Discover Viterbi: Petroleum Engineering with Professor Iraj Ershaghi
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 Petroleum Engineering
  - Program Overview
  - Application Criteria
- DEN@Viterbi
- Tuition & Fees
- Q&A
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

**Alumni**
- More than 65,000+

**Research**
- Leader in funded research
- 45+ Research Centers
- More than $185M in research expenditures
<table>
<thead>
<tr>
<th>Category</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best Engineering Graduate Schools</td>
<td>Top 10 Graduate Engineering Program</td>
</tr>
<tr>
<td>Best Online Graduate Engineering Programs</td>
<td>Ranked #1 Online Computer Information Technology Program (Computer Science)</td>
</tr>
<tr>
<td></td>
<td>Ranked #2 Online Graduate Engineering Programs</td>
</tr>
<tr>
<td>Best Online Graduate Programs for Veterans</td>
<td>Ranked #1 Online Graduate Engineering for Veterans</td>
</tr>
<tr>
<td></td>
<td>Ranked #1 Online Computer Information Technology for Veterans</td>
</tr>
</tbody>
</table>
## Best Graduate Petroleum Engineering Programs

**Best Graduate Petroleum Engineering Programs**

Ranked in 2018, part of Best Engineering Schools

Petroleum engineers are charged with discovering the best ways to extract oil and gas from underground deposits. These are the top graduate schools for petroleum engineering. Each school’s score reflects its average rating on a scale from 1 (marginal) to 5 (outstanding), based on a survey of academics at peer institutions.

* For full rankings, GRE scores and student debt data, sign up for U.S. News Engineering School Compass.

### Overall Engineering School Program Data

<table>
<thead>
<tr>
<th>Rank</th>
<th>School Name</th>
<th>Score</th>
<th>Tuition (in-state, full-time)</th>
<th>Tuition (out-of-state, full-time)</th>
<th>Total Graduate Engineering Enrollment</th>
<th>Average GRE Quantitative Score (Master’s and Ph.D. Students)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University of Texas—Austin (Main) Austin, TX</td>
<td>4.7</td>
<td>$10,148 per year (in-state, full-time)</td>
<td>$19,970 per year (out-of-state, full-time)</td>
<td>2,308</td>
<td>2.305</td>
</tr>
<tr>
<td>2</td>
<td>Stanford University Stanford, CA</td>
<td>4.6</td>
<td>$52,108 per year (full-time)</td>
<td></td>
<td>2,942</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Texas A&amp;M University—College Station College Station, TX</td>
<td>4.3</td>
<td>$27,750 per credit (in-state, full-time)</td>
<td>$21,100 per credit (out-of-state, full-time)</td>
<td>3,600</td>
<td>2.600</td>
</tr>
<tr>
<td>4</td>
<td>University of Tulsa Tulsa, OK</td>
<td>3.9</td>
<td>$1,210 per credit (full-time)</td>
<td></td>
<td>227</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Colorado School of Mines Golden, CO</td>
<td>3.8</td>
<td>$18,170 per year (in-state, full-time)</td>
<td>$39,320 per year (out-of-state, full-time)</td>
<td>1,289</td>
<td>1.289</td>
</tr>
<tr>
<td>6</td>
<td>Pennsylvania State University—University Park University Park, PA</td>
<td>3.5</td>
<td>$22,114 per year (in-state, full-time)</td>
<td>$37,622 per year (out-of-state, full-time)</td>
<td>1,725</td>
<td>1.725</td>
</tr>
<tr>
<td>7</td>
<td>University of Oklahoma Norman, OK</td>
<td>3.4</td>
<td>$21,616 per credit (in-state, full-time)</td>
<td>$32,520 per credit (out-of-state, full-time)</td>
<td>1,785</td>
<td>1.785</td>
</tr>
<tr>
<td>8</td>
<td>University of Southern California (Fullerton) Los Angeles, CA</td>
<td>3.1</td>
<td>$1,932 per credit (full-time)</td>
<td></td>
<td>1,380</td>
<td>1.380</td>
</tr>
<tr>
<td>9</td>
<td>Louisiana State University—Baton Rouge Baton Rouge, LA</td>
<td>2.5</td>
<td>$38,728 per year (in-state, full-time)</td>
<td>$32,943 per year (out-of-state, full-time)</td>
<td>846</td>
<td>0.45</td>
</tr>
</tbody>
</table>
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 Iraj Ershaghi

- **Dr. Iraj Ershaghi**
  - Director of Petroleum Engineering
  - Executive Director of the Chevron-USC Center for Interactive Smart Oilfield Technologies at USC
  - Executive Director of UKC (USC-KOC) Center for Research and Education
Q&A

with Program Director, Professor Ershaghi
What Petroleum Engineering Graduate Programs are Offered by USC?
Petroleum Engineering: Program Offerings

- MS in Petroleum Engineering
- MS in Petroleum Engineering (Geoscience Technologies)
- MS in Petroleum Engineering (Smart Oilfield Technologies)
- MS in Petroleum Engineering / MS in Engineering Management (Dual Degree)
- Graduate Certificate in Petroleum Engineering (Smart Oilfield Technologies)
- Graduate Certificate in Petroleum Engineering (Unconventional Resources)

