

# EEE 261: INFORMATION THEORY

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## In Workflow

1. EEE Committee Chair (pheedley@csus.edu)
2. EEE Chair (mahyar.zarghami@csus.edu)
3. ECS College Committee Chair (figgess@csus.edu)
4. ECS Dean (arad@csus.edu)
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7. Dean of Undergraduate (james.german@csus.edu; celena.showers@csus.edu)
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9. Catalog Editor (torsetj@csus.edu)
10. Registrar's Office (w lindsey@csus.edu)
11. PeopleSoft (PeopleSoft@csus.edu)

## Approval Path

1. Fri, 09 Oct 2020 21:33:16 GMT  
Perry Heedley (pheedley): Rollback to Initiator
2. Fri, 09 Oct 2020 22:38:34 GMT  
Perry Heedley (pheedley): Approved for EEE Committee Chair
3. Sat, 21 Nov 2020 18:25:25 GMT  
Mahyar Zarghami (mahyar.zarghami): Approved for EEE Chair
4. Fri, 04 Dec 2020 17:40:02 GMT  
Gareth Figgess (figgess): Rollback to Initiator
5. Fri, 12 Feb 2021 22:20:31 GMT  
Perry Heedley (pheedley): Approved for EEE Committee Chair
6. Fri, 02 Apr 2021 21:39:09 GMT  
Mahyar Zarghami (mahyar.zarghami): Approved for EEE Chair
7. Fri, 16 Apr 2021 16:30:29 GMT  
Gareth Figgess (figgess): Approved for ECS College Committee Chair
8. Fri, 16 Apr 2021 16:32:29 GMT  
Kevan Shafizadeh (kevan): Approved for ECS Dean

Date Submitted: Mon, 28 Dec 2020 12:38:08 GMT

## Viewing: EEE 261 : Information Theory

Last edit: Mon, 28 Dec 2020 12:38:07 GMT

Changes proposed by: Mohammed Eltayeb (219702627)

### Contact(s):

Name (First Last)	Email	Phone 999-999-9999
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### Catalog Title:

Information Theory

### Class Schedule Title:

Info Theory

### Academic Group: (College)

ECS - Engineering & Computer Science

### Academic Organization: (Department)

Electrical and Electronic Engineering

### Will this course be offered through the College of Continuing Education (CCE)?

No

### Catalog Year Effective:

Spring 2021 (2021/2022 Catalog)

**Subject Area: (prefix)**

EEE - Electrical and Electronic Engineering

**Catalog Number: (course number)**

261

**Course ID: (For administrative use only.)**

127481

**Units:**

3

**In what term(s) will this course typically be offered?**

Spring term only

**Does this course require a room for its final exam?**

Yes, final exam requires a room

**Does this course replace an existing experimental course?**

No

**This course complies with the credit hour policy:**

Yes

**Justification for course proposal:**

Course update.

The main changes include removing "probability review" and "signal detection" topics and focusing on information theoretical concepts instead, i.e. adding additional information theory topics. The justification is probability is covered in the undergraduate curriculum and signal detection is taught in EEE 260.

**Course Description: (Not to exceed 80 words and language should conform to catalog copy.)**

The concepts of source, channel, rate of transmission of information. Entropy and mutual information. The noiseless coding theorem. Mutual information; typical sequences and their applications. Noisy channels, the coding theorem for finite-state zero memory channels. Channel capacity. Error bounds. Source encoding.

**Are one or more field trips required with this course?**

No

**Fee Course?**

No

**Is this course designated as Service Learning?**

No

**Does this course require safety training?**

No

**Does this course require personal protective equipment (PPE)?**

No

**Does this course have prerequisites?**

Yes

**Prerequisite:**

ENGR 120 and EEE 185; or instructor permission.

**Prerequisites Enforced at Registration?**

No

**Does this course have corequisites?**

No

**Graded:**

Letter

**Approval required for enrollment?**

No Approval Required

**Course Component(s) and Classification(s):**

Seminar

**Seminar Classification**

CS#05 - Seminar (K-factor=1 WTU per unit)

**Seminar Units**

3

**Is this a paired course?**

No

**Is this course crosslisted?**

No

**Can this course be repeated for credit?**

No

**Can the course be taken for credit more than once during the same term?**

No

**Description of the Expected Learning Outcomes: Describe outcomes using the following format: "Students will be able to: 1), 2), etc."**

Students will be able to:

- 1) Calculate the entropy, relative entropy, and mutual information of a random source.
- 2) Determine the information content of a random variable from its probability distribution.
- 3) Apply Shannon's source coding and channel coding theorems.
- 4) Devise efficient codes for data transmission on imperfect communication channels.
- 5) Calculate the capacity of discrete memoryless channels.
- 6) Explain the various methods for channel and source coding and derive their performance.

**Attach a list of the required/recommended course readings and activities:**

EEE\_261\_outline\_v3.docx

**Assessment Strategies: A description of the assessment strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above.**

Student performance in this course will be evaluated on the basis of three exams (EO 1-6), a project (EO 6), and homework (EO 1-6). The project will focus on identifying a recent research paper on information theory and making an oral presentation of the paper to the class.

**Is this course required in a degree program (major, minor, graduate degree, certificate?)**

No

**Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?**

No

**Will there be any departments affected by this proposed course?**

No

**I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.**

I/we agree

**University Learning Goals****Graduate (Masters) Learning Goals:**

Critical thinking/analysis  
 Communication  
 Information literacy  
 Disciplinary knowledge

Research (optional)

**Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?**

No

**Is this a Graduate Writing Intensive (GWI) course?**

No

**Reviewer Comments:**

**Perry Heedley (pheedley)** (Fri, 09 Oct 2020 21:33:16 GMT): Rollback: Make changes to match syllabus to Form A.

**Gareth Figgess (figgess)** (Fri, 04 Dec 2020 17:40:02 GMT): Rollback: Prerequisites, Course Objectives per discussion. Add Form B to reflect name change

Key: 1761