Master of Advanced Study Degree

Information Session

29 March 2016
Agenda

- Master of Advanced Study Overview
  - MAS vs MS
  - Application Process/Requirements/Tuition
- Architecture-based Enterprise Systems Engineering
- Medical Device Engineering
- Wireless Embedded Systems
- Data Science and Engineering
- Next Steps
Introduction

• UC San Diego School of Engineering
  – Jacobs School of Engineering
  – Top ranked engineering school
  – Distinguished faculty
  – Commitment to serving needs of industry for latest in research and education
Introduction

• Master of Advanced Study (MAS)
  – Master’s degree, conferred by the University of California, San Diego
  – Technical executive education program designed for engineering professionals
  – Unique multidisciplinary degree program focused on emerging technology areas and new fields traditional curricula do not address
  – MAS degree programs
    • Architecture-Based Enterprise Systems Engineering (since 2010)
    • Medical Device Engineering (since 2011)
    • Wireless Embedded Systems (since 2011)
    • Data Science and Engineering (since 2014)
<table>
<thead>
<tr>
<th>MAS Alums and Current Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott Laboratories</td>
</tr>
<tr>
<td>Abbott Vascular</td>
</tr>
<tr>
<td>Active Mind Technology</td>
</tr>
<tr>
<td>Advanced Brain Monitoring</td>
</tr>
<tr>
<td>AeroAstroTech</td>
</tr>
<tr>
<td>ai-one Inc.</td>
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<tr>
<td>Ajinomoto Althea</td>
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<tr>
<td>Alion Science and Technology</td>
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<tr>
<td>Alphatec Spine</td>
</tr>
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<td>Apex Biotechnology Corp</td>
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<td>BAE Systems</td>
</tr>
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<td>Bank of America Home Loans</td>
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<td>Barona Resort &amp; Casino</td>
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<td>Beckman Coulter</td>
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<tr>
<td>Biopico Systems</td>
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<tr>
<td>Boeing</td>
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<td>Booz Allen Hamilton</td>
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<td>Broadcom Corp</td>
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<td>Cakesoft Technology</td>
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<td>California Correctional Health Care Services</td>
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<td>Callaway Golf</td>
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<td>Carefusion</td>
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<tr>
<td>Catheter Connections</td>
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<tr>
<td>CeloNova BioSciences</td>
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<td>CoStar Group</td>
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<td>Covidien</td>
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<td>Cubic Global Defense</td>
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<tr>
<td>Cubic Transportation Systems</td>
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<td>Cymer</td>
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<td>D&amp;K Engineering</td>
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<td>Dencore Capital Group</td>
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<td>Entropic Communications</td>
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<td>Fallbrook Engineering</td>
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<td>Galaxy, Inc.</td>
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<tr>
<td>Genentech</td>
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<td>General Atomics</td>
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<tr>
<td>GlySens</td>
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<tr>
<td>Harper Construction</td>
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<tr>
<td>Hewlett Packard</td>
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<tr>
<td>Hologic</td>
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<td>Hospira</td>
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<td>Illumina</td>
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<td>Innovive</td>
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<tr>
<td>Inova Diagnostics</td>
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<td>Integrant Inc.</td>
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<td>Intuit</td>
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<tr>
<td>JMJ Financial</td>
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<tr>
<td>KAB Laboratories</td>
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<tr>
<td>Kontron America</td>
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<tr>
<td>Leica Systems</td>
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<td>Life Technologies</td>
</tr>
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<td>LifeNet Health</td>
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<td>Lockheed Martin</td>
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<td>Lucent-Alcatel</td>
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<td>Makena Technologies</td>
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<td>Medtronic Ablation Frontiers</td>
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<td>Medtronic Minimed</td>
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<td>MITRE</td>
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<tr>
<td>Neustar</td>
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<tr>
<td>Nokia</td>
</tr>
<tr>
<td>Northrop Grumman</td>
</tr>
<tr>
<td>NuVasive</td>
</tr>
<tr>
<td>Obzervant</td>
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<tr>
<td>Oncore Manufacturing</td>
</tr>
<tr>
<td>Optum360, a division of United Health Group</td>
</tr>
<tr>
<td>Panasonic</td>
</tr>
<tr>
<td>Peregrine Semiconductor</td>
</tr>
<tr>
<td>Pfizer</td>
</tr>
<tr>
<td>Qualcomm</td>
</tr>
<tr>
<td>Raytheon</td>
</tr>
<tr>
<td>SAIC</td>
</tr>
<tr>
<td>Samsung</td>
</tr>
<tr>
<td>San Diego Super Computer</td>
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<tr>
<td>Sentek Global</td>
</tr>
<tr>
<td>Servicios Quirugicos S.A.</td>
</tr>
<tr>
<td>Scripps Institute, UCSD</td>
</tr>
<tr>
<td>Solar Turbines</td>
</tr>
<tr>
<td>SPAWAR</td>
</tr>
<tr>
<td>SSC Pacific</td>
</tr>
<tr>
<td>Survice Engineering</td>
</tr>
<tr>
<td>SynteractHCR</td>
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<tr>
<td>Tandem Diabetes</td>
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<tr>
<td>TASC</td>
</tr>
<tr>
<td>Teradata</td>
</tr>
<tr>
<td>The Boeing Company</td>
</tr>
<tr>
<td>Ticom Geomatics</td>
</tr>
<tr>
<td>TrellisWare</td>
</tr>
<tr>
<td>UCSD Medical Center</td>
</tr>
<tr>
<td>UCSD Research Administration</td>
</tr>
<tr>
<td>United Technologies Aerospace</td>
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<tr>
<td>Universal Hospital Services</td>
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<tr>
<td>ViaSat</td>
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<tr>
<td>Volcano</td>
</tr>
<tr>
<td>Vulcan Wireless</td>
</tr>
<tr>
<td>West Arbor Group</td>
</tr>
<tr>
<td>Y8L Consulting</td>
</tr>
<tr>
<td>4Med Imaging Solutions</td>
</tr>
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# Program Requirements

