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 info session?

1. Use the Q&A panel to the right of this presentation.
2. Type your question in the box.
3. An USC representative will answer your question as soon as they are able.
## Today’s Program

<table>
<thead>
<tr>
<th>The University of Southern California</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viterbi School of Engineering</td>
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<tr>
<td>Master of Science in Systems Architecting and Engineering</td>
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<tr>
<td>Program Overview</td>
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<td>Application Criteria</td>
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<tr>
<td>Distance Education Network (DEN@Viterbi)</td>
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<tr>
<td>Tuition &amp; Fees</td>
</tr>
<tr>
<td>Q&amp;A</td>
</tr>
</tbody>
</table>
University of Southern California

- Oldest private university in western U.S. – founded in 1880
- 43,000 Students: 19,000 Undergrads | 24,000 Graduates
- 3,900+ full-time faculty
- Diverse student population
A Dynamic Location: Los Angeles, California

Principal world center for aerospace, communications, biotech R&D, commerce, entertainment and the arts

Los Angeles provides a setting for numerous cultural, educational and career opportunities

California offers rich opportunities for internships and careers, with Silicon Valley to the north; the hub of biotech activity in San Diego, to the south; and Silicon Beach to the west - right in our back yard
Viterbi School at a Glance

Academic Departments
• 8 Academic Departments

Faculty
• 180 tenure-track faculty
• 22 NAE
• 60+ NSF CAREER, Nat’l & Presidential Young Investigator

Student population
• 2,600 Undergraduate
• 5,200 Graduate students

Alumni
• More than 60,000+

Research
• Leader in funded research 45+ Research Centers
### Recent Announcements

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Best Online Graduate Engineering Programs</strong> by U.S. News &amp; World Report (2015 Edition)</td>
<td>- Ranked #1 in Online Computer Information Technology Program (Computer Science) - Top 3 Ranked Online Graduate Engineering Program</td>
</tr>
<tr>
<td><strong>Best Online Graduate Engineering Programs for Veterans</strong> by U.S. News &amp; World Report (2015 Edition)</td>
<td>- Ranked #1 Online Computer Information Technology for Veterans - Ranked #2 Online Graduate Engineering for Veterans</td>
</tr>
</tbody>
</table>
Viterbi School: Points of Distinction

- International Reputation for Excellence

- World Class Faculty & Research
  - NSF Career Awardees
  - Sol Golomb, Nat’l Medal of Science
  - MIT TR35 Faculty Distinctions

- Trojan Family Network

- Complete range of programs
  - Ph.D., Master’s & Bachelor’s Programs
  - Graduate Certificates
  - Continuing Education Short Courses
  - Custom Programs
Viterbi School is a consistent leader in funded research in the U.S.

- highly interdisciplinary research environment
- diverse research areas as robotics, software engineering, sensor networks, vision sciences, automated construction and photonics
- over 45 research centers
- industrial partnerships and collaboration
Meet Professor Azad Madni

Professor Azad Madni

- Technical Director, SAE Program
- Professor, Astronautical Engineering
- 2014 INCOSE Lifetime Achievement Award Winner
- 2011 INCOSE Pioneer Award Winner
- Elected Fellow of AAAS, AIAA, IEEE, INCOSE, IETE, SDPS
- Teaches SAE 549, SAE 547, SAE 548
What Makes SAE Program Unique (http://viterbi.usc.edu/sae)

USC’s Eb Rechtin is Systems Architecting pioneer
- his book on Systems Architecting is required text

Only Program with 2 INCOSE Pioneer Award Winners
- Azad M. Madni and Eb Rechtin

Several Fellows of Professional Societies
- 1 AAAS, 10+IEEE, 7 INCOSE, 2 AIAA, 1 IIE
- SAE students active in INCOSE, IEEE, AIAA, CSER
- first INCOSE Student Division in Southern California

Synergy between teaching and research
- research feeds new material into courses
- teaching uncovers new areas for research

Madni’s award-winning storytelling, P2P learning approach

Top notch adjunct faculty from industry
<table>
<thead>
<tr>
<th>Interesting Factoids for MS Students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active INCOSE-LA USC Student Division</strong></td>
</tr>
<tr>
<td>- opportunity to network with SAE students and faculty</td>
</tr>
<tr>
<td><strong>Active INCOSE-LA Chapter</strong></td>
</tr>
<tr>
<td>- opportunity to network with engineers in space, aerospace, medical devices and energy sectors</td>
</tr>
<tr>
<td><strong>Conference on Systems Engineering Research</strong></td>
</tr>
<tr>
<td>- opportunity to present technical/research papers and network with SE students from US and abroad</td>
</tr>
<tr>
<td><strong>INCOSE-LA Mini-Conference and Regional Mini-Conference</strong></td>
</tr>
<tr>
<td>- opportunity to present and network with industry professionals, students and faculty from LA region</td>
</tr>
</tbody>
</table>
## SAE Skills in Demand

