

## Astronautical Engineering (ASTE) DEN @ Viterbi Orientation

Luis Saballos, Student Advisor & Director of ASTE Student Affairs





## AGENDA

- Welcome
- Department Overview
- Degree Requirements
- Department Policies, Procedures, Tips
- ASTE DEN
- Academic Advising
- Questions?



# **ASTE- Student Services**



Luis Saballos, Director, ASTE Dept. Student Services <u>Isaballo@usc.edu</u> <u>Office Phone: (213)821-4234</u> Office: OHE 500Q

One stop shop for all student services and inquiries.

Always feel free to reach out to me and I can direct you to the proper help or support. =)



#### University of Southern California

## Department of Astronautical Engineering

- Unique pure-space-engineering department (established in 2004)
- Offers the full set of degrees in Astronautical Engineering (ASTE)
  - Bachelor of Science
  - Bachelor of Science Minor
  - Master of Science
  - Engineer
  - PhD
  - Graduate Certificate
- Among largest national programs in space engineering on Master's level
- Mission:

to provide forefront research and education in astronautical (space) engineering













#### Department of Astronautical Engineering Faculty, Adjunct Faculty, and Lecturers

#### Faculty

- Prof. Mike Gruntman (Chairman; (Director, Master of Science Program)
- Prof. Daniel Erwin (Director, Bachelor of Science Program)
- · Prof. Joseph A. Kunc
- Prof. Azad Madni
- Prof. E. Phillip Muntz
- Prof. Stan Settles (joint appt.; ISE/SAE)
- Prof. Joseph Wang (Director, PhD Program)

#### **Research Faculty**

- Prof. Elliot Axelband
- Prof. David Barnhart
- Prof. Sergei Gimelshein
- Prof. Herb Schorr (joint appt.; ISI)
- Prof. Peter Will (joint appt.; ISI)

#### Adjunct Faculty and Lecturers (grad courses)

- Dr. Mohamed Abid (JPL)
- Dr. Oscar Alvarez-Salazar (JPL)
- Dr. Rodney Anderson (JPL)
- Dr. Kirstie Bellman (Aerospace Corp).
- Dr. Douglas Buettner (Aerospace Corp.)
- Prof. Bruce Cordell (21st Century Waves)
- Prof. Don Edberg (Cal Poly Pomona)
- Dr. Anthony Freeman (JPL)
- Dr. Michael Gabor (TASC)
- Dr. Keith Goodfellow (Aerojet Rocketdyne)
- Dr. Troy Goodson (JPL)
- · Prof. Gerald Hintz (ret., JPL, Aerospace Corp.)
- Prof. Michael Kezirian (IAASS, ISSF)
- Dr. Johnny Kwok (JPL)
- Mr. Steve Matousek (JPL)
- Dr. Leila Meshkat (JPL)
- Prof. Ryan Park (JPL)
- Dr. Robert Parker (ret.; Northrop-Grumman)
- Dr. G.P. Purohit (Aerospace Corp.)
- Prof. Anita Sengupta
- Mr. Madhu Thangavelu (AAA Visioneering)
- Prof. Kent Tobiska (Space Environm. Techn.)
- Prof. James Wertz (Microcosm)
- Dr. Bret Williams (Raytheon)
- Dr. Sydney Yuan (Aerospace Corp.)



#### Department of Astronautical Engineering Research Areas







- Astronautics
- · Space environment and spacecraft interactions
- Space science
- Space instrumentation and sensors
- Spacecraft propulsion
- Space mission and spacecraft design
- Non-equilibrium processes in gases and plasmas
- Computational physics and high performance computing



- Faculty are Principal Investigators (PI's) and Co-Investigators (Co-I's) on programs supported by NASA, Air Force, Navy, NSF, industry
- Served on science teams (members, investigators, development, analysis): Pioneer 10/11, SOHO, Deep Space 1, IMAGE, Dawn
- Current NASA missions Co-I: TWINS and IBEX
- Student (undergraduate and Master's) projects
  - Rocket propulsion lab
  - Liquid-propulsion lab
  - Lunar lander
  - > Student microsatellites and cubesats





