Master of Advanced Study (MAS) Degree Information Session

12 June 2019

Watch the live stream video of our March presentation here.
Agenda

• Master of Advanced Study Overview
  – MAS vs MS
  – Application Process/Requirements/Tuition

• Wireless Embedded Systems (WES)

• Data Science and Engineering (DSE)

• Architecture-based Enterprise Systems Engineering (AESE)

• Next Steps
Introduction

- **UC San Diego School of Engineering**
  - Jacobs School of Engineering (largest in CA among public universities)
  - Top ranked engineering school
    - 6th in the nation among public universities / 11th among all engineering programs
  - Distinguished faculty (>230 research-active 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 education programs designed for engineering professionals
  - Unique multidisciplinary degree program focused on emerging technology areas and new fields traditional curricula do not address
  - MAS degree programs
    - WES - Wireless Embedded Systems (since 2011)
    - DSE - Data Science and Engineering (since 2014)
    - AESE - Architecture-Based Enterprise Systems Engineering (since 2010)

194 Companies Represented

4Med Imaging Solution
Abbott Laboratories
Abbott Vascular Devices
Accenture
Active Mind Technology
Advanced Brain Monitoring
AeroAstroTech
ai-one
Ajinomoto Althea
Alion Science and Technology
Alphatec Spine
American Bureau of Shipping
Angeles Crest Engineering
Apex Biotechnology
Applied Medical
AT Dynamics
Athena Mobile
Automatic Data Processing
BAE Systems
Bank of America
Bank of America Home Loans
Barona Resort & Casino
Beckman Coulter
Biopico Systems
Biorxn
Boeing
Booz Allen Hamilton
Branchpoint Technologies
Broadcom
CA Technologies
Cakesoft Technology
California Correctional Health Care
Gas and Power Technologies
Services
Callaway Golf
Caltrans
Caradigm
Carefusion
Carollo Engineers
Catheter Connections
CeloNova BioSciences
Circadence
Clarity Design
Classic Wire Cut
CodeMetro
Cognex Corporation
CoStar Group
Coviden
Coway USA
Craffer Brothers
Cubic Global Defense
Cubic Mission Systems
Cubic Transportation Systems
Cymer
DRK Engineering
Deccan International
Dexcom
EMN Defense Services
Encore Capital Group
Endologix
EnGenious Technologies
Entropic Communications
Epic Systems
ESRI
Fallbrook Engineering
FICO
FloQast
Forcepoint
Ford Motor Company
Forward Slope
Future Education
Galaxy
Genentech
General Atomics
Gimbal
GlySens
Goal Structured Solutions
Google
GoPro
greenfence
Growth 2.0
Harper Construction
Hewlett Packard
Hologic
Hospira
Hyundai Mobis
IBM
IKA
Illumina
InfoSys
Innovive
Inova Diagnostics
Integran
INTEGRIS Group
Intel
Intuit
JMJ Financial
John Wayne Cancer Institute
KAB Laboratories
KEDZIG
Kelpac Medical
Kiran Analytics
Komaru Technologies
Kontron America
kWh Analytics – Solar Risk Management
Lead Crunch
Leica Systems
Leidos
Life Technologies
LifeNet Health
LinkedIn
Loan Depot
Lockheed Martin
Los Angeles Dodgers
Lucent-Alcatel
Makena Technologies
Medimexico
MedImpact
Medtronic Ablation Frontiers
Medtronic Minimed
Metron Scientific Solutions
Microsoft
MITRE
NAVAIR
Network Appliances (NetApp)
Neustar
Nokia
Northrop Grumman Aerospace Systems
Northrop Grumman Mission Systems
Novartis
NuVasive
Obzervant
Oncore Manufacturing
OneRoof Energy
Optum360/United Health Group
Panasonic
Parastack
Pegasystems
Peregrine Semiconductor
Pfizer
PluralProQinase GmbH
Qualcomm
Raytheon
Resonetics
SAIC
Samsung
San Diego State University
Scripps Health
Scripps Institute, UC San Diego
SeaSpine
Sentek Global
Servicios Quirugicos S.A.
Shutterfly
Skillnet Solutions
SkySurgery
Slacker Radio
Social Nightlife
Solar Turbines
SPAWAR SSC Pacific
Stanford University
Stonehenge Financial Partners
Survice Engineering
Sycuan Casino
SyneractHCR
Tandem Diabetes
TASC
Tek Diagnostics
Teradata
Texas Instruments
Thermo Fisher Scientific
Ticom Geomatics
TrellisWare
Triage Consulting Group
Turn Key
Ubiquomm
UCSD Health
UCSD Information Technology Services
UCSD Medical Center
UCSD Research Administration
UCSD Scripps Institute of Oceanography
UCSD San Diego Super Computer
United States Navy
United Technologies Aerospace
Universal Hospital Services
Uptake
Veyo
ViaSat
Volcano
Vulcan Wireless
Walt Disney Company
Webroot
West Arbor Group
Workday
Y8L Consulting
Zodiam Pool Systems
## Program Requirements