- Systems Architecting
- Systems Integration/SoS Integration
- Concepts of Operations Prototyping
- Engineered Resilient Systems
- Model Based Systems Engineering
- Simulation-based Modeling and Analysis
- Human Systems Integration
- Resilience Engineering
- Agile Development and Lean Operations
## Potential Employers

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace and Automotive companies</td>
<td>Boeing, NGC, Raytheon, Space-X, Toyota, Tesla</td>
</tr>
<tr>
<td>FFRDCs and National Labs</td>
<td>Aerospace Corp., JPL, MITRE, RAND</td>
</tr>
<tr>
<td>Medical Devices and Healthcare Organizations</td>
<td>Medtronic, Kaiser Permanente, VA</td>
</tr>
<tr>
<td>Web Companies</td>
<td>Google, Amazon, Facebook</td>
</tr>
<tr>
<td>State and City Organizations</td>
<td>Port of Los Angeles, LADWP</td>
</tr>
</tbody>
</table>

*USC Viterbi School of Engineering*
M.S. in Systems Architecting & Engineering – Program Details

**Required Courses (15 units)**
All courses required, students may take ISE 460 or SAE 560, SAE 547 or SAE 548
ISE 460 | Engineering Economy or SAE 560
SAE 560 | Economic Considerations for Systems Engineering or ISE 460
SAE 541 | Systems Engineering Theory and Practice
SAE 542 | Advanced Topics in Systems Engineering
SAE 547 | Model-Based Systems Architecting & Engineering or SAE 548
SAE 548 | Systems/System-of-Systems Integration & Communication or SAE 547
SAE 549 | Systems Architecting

**Electives**

Technical Management Area (3 units)
General Technical Area (3 units)
# Technical Specialization Areas (9 units)

- Aerospace and Mechanical Systems
- Artificial Intelligence/Neural Networks
- Automation and Control Systems
- Communication and Signal Processing Systems
- Computer and Information Systems
- Construction
- Cyber-Security
- Engineering Management Systems
- Integrated Media Systems
- Manufacturing Systems
- Network-centric Systems
- Software Process Architecture
- Systems
<table>
<thead>
<tr>
<th>Application Criteria for the M.S. in Systems Architecting &amp; Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Undergraduate degree (Bachelor of Science) in engineering, math, or hard science from a regionally-accredited university</td>
</tr>
<tr>
<td>• Minimum of 3 years of industrial experience is highly recommended</td>
</tr>
<tr>
<td>• A cumulative undergraduate GPA of at least 3.0 on a 4.0 scale is recommended</td>
</tr>
<tr>
<td>• Satisfactory scores on the general portion of the Graduate Record Examination (GRE) that are less than five years old</td>
</tr>
<tr>
<td>• TOEFL (International Applicants)</td>
</tr>
<tr>
<td>• Supplemental Materials:</td>
</tr>
<tr>
<td>o 3 Letters of Recommendation (Required)</td>
</tr>
<tr>
<td>o Statement of Purpose (Required)</td>
</tr>
<tr>
<td>• Please visit viterbi.usc.edu/msdegrees for complete requirements</td>
</tr>
</tbody>
</table>
Waiving the GRE Requirement (only applies to the MSSARE)

There are two ways to waive the GRE admissions requirement for the MS in Systems Architecting and Engineering program.

They are:

1. Having an undergraduate degree in engineering with an overall GPA of 3.0 (or higher) on a 4.0 scale plus either an MS in Engineering or an MBA degree

2. As a Limited student, completing SAE 541, SAE 542, and SAE 549; and either SAE 560 (preferred) or ISE 460. A grade of “B” or better must be earned in each course in order to qualify for the waiver.
Required Courses (15 units)

Five of the following courses required:

ISE 460 | Engineering Economy
SAE 560 | Economic Considerations for Systems Engineering
ISE 515 | Engineering Project Management
ISE 544 | Management of Engineering Teams
SAE 541 | Systems Engineering Theory and Practice
SAE 542 | Advanced Topics in Systems Engineering
SAE 547 | Model based Systems Engineering
SAE 549 | Systems Architecting
SAE 574 | Net-Centric Systems Architecting & Engineering
## Application Criteria for the Grad Cert in Systems Architecting & Engineering

- Undergraduate degree (Bachelor of Science) in engineering, math, or hard science from a regionally-accredited university
- Minimum of 3 years of industrial experience is highly recommended
- To be competitive, a cumulative undergraduate GPA of at least 3.0 on a 4.0 scale is recommended
- TOEFL (International Applicants)
- All courses taken can apply to the M.S. in SARE (if admitted)
- Please visit [viterbi.usc.edu/msdegrees](http://viterbi.usc.edu/msdegrees) for complete requirements
<table>
<thead>
<tr>
<th>Application Deadlines</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FALL – January 15</strong></td>
</tr>
<tr>
<td>- For on-campus students: Apply by December 15 for funding consideration</td>
</tr>
<tr>
<td><strong>SPRING – September 15</strong></td>
</tr>
<tr>
<td>Apply Online:</td>
</tr>
<tr>
<td>- <a href="http://www.usc.edu/admission/graduate/apply">http://www.usc.edu/admission/graduate/apply</a></td>
</tr>
</tbody>
</table>
Where our Alumni are working

What do our students do?

What do our graduates do?
Course Delivery Methods

Methods of Course Delivery

❖ On-campus, full time
  o 3 classes per semester
  o 1.5-2 years to complete degree

❖ Online delivery via DEN@Viterbi
  o 1-2 classes per semester
  o 2 ½ - 3 years to complete degree
## Distance Education Network (DEN@Viterbi)

More than **40 years** of distance education expertise

Online delivery makes earning an MS degree practical and flexible for working professionals

**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)
## Distance Education Network (DEN@Viterbi)

<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</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><em>(Lectures &amp; Course Documents)</em></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td><strong>Assignments</strong></td>
<td>Submit electronically via email or fax</td>
<td>Submit during lecture or lab</td>
</tr>
<tr>
<td></td>
<td>according to course deadlines</td>
<td>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</strong></td>
<td>1-2</td>
<td>3-4</td>
</tr>
<tr>
<td><em>(Average)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Degree Completion Requirements</strong></td>
<td>27-34 units with a 3.0 GPA or above</td>
<td>27-34 units with a 3.0 GPA or above</td>
</tr>
<tr>
<td><strong>USC Diploma</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><em>(No Distinction)</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*DEN@Viterbi sections only.*
Schematic of deflagration

Turbulent premixed flame experiment in a fan-stirred chamber (http://www.mech-eng.leeds.ac.uk/res-group/combustion/activities/Bomb.htm)

Flame thickness ($\delta$) $\sim \alpha/S_L$
($\alpha$ = thermal diffusivity)

Distance from reaction zone:

Convexion-diffusion zone

$\delta = c_{cd}S_L = 0.3 - 6$ mm

Direction of propagation

Speed relative to unburned gas $= S_L$

Product concentration

Temperature

Reactant concentration

2000K

Videos can be streamed or downloaded at high resolutions
DEN@Viterbi’s E-Learning System

DEN@Viterbi Classroom on USC’s Campus
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: http://gapp.usc.edu/graduate-programs/den/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: http://gapp.usc.edu/tuitiondeferment
## Tuition & Fees for M.S. Students

**PER-COURSE TUITION**

<table>
<thead>
<tr>
<th>Course Level</th>
<th>Tuition for 3-Unit Course</th>
<th>Tuition for 4-Unit Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>500/600 level course:</td>
<td>$1,774 per unit</td>
<td>$5,322</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$7,096</td>
</tr>
</tbody>
</table>

- Degree Programs are 27-34 units (9-11 courses)
- For an overview of additional fees, please visit: [https://gapp.usc.edu/graduate-programs/graduate-funding/masters/tuition](https://gapp.usc.edu/graduate-programs/graduate-funding/masters/tuition)
Getting Started

For those interested in taking classes on campus:
- Visit USC campus
- Start your application:
  http://www.usc.edu/admission/graduate/apply

For those interested in DEN@Viterbi delivery
- Start as Limited Student next semester or apply for admission at the link above
USC Viterbi School of Engineering
Graduate and Professional Programs

Email (On Campus): viterbi.gradprograms@usc.edu
Email (DEN@Viterbi): DEN@Viterbi.usc.edu

Phone: 213.740.4488

Web: http://viterbi.usc.edu/msdegrees