<table>
<thead>
<tr>
<th>General Requirements</th>
<th>Work Experience Required</th>
<th>Application Deadline (all dates 2016)</th>
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</thead>
<tbody>
<tr>
<td>AESE</td>
<td>5 Years</td>
<td>Priority: May 2 Standard: June 30</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mathematics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Physics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>3.0 Minimum*</td>
<td></td>
</tr>
<tr>
<td>WES</td>
<td>2 Years</td>
<td>Priority: May 2 Standard: June 30</td>
</tr>
<tr>
<td>3 Letters of Reccomendation</td>
<td>2 Years</td>
<td>Priority: May 2 Standard: June 30</td>
</tr>
<tr>
<td>CV/Resume</td>
<td>2 Years</td>
<td>Priority: May 2 Standard: June 30</td>
</tr>
<tr>
<td>DSE</td>
<td>2 Years</td>
<td>Priority: May 2 Standard: June 30</td>
</tr>
<tr>
<td>No GRE</td>
<td></td>
<td></td>
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</tbody>
</table>

- Online application process: MASEng.ucsd.edu/<<program>>/admissions
- You may apply to more than 1 program
# Program Schedule

<table>
<thead>
<tr>
<th></th>
<th>Schedule</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>AESE</td>
<td>1 Year (Full-time)</td>
<td>13 units-----</td>
<td>13 units------</td>
<td>13 units------</td>
<td>3 units capstone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>42 units total</td>
<td>3 classes + project</td>
<td>3 classes + project</td>
<td>3 classes + project</td>
<td>project</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MDE</td>
<td>6 units-----</td>
<td>6 units------</td>
<td>8 units------</td>
<td>no summer classes</td>
<td>5 units-----</td>
<td>6 units------</td>
<td>5 units------</td>
</tr>
<tr>
<td></td>
<td>2 Years (Part-time)</td>
<td>1.5 classes</td>
<td>1.5 classes</td>
<td>2 classes</td>
<td></td>
<td>1.25 classes</td>
<td>1.5 classes</td>
<td>1.25 classes</td>
</tr>
<tr>
<td></td>
<td>36 units total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WES</td>
<td>4 units-----</td>
<td>4 units------</td>
<td>4 units------</td>
<td>8 units------</td>
<td>8 units------</td>
<td>8 units------</td>
<td>4 units------</td>
</tr>
<tr>
<td></td>
<td>2 Years (Part-time)</td>
<td>1 class</td>
<td>1 class</td>
<td>1 class</td>
<td>2 classes</td>
<td>2 classes</td>
<td>capstone</td>
<td>capstone</td>
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<tr>
<td></td>
<td>36 units total</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DSE</td>
<td>6 units------</td>
<td>8 units------</td>
<td>8 units------</td>
<td>no summer classes</td>
<td>8 units------</td>
<td>6 units------</td>
<td>2 units</td>
</tr>
<tr>
<td></td>
<td>2 Years (Part-time)</td>
<td>1 class</td>
<td>2 classes</td>
<td>2 classes</td>
<td></td>
<td>1 class</td>
<td></td>
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<tr>
<td></td>
<td>38 units total</td>
<td>1 seminar</td>
<td></td>
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</table>
# Program Cost (Fall 2016 Cohorts)