<table>
<thead>
<tr>
<th>General Requirements</th>
<th>Work Experience Required</th>
<th>Application Deadline (all dates 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AESE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Engineering</td>
<td>5 Years</td>
<td>June 24</td>
</tr>
<tr>
<td>- Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mathematics</td>
<td>2 Years</td>
<td>June 24</td>
</tr>
<tr>
<td>- Physics</td>
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<tr>
<td><strong>WES</strong></td>
<td></td>
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<tr>
<td>- Mathematics</td>
<td>2 Years</td>
<td>June 24</td>
</tr>
<tr>
<td>- Physics</td>
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<tr>
<td><strong>DSE</strong></td>
<td></td>
<td></td>
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<tr>
<td>GPA</td>
<td>2 Years</td>
<td>June 24</td>
</tr>
<tr>
<td>- 3.0 Minimum*</td>
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<td></td>
</tr>
<tr>
<td>No GRE</td>
<td></td>
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</tr>
<tr>
<td>No TOEFL if working in US for more than 1 year (may require Letter of Exception)</td>
<td></td>
<td></td>
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</table>

*Some exceptions*

- You may apply to more than 1 program
## Program Schedule

<table>
<thead>
<tr>
<th>Program</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</td>
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<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>capstone project</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WES</td>
<td>2 Years (Part-time)</td>
<td>4 units</td>
<td>4 units</td>
<td>4 units</td>
<td>8 units</td>
<td>8 units</td>
<td>4 units</td>
<td>capstone</td>
</tr>
<tr>
<td></td>
<td>36 units total</td>
<td>1 class</td>
<td>1 class</td>
<td>1 class</td>
<td>2 classes</td>
<td>2 classes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DSE</td>
<td>2 Years (Part-time)</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>38 units total</td>
<td>1 class</td>
<td>2 classes</td>
<td>2 classes</td>
<td></td>
<td>2 classes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 seminar</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Notes:**
- AESE: 3 classes + project
- WES: 2 classes
- DSE: no summer classes
## Program Cost (Fall 2019 Cohorts)

<table>
<thead>
<tr>
<th></th>
<th>Total Cost*</th>
<th>Includes</th>
</tr>
</thead>
</table>
| AESE           | $33,000.    | • Tuition  
• Books  
• Software  
• Mandatory UC Graduate Student Fees  
• Breakfast and Lunch on class days  
• Parking (10 days/quarter)                                                                 |
| 42 units (1 year) |             |                                                                                                                         |
| WES            | $37,000.    | • Does NOT include mandatory health coverage (~$3500. per academic year) – can be waived with proof of insurance     |
| 36 units (2 year) |             |                                                                                                                         |
| DSE            | $39,000.    | • Payment options  
• Pay by quarter (standard)  
• Other payment options (MAS only)                                                                 |
| 38 units (2 year) |             |                                                                                                                         |

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

http://jacobsschool.ucsd.edu/mas/

Master of Advanced Study Degree

Details available for each program

MAS Home Programs Overview Faculty Curriculum Admissions Costs Resources

Course Calendar FAQ
Master of Advanced Study

Questions?
Master of Advanced Study Degree

Wireless Embedded Systems

Faculty Directors
Professor George Papen
Professor Ryan Kastner
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 2019 – June 2021)
  - Alternating Fridays or Friday/Saturdays
  - 7 quarters, including Summer
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: Ericsson 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

**CS**
- Embedded Systems Design
- Software for Embedded Systems
- Hardware Design for Embedded Systems
- Validation and Prototyping of Embedded Systems

