



# MORK FAMILY DEPARTMENT

Department of Chemical Engineering & Materials Science

*Anthony Tritto, Director, MFD Student Affairs*

*Karen Woo, Assistant Director, MFD Student Services*



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

*<https://viterbigrad.usc.edu/academic-services/new-student-information/>*



# AGENDA

- Introduction - Mork Family Department
- List of MS programs
- Faculty Advisors
- Student Affairs
- Program Overview
- Registering for courses
- Getting connected
- Q & A



Mork Family Department Website: <https://chems.usc.edu/>

**USC**Viterbi

USC University of Southern California

**Mork Family**

Department of Chemical Engineering & Materials Science

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# Master's Programs

Chemical Engineering

Materials Science

Petroleum Engineering



## MFD Masters Programs:

- Master of Science in Chemical Engineering
- Master of Science in Materials Engineering
- Master of Science in Materials Science
- Master of Science in Petroleum Engineering
- Master of Science in Petroleum Engineering Smart Oilfield Technologies
- Master of Science in Petroleum Engineering Geoscience Technologies
- Master of Science in Petroleum Engineering/Engineering Management



## Faculty Advisor



**Chemical Engineering**

**Dr. Katherine Shing**

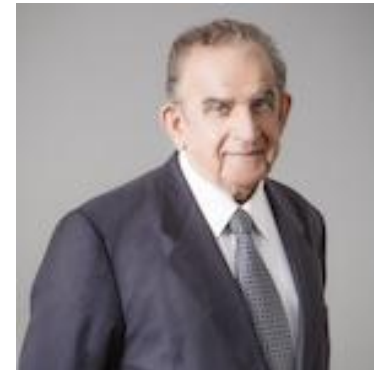
Email [shing@usc.edu](mailto:shing@usc.edu)



**Materials Science**

**Dr. Ken-Ichi Nomura**

Email [knomura@usc.edu](mailto:knomura@usc.edu)



**Petroleum Engineering**

**Dr. Iraj Ershaghi**

Email [ershaghi@usc.edu](mailto:ershaghi@usc.edu)

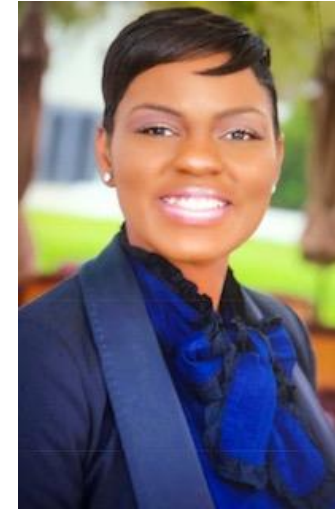
# Mork Family Department Student Affairs



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Contact: [mfdstudentaffairs@vsoe.usc.edu](mailto:mfdstudentaffairs@vsoe.usc.edu)

# Master of Science in Chemical Engineering

<https://chems.usc.edu/academics/graduate-programs/chemical-engineering/>



*Requirements for Graduation* 28 units total with 3.0 GPA overall (deficiency courses may be required for students without a CHE background):

**1 unit Requirement:** 1 unit of ChE 590 or approved additional unit from a 4 unit course

The nine courses are divided into 3 Groups:

**Group I: Required Core:** (All 4 required for 12-units total)

4 required core courses, all students must take:

ChE 501 Modeling and Analysis of Chemical Engineering Systems (Fall Semester)

ChE 530 Thermodynamics for Chemical Engineers (Fall Semester)

ChE 540 Viscous Flow (Fall Semester)

ChE 542 Chemical Engineering Kinetics (Spring Semester)

**Group II: Elective Core:** (Chose 2 for 6 units total)

ChE 541 Mass Transfer (Spring Semester)

ChE 544 Heat Transfer (Spring Semester)

ChE 586 Process Data Analytics and Machine Learning (Spring Semester)

ChE 502 Numerical Methods for Diffusive and Convective Transport\*

ChE 560 Advanced Separation and Bioseparation Processes\*

ChE 554 Principles of Tissue Engineering\*

**Group III: Electives** (Choose 3 for 9 units total):

Choose from:

ChE 510 Energy and Process Efficiency

ChE/AME 513 Principles and Process Efficiency

ChE/MASC 523 Principles of Electrochemical Engineering\*

ChE/PTE 531 Enhanced Oil recovery

ChE 532 Vapor-Liquid Equilibria\*

ChE 572 Advanced Topics in Polymer Kinetics & Rheology\*

ChE/PTE 582 Fluid Flow and Transport Processes in Porous Media

ChE 590 (Directed Research, 1 - 3 units, approval of research advisor required before registering)