<table>
<thead>
<tr>
<th></th>
<th>Total Cost*</th>
<th>Includes</th>
</tr>
</thead>
</table>
| AESE | $32,800.+   | • Tuition
        |             | • Books
        |             | • Software
        |             | • Mandatory UC Graduate Student Fees
        |             | • Parking (10 days/quarter)                   |
| MDE  | $35,300.    | • Does NOT include mandatory health coverage  |
        |             | (~$3000. per academic year)                   |
| WES  | $35,400.    | • Payment options
        |             | • Pay by quarter (standard)
        |             | • Annual payment options                     |
| DSE  | $37,000.    |                                               |

* UC Graduate Student Fees are estimated pending State of California final budget

+ Pending UC Approval
Specific Program Information

• Program Calendars
  JacobsSchool.ucsd.edu/MAS/<PROGRAM>
  – “Download 2016-18 Schedule” (DSE, MDE, WES)
  – “Download 2016-17 Schedule” (AESE)

• Program Cost
  JacobsSchool.ucsd.edu/MAS/<PROGRAM> → Cost
  – “Total program cost”
  – Breakdown of costs by quarter and course
# MDE Program Costs 2016-18

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Class #</th>
<th>Class Name</th>
<th># Units</th>
<th>Class Fee</th>
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</thead>
<tbody>
<tr>
<td>Fall 2016</td>
<td>MDE 210</td>
<td>Medical Devices: Clinical Perspectives</td>
<td>4</td>
<td>$3,520.00</td>
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<tr>
<td></td>
<td>MDE 231A</td>
<td>Fundamentals of Physiology and Anatomy</td>
<td>2</td>
<td>$1,760.00</td>
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<tr>
<td></td>
<td></td>
<td>Mandatory UCSD Graduate Student Fees**</td>
<td></td>
<td>$600.21</td>
</tr>
<tr>
<td></td>
<td>Quarter Total</td>
<td></td>
<td>6</td>
<td>$5,880.21</td>
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<tr>
<td>Winter 2017</td>
<td>MDE 209</td>
<td>Mechanics and Transport Processes for Biomedical Device Design</td>
<td>4</td>
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<td></td>
<td>MDE 231B</td>
<td>Fundamentals of Physiology and Anatomy</td>
<td>2</td>
<td>$1,760.00</td>
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<tr>
<td></td>
<td></td>
<td>Mandatory UCSD Graduate Student Fees**</td>
<td></td>
<td>$600.21</td>
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<tr>
<td></td>
<td>Quarter Total</td>
<td></td>
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<td>$5,880.21</td>
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<tr>
<td>Spring 2017</td>
<td>MDE 292</td>
<td>Computer Aided Design of Medical Devices</td>
<td>4</td>
<td>$3,520.00</td>
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<td></td>
<td>MDE 230</td>
<td>Life Sciences and Technologies</td>
<td>4</td>
<td>$3,520.00</td>
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<td>$600.21</td>
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<td></td>
<td>Quarter Total</td>
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<td>8</td>
<td>$7,640.21</td>
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<tr>
<td>Fall 2017</td>
<td>MDE 260A</td>
<td>Design and Implementation of Medical Device Technology I</td>
<td>1</td>
<td>$880.00</td>
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<td>MDE 266</td>
<td>Biomaterials: Nano to Macroscale</td>
<td>4</td>
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<td>Mandatory UCSD Graduate Student Fees**</td>
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<td>$600.21</td>
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<td></td>
<td>Quarter Total</td>
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<td>5</td>
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<tr>
<td>Winter 2018</td>
<td>MDE 260B</td>
<td>Design and Implementation of Medical Device Technology II</td>
<td>1</td>
<td>$880.00</td>
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<tr>
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<td>MDE 240</td>
<td>Embedded System Design</td>
<td>4</td>
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<td>MDE 225A</td>
<td>Biobusiness: Small to Large</td>
<td>2</td>
<td>$1,760.00</td>
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<td>Mandatory UCSD Graduate Student Fees**</td>
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<td>$600.21</td>
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<tr>
<td></td>
<td>Quarter Total</td>
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<td>7</td>
<td>$6,760.21</td>
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<tr>
<td>Spring 2018</td>
<td>MDE 260C</td>
<td>Design and Implementation of Medical Device Technology III</td>
<td>2</td>
<td>$1,760.00</td>
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<td>MDE 225B</td>
<td>Biobusiness: Small to Large</td>
<td>2</td>
<td>$1,760.00</td>
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<td></td>
<td></td>
<td>Mandatory UCSD Graduate Student Fees**</td>
<td></td>
<td>$600.21</td>
</tr>
<tr>
<td></td>
<td>Quarter Total</td>
<td></td>
<td>4</td>
<td>$4,120.21</td>
</tr>
<tr>
<td></td>
<td>**2016-2018 Total</td>
<td></td>
<td>36</td>
<td>$35,281.26</td>
</tr>
</tbody>
</table>