**EE**
- Digital Signal Processing
- Digital Communication Systems
- Wireless Communication Systems

Capstone Project
# MAS WES: Curriculum

<table>
<thead>
<tr>
<th>Y1 Fall</th>
<th>Y1 Winter</th>
<th>Y1 Spring</th>
<th>Y1 Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Signal Processing (Prof. Fred Harris)</td>
<td>Intro to Embedded Systems (Prof. Hoover/Prof. Barngrover)</td>
<td>DSP II / Wireless Communication Circuit Systems (Prof. Das)</td>
<td>Software for Embedded Systems (Prof. Gupta)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y2 Fall</th>
<th>Y2 Winter</th>
<th>Y2 Spring</th>
</tr>
</thead>
</table>
Program Requirements

• **Admission Guidelines:**
  - Bachelor’s Degree
    • Computer Science
    • Electrical Engineering

• GPA: 3.0 Minimum

• Statement of Purpose

• 3 Letters of Recommendation

• No GRE required: 2 Years relevant experience

• Admissions open now
Wireless Embedded Systems

Questions?

CS
- Embedded Systems Design
- Software for Embedded Systems
- Hardware Design for Embedded Systems

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

Capstone Project
- Validation and Prototyping of Embedded Systems

UC San Diego
Jacobs School of Engineering
Master of Advanced Study Degree

Data Science and Engineering

Faculty Directors
Professor Ilkay Altintas de Callafon
Professor Yoav Freund
Professor Alin Deutsch
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
  – Dr. Ilkay Altintas de Callafon, Chief Data Science Officer, San Diego Supercomputer Center
  – Professor Yoav Freund, Computer Science and Engineering
  – Professor Alin Deutsch, Computer Science and Engineering

• 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 2019 – June 2021)
  – Alternating Fridays or Friday/Saturdays
What is Big Data?

- **Gigabyte**: The first Gigabyte hard drive was introduced by IBM in 1980 and weighed 550 lbs with a price of $40,000.
- **Terabyte**: 500TB of new data per day are ingested in Facebook databases.
- **Petabyte**: The CERN Large Hadron Collider generates 1PB per second.
- **Exabyte**: 1EB of data is created on the internet each day.
- **Zettabyte**: 1EB of data is created on the internet each day.
- **Brontobyte**: 10^27 bytes.
- **Yottabyte**: 10^24 bytes.
- **Geopbyte**: 10^30 bytes.

**Gigabyte**

- 10^9 bytes
- The first Gigabyte hard drive was introduced by IBM in 1980 and weighed 550 lbs with a price of $40,000.

**Terabyte**

- 10^12 bytes
- 500TB of new data per day are ingested in Facebook databases.

**Petabyte**

- 10^15 bytes
- The CERN Large Hadron Collider generates 1PB per second.

**Exabyte**

- 10^18 bytes
- 1EB of data is created on the internet each day.

**Zettabyte**

- 10^21 bytes
- 1EB of data is created on the internet each day.

**Brontobyte**

- 10^27 bytes

**Yottabyte**

- 10^24 bytes

**Geopbyte**

- 10^30 bytes
The Education of a Data Scientist

- Hacking Skills
- Math & Statistics Knowledge
- Data Science
- Machine Learning
- Traditional Research
- Substantive Expertise
- Danger Zone!
### MAS DSE: Coursework

<table>
<thead>
<tr>
<th>Y1 Fall</th>
<th>Y1 Winter</th>
<th>Y1 Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSE 200: Python for Data Analysis (4 units)</td>
<td>DSE 201: Data Management Systems (4 units)</td>
<td>DSE 220: Machine Learning (4 units)</td>
</tr>
<tr>
<td>– Altintas de Callafon</td>
<td>– Papakonstantinou</td>
<td>– Vural</td>
</tr>
<tr>
<td>DSE 290: Case studies in Data Science (2</td>
<td>DSE 210: Probability and Statistics using</td>
<td>DSE 230: Data Science using Hadoop and Spark</td>
</tr>
<tr>
<td>units) - Various</td>
<td>Python (4 units) – Dasgupta</td>
<td>(4 Units) – Freund</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td><strong>Case Studies</strong></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Y2 Fall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DSE 203: Data Integration &amp; ETL (4 units)</td>
<td>DSE 241: Data Visualization (4 units) –</td>
<td></td>
</tr>
<tr>
<td>– Gupta</td>
<td>Chourasia</td>
<td></td>
</tr>
<tr>
<td>DSE 250: Beyond Relational Data Models (4</td>
<td></td>
<td></td>
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<tr>
<td>units) - Deutsch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Data Science Design Capstone Project</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DSE 260 (2 units) – Altintas de Callafon</td>
<td>DSE 260 (2 units) – Altintas de Callafon</td>
</tr>
</tbody>
</table>
MAS DSE: Admissions Requirements