**Please note that Graduate Students Cannot Count More than 9 units of 400 Level Courses towards Their MS Degree**

ChE 450 Sustainable Energy

ChE 472 Polymer Science & Engineering

ChE 474L Polymer Science Engineering Laboratory\*

ChE 475 Physical Properties of Polymers

ChE 477 Computer Assisted Polymer Engineering and Manufacturing I\*

ChE 486 Design of Environmentally Benign Process Design\*

ChE 487 Nanotechnology and Nanoscale Engineering through Chemical Processes

ChE 489 Biochemical Engineering

ChE 499 Chemical Process Safety

**Approved** 400-level or above courses in Math, Science & Engineering.

**Note: Courses marked with \* are not offered on regular schedule.**





# Master of Science in Materials Science

*Requirements for Graduation* 28 units total with 3.0 GPA overall\*:

Core Courses: 20 units

MASC 501 Solid State

MASC 503 Thermodynamics of Materials

MASC 504 Diffusion and Phase Equilibria

MASC 505 Crystals and Anisotropy

MASC(EE) 471 Applied Quantum Mechanics for Engineers

MASC 551 Mechanical Behavior of Engineering Materials

CHE 501 Modeling and Analysis of Chemical Engineering Systems

Electives:

The remaining 8 units may be graduate courses outside of Materials Science with departmental approval.

<https://chems.usc.edu/academics/graduate-programs/materials-science/>

**\*Please note that students who started MASC in the Fall 2020 semester or after, are subject to complete 28 units towards their Graduate degree. Resource guide for MASC courses is available upon request from MFD student affairs**



# Master of Science in Materials Engineering

*Requirements for Graduation* 28 units total with 3.0 GPA overall:

Core Courses: 20 units

A minimum of 18 units must be graduate courses in Materials Science.

Electives:

The remaining 8 units may be graduate courses outside of Materials Science with departmental approval.

**\*Please note that students who started MTE in the Fall 2020 semester or after, are subject to complete 28 units towards their Graduate degree.**

**Resource guide for MTE courses is available upon request from MFD Student Affairs**

<https://chems.usc.edu/academics/graduate-programs/materials-science/>

## Core Courses for MASC & MTE

MASC 501 Solid State  
MASC 502 Advanced Solid State  
MASC 503 Thermodynamics of Materials  
MASC 504 Diffusion and Phase Equilibria  
MASC 505 Crystals and Anisotropy  
MASC 506 Semiconductor Physics  
MASC 511 Materials Preparation  
MASC 514L Processing of Advanced Semiconductor Devices  
MASC 520 Mathematical Methods for Deep Learning  
MASC 523 Principles of Electrochemical Engineering  
MASC 524 Techniques and Mechanisms in Electrochemistry  
MASC 534 Materials Characterization  
MASC 535L Transmission Electron Microscopy  
MASC 539 Engineering Quantum Mechanics  
MASC 548 Rheology of Liquids and Solids  
MASC 551 Mechanical Behavior of Engineering Materials  
MASC 559 Creep  
MASC 560 Fatigue and Fracture  
MASC 561 Dislocation Theory and Applications  
MASC 562 Failure Analysis  
MASC 564 Composite Processing  
MASC 570 Introduction to Photovoltaic Solar Energy Conversion  
MASC 575 Basics of Atomistic Simulation of Materials  
MASC 576 Molecular Dynamics Simulations of Materials and Processes  
MASC 583 Materials Selection  
MASC 584 Fracture Mechanics and Mechanisms  
MASC 599 Special Topics  
MASC 601 Advanced Semiconductor Device Physics  
MASC 606 Nonequilibrium Processes in Semiconductors  
MASC 610 Molecular Beam Epitaxy

## List of Approved Electives for MASC & MTE

AME 503 Advanced Mechanical Design  
AME 509 Applied Elasticity  
AME 525 Engineering Analysis  
AME 526 Engineering Analytical Methods  
AME 577 Survey of Energy and Power for a Sustainable Future  
AME 578 Modern Alternative Energy Conversion Devices  
AME 588 Materials Selection  
BME 510: Cellular Systems Engineering – 3 units  
CE 507 Mechanics of Solids I  
CE 529ab Finite Element Analysis  
CE 546 Structural Mechanics of Composite Materials  
CHE 475 Physical Properties of Polymers  
CHE 501 Modeling and Analysis of Chemical Engineering Systems  
CHEM 463L Chemical Nanotechnology Laboratory  
EE 480 Introduction to Nanoscience and Nanotechnology  
EE 504L Solid State Processing and Integrated Circuits Laboratory  
EE 513 Solid State Energy Devices  
EE 529 Optics  
EE 531 Non-linear Optics  
EE 537 Modern Solid-State Devices  
EE 540 Introduction to Quantum Electronics  
EE 601 Semiconductor Devices  
EE 606 Nonequilibrium Processes in Semiconductor  
EE 607 Microelectromechanical Systems  
EE 612 Science and Practice of Nanotechnology  
ENE 505 Energy and the Environment  
ISE 515 Engineering Project Management  
ISE 525 Design of Experiments



