MORK FAMILY DEPARTMENT
Department of Chemical Engineering & Materials Science

Anthony Tritto, Director, MFD Student Affairs
Jordan Laffin, Assistant Director, MFD Student Affairs
Karen Woo, Assistant Director, MFD Student Affairs
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/
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 Digital Oilfield Technologies
- Master of Science in Petroleum Engineering Geoscience Technologies
- Master of Science in Petroleum Engineering/Engineering Management
Meet our MFD Administrators

**Professor Andrea Hodge**
Chair of the Mork Family Department of Chemical Engineering and Material Science

**Professor Iraj Ershaghi**
Director, Petroleum Engineering Program
*Faculty Advisor for CHPE*

**Dr. Ken-Ichi Nomura**
Senior Lecturer
Mork Family Department of Chemical Engineering and Material Science

**Professor Noah Malmstadt**
Associate Chair, Undergraduate Program
*Faculty Advisor for CHE, CHEB, CHEE, CHEN, CHPM, CHSE*
Mork Family Department
Student Affairs

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Chemical Engineering

Requirements for Graduation 28 units total with 3.0 GPA overall
Deficiency courses may be required for students without a CHE background

Group I: Required Core Courses (All 4 required for 16 units total):
ChE 501 Modeling and Analysis of Chemical Engineering Systems – 4 units**
(This is required in your first semester**)
CHE 530 Thermodynamics for Chemical Engineers – 4 units
ChE 538 Transport Processes I – 4 units (Offered in the Fall)
ChE 542 Chemical Engineering Kinetics – 4 units (Offered in the Fall)

Group II: Elective Courses (Complete 12 units from the list below):
ChE 510 Energy and Process Efficiency – 3 Units
ChE 539 Transport Processes II – 4 units
ChE/PTE 531 Enhanced Oil recovery
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)
Chemical Engineering

Requirements for Graduation 28 units total with 3.0 GPA overall
Deficiency courses may be required for students without a CHE background

Please note that Graduate Students Cannot Count More than 9 units of 400 Level Courses towards Their MS Degree
ChE 450 Sustainable Energy
ChE 475 Physical Properties of Polymers
ChE 487 Nanotechnology and Nanoscale Engineering through Chemical Processes
ChE 489 Biochemical Engineering
ChE 499 Chemical Process Safety

Or other 400-level or above courses in Math, Science & Engineering upon Department Approval*
Non-CHE courses that can be applied as Electives*

These are classes that are not cross listed with CHE that we would recommend for the CHE Graduate major

Materials Science:
• MASC 515 Basics of Machine Learning for Materials
• MASC 551 Mechanical Behavior of Engineering Materials
• MASC 575 Basics of Atomistic Simulation of Materials
• MASC 583 Materials Selection
• MASC 576 Molecular Dynamics Simulations of Materials and Processes

Petroleum Engineering:
• PTE 519 Integrated Physical and Cyber Security for Oil & Gas Operations
• PTE 500 Computational Reservoir Modeling
• PTE 502 Advanced Reservoir Characterization
• PTE 507 Engineering and Economic Evaluation of Subsurface Reservoirs
• PTE 508 Numerical Simulation of Subsurface Flow and Transport Processes
Chemical Engineering Recommended
Electives

Fall:

AME 522: Nonlinear Dynamical Systems, Vibrations, and Chaos
AME 554: Additive Manufacturing Technology
BME 559: Nanomedicine and Drug Delivery
CE 523: Physicochemical Processes in Environmental Engineering
ISE 562: Decision Analysis

Spring:

BME 559: Nanomedicine and Drug Delivery
CE 553: Biological Processes in Environmental Engineering
ISE 525: Design of Experiments
Materials Science

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

Core Courses: *(12 units)*
- MASC 471 Applied Quantum Mechanics for Engineers (4)
- MASC 501 Solid State (4)
- MASC 503 Thermodynamics of Materials (4)
- MASC 504 Diffusion and Phase Equilibria (4)
- MASC 505 Crystals and Anisotropy (3)
- MASC 520 Mathematical Methods for Deep Learning (4)
- MASC 551 Mechanical Behavior of Engineering Materials (4)