• **MAJOR Importance** (at least 2/3)
  1. Programming experience in a general purpose language (C, Java, Python)
  2. Experience with databases/SQL
  3. Experience with data analysis in an application domain

• **MINOR Importance** (strengthens your application)
  1. **MATH**: Linear Algebra, Probability and Statistics
  2. **Distributed Systems**: Hadoop, Spark ...
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, and machine learning that 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.
Data Science and Engineering

Questions?
Master of Advanced Study Degree

Architecture-Based Enterprise Systems Engineering Leadership Program

Founding Director
Professor Hal Sorenson
What Motivated the Creation of the “Architecture-based Enterprise Systems Engineering Leadership Program”? 
The World of System Development Has Changed from Products and Technological Implementation to Enterprises and System-of-Systems
What Embodies the AESE Solution?

We Include the consideration of

Technology and engineering (T)

Organizational and business aspects (O)

Human-based involvements (P)

A TOP-down Perspective
Result: engineers are better prepared for senior engineering and management positions.
Model Architecture-based Enterprise Systems Engineering Leadership Program

Founding Director
Professor Hal Sorenson

Master of Advanced Study Degree
What is “Systems Thinking“?

- Function
- Requirements
- Trade-off analyses/alternatives
- Specification
- Verification and validation

This is not what we do in AESE!
Apply Model-based Systems Thinking and Development For Decision-making & Leadership

Systems Modeling Tools

- Concept Maps
- Planning Tools (e.g., NOV)
- Use Case Template
- Unified Modeling Language
- Colored Petri Nets
- Data Analytic Tools
- Cybersecurity Tools

Decision Systems – Spring

- Architecture Patterns
- Event-driven Architectures
- Art of Decision Making
- Data Analytics
- Big Data and Deep Learning
- Investment Valuation and NOV
- Managing Stakeholder Relationships

Systems Thinking – Fall

- Leadership
- Goals & Strategy
- Finance/Accounting
- Operations
- Complex Adaptive Systems
- Agile Development
- DevOps
- Systems Development

Systems Development – Winter

- Enterprise Architectures
- Architecture Frameworks
- Use Cases/Capabilities
- Domain Modeling
- Service-Oriented Architecture
- SOA Governance
- Enterprise Cybersecurity
- Functional & Physical Architectures
- MOPs & MOEs

START Program
• Enterprise systems and system-of-systems are complex adaptive systems.
• Development of complex adaptive systems stresses heuristics through synthesis rather than analysis.
• Team projects are major requirement for program completion.

70:20:10 Learning Model

- Team Project Work: 70%
- In-Class Breakouts: 20%
- Courses: 10%

Development Model
- Developing An Enterprise Knowledge System
- Defining the Project
- Defining the Capabilities
- On the Job Experience
- Mentoring & Coaching

Classroom
Distance Learning

• Synchronous, two-way video/audio connections

• Students must attend the four day Workshops
  • One in each quarter
  • Final team presentations in August

• All lectures are video taped and available within a few days

• 10% of graduates are distance learners
Outline of program characteristics

5 years of work experience

Program costs $33K – covers everything

In 13 years, 305 students have completed the program

More than 50 organizations have supported employee participation
Applications

On-line admission application at:
https://apply.grad.ucsd.edu/home

Application due: June 24, 2019
Structured for working professionals

One year program (e.g., September 2019 – August 2020)

Classes scheduled from 8 AM to 5 PM on alternating Friday/Saturdays

Classes are offered sequentially (not concurrently) with 3 courses/quarter

One 4-day workshop/quarter

Team project meetings every quarter and at end of Summer
Contact Information

• Harold W. Sorenson, Professor of Engineering Systems
  Faculty Director; Graduate Program in Architecture-based Enterprise Systems Engineering
  Jacobs School of Engineering, Room 355R in EBUII (MAE) Building
  Rady School of Management
  University of California, San Diego
  La Jolla, CA 92037
  Email: hsorenson@ucsd.edu
  Office: (858) 534 4406

• Stacey Williams
  Program Administrator, AESE Leadership Program
  Executive Education, Jacobs School of Engineering,
  UC San Diego
  Email: staceyw@eng.ucsd.edu
  Office: 858-534-1069
Questions?
Master of Advanced Study Degree