# Master of Science in Petroleum

## Graduation requirements:

27 units total

3.0 GPA overall

*16 additional units min. of deficiency courses are required for students without a B.S. in Petroleum Engineering*

## Core 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

## Electives (9 units for MS PTE):

502, 503, 504, 505, 506, 511, 512, 514, 515, 519, 542, 545, 572, 574, 578, 581, 586, 587, 588, 589 and 590

## Deficiency Courses

411, 412, 461, 466, 500

<http://catalogue.usc.edu/schools/engineering/petroleum-engineering/courses/>



# Master of Science in Petroleum Engineering (Smart Oilfield Technologies)

*Requirements for Graduation* 34 units total with 3.0 GPA overall (15 additional units min. of deficiency courses are required for students without a B.S. in Petroleum Engineering) :

## Core Courses: 30 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

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

## Electives (4 units):

PTE 502, 503, 504, 505, 506, 511, 512, 514, 515, 519, 542, 545, 572, 574, 578, 581, 590

## Deficiency Courses

411, 412, 461, 466, 500



# Master of Science in Petroleum Engineering (Geoscience Technologies)

*Requirements for Graduation* 34 units total with 3.0 GPA overall (15 additional units min. of deficiency courses are required for students without a B.S. in Petroleum Engineering) :

## Core Courses: 30 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 Dynamics Data Integration

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

## Electives (4 units):

4 units of an elective course i.e. PTE 572 (Engineering Geostatistics)

## Deficiency Courses

411, 412, 461, 466, 500



# Master of Science in Petroleum Engineering/Engineering Management

*Requirements for Graduation* 45 units total with 3.0 GPA overall (15 additional units min. of deficiency courses are required for students without a B.S. in Petroleum Engineering) :

## Core Courses: 36 units

ISE 500 Engineering Management Decisions and Statistics  
ISE 514 Advanced Production Planning and Scheduling  
ISE 515 Engineering Project Management  
ISE 544 Management of Engineering Teams  
ISE 561 Economic Analysis of Engineering Projects  
1 Pre-approved Business Management Course (3 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

## Electives (9 units):

9 units of PTE elective courses

## Deficiency Courses (required for Non-BS PTE students)

411, 412, 461, 466, 500



## Spring 2021 DEN Courses

MASC: <https://classes.usc.edu/term-20211/classes/masc/>

CHE: <https://classes.usc.edu/term-20211/classes/che/>

PTE: <https://classes.usc.edu/term-20211/classes/pte/>

### Materials Science

- MASC 504
- MASC 551
- MASC 560
- MASC 575

### Chemical Engineering

- CHE 530

### Petroleum Engineering

- PTE 508
- PTE 515
- PTE 517
- PTE 531
- PTE 578
- PTE 589

#### – MASC 503: Thermodynamics of Materials (4.0 units)

Classical thermodynamics, chemical potential, pure phases and mixtures; interphase relationships; binary and ternary solutions; free energy and activity; galvanic cell, electrochemical potential and Pourbaix diagram.

Section	Session	Type	Time	Days	Registered	Instructor	Location	Syllabus	Info
32140D	034	Lecture	3:00-4:50pm	Mon, Wed	1 of 15	Paulo Branicio	DEN@Viterbi		
32142R	048	Lecture	3:00-4:50pm	Mon, Wed	10 of 56	Paulo Branicio	OHE 100D		



# How To Request D-clearance From DEN



All DEN courses require D-clearance.

**USC Viterbi**  
School of Engineering

Student FAQ **DEN@Viterbi Tools**

29071D-AME541\_20163  
29073D-AME541(DIS)\_20163  
29092D-AME578\_20163  
29093D-AME581\_20163  
29095D-AME588\_20163  
11288D-ARCH511\_20163  
29157D-ASTE470\_20163  
Please Select a Course

**DEN@Viterbi Tools**

**Enrollments**

- Request D-Clearance
- Check D-Clearance Status
- DEN Terms of Service

**Profile**

- Update Profile

To begin D-Clearance, Please select a term to apply for D Clearance

Summer 2019 Select Term

1. Login to DEN Desire2Learn: <http://courses.uscden.net>
2. Go to [DEN@Viterbi Tools](#) on the navigation bar
3. Select “Request D-clearance” link, select the term, and select a course
4. Approval process takes 1-2 business days. To view the status of a request, click on “Check D-Clearance Status”
5. You can register once your request has been processed. D-clearances expire **7 days** from when it is issued so register as soon as you obtain it to secure a seat in a course.

