Discover Viterbi: Electrical Engineering with Prof. Eun Sok Kim

Viterbi School of Engineering
University of Southern California
Spring 2018
WebEx Quick Facts

Will I be able to get a copy of the slides after the presentation?

YES!

How can I ask a question during the information session?

1. Using the Q&A Panel, type a question in the box below the Ask drop-down menu.
2. Select a recipient from the Ask drop-down menu.
3. Click Send. We will respond as soon as we are able.
Today’s Program

- University of Southern California
- USC Viterbi School of Engineering
- Graduate Programs in Electrical Engineering
  - Program Overview
  - Application Criteria
- DEN@Viterbi
- Tuition & Fees
- Q&A
UNIVERSITY OF SOUTHERN CALIFORNIA
The University of Southern California

- Oldest Private University in the western U.S.
  - Founded in 1880
- 44,000 Students
  - 19,000 Undergraduates | 25,000 Graduates
- 4,190 Full-time Faculty
- Diverse Student Population
- Located in Los Angeles
Viterbi School at a Glance

**Academic Departments**
- 8 Academic Departments

**Faculty**
- 185 tenure-track faculty
- 20+ NAE
- 60+ NSF CAREER, National & Presidential Young Investigator

**Student Populations**
- 2,700 Undergraduate
- 5,600 Graduate students

**Research**
- Leader in funded research
- 45+ Research Centers
- More than $185M in research expenditures

**Alumni**
- More than 65,000+
U.S. News & World Report, 2018

Best Engineering Graduate Schools

- Top 10 Ranked Graduate Engineering Program

Best Online Graduate Engineering Programs

- Ranked #1 Online Computer Information Technology Program (Computer Science)
- Ranked #2 Online Graduate Engineering Programs

Best Online Graduate Engineering Programs for Veterans

- Ranked #1 Online Graduate Engineering for Veterans
- Ranked #1 Online Computer Information Technology for Veterans
USC Engineering: Points of Distinction

- International Reputation for Excellence
- The Trojan Family Network: 65,000+ engineers strong
- Unique engineering programs available: Online, on site & on campus
- Complete range of programs
  - PhD, Masters and Bachelors
  - Graduate Certificates
  - Short Courses
  - Custom Programs
The Viterbi School of Engineering: A Leader in Research

Viterbi School is a consistent leader in funded research in the U.S.

- Highly interdisciplinary research environment
- Diverse research areas such as robotics, software engineering, sensor networks, vision sciences, automated construction and photonics
- Over 45 research centers
- Industrial partnerships and collaboration
Meet Professor Eun Sok Kim

- **Professor Eun Sok Kim**
  - Department Chair of Electrical Engineering - Electrophysics
  - PhD in Electrical Engineering, University of California, Berkeley
  - Published more than 220 papers and 11 issued patents in the field of acoustic and piezoelectric MEMS and recently launched a research program on electromagnetic vibration-energy harvesting
Electrical Engineering: Program Offerings

- MS in Electrical Engineering
- MS in Computer Engineering
- MS in Electrical Engineering (Computer Networks)
- MS in Electrical Engineering (Electric Power)
- MS in Electrical Engineering (Multimedia & Creative Technologies)
- MS in Electrical Engineering (VLSI Design)
- MS in Electrical Engineering (Wireless Health Technology)
- MS in Electrical Engineering (Wireless Networks)
- MS in Financial Engineering
- MS in Electrical Engineering/Engineering Management (dual degree)
MS in Electrical Engineering – Program Details

Program Requirements: 28 units

5 Courses should be taken from one of the following areas

- Computer Networks and Computer Systems Performance Area
- Computer Systems Architecture Area
- Communications Area
- Controls Area
- Design and Implementation of Digital Circuits (VLSI) Area
- Electric Power Systems Area
- Mixed-Signal Integrated Circuits Area
- Optics / Photonics Area
- Signal and Image Processing Area
- Telecommunication Systems Area

Additional Requirements

- Minimum 20 units must be taken in electrical engineering
- Minimum 19 units must be taken at the 500-or 600-level (adviser-approved courses)
- Every non-Electrical Engineering course for graduate credit requires prior written adviser approval
MS in Computer Engineering – Program Details

Program Requirements: 28 units

A minimum of 20 units of Computer Engineering courses from the listed areas below, including at least one course from two of the following areas:

Computer Architecture - Sample courses include:
- EE 457 | Computer Systems Organization (4 units)
- EE 542 | Internet and Cloud Computing (3 Units)
- EE 557 | Computer Systems Architecture (3 units)

Computer Networks - Sample courses include:
- EE 450 | Introduction to Computer Networks (or EE 503) (3 units)
- EE 550 | Design and Analysis of Computer Communication Networks (3 units) OR:
- EE 555 | Broadband Network Architectures (or EE 550) (3 units)

VLSI/CAD - Sample courses include:
- EE 536ab | Mixed-Signal Integrated Circuit Design (3 units)
- EE 552 | Asynchronous VLSI Design (3 units)
- EE 577a | VLSI System Design (3 units)
MS in Electrical Engineering (Computer Networks) – Program Details

Program Requirements: 27 units

Fundamental Courses (11-12 units)
Three of the following courses are required

- CSCI 402 | Operating Systems (4 units)
- EE 450 | Introduction to Computer Networks (or EE 503) (3 units)
- EE 457 | Computer Systems Organization (4 units)
- EE 503 | Probability for Electrical and Computer Engineers (or EE 450) (4 units)

Required Courses (9 units)
Three of the following courses are required.

- CSCI 551 | Computer Communications (4 units)
- EE 550 | Design & Analysis of Computer Communication Networks (3 units)
- EE 555 | Broadband Network Architectures (3 units)
- EE 597 | Wireless Networks (3 units)

Elective Courses (6-7 units)
Students are encouraged to take two technical elective courses outside their area of specialization but within Electrical Engineering.
MS in Electrical Engineering – Electric Power Program Details

Program Requirements: 27 units

Required Courses (12 units)
- EE 443 | Introduction to Power Systems (3 units)
- EE 444 | Power Systems Technology (3 units)
- EE 521 | Power System Analysis and Design (3 units)
- SAE 515 | Sustainable Infrastructure Systems (3 units)

Elective Courses (15 units)
Five courses required with at least one from each of the following areas:
- Transmission, Distribution, and Planning Area
- Power-System Control and the Smart Grid
- High-Voltage Equipment and Design

Available online via DEN@Viterbi
MS in Electrical Engineering (Multimedia & Creative Technologies) – Program Details

Program Requirements: 27 units

Fundamental Courses (9 units)

All courses are required – 9 units total.

- EE 483 | Introduction to Digital Signal Processing (3 units)
- EE 519 | Speech Recognition and Processing for Multimedia (3 units)
- EE 569 | Introduction to Digital Image Processing (3 units)

Elective Courses (18 units)

No more than 4 units of electives can be taken outside of the Viterbi School of Engineering with advisor approval.

- Computer science courses that are cross-listed with Electrical Engineering can count toward the 18 EE units.
- Up to nine units of other CSCI courses that either are or are not cross-listed can also be used.

Available online via DEN@Viterbi
MS in Electrical Engineering (VLSI Design) – Program Details

*Program Requirements: 27 units*

**Fundamental Courses (12 units)**

All courses are required

- EE 536a | Mixed-Signal Integrated Circuit Design (4 units)
- EE 577a | VLSI System Design (3 units)
- EE 536b | Mixed-Signal Integrated Circuit Design (or EE 577b) (3 units)
- EE 577b | VLSI System Design (or EE 536b) (4 units)
- EE 552 | Asynchronous VLSI Design (3 units)

**Required Courses (9-11 units)**

Two courses from one designated program area and one course from another area required

**Elective Courses (6-8 units)**

The remaining courses must be technical electives approved by a department advisor
MS in Electrical Engineering (Wireless Health Technology) – Program Details

Program Requirements: 30-31 units

Required Courses (20 units)

All of the following courses are required

- EE 450 | Introduction to Computer Networks (3 units)
- EE 579 | Wireless and Mobile Networks Design and Laboratory (3 units)
- MEDS 530a | Foundation of Medicine: Anatomy, Physiology, and Pathology (4 units)
- MEDS 530b | Foundation of Medicine: Anatomy, Physiology, and Pathology (4 units)
- MEDS 530c | Foundation of Medicine: Anatomy, Physiology, and Pathology (4 units)
- MEDS 597a | Health Technology Internship (1 Unit)
- MEDS 597b | Health Technology Internship (1 Unit)

