

Master of Engineering Program in Materials Science and Engineering (International Program)

1.2: Research and Coursework (2-year program) MSE

Total Credits of the Program

Not less than 36 Credits

Curriculum Structure

1) Core Courses	Not less than	11 Credits
1.1) Seminar	Not less than	2 Credits
MSE 578 Seminar I (GD)		1(---)
MSE 579 Seminar II (GD)		1(---)
1.2) Graduate Development Courses		6 Credits (non-Credits)
VIS 561 Professional Development I (SU)		3(3-0-6) (non-credit)
VIS 562 Professional Development II (SU)		3(3-0-6) (non-credit)
1.3) Compulsory Core Courses		6 Credits
1.3.1) Required for every student		
MSE 504 Characterization of Materials (GD)		3(3-0-6)
1.3.2) Select at least one of the following courses		
MSE 501 Thermodynamics and Kinetic Processes in Materials (GD)		3(3-0-6)
MSE 502 Chemical Synthesis of Materials (GD)		3(3-0-6)
MSE 503 Structure and Properties of Materials (GD)		3(3-0-6)
1.4) Elective Core Courses		3 Credits
1.4.1) Frontiers in Materials Science and Engineering		
MSE 512 Solid State Chemistry and Physics (GD)		3(3-0-6)
MSE 515 Modeling and Simulation of Materials (GD)		3(3-0-6)
MSE 611 Surface and Interface Properties of Materials (GD)		3(3-0-6)
MSE 612 Electronic Structures of Solid Surface and Nano-scale Materials (GD)		3(3-0-6)
MSE 615 Molecular Structures and Properties of Polymers (GD)		3(3-0-6)
MSE 616 Chemistry and Physics of Nanostructures (GD)		3(3-0-6)
MSE 617 Electrochemistry and Corrosion (GD)		3(3-0-6)
MSE 619 Frontiers in Materials Science and Technology (GD)		3(3-0-6)
BSE 612 Biocatalysis and Mechanistic Enzymology (GD)		3(3-0-6)
CHE 612 Electrochemical Energy Systems (GD)		3(3-0-6)
1.4.2) Specialized Courses on Molecular Design and Synthesis Processes		
MSE 521 Advanced Synthesis for Organic and Inorganic and Biological Materials (GD)		3(3-0-6)
MSE 522 Synthesis and Processing of Electronic and Photonic Materials (GD)		3(3-0-6)

MSE 621 Composite Materials and Processing (GD)	3(3-0-6)
MSE 624 Molecular Design of Functional Polymers (GD)	3(3-0-6)
MSE 627 Qualitative Property Predictions for Transition Metal Complexes (GD)	3(3-0-6)
CHE 521 Applied Catalysis (GD)	3(3-0-6)
CHE 522 Design and Preparation of Heterogeneous Catalysts (GD)	3(3-0-6)
CHE 622 Quantum Simulation of Molecules and Materials (GD)	3(3-0-6)
CHE 623 Advanced Catalysis and Electrocatalysis (GD)	3(3-0-6)
CHE 624 Industrial Catalysis (GD)	3(3-0-6)

1.4.3) Advanced Courses on Cutting-Edge Analysis and Characterization of Materials

MSE 631 X-ray Science and Applications (GD)	3(3-0-6)
MSE 634 Spectroscopic Methods for Organic Compounds (GD)	3(3-0-6)
MSE 635 Advanced Characterization of Semiconducting Materials (GD)	3(3-0-6)

1.4.4) Novel Materials, New Processes and Applications

MSE 541 Materials for Energy Environmental and Biological Applications (GD)	3(3-0-6)
MSE 542 Photovoltaic and Solar Cell Materials and Devices (GD)	3(3-0-6)
MSE 545 Catalytic Materials and Applications (GD)	3(3-0-6)
MSE 642 Nano Electronic and Photonics Materials and Devices (GD)	3(3-0-6)
MSE 644 Composite and Hybrid Materials (GD)	3(3-0-6)
MSE 645 Biomaterials and Soft Materials (GD)	3(3-0-6)
MSE 646 Thin-Film Semiconductors and Devices (GD)	3(3-0-6)
MSE 647 Innovative Biomaterials (GD)	3(3-0-6)
MSE 648 Crystallization of Materials (GD)	3(3-0-6)
BSE 642 Biosensor and Electrochemistry (GD)	3(3-0-6)
CHE 696 Selected Topics: "Advanced Materials" (GD)	3(3-0-6)
MSE 567 Selected Topics: "Advanced NMR Analysis" (GD)	3(3-0-6)
MSE 567 Selected Topics: "Coordination and Organometallic	3(3-0-6)
MSE 567 Selected Topics: "Functional Porous Materials and Periodic	3(3-0-6)
MSE 567 Selected Topics: "Molecular Orbital Theory of the Transition	3(3-0-6)
MSE 567 Selected Topics: "Solid State Chemistry" (GD)	3(3-0-6)
CHE 596 Selected Topics: "Advanced Zeolites in Catalysis" (GD)	3(3-0-6)
CHE 596 Selected Topics: "Crystallization" (GD)	3(3-0-6)
CHE 596 Selected Topics: "Solid State Chemistry I" (GD)	3(3-0-6)
CHE 596 Selected Topics: "Solid State Chemistry II" (GD)	3(3-0-6)
CHE 596 Selected Topics: "Material Chemistry: Metal-Organic Frameworks - Characterization and Applications" (GD)	3(3-0-6)
CHE 596 Selected Topics: "Modeling of Crystallization Processes" (GD)	3(3-0-6)

2) Thesis

Not less than 25 Credits

MSE 599 Thesis (SU)	1-25
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