Available online via DEN@Viterbi
Program Requirements: 30-32 units selected under the direction of the student’s adviser (new requirements for Fall 2019)

The Master of Science in petroleum engineering is awarded in strict conformity with the general requirements of the Viterbi School of Engineering. Electives vary according to the area of interest. A student may be permitted to elect the program without thesis upon approval from the department.
MS in Petroleum Engineering (Geoscience Technologies) – Program Details

Program Requirements: 34 units

Required Courses (18 units)

- PTE 507 | Engineering and Economic Evaluation of Subsurface Reservoirs
- PTE 508 | Numerical Simulation of Subsurface Flow and Transport Processes
- PTE 517 | Testing of Wells and Aquifers
- PTE 531 Enhanced Oil Recovery
- PTE 555 | Well Completion, Stimulation, and Damage Control
- PTE 582 | Fluid Flow and Transport Processes in Porous Media

Take 4 out of 5 Courses Shown Below (12 units)

- PTE 502 | Advanced Reservoir Characterization
- PTE 503 | Technology of Unconventional Oil and Gas Resources Development
- PTE 504 | Geophysics for Petroleum Engineers
- PTE 505 | Inverse Modeling for Dynamic Data Integration
- PTE 572 | Geostatistics

Elective Courses (4 units)
MS in Petroleum Engineering (Smart Oilfield Technologies) – Program Details

Program Requirements: 34 units selected under the direction of the student’s adviser

The Master of Science in petroleum engineering (smart oilfield technologies) is awarded in strict conformity with the general requirements of the Viterbi School of Engineering. A student may be permitted to elect the program without thesis upon approval from the department. Course requirements are similar to the existing MS degree in petroleum engineering in terms of core requirements.

Students without a BS in Petroleum Engineering will normally be required to complete prerequisite courses before beginning the MS program. Specific prerequisite courses are decided upon consultation with the department adviser. Units from these courses cannot be applied toward the degree.
Graduate Certificate in Smart Oilfield Technologies

Program Requirements: 12 units

Required Courses (12 units)

- PTE 586 | Intelligent and Collaborative Oilfield Systems Characterization and Management
- PTE 587 | Smart Completions, Oilfield Sensors and Sensor Technology
- PTE 588 | Smart Oilfield Data Mining
- PTE 589 | Advanced Oilfield Operations with Remote Immersive Visualization and Control
Graduate Certificate – Unconventional Resources in Petroleum Engineering

Program Requirements: 12 units

Required Courses (12 units)

- PTE 502 | Advanced Reservoir Characterization
- PTE 503 | Technology of Unconventional Oil and Gas Resources Development
- PTE 504 | Geophysics for Petroleum Engineers
- PTE 572 | Geostatistics
  or
- PTE 591 | Petroleum Geochemistry

Available on DEN@Viterbi
Where are USC Viterbi Petroleum Engineering alumni working?
Where Our Alumni Are Working

- What do our students do?
- What do our graduates do?
Can a student pursue a Petroleum Engineering graduate program online?
Course Delivery Methods

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>Program Admission</td>
<td>USC Graduate Application &amp; required materials</td>
<td>USC Graduate Application &amp; required materials</td>
</tr>
<tr>
<td>Weekly Course Lectures</td>
<td>Online with Interactivity</td>
<td>On USC’s Campus</td>
</tr>
<tr>
<td>Online Course Archives</td>
<td>✓</td>
<td>✓ *</td>
</tr>
<tr>
<td>(Lectures &amp; Course Documents)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assignments</td>
<td>Submit electronically according to course deadlines</td>
<td>Submit during lecture or lab according to course deadlines</td>
</tr>
<tr>
<td>Exams</td>
<td>Proctored location</td>
<td>USC’s campus</td>
</tr>
<tr>
<td>Courses per Semester (Average)</td>
<td>1-2</td>
<td>3-4</td>
</tr>
<tr>
<td>Degree Completion Requirements</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>USC Diploma (No Distinction)</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

- Breadcrumbs for easy navigation
- Pull-out tab for easy weekly content access
- Player controls include play/pause, and forward/rewind 30 seconds
- Stream in HD, SD, or on your mobile device
- Bookmark needed content areas
- Navigate to the next item or previous

 USC Viterbi School of Engineering
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
Den@Viterbi

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)
What are the Application Requirements and Tuition & Fees?
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/petroleum-engineering/

General Application Criteria

- An undergraduate degree in Petroleum Engineering (or other engineering, math or hard science with assigned deficiencies) from a regionally accredited college or 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

- Letters of Recommendation (3 Required)

- Statement of Purpose (Required)

- TOEFL (International Applicants)
Application Deadlines

Application Deadlines for 2018

Fall 2018
- Deadline to submit all required materials: January 17, 2018*
- Deadline for Scholarship Consideration (on-campus only): December 15, 2017

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
## 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/](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://usc.liaisoncas.com

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

- Start as a Limited Status Student in Summer 2018 -or-
- Start your application: http://www.usc.edu/admission/graduate/apply
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