### Department of Astronautical Engineering Interdisciplinary Collaborations



- Interdisciplinary collaborations with other USC programs/departments/schools
  - Systems Architecting and Engineering
  - Electrical Engineering
  - Mechanical Engineering
  - Information Sciences Institute (ISI), VSOE
  - Physics and Astronomy
- External collaborations
  - U.S. Universities (Harvard, UC Berkeley, U of Az., BU, U Mass., ...)
  - NASA centers (JPL, Goddard)
  - DoE National Labs (Los Alamos, Princeton Plasma Physics Lab)
  - R&D centers and institutes (Applied Physics Laboratory; Southwest Research Institute, ...)
  - Industry (Northrop-Grumman, Lockheed-Martin, Boeing, ...)
  - Foreign R&D centers and universities (Germany, Japan, ...)



#### Master of Science Program in Astronautical Engineering – Students –



- Students pursuing MS in Astronautical Engineering
  - Full-time on-campus students 25-30%
  - Working full-time and studying part-time students (through Distance Education Network of the Viterbi School – DEN@Viterbi) – 70-75%
  - Active duty military (Air Force, Army, Navy, Marine Corp)
  - Student background (BS and MS degrees)
    - Astronautical engineering
    - Mechanical Engineering
    - Electrical engineering
    - Aerospace engineering
    - Other areas (chemical, computer, systems, etc) of engineering
    - Physics and Astronomy
    - Other areas of science (including medical doctors)
    - Planning apply for astronaut training
- Pathway to positions in system engineering of space systems (especially important for engineers with BS and MS in EE, ME, etc.)



## Master of Science Program in Astronautical Engineering – Common Questions –



- Typical time to complete the program
  - Full-time students: 1.5 years (3 semesters)
  - Part-time student: 3 4 years (1 2 courses per semester)
- · Course sequence (e.g., required courses before electives?)
  - Course sequence is entirely up to students. Advisors help as needed. Few exceptions: space navigation requires orbital mechanics; advanced propulsion requires propulsion, ...
- Waiver of required courses yes
  - Required courses waived if a student had similar level courses elsewhere.
- Technical electives from other departments yes
  - Almost any graduate science and engineering course approved





# **ASTE Degree Requirements**



### Master of Science in Astronautical Engineering (MS ASTE)



- 27 units of course work (9 classes)
- 3.0 minimum GPA required to fulfill degree requirements
- 5-year limit to satisfy degree requirements
- Thesis not required but is possible (for on-campus students)

ASTE Director of the Master's Program Dr. Mike Gruntman, <u>mikeg@usc.edu</u>

Helpful websites: MS ASTE newsletter: <u>http://astronauticsnow.com/msaste/astd\_ms-aste\_update.pdf</u>

<u>MS ASTE Frequently Asked Questions:</u> <u>http://astronauticsnow.com/msaste/faq.html</u>





#### Degree Requirements for the ASTE Master's Program

Core Required Courses (4 courses, 3 units each) Core Electives (3 courses, 3 units each) Technical Electives (2 courses, 6 units total)









# Degree Requirements for the ASTE Master's Program cont'd

#### **Core Electives Continued**

ASTE 553 Systems for Remote Sensing from Space Units: 3 ASTE 554 Spacecraft Sensors Units: 3 ASTE 555 Space Cryogenic Systems and Applications Units: 3 ASTE 556 Spacecraft Structural Dynamics Units: 3 ASTE 557 Spacecraft Structural Strength and Materials Units: 3 ASTE 561 Human Factors of Spacecraft Operations Units: 3 ASTE 562 Spacecraft Life Support Systems Units: 3 ASTE 566 Ground Communications for Satellite Operations Units: 3 ASTE 570 Liquid Rocket Propulsion Units: 3 ASTE 571 Solid Rocket Propulsion Units: 3 ASTE 572 Advanced Spacecraft Propulsion Units: 3 \* ASTE 574 Space Launch Vehicle Design Units: 3 ASTE 577 Entry and Landing Systems for Planetary Surface Exploration Units: 3 ASTE 581 Orbital Mechanics II Units: 3 ASTE 583 Space Navigation: Principles and Practice Units: 3 ASTE 584 Spacecraft Power Systems Units: 3 ASTE 585 Spacecraft Attitude Control Units: 3 \* (Summer only) ASTE 586 Spacecraft Attitude Dynamics Units: 3 ASTE 589 Solar System Navigation Units: 3





