs/Code/part2.html). Students absent due to an excused absence bear the responsibility of informing the instructor about their excused absence within one week following the period of the excused absence (except where prior notification is required)

and of making up the missed work. The instructor shall give the student an opportunity to make up the work and/or the exams missed due to an excused absence.

Homework: There will be frequent homework assignments, usually assigned weekly, with specified due dates. The homework problems will have varying length and complexity. It is expected that you regularly read in detail the relevant sections in the textbook and complete all assigned work. It is fine to discuss the homework together, but you must write up your own solutions in your own words.

Exams: There will be two exams during the semester and a final exam.

Grading Policy: Your course score will be based on on the following percentages:

50%	Homework
30%	In-Class Exams
20%	Final Exam

If you are an undergraduate student, your letter grade will be determined according to the standard 10% scale:

90–100%	A
80–89%	B
70–79%	C
60–69%	D
0–59%	E

If you are a graduate student, your letter grade will be determined according to the scale:

90–100%	A
80–89%	B
70–79%	C
0–69%	E

You will receive information on your current grade after each of the exams. In particular, you will receive your midterm evaluation by the middle of the semester.

Accommodations Due to Disability: If you have a documented disability that requires academic accommodations, please see the instructor as soon as possible. In order to receive

accommodations in this course, you must provide the instructor with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Cheating and Plagiarism: Students are encouraged to discuss the course material together. Part of the work in class will be group work that will provide ample opportunity to exchange ideas and learn from each other. As mentioned above, discussing the homework assignments is permissible, but you must write up your solutions in your own words, and not simply copy someone else's work. Any kind of communication with other students during an exam will be considered cheating and prosecuted according to university regulations. Cheating and plagiarism can lead to significant penalties. See Sections 6.3 and 6.4 of *Student Rights and Responsibilities*, www.uky.edu/StudentAffairs/Code/part2.html.

Suggestions and Conflicts: Suggestions for improvement are welcome at any time. Any concern about the course should be brought first to my attention. Further recourse is available through the offices of the Mathematics Department Ombud and the Department Chair, both accessible from the Main Office in 715 Patterson Office Tower, as well as the University Ombud.

Important Dates:

August XX — Last day a student may officially drop a course or cancel registration with the University Registrar for a full refund of fees

August XX — First day of classes

August XX — Last day to add a class for the 201X Fall Semester

August XX — Last day to officially withdraw from the University or reduce course load and receive an 80 percent refund

September XX — Labor Day — Academic Holiday

September XX — Last day to drop a course without it appearing on the student's transcript

September XX — Last day to officially withdraw from the University or reduce course load and receive a 50 percent refund

September XX — Exam #1

October XX — Midpoint of 2010 Fall Semester

October XX — Exam #2

November XX — Last day to withdraw from the University or reduce course load. Students can withdraw or reduce course load after this date only for "urgent nonacademic reasons"

November xx—XX — Thanksgiving — Academic Holidays

December XX — Last day of classes

December XX — Final exam, XX:XX – XX:XX, in our regular room