**UCSD Graduate Student Fees are estimated pending State of California final budget.
Master of Advanced Study Degree

Architecture-based Enterprise Systems Engineering Leadership Program

Prof. Alexander Zak
Enterprise systems and system-of-systems are necessarily complex adaptive systems. Development of complex adaptive systems stresses heuristics through synthesis rather than analysis. Team projects are major requirement for program completion.

- Faculty directors
  - Hal Sorenson, Professor, Mechanical and Aerospace Engineering
  - Ingolf Kreuger, Associate Professor, Computer Science and Engineering
    - and Rady School of Management
  - Joseph Engelberg, Associate Professor, Rady School of Management

- Jacobs School of Engineering + Rady School of Management

- Intended audience
  - Senior engineers
  - Engineering managers

- Courses:
  - 1 year program (September 2016 – August 2017)
  - Alternating Friday/Saturdays
  - Plus a Wednesday-Saturday workshop each quarter
Learn the appropriate management and engineering domains, methodologies, technologies, and tools for developing the complex distributed systems that support effective and knowledgeable decisions for an enterprise.
AESE Academic Context

- Business environment is global and driven by events that necessitate timely and effective response
- Engineering development environment is directed toward interoperability through integration of heterogeneous resources

⇒ *Engineers who want to lead* in this environment need a greater knowledge of
  - Business and leadership essentials
  - Methodologies for architecting and engineering of information-intensive socio-technical systems

### Educational Alternatives for Working Professionals

<table>
<thead>
<tr>
<th>M.S.</th>
<th>M.B.A.</th>
<th>MAS in AESE</th>
</tr>
</thead>
<tbody>
<tr>
<td>No business</td>
<td>No engineering</td>
<td>Business and Engineering</td>
</tr>
<tr>
<td>2 or 3 years</td>
<td>2 or 3 years</td>
<td>1 year</td>
</tr>
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# AESE Curriculum

<table>
<thead>
<tr>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essentials of Business Practice (Rady)</td>
<td>Enterprise Architecting (Jacobs)</td>
<td>Patterns for Enterprise Architecting (Jacobs)</td>
<td>Team Project Workshop &amp; Final Presentation</td>
</tr>
<tr>
<td>Leadership Skills, Values, and Team Building Workshop (Rady)</td>
<td>Engineering Essentials for Distributed Systems (Jacobs)</td>
<td>Decision and Risk Analysis (Rady)</td>
<td></td>
</tr>
<tr>
<td>Complexity and Large-Scale Systems (Jacobs)</td>
<td>Modeling, Simulation &amp; Analysis (Jacobs)</td>
<td>Managing Stakeholder Relationships Workshop (Rady)</td>
<td></td>
</tr>
<tr>
<td>Team Project 1</td>
<td>Team Project 2</td>
<td>Team Project 3</td>
<td></td>
</tr>
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</table>