Elective Courses (9-12 units)

Students are required to take three approved elective courses.
**MS in Electrical Engineering (Wireless Networks) – Program Details**

*Program Requirements: 27 units*

**Required Courses (15 units)**

*All of the following courses are required*
- CSCI 402 | Operating Systems (4 Units)
- EE 503 | Probability for Electrical and Computer Engineers (4 Units)
- EE 511 | Simulation Methods for Stochastic Systems (1 Unit)
- EE 535 | Mobile Communications (3 Units)
- EE 597 | Wireless Networks (3 Units)

**Elective Courses (12-14 units)**

*Select courses available in areas including:*
- Transmission Techniques and Signal Processing
- Architectures, Protocols, and Applications
- Communication Hardware and Design
MS in Financial Engineering – Program Details

Program Requirements: 30 units

Required Courses (17 units)

All of the following courses are required

- GSBA 548 | Corporate Finance (2-3 units)
- ISE 563 | Financial Engineering (3 units)
- EE 503 | Probability for Electrical and Computer Engineers (4 units)
- EE 512 | Stochastic Processes (3 units)
- EE 518 | Mathematics and Tools for Financial Engineers (4 units)
- EE 590 | Directed Research with faculty adviser-approval

Elective Courses (12-14 units)

Two Courses from each area – 6-7 units from each area total.

- Finance, Business and Economics Area (6-7 units)
- Optimization, Simulations, and Stochastic Systems (6-7 units)
MS in Electrical Engineering/MS in Engineering Management Dual Degree – Program Details

Program Requirements: 48 units

Required Courses

All applicants must meet the admissions requirements of both the Department of Electrical Engineering and the Department of Industrial and Systems Engineering

- 24 units must satisfy the requirements of the master’s degree in electrical engineering.
- 21 units must satisfy the required courses towards the master’s degree in engineering management.
- 3 units of electives approved by the program director or adviser.
- All courses counted towards the dual degree must be at the 500 level, except those 400-level courses required by the master’s degree in electrical engineering
Application Criteria for Masters Programs

Each program has unique application requirements – please be sure to review specific information for your program(s) of interest:
https://viterbigradadmission.usc.edu/programs/masters/msprograms/electrical-engineering/

General Application Criteria

- Undergraduate degree (Bachelor of Science) in engineering, math, or hard science from a regionally-accredited university
- A cumulative undergraduate GPA of at least 3.0 on a 4.0 scale is recommended
- Satisfactory scores on the general portion of the Graduate Record Examination (GRE) that are less than five years old
- Resume/CV
- Supplemental Materials (Letters of Recommendation/Statement of Purpose) – optional or required (see individual program page)
- TOEFL (International Applicants)
Application Deadlines

Application Deadlines for 2018

Fall 2018
- Deadline to submit all required materials: January 17, 2018*

Spring 2019
- Deadline to submit all required materials: September 15, 2018*
- Deadline for Scholarship Consideration (on-campus only): August 31, 2018

* A deadline extension for DEN@Viterbi applicants may be available. Please email DEN@Viterbi.usc.edu for more information.

Helpful Links:
- List of DEN@Viterbi Programs: http://viterbi.usc.edu/DENDegrees
- USC Graduate Application: https://usc.liaisoncas.com

USC Viterbi
School of Engineering
Where Our Alumni Are Working

- What do our students do?
- What do our graduates do?
Methods of Course Delivery

• On-campus, full time
  3 classes per semester
  1.5 – 2 years to complete

• Online delivery via DEN@Viterbi
  1-2 classes per semester
  2.5 – 3 years to complete degree
How DEN@Viterbi Works

The Viterbi School of Engineering uses a state-of-the-art, proprietary web-based delivery system that enables students from around the world to access classes live or on-demand.

