MORK FAMILY DEPARTMENT
Department of Chemical Engineering & Materials Science

Cory Reano, Director, MFD Student Affairs
Ebonie Hawthorne, Assistant Director, MFD Student Services
A recording of this online orientation and this presentation will be available for viewing and download on the GAPP 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
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

Materials Science
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Petroleum Engineering
Dr. Iraj Ershaghi
Email ershaghi@usc.edu
Mork Family Department
Student Affairs

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Karen Woo
Assistant Director
karenwoo@usc.edu
213-740-2227
Office: VHE 604
Master of Science in 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.

https://chems.usc.edu/academics/graduate-programs/chemical-engineering/
Master of Science in Materials Science

Requirements for Graduation 27 units total with 3.0 GPA overall:

Core Courses: 21 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 6 units may be graduate courses outside of Materials Science with departmental approval.

https://chems.usc.edu/academics/graduate-programs/materials-science/
Master of Science in Materials Engineering

Requirements for Graduation 27 units total with 3.0 GPA overall:

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

Electives:
The remaining 9 units may be graduate courses outside of Materials Science with departmental approval.

https://chems.usc.edu/academics/graduate-programs/materials-science/
Core Courses
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 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
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 410 Introduction to Biomaterials and Tissue Engineering
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

Requirements for Graduation 27 units total for Petroleum Engineering 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: 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)

**Electives (9 units):**
- 9 units of PTE elective courses

**Deficiency Courses (required for Non-BS PTE students)**
- 411, 412, 461, 466, 500
## Fall 2019 DEN Courses:

<table>
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<tr>
<th>Course</th>
<th>Days</th>
<th>Times</th>
<th>Instructors</th>
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<tbody>
<tr>
<td>(CHE501)</td>
<td>Mon/Wed</td>
<td>08:30 - 10:20</td>
<td>Sahimi, Muhammed</td>
</tr>
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<td>(CHE540)</td>
<td>Mon/Wed</td>
<td>11:00 - 12:20</td>
<td>Sahimi, Muhammed</td>
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<td>(CHE542)</td>
<td>Tue/Thu</td>
<td>14:00 - 15:20</td>
<td>Tsotsis, Theo</td>
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<td>(MASC503)</td>
<td>Mon/Wed</td>
<td>15:00 - 16:50</td>
<td>Brancio, Paulo</td>
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<td>(MASC551)</td>
<td>Tue/Thu</td>
<td>09:30 - 11:20</td>
<td>Grunenfelder, Lessa</td>
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<tr>
<td>(MASC583)</td>
<td>Wed</td>
<td>18:00 - 21:20</td>
<td>Grunenfelder, Lessa</td>
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<tr>
<td>(PTE411)</td>
<td>Fri</td>
<td>15:30 - 18:10</td>
<td>Chang, Jincai</td>
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<tr>
<td>(PTE461)</td>
<td>Tue/Thu</td>
<td>09:00 - 10:50</td>
<td>Jha, Birendra</td>
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<tr>
<td>(PTE500)</td>
<td>Tue</td>
<td>15:30 - 18:10</td>
<td>Chang, Jincai</td>
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<td>(PTE503)</td>
<td>Mon</td>
<td>15:30 - 18:10</td>
<td>Ershaghi, Iraj</td>
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<td>(PTE507)</td>
<td>Thu</td>
<td>19:00 - 21:40</td>
<td>Chang, Jincai</td>
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<tr>
<td>(PTE519)</td>
<td>Wed</td>
<td>12:30 - 15:10</td>
<td>Paul, Donald</td>
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<tr>
<td>(PTE572)</td>
<td>Mon/Wed</td>
<td>09:00 - 10:50</td>
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<tr>
<td>(PTE582)</td>
<td>Wed</td>
<td>15:30 - 18:10</td>
<td>Civan, Faruk</td>
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<tr>
<td>(PTE588)</td>
<td>Thu</td>
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### 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.

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<thead>
<tr>
<th>Section</th>
<th>Session</th>
<th>Type</th>
<th>Time</th>
<th>Days</th>
<th>Registered</th>
<th>Instructor</th>
<th>Location</th>
<th>Syllabus</th>
<th>Info</th>
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<tr>
<td>32140D</td>
<td>034</td>
<td>Lecture</td>
<td>3:00-4:50pm</td>
<td>Mon, Wed</td>
<td>1 of 15</td>
<td>Paulo Brancio</td>
<td>DEN@Viterbi</td>
<td></td>
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<tr>
<td>32142R</td>
<td>048</td>
<td>Lecture</td>
<td>3:00-4:50pm</td>
<td>Mon, Wed</td>
<td>10 of 56</td>
<td>Paulo Brancio</td>
<td>OHE 100D</td>
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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@gapp.usc.edu
# CONTACT INFO

**OFFICE OF GRADUATE AND PROFESSIONAL PROGRAMS**

**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/)

<table>
<thead>
<tr>
<th>DEN@Viterbi Support</th>
<th>Contact Information</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical support,</td>
<td><a href="mailto:dentsc@usc.edu">dentsc@usc.edu</a></td>
<td>Rebecca Lee</td>
</tr>
<tr>
<td>Desire2Learn training,</td>
<td>213-740-9356</td>
<td>Bianca Richter</td>
</tr>
<tr>
<td>Homework</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEN d-clearance inquiries</td>
<td><a href="mailto:den@gapp.usc.edu">den@gapp.usc.edu</a></td>
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</tr>
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<table>
<thead>
<tr>
<th>Exams</th>
<th><a href="mailto:denexam@usc.edu">denexam@usc.edu</a></th>
<th>Shirley Schutt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>213-740-9356</td>
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<tr>
<th>GAPP Advisor</th>
<th><a href="mailto:ptrinida@usc.edu">ptrinida@usc.edu</a></th>
<th>Patty Rinehart</th>
</tr>
</thead>
<tbody>
<tr>
<td>• General advisement</td>
<td>213-740-0116</td>
<td></td>
</tr>
<tr>
<td>• Policies &amp; Procedures</td>
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<thead>
<tr>
<th>Employer Reimbursement</th>
<th><a href="mailto:susannas@usc.edu">susannas@usc.edu</a></th>
<th>Susanna Sahakian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deferment or Vouchers</td>
<td>213-740-8198</td>
<td></td>
</tr>
</tbody>
</table>
How to make an appointment with your academic advisor

For Chemical Engineering and Material Science students:
MFD Student Affairs Office
Email: mfdstudentaffairs@vsoe.usc.edu
Telephone: (213) 740-4339

For Petroleum Engineering students:
Ebonie Hawthorne
hawthorne@vsoe.usc.edu
(213) 740-0322
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
- GAPP Office
- Check in with your advisors
- Research
THANK YOU!