For questions on D-Clearance status, contact [den@vase.usc.edu](mailto:den@vase.usc.edu)

# University Calendar- Spring 2021



Jan. 15	Class Begins
January 18	Martin Luther King's Birthday
February 15	President's Day
March 12	Spring 2021 Wellness Days
March 23	Spring 2021 Wellness Days
April 7	Spring 2021 Wellness Days
April 22	Spring 2021 Wellness Days
April 30	Spring 2021 Wellness Days
April 30	Classes Ends
April 30 - May 4	Study Days
May 5 - 12	Final Exams
May 14	Commencement



# Contact Info

## VITERBI ADMISSION & STUDENT ENGAGEMENT (VASE)

**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

<https://viterbigrad.usc.edu/>

DEN@Viterbi Support	Contact Information	Staff
Technical support, Desire2Learn training, Homework	<a href="mailto:dentsc@usc.edu">dentsc@usc.edu</a> 213-740-9356	Bianca Richter
DEN d-clearance inquiries	<a href="mailto:den@vase.usc.edu">den@vase.usc.edu</a>	
Exams	<a href="mailto:denexam@usc.edu">denexam@usc.edu</a> 213-740-9356	Shirley Schutt
VASE Advisor	<a href="mailto:ptrinida@usc.edu">ptrinida@usc.edu</a> 213-740-0116	Patty Rinehart
<ul style="list-style-type: none"><li>• General advisement</li><li>• Policies &amp; Procedures</li></ul>		



## How to make an appointment with your academic advisor

### **For Chemical Engineering, Material Science & Petroleum students:**

MFD Student Affairs Office

Email: [mfdstudentaffairs@vsoe.usc.edu](mailto:mfdstudentaffairs@vsoe.usc.edu)

Telephone: (213) 740-4339

We-are-SC: <https://we-are.usc.edu/>

Viterbi Career Connections: <https://viterbicareers.usc.edu/>

Student Health Center: <https://studenthealth.usc.edu/>

Kortschak Center: <https://kortschakcenter.usc.edu/>



# Get Connected

- Student groups- AICHE, MFD GSA, MRS@USC, SPE, and VGSA
  - Professional Conferences
  - Network Sessions
  - Study Groups
  - Career fairs
  - Faculty panels
  - Alumni Panels
  - Social Events
- Career Services
- VASE Office
- Check in with your advisors
- Research



THE MORK DEPARTMENT & AICHE INVITE YOU TO:

# RECEPTION AT TEO RESTAURANT

For those attending the AICHE Conference or in the Bay Area.

*There will be appetizers and light*



AICHE USC PRESENTS:

# 1st Chemical Engineering

Genentech  
PSC Biotech  
JACOBS  
ASTRIX  
Chevron  
AQMD  
RENOLIT



12TH SESSION SANCISCO




University of Southern California  
SPE Student Chapter



# Career Fair

10AM - 5PM - ENTRY \$5 FOR NON-MEMBERS



MORK FAMILY DEPARTMENT OF CHEMICAL ENGINEERING AND MATERIALS SCIENCE INVITES YOU TO JOIN US AT THE

# LA FESTIVAL OF BOOKS

April 12, 9AM  
MEET AT E-GUARD IN FRONT OF VHE

DON'T MISS OUT ON THE LARGEST BOOK FESTIVAL IN THE COUNTRY, FEATURING CELEBRITIES AND FAMOUS AUTHORS

FREE ADMISSION AT USC.



MORK FAMILY DEPARTMENT

# ALUMNI PANEL

14TH APRIL (THU)  
6-30 PM TO 8-30 PM  
LOCATION-EEB 248

**GUEST SPEAKERS :**

**FRANK HE**  
PROJECT ENGINEER III AT JACOBS

**VAL LERMA**  
ENGINEERING MANAGER AT INTERACTPROJECTS

**LESSA GRUNENFELDER**  
LECTURER AT USC

\*MORE ALUMNI SPEAKERS TO BE ANNOUNCED

FOR MORE INFO CONTACT: SYEDFARH@USC.EDU NALLA@USC.EDU





**THANK YOU!**