DEN@Viterbi Students:
- View the same lectures as on-campus students, with fresh content every semester
- Participate in highly interactive discussions with professors and peers
- Submit homework electronically
- Take exams at proctored testing centers near their home or work (or at USC if in the Los Angeles area)
## DEN@Viterbi Overview

<table>
<thead>
<tr>
<th></th>
<th>DEN@Viterbi Student</th>
<th>On-Campus Student</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Admission</strong></td>
<td>USC Graduate Application &amp; required materials</td>
<td>USC Graduate Application &amp; required materials</td>
</tr>
<tr>
<td><strong>Weekly Course Lectures</strong></td>
<td>Online with Interactivity</td>
<td>On USC’s Campus</td>
</tr>
<tr>
<td><strong>Online Course Archives (Lectures &amp; Course Documents)</strong></td>
<td>✓</td>
<td>✓ *</td>
</tr>
<tr>
<td><strong>Assignments</strong></td>
<td>Submit electronically according to course deadlines</td>
<td>Submit during lecture or lab according to course deadlines</td>
</tr>
<tr>
<td><strong>Exams</strong></td>
<td>Proctored location</td>
<td>USC’s campus</td>
</tr>
<tr>
<td><strong>Courses per Semester (Average)</strong></td>
<td>1-2</td>
<td>3-4</td>
</tr>
<tr>
<td><strong>Degree Completion Requirements</strong></td>
<td>27-37 units with a 3.0 GPA or above</td>
<td>27-37 units with a 3.0 GPA or above</td>
</tr>
<tr>
<td><strong>USC Diploma (No Distinction)</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

*DEN@Viterbi Sections Only*
DEN@Viterbi’s E-Learning System

DEN@Viterbi Classroom
DEN@Viterbi’s E-Learning System
DEN@Viterbi’s E-Learning System

Helium Porosity vs. Air Permeability

- Used to select porosity cut-offs, for reservoir rocks.
- Based on permeability values.
Student Interactivity & Group Meetings

- All DEN@Viterbi students are provided access to their own meeting rooms which can be used for several purposes:
  - Enable video communication (web and mobile)
  - Integrate phone conferencing
  - Integrate fixed room IP video systems
  - Desktop sharing
  - Set up meetings with faculty, teaching assistants and peers

- Call in during live lectures

- Participate in live chats and threaded discussion boards
Question: Is there any difference between earning a Master’s degree on campus vs. via DEN@Viterbi?

Answer: NO. DEN@Viterbi is a delivery method. Students adhere to the:
- Same Admission Criteria
- Same Curriculum
- Same Exams and Homework
- Same Academic Standards and Graduation Requirements

Therefore...

You earn the same diploma whether you earn the degree on-campus or online through DEN@Viterbi.
DEN@Viterbi Additional Info

Limited Status

- Allows strong candidates to begin coursework before formal admission.
- Courses *(maximum of 12 units)* can be applied toward degree program once admitted but *limited status does not guarantee admission*.
- Get Started this Summer 2018:
  [https://viterbigradadmission.usc.edu/denviterbi/getting-started/](https://viterbigradadmission.usc.edu/denviterbi/getting-started/)

Tuition Deferment Program

- Students supported by company can defer “up front” payment of tuition until after the semester is over.
- Company must pay 75-100% of tuition to be eligible for program.
- For additional information: [https://viterbigrad.usc.edu/tuition-and-funding/employer-supported](https://viterbigrad.usc.edu/tuition-and-funding/employer-supported)
## Tuition & Fees (2017-2018)

<table>
<thead>
<tr>
<th>PER-COURSE FEES</th>
<th>Unit Cost</th>
<th>Tuition for 3-Unit Course</th>
<th>Tuition for 4-Unit Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition for 500/600 level course</td>
<td>$1,937</td>
<td>$5,811</td>
<td>$7,748</td>
</tr>
</tbody>
</table>

Degree Programs are 27-36 units (9-11 courses)

For an overview of additional fees, please visit: https://viterbigradadmission.usc.edu/programs/masters/tuition-funding/tuition-funding-masters/
Getting Started

For those interested in taking classes on campus:

- Visit USC campus
- Start your application: https://gradadm.usc.edu/apply/

For those interested in taking classes online via DEN@Viterbi:

- Start your application: https://gradadm.usc.edu/apply/ -or-
- Start as a Limited Status Student as early as Summer 2018
  Complete the DEN@Viterbi Profile: viterbi.usc.edu/denprofile
Contact Us

USC Viterbi School of Engineering
Graduate & Professional Programs

On Campus: viterbi.gradprograms@usc.edu
DEN@Viterbi: DEN@Viterbi.usc.edu

213.740.4488

http://viterbi.usc.edu/gradprograms