Electives:
8-16 units from MASC elective list and 0-8 units from ENG elective list on the following page
Up to 8 units may be from 400-level courses on approval by department.
## MASC elective list (20-28 units)
- MASC 501 Solid State (3)
- MASC 502 Advanced Solid State (3)
- MASC 503 Thermodynamics of Materials (4)
- MASC 504 Diffusion and Phase Equilibria (4)
- MASC 505 Crystals and Anisotropy (4)
- MASC 506 Semiconductor Physics (4)
- MASC 512 Thin Film Science and Technology (4)
- MASC 515 Basics of Machine Learning for materials (4)
- MASC 520 Mathematical Methods for Deep Learning (4)
- MASC 534 Materials Characterization (3)
- MASC 535L Transmission Electron Microscopy (4)
- MASC 551 Mechanical Behavior of Engineering Materials (4)
- MASC 559 Creep (3)
- MASC 560 Fatigue and Fracture (3)
- MASC 561 Dislocation Theory and Applications (3)
- MASC 562 Failure Analysis (3)
- MASC 564 Composite Processing (4)
- MASC 570 Introduction to Photovoltaic Solar Energy Conversion (3)
- MASC 575 Basics of Atomistic Simulation of Materials (4)
- MASC 576 Molecular Dynamics Simulations of Materials and Processes (4)
- MASC 583 Materials Selection (4)
- MASC 599 Special Topics (varies)
- MASC 601 Advanced Semiconductor Device Physics (4)
- MASC 610 Molecular Beam Epitaxy

## ENG elective list (0-8 units)
- AME 503 Advanced Mechanical Design
- AME 508 Machine Learning and Computational Physics
- AME 509 Applied Elasticity
- AME 525 Engineering Analysis
- AME 526 Engineering Analytical Methods
- AME 546 Design for Manufacturing and Assembly
- AME 577 Survey of Energy and Power for a Sustainable Future
- AME 578 Modern Alternative Energy Conversion Devices
- AME 588 Materials Selection
- ASTE 557 Spacecraft Structural Strength and Materials
- BME 510 Cellular Systems Engineering
- CE 507 Mechanics of Solids I
- CE 529a Finite Element Analysis
- CE 546 Structural Mechanics of Composite Materials
- CHE 501 Modeling and Analysis of Chemical Engineering Systems
- CHEM 630 Fundamentals of Electrochemical Energy Systems
- CHEM 632 Introduction to Surface Chemistry and Electrocatalysis
- EE 471 (MASC 471) Applied Quantum Mechanics for Engineers (4)
- EE 504L Solid State Processing and Integrated Circuits Laboratory
- EE 507 (MASC 507) Micro- and Nano-Fabrication Technology
- EE 508 (MASC 508) Nano-Fabrication Lithography
- EE 512 Stochastic Processes
- EE 529 Optics
- EE 531 Non-linear Optics
- EE 537 Modern Solid-State Devices
- EE 601 Semiconductor Devices
- EE 607 Microelectromechanical Systems
- EE 612 Science and Practice of Nanotechnology
- ENE 505 Energy and the Environment
- ISE 510 Advanced Computational Design and Manufacturing
- ISE 515 Engineering Project Management
- PTE 586 Artificial Intelligence and Machine Learning in Oilfield Operations (3)
Master of Science in Petroleum

Graduation requirements:
28-29 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 (9-10 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
411x, 412x, 461, 466, 500

http://catalogue.usc.edu/schools/engineering/petroleum-engineering/courses/
Master of Science in Petroleum Engineering (Digital Oilfield Technologies)

Requirements for Graduation 37-38 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

Specialization course
- PTE 586 Intelligent and Collaborative Oilfield Systems Characterization and Management
- PTE 588 Smart Oilfield Data Mining