## Degree Requirements for the ASTE Master's Program continued



#### Two Technical Electives, 500-level, 6 units total.

Courses that apply as technical electives:

- Any course from the list of ASTE Core Electives
- ASTE 599 Special Topics courses. They are not offered every semester, so check the Schedule of Classes for availability (<u>http://classes.usc.edu/</u>)
- A course from another engineering department must be approved by Dr. Mike Gruntman (copy <u>lsaballo@usc.edu</u> to the email) prior to registration. More information can be found here: <u>http://astronauticsnow.com/msaste/faq.html</u>

Full curriculum requirements found here: https://catalogue.usc.edu/preview\_program.php? catoid=14&poid=17112&returnto=5360





#### **Seven Areas of Concentration in ASTE**

Spacecraft Propulsion Spacecraft Dynamics Space Systems Design Spacecraft Systems Space Applications Safety of Space Systems Human Space Flight

Students are *not* required to identify an area of specialization. These concentrations act as a guide for students in order to meet their educational or professional objectives.



### Seven Areas of Concentration in ASTE cont'd

#### **Spacecraft Propulsion**

ASTE 501a Physical Gas Dynamics Units: 3 ASTE 501b Physical Gas Dynamics Units: 3 ASTE 505a Plasma Dynamics Units: 3 ASTE 570 Liquid Rocket Propulsion Units: 3 ASTE 571 Solid Rocket Propulsion Units: 3 ASTE 572 Advanced Spacecraft Propulsion Units: 3 ASTE 574 Space Launch Vehicle Design Units: 3 ASTE 584 Spacecraft Power Systems Units: 3

#### **Spacecraft Dynamics**

ASTE 556 Spacecraft Structural Dynamics ASTE 557 Spacecraft Structural Strength and Materials ASTE 581 Orbital Mechanics II ASTE 583 Space Navigation: Principles and Practice ASTE 585 Spacecraft Attitude Control (*summer only*) ASTE 586 Spacecraft Attitude Dynamics ASTE 589 Solar System Navigation





### Seven Areas of Concentration in ASTE cont'd

#### **Space Systems Design**

ASTE 523 Design of Low Cost Space Missions Units: 3 ASTE 524 Human Spaceflight Units: 3 ASTE 527 Space Studio Architecting Units: 3 ASTE 528 Reliability of Space Systems Units: 3 ASTE 529 Safety of Space Systems and Space Missions Units: 3 ASTE 557 Spacecraft Structural Strength and Materials Units: 3 ASTE 562 Spacecraft Life Support Systems Units: 3 ASTE 574 Space Launch Vehicle Design Units: 3 ASTE 577 Entry and Landing Systems for Planetary Surface Exploration Units: 3 **Spacecraft Systems** ASTE 524 Human Spaceflight Units: 3 ASTE 529 Safety of Space Systems and Space Missions Units: 3

ASTE 552 Spacecraft Thermal Control Units: 3

ASTE 553 Systems for Remote Sensing from Space Units: 3

ASTE 554 Spacecraft Sensors Units: 3

ASTE 555 Space Cryogenic Systems and Applications Units: 3

ASTE 561 Human Factors of Spacecraft Operations Units: 3

ASTE 562 Spacecraft Life Support Systems Units: 3

ASTE 566 Ground Communications for Satellite Operations Units: 3

ASTE 584 Spacecraft Power Systems Units: 3







### Seven Areas of Concentration in ASTE cont'd

#### **Space Applications**

ASTE 524 Human Spaceflight Units: 3 ASTE 527 Space Studio Architecting Units: 3 ASTE 553 Systems for Remote Sensing from Space Units: 3 ASTE 554 Spacecraft Sensors Units: 3 ASTE 555 Space Cryogenic Systems and Applications Units: 3

#### **Safety of Space Systems**

ASTE 528 Reliability of Space Systems Units: 3 ASTE 529 Safety of Space Systems and Space Missions Units: 3 ASTE 561 Human Factors of Spacecraft Operations Units: 3

