B.S. CHEMICAL ENGINEERING PROGRAM (2016-2017 Catalog)

TECHNICAL ELECTIVES

BIOCHEMICAL EMPHASIS

Advanced Chemical Science Elective (6 credit hours minimum)
- BMB 301 Biochemistry (3)
- BMB 401 Biochemistry of Proteins and Information Flow (3)
- ChE 505 Biochemical Engineering (3)
- Chem 342/342L Organic Chemistry II (4/1)
- Biol 450 Molecular Genetics (2)
- MBIO 302/302L General Microbiology/Laboratory (2/2)

Technical Elective (3 credit hours minimum)
Any course acceptable for the Advanced Chemical Science Elective and the following:
- BIOL 315 Genetics (3)
- BIOL 341/341L Cell Biology/Laboratory (3/1)
- ChE 397 Cooperative Education (1-3)
- MLS 478 Clinical Microbiology I (2)
- MLS 487 Medical Mycology (1)

CHEMICAL ENGINEERING RESEARCH EMPHASIS