Next Steps
Next Steps – All Programs

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

• Applications:
  – Open now: each program has an admissions page
  – June 24 applications due – start now, no fee to start
  – Unofficial copy of transcript is ok for initial submission
  – Recommendations need to be requested by June 24 when you submit, but we will work with you to get any missing information prior to review
AESE Calendar 2019 – 2020

Download pdf at jacobsschool.ucsd.edu/mas/aese/
# AESE Program Costs 2019 – 2020

Download pdf at [jacobsschool.ucsd.edu/mas/aese/cost.shtml](http://jacobsschool.ucsd.edu/mas/aese/cost.shtml)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Class #</th>
<th>Class Name</th>
<th># Units</th>
<th>Class Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2019</td>
<td>MGT 291</td>
<td>Essentials of Business Practice</td>
<td>4</td>
<td>$2,940.00</td>
</tr>
<tr>
<td></td>
<td>MGT 406</td>
<td>Leadership Values, Skills &amp; Team Building</td>
<td>4</td>
<td>$2,940.00</td>
</tr>
<tr>
<td></td>
<td>AESE 278A</td>
<td>Complexity and Large Scale Systems</td>
<td>4</td>
<td>$2,940.00</td>
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<tr>
<td></td>
<td>AESE 279A</td>
<td>AESE Quarterly Team Project</td>
<td>1</td>
<td>$735.00</td>
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<tr>
<td></td>
<td></td>
<td>Mandatory UCSD Graduate Student Fees*</td>
<td></td>
<td>$751.62</td>
</tr>
<tr>
<td></td>
<td>Quarter Total</td>
<td></td>
<td>13</td>
<td>$10,306.62</td>
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<tr>
<td>Winter 2020</td>
<td>AESE 278B</td>
<td>Enterprise Architecting</td>
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<td>AESE 278D</td>
<td>Engineering Essentials for Distributed Systems</td>
<td>4</td>
<td>$2,940.00</td>
</tr>
<tr>
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<td>AESE 278C</td>
<td>Modeling, Simulation &amp; Analysis</td>
<td>4</td>
<td>$2,940.00</td>
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<td>AESE 279A</td>
<td>AESE Quarterly Team Project</td>
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<td>$735.00</td>
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<td>Mandatory UCSD Graduate Student Fees**</td>
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<td>$651.62</td>
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<td>Quarter Total</td>
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<td>13</td>
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<tr>
<td>Spring 2020</td>
<td>AESE 278E</td>
<td>Patterns for Enterprise Architecting</td>
<td>4</td>
<td>$2,940.00</td>
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<td></td>
<td>AESE 241</td>
<td>Risk and Decision Analysis</td>
<td>4</td>
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<td>AESE 261</td>
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* Fall Quarter 2019 fees include a mandatory $100 New Student One-Time Document Fee  
**2019-2020 UCSD Graduate Student Fees are estimated pending State of California final budget
WES Calendar 2019 – 2021

Download pdf at jacobsschool.ucsd.edu/mas/wes/
## JACOBS SCHOOL OF ENGINEERING
### PROGRAM COSTS 2019-21
#### Wireless Embedded Systems Master’s Degree Program

**TENTATIVE**

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Class #</th>
<th>Class Name</th>
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**Total 2019-2021**

- Fall Quarter 2019 fees include a mandatory $100 New Student One-Time Document Fee
- **2019-2021 UCSD Graduate Student Fees are estimated pending State of California final budget**

Download pdf at [jacobsschool.ucsd.edu/mas/wes/cost.shtml](http://jacobsschool.ucsd.edu/mas/wes/cost.shtml)
DSE Calendar 2019 – 2021

Download pdf at jacobsschool.ucsd.edu/mas/dse/

*University scheduling policy may necessitate changes. Advance notice will be given.
## DSE Program Costs 2019 – 2021

Download pdf at jacobsschool.ucsd.edu/mas/dse/cost.shtml

### Tentative

***Additional Courses to be determined for your Cohort prior to your second year

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Class #</th>
<th>Class Name</th>
<th># Units</th>
<th>Class Fee</th>
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**2019-2021 Total**

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<td>DSE 251</td>
<td>Managing Large-Scale Graph Data</td>
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* Fall Quarter 2019 fees include a mandatory $100 New Student One-Time Document Fee

** 2019-2021 UCSD Graduate Student Fees are estimated pending State of California final budget

*** Additional Courses TBD