#### Human Space Flight

ASTE 524 Human Spaceflight Units: 3 ASTE 529 Safety of Space Systems and Space Missions Units: 3 ASTE 561 Human Factors of Spacecraft Operations Units: 3 ASTE 562 Spacecraft Life Support Systems Units: 3





# ASTE Policies, Procedures, Tips



## **ASTE Policies, Procedures, Tips**



- Maintain a 3.0 grade point average
- Review your STARS Report every semester.
  - The STARS Report includes the degree and major you are currently pursuing, GPA, Catalogue year, admission term, the number of units and course required to fulfill your degree requirements.
  - You can access it through the "OASIS" section of the myUSC portal (<u>http://my.usc.edu</u>).
  - Your STARS Report is manually activated after you enroll in your first course as an officially admitted student.
- Check your USC email regularly
- It is possible to transfer in previous graduate coursework (please contact me for the full policy)
- If you desire to change majors, you can do so after your first semester if you receive a 3.0 of higher (contact the other department for the transfer procedures)
- USC requires graduate students to maintain continuous enrollment every Fall and Spring semester (more detailed information provided on the next slide).



#### **ASTE Policies, Procedures, Tips Cont.d**



USC Schedule of Classes: http://classes.usc.edu/

ASTE Future Courses List:

http://astronauticsnow.com/msaste/astd\_ms\_class\_schedule.pdf

ASTE Curriculum Requirements: <u>https://catalogue.usc.edu/preview\_program.php?</u> catoid=14&poid=17112&hl=aste&returnto=search

- Since some electives may be offered in specific semesters, it is recommended to plan out those courses first (use the future courses list above for reference). Most of the core classes can then be filled in between.
- If you will be working full-time, we strongly recommend only taking 1 class in your first semester. If you will be a full-time student, it is recommended you enroll in no more than 3 classes per semester





### **ASTE Policies, Procedures, Tips Cont.d**

#### Continuous Enrollment/Leave of Absence/Withdrawal/ Reinstatement

- Once admitted to a graduate degree program, students must enroll at USC each fall and spring semester each year until she or he has satisfactorily completed all degree requirements.
- If a student must skip a semester, the student must petition for a leave of absence. Leave of absence request forms are available by emailing <u>lsaballo@usc.edu</u>.
- An approved leave may not exceed one academic year (and a total of 4 semesters are granted). A student who fails to maintain continuous enrollment without obtaining an approved leave must, when ready to return to school, may have to apply for readmission to the program.



## **DEN@Viterbi Contacts**

#### Viterbi Admission & Student Engagement Office

Location: Olin Hall of Engineering (OHE), Rm. 106 Hours: Mon. - Fri. 8:30 am - 5 pm (Pacific Time) Phone: (213) 740-4488 | Fax: (213) 821-0851 <u>https://viterbigrad.usc.edu/</u> DEN d-clearance inquiries <u>den@vase.usc.edu</u>

DEN@Viterbi Support	Contact Information	Staff
Technical support,	dentsc@usc.edu	Daniel Cueva
Desire2Learn training,	213-740-9356	Bianca Richter
Homework		
DEN d-clearance inquiries	den@vase.usc.edu	
Exams	denexam@usc.edu	Shirley Schutt
	213-740-9356	
VASE Advisor	ptrinida@usc.edu	Patty Rinehart
General advisement	213-740-0116	

• Policies & Procedures





Academic Advising Appointments

#### Luis Saballos, ASTE Student Advisor

Email: Lsaballo@usc.edu Phone: (213) 821-4234

- I am available by email and phone if you have any questions. If you send an email, please include your 10-digit USC ID number
- Please email me to set up a zoom advising appointment.





## MyViterbi Advisement Appointment System https://myviterbi.usc.edu/

**myViterbi** 

Announcements

#### **Student Resources**

- Academic Integrity Introduction
- Advisement Appointment System
- Application to Graduate





## **QUESTIONS?**

# Please feel free to unmute your audio and ask your question.





# **THANK YOU!**

#### HAVE A GREAT FALL 2022 SEMESTER!

A recording of this online orientation and presentation will be available for viewing and download on the VASE website at

https://viterbigrad.usc.edu/ms-denviterbi-new-student-information/

FIGHT ON!

