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**College of Engineering Syllabus Template – Needed for ABET and the Campus Higher Learning Commission accreditation.**

1. **Course Name and Number**Theory of Information Processing and Transmission, 729

**2. Credits and contact hours**

1. credits, 45 contact hours

**3.Course URL**

http://www.math.wisc.edu/~boston/729bis2018.html

**4. Course Designations and Attributes**

Grad 50% - Counts toward 50% graduate coursework requirement

**5. Meeting Time and Location**

MWF, 9:55-10:45, 2239 Engineering Hall

**6. Indicate whether the course is required, elective, or selected elective (if you do not know, check with your ABET program representative).**

Selected elective.

**7. Instructional Mode**

Face to face.

**8. Specify How Credit Hours Are Met by the Course**

1. Traditional Carnegie Definition – One hour (i.e. 50 minutes) of classroom or direct faculty/instructor instruction and a minimum of two hours of out of class student work each week over approximately 15 weeks, or an equivalent amount of engagement over a different number of weeks.

**9. INSTRUCTORS AND TEACHING ASSISTANTS**

**9.1 Instructor Title and Name**

Professor Nigel Boston

**9.2 Instructor Availability**

M 3-4 in 3619 EH, W 2-3 in 3619 EH, or Th 1:30-2:30 in 303 VV, or by appointment.

**9.3 Instructor Email/Preferred Contact**

boston@engr.wisc.edu

**9.4 Teaching Assistant (if applicable)**

None

**9.5 TA Office Hours**

**9.6 TA Email/Preferred Contact**

**10 OFFICIAL COURSE DESCRIPTION**

**Course Description**

Definition of measures of information and their properties, capacity of discrete and continuous channels with noise, source and channel coding theorems, fundamentals of channel coding, noiseless source coding, and source coding with a fidelity criterion.

**11. Requisites**

Graduate/professional standing. Enroll Info: ECE 331 or [MATH/​STAT  431](http://guide.wisc.edu/search/?P=MATH%20431) or consent of instructor.

**12 LEARNING OUTCOMES**

**12.1 Course Learning Outcomes**

At the end of this course students should be able to:

• Possess familiarity with the major notions of information theory such as entropy and capacity

• Be knowledgeable of issues involving information-theoretical limits and Shannon’s fundamental theorems

• Be able to compute basic notions such as the capacity of a given channel

**12.2 ABET STUDENT OUTCOMES**

(a) an ability to apply knowledge of mathematics, science, and engineering

(d) an ability to function on multidisciplinary teams

(e) an ability to identify, formulate, and solve engineering problems

(g) an ability to communicate effectively

(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**13 BRIEF LIST OF TOPICS TO BE COVERED**

Definition of measures of information and their properties, capacity of discrete and continuous channels with noise, source and channel coding theorems, fundamentals of channel coding, noiseless source coding, and source coding with a fidelity criterion.

**14 DISCUSSION SESSIONS**

**15 LABORATORY SESSIONS**

**16 REQUIRED TEXTBOOK, SOFTWARE & OTHER COURSE MATERIALS**

Elements of Information Theory, Second Edition, by Thomas M. Cover and Joy A. Thomas, available free online.

**GRADING**

The HW will be worth 10%, each midterm 20%, and the final 50% of your grade. If you score 90% or higher, you will get an A; if you score 80% or higher, you will at least get a B; if you score 70% or higher, you will at least get a C; if you score 60% or higher, you will at least get a D.

## EXAMS, QUIZZES, PAPERS & OTHER MAJOR GRADED WORK

Midterms will be in class on Friday, Oct 12, and TBA. Final - 7:25pm, Monday, December 17, room TBA.

**HOMEWORK & OTHER ASSIGNMENTS**

Homework will be set most Fridays and be due the following Friday (in class- I will not go looking for or accept homeworks in my mailboxes and offices around campus). You are encouraged to discuss the exercises with your classmates but the work you hand in should be your own.

**OTHER COURSE INFORMATION**

**RULES, RIGHTS & RESPONSIBILITIES**

* See the Guide’s [Rules, Rights and Responsibilities](http://guide.wisc.edu/undergraduate/%22%20%5Cl%20%22rulesrightsandresponsibilitiestext)

**ACADEMIC INTEGRITY**

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison’s community of scholars in which everyone’s academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to <https://conduct.students.wisc.edu/academic-integrity/>.

**ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**

**McBurney Disability Resource Center syllabus statement:** “The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.” <http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php>

**DIVERSITY & INCLUSION**

**Institutional statement on diversity:** “Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.” <https://diversity.wisc.edu/>