**TOTAL: 42 units**
Master of Advanced Study Degree

Medical Device Engineering

Faculty Directors
Professor Juan Lasheras, MAE
Professor John Watson, BE
Professor David Gough, BE
Medical Device Engineering

Broad education in biology, mechanical design, and materials focused on medical device engineering.

• Faculty directors
  – Juan Lasheras, Professor, Mechanical and Aerospace Engineering
  – John Watson, Professor, Bioengineering
  – David Gough, Professor, Bioengineering

• Bioengineering + Mechanical Engineering

• Intended audience
  – Engineering professionals in medtech with minimum ~2 years experience

• Courses:
  – 2 year program (September 2016 – June 2018)
  – Alternating Fridays or Friday/Saturdays
MAS Medical Device Engineering

• Target applicants
  – Engineering professionals working in industries concerned with medical devices and medical instrumentation.
  – The program is designed for early to mid-career design engineers who are on a technical leadership track within their companies, or who are interested in learning the business development and regulatory issues associated with the design of novel devices and instrumentation.
## MAS MDE: Curriculum

<table>
<thead>
<tr>
<th>Y1 Fall</th>
<th>Y1 Winter</th>
<th>Y1 Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Devices: Clinical Perspectives (4 units)</td>
<td>Mechanics and Transport Process for Biomedical Device Design (4 units)</td>
<td>Computer Aided Design of Medical Devices (4 units)</td>
</tr>
<tr>
<td>Fundamentals of Physiology and Anatomy (2 units)</td>
<td>Fundamentals of Physiology and Anatomy (2 Units)</td>
<td>Life Sciences and Technologies (4 units)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y2 Fall</th>
<th>Y2 Winter</th>
<th>Y2 Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomaterials for Medical Devices (4 units)</td>
<td>Biobusiness: Small to Large (2 units)</td>
<td>Biobusiness: Small to Large (2 units)</td>
</tr>
<tr>
<td></td>
<td>Embedded Systems Design (4 units)</td>
<td></td>
</tr>
<tr>
<td>Design and Implementation of Medical Technology (Capstone – 4 units)</td>
<td>Part I</td>
<td>Part II</td>
</tr>
</tbody>
</table>
MAS MDE: Curriculum

• Master of Advanced Study – MDE
  – 36-unit degree program spanning two years
    • Eight 4-unit courses
    • One 4-unit, 3-quarter capstone team project
      – Create a prototype
      – Begins Fall Y2
      – Combination of in-class, laboratory, and off-campus work.
      – The capstone provides an opportunity for students to integrate knowledge acquired over previous quarters in a written report and oral presentation.
      – Incorporates development cycle, process, regulatory concerns, reimbursement strategies.

• Seminars
  – Technical leadership
  – Healthcare economics/reimbursement
  – Biomedical informatics
  – Regulatory aspects
  – Design control
Master of Advanced Study Degree

Wireless Embedded Systems

Faculty Directors
Professor George Papen, ECE
Professor Ryan Kastner, CSE
Wireless Embedded Systems

Deep and broad education in the multidisciplinary fundamentals of wireless communications and embedded system design.

- Faculty directors
  - Professor George Papen, Electrical and Computer Engineering
  - Professor Ryan Kastner, Computer Science and Engineering
- Electrical and Computer Engineering + Computer Science and Engineering
- Intended audience
  - Engineering professionals with a background in computer science and/or electrical engineering
- Courses:
  - 2 year program (September 2016 – June 2018)
  - Alternating Fridays or Friday/Saturdays
Why a MAS Wireless Embedded Systems Degree?