And two of the other following courses:
- PTE 587 Smart Completions, Oilfield Sensors and Sensor Technology
- 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: 411x, 412x, 461, 466, 500
Master of Science in Petroleum Engineering (Geoscience Technologies)

Requirements for Graduation: 38-39 units total with 3.0 GPA overall (16 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

Specialization Courses (Take 502 and 503)
- PTE 502 Advanced Reservoir Characterization
- PTE 503 Technology of Unconventional Oil and Gas Resources Development

And two of the following courses:
- PTE 504 Geophysics for Petroleum Engineers (3)
- PTE 505 Inverse Modeling for Dynamics Data Integration (4)
- PTE 572 Applied Geostatistical Modeling for Subsurface Characterization – 4 units
- PTE 592 Computational Geomechanics (4)

Electives (Complete two from the PTE elective courses)

Deficiency Courses: 411x, 412x, 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)
411x, 412x, 461, 466, 500
Fall 2021 DEN Courses
MASC: https://classes.usc.edu/term-20213/classes/masc/
CHE: https://classes.usc.edu/term-20213/classes/che/
PTE: https://classes.usc.edu/term-20213/classes/pte/

Materials Science
• MASC 503
• MASC 551
• MASC 583

Chemical Engineering
• CHE 501
• CHE 538
• CHE 542

Petroleum Engineering
• PTE 500
• PTE 502
• PTE 507
• PTE 519
• PTE 572
• PTE 582
• PTE 588
How To Request D-clearance From DEN

All DEN courses require D-clearance.

1. Login to DEN Desire2Learn: [http://courses.uscden.net](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
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<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>Aug. 20</td>
<td>Last Day to register and settle without late fee</td>
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<tr>
<td>Aug. 23</td>
<td>Fall Semester classes begin</td>
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<tr>
<td>Sept. 6</td>
<td>Labor Day</td>
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<tr>
<td>Sept. 10</td>
<td>Last day to register and add classes</td>
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<td>Sept. 10</td>
<td>Last day to drop a class without a “W”</td>
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<td>Sept. 11</td>
<td>Last Day to Add and Drop with Refund</td>
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<td>Oct. 8</td>
<td>Last Day to Drop Without “W”</td>
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<tr>
<td>Oct. 8</td>
<td>Last Day to change a Pass/No Pass</td>
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<tr>
<td>Oct. 14-15</td>
<td>Fall Recess</td>
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<tr>
<td>Nov. 12</td>
<td>Last day to drop with a “W”</td>
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<td>Nov. 24</td>
<td>Fall Semester Classes End</td>
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<td>Nov. 24-28</td>
<td>Thanksgiving Recess</td>
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<td>Dec. 3</td>
<td>Fall Semester Classes End</td>
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<td>Dec. 4-7</td>
<td>Study Days</td>
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<td>Dec. 8-15</td>
<td>Final Examinations</td>
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<tr>
<td>Dec. 16- Jan 9</td>
<td>Winter Recess</td>
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# 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/](https://viterbigrad.usc.edu/)

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<thead>
<tr>
<th>DEN@Viterbi Support</th>
<th>Contact Information</th>
<th>Staff</th>
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<tbody>
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<td>Technical support,</td>
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<td>Daniel Cueva</td>
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<td>Desire2Learn training,</td>
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<td>Bianca Richter</td>
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<td>DEN d-clearance inquiries</td>
<td><a href="mailto:den@vase.usc.edu">den@vase.usc.edu</a></td>
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<td>Shirley Schutt</td>
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<td>VASE Advisor</td>
<td><a href="mailto:ptrinida@usc.edu">ptrinida@usc.edu</a></td>
<td>Patty Rinehart</td>
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<tr>
<td>• General advisement</td>
<td>213-740-0116</td>
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<tr>
<td>• Policies &amp; Procedures</td>
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Resources:

For Chemical Engineering, Material Science & Petroleum students:
MFD Student Affairs Office
Email: mfdstudentaffairs@vsoe.usc.edu

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
THANK YOU!