• **Wireless revolution**
  - Interconnection of everyday devices through wireless technology - "Internet of Things"
  - 50 billion wireless devices by 2020: Ericson CEO Hans Vestberg
  - Inherently interdisciplinary, residing at the boundary between Electrical Engineering and Computer Science

• **Next generation embedded wireless devices**
  - Form factor, cost, and power consumption must be dramatically lower than existing cellular phones.
  - Design requires a unique interdisciplinary background in systems, software, hardware, and communication theory.

There is a strong need for a targeted *high-quality* program aimed at high-level training of professional engineers.
MAS WES: Curriculum

Software

- Introduction to Embedded Systems Design
- Validation and Prototyping of Embedded Systems
- Software for Embedded Systems
- Wireless Embedded System on Chip

Hardware

- Wireless Communication Systems
- Digital Signal Processing
- Digital Communication Systems

Capstone Project

Software for Embedded Systems

Digital Communication Systems
### MAS WES: Curriculum

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<th>Y1 Spring</th>
<th>Y1 Summer</th>
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<th>Y2 Winter</th>
<th>Y2 Spring</th>
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</table>
Master of Advanced Study Degree

Data Science and Engineering

Faculty Directors
Professor Yoav Freund
Professor Yannis Papakonstantinou
Professor Ilkay Altintas de Callafon
MAS Data Science and Engineering

Combine the skills of software programmer, database manager and statistician to create mathematical models of the data, identify trends, then present them in effective visual ways.

• Faculty directors
  – Professor Yoav Freund, Computer Science and Engineering
  – Professor Yannis Papakonstantinou, Computer Science and Engineering
  – Dr. Ilkay Altintas de Callafon, Chief Data Science Officer, San Diego Supercomputer Center

• Computer Science and Engineering + San Diego Supercomputer Center

• Intended audience
  – Engineering professionals with a background in computer science or other engineering or mathematics with substantial experience in data analysis.

• Courses:
  – 2 year program (September 2016 – June 2018)
  – Alternating Fridays or Friday/Saturdays
The Education of a Data Scientist

Hacking Skills
Machine Learning
Math & Statistics Knowledge

Danger Zone!
Data Science
Traditional Research

Substantive Expertise

Doing Data Science: Straight Talk from the Frontline
Rachel Schutt & Cathy O’Neil
## MAS DSE: Coursework

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<td>DSE 200: Python for Data Analysis (4 units) – Freund</td>
<td>DSE 201: Data Management Systems (4 units) – Papakonstantinou</td>
<td>DSE 220: Machine Learning (4 units) – Balac</td>
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<td>DSE 210: Probability and Statistics using Python (4 units) – Dasgupta</td>
<td>DSE 230: Data Science using Hadoop and Spark (4 Units) – Freund</td>
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- DSE 260 (2 units) – Papakonstantinou
- DSE 260 (2 units) – Papakonstantinou
MAS Data Science and Engineering

• Curriculum

**Foundational Courses (required)**
- Python for Data Analysis
- SQL Database Management Systems
- Statistics and Probability Using Python

**Core Courses (required)**
- Data Integration & ETL
- Machine Learning
- Data Analysis Using Hadoop, and Spark
- Case Studies in Data Science

**Elective Courses (2 required)**
- Data Analysis Using R
- Performance Measurement
- Online Analytics Applications
- Data Visualization
- Beyond Relational Data Models
- Managing Large-Scale Graph Data

**Capstone Course (required)**
- Data Science Capstone Design Project
MAS DSE: Requirements

1. What is your programming experience? List the programming languages in which you are fluent in. Describe your role in the development of a complex/interesting software project.

2. Describe your experience using SQL systems. Have you designed a database schema? Have you tuned the performance of a database? Have you written queries involving joins/outer-joins, nesting, grouping?

3. Do you have any hands-on experience with parallel and distributed systems? Please describe one of these experiences.

4. Describe your experience using analytical software such as R, Matlab, SPSS, SAS, Stata, Pandas, Weka, ...? Briefly describe on one of the projects using that software.

5. What are the more advanced concepts from probability, statistics that and machine learning you have used in your work? (Examples: regression, covariance, decision trees, graphical models, SVD, SVM, P-values....) Briefly describe the context in which you used one of these concepts.

6. Describe the most significant analytical task that you have performed in the course of your job or school work.
Master of Advanced Study Degree

Next Steps
Next Steps – All Programs

• For more information:
  – JacobsSchool.ucsd.edu/MAS

• To apply:
  – JacobsSchool.ucsd.edu/<PROGRAM>/admissions

• Questions:
  – Ask today!

• More questions:
  – JacobsMAS@eng.ucsd.edu
  – Specify program
Download 2016-18 PDF from:
JacobsSchool.ucsd.edu/MAS/MDE
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Download 2016-18 PDF from: JacobsSchool.ucsd.edu/MAS/WES
### AESE Program Costs 2016-17

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<th>Class #</th>
<th>Class Name</th>
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| **2016-2017 Total** | **42** | **$32,760.63** |

*UCSD Graduate Student Fees are estimated pending State of California final budget*

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## DSE Program Costs 2016-18

<table>
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<th>Class #</th>
<th>Class Name</th>
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<th>Class Fee</th>
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**Electives**

- DSE 221 Data Analysis Using R
- DSE 232 Performance Measurement
- DSE 240 Online Analytics Applications
- DSE 241 Data Visualization
- DSE 250 Beyond Relational Data Models
- DSE 251 Managing Large-Scale Graph Data

**UCSD Graduate Student Fees are estimated pending State of California final budget**

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## MDE Program Costs 2016-18

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<th>Class Name</th>
<th># Units</th>
<th>Class Fee</th>
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<td>Medical Devices: Clinical Perspectives</td>
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**UCSD Graduate Student Fees are estimated pending State of California final budget.
## WES Program Costs 2016-18

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**2016-2018 Total** | **36** | **$35,371.26**

**UCSD Graduate Student Fees are estimated pending State of California final budget.**
## AESE Payment Options

### MAS AESE 2016-17

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<th>Semester</th>
<th>Courses</th>
<th># Units</th>
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<th>Mandatory UCSD Graduate Student Fees**</th>
<th>Option 1 (UCSD Standard - quarterly payments)</th>
<th>Option 2 (Designed for those with $15K tuition reimbursement plans)</th>
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</tbody>
</table>

*Includes books, materials, 10 days of parking per quarter, lunch*

**Estimated

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**Please note:** UCSD accepts personal and cashier's checks. UCSD does not accept personal credit card payments.

Payments are made through student TritonLink account or UCSD Cashier's Office.

Payments are made through MAS Office.
# MDE Payment Options

## MAS MDE Cohort 6 (2016-2018)

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<th>Course #</th>
<th># Units</th>
<th>Tuition*</th>
<th>Mandatory UCSD Graduate Student Fees</th>
<th>Option 1 (UCSD Standard - quarterly payments)</th>
<th>Option 2 (designed for those with &gt;$10K annual tuition reimbursement)</th>
<th>Option 3 (designed for those with &gt;$7500 annual tuition reimbursement)</th>
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*Estimated

*(includes books, materials, 10 days of parking per quarter, lunch)

**Please note:** UCSD accepts personal and cashier's checks.

Payments are made through student TritonLink account or UCSD Cashier's Office
Payments are made through MAS Office
# MAS WES Payment Options

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<th>Mandatory UCSD Graduate Student Fees**</th>
<th>Option 1 (UCSD Standard - quarterly payments)</th>
<th>Option 2 (designed for those with &gt;$10K annual tuition)</th>
<th>Option 3 (optimized for those with ~$5K annual tuition)</th>
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*(includes books, materials, 10 days of parking per quarter, lunch - does NOT include health insurance)

$35,373.01 $35,373.01 $35,373.01

**Please note:** UCSD accepts personal and cashier's checks. UCSD does not accept personal credit card payments.

**Estimated**

Payments are made through student TritonLink account or UCSD Cashier's Office Payments are made through MAS Office.
# DSE Payment Options

## MAS DSE Cohort 3 (2016-2018)

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*Includes books, materials, 10 days of parking per quarter, lunch - does NOT include health insurance

**Please note:** UCSD accepts personal and cashier's checks. UCSD does not accept personal credit card payments.

Payments are made through student TritonLink account or UCSD Cashier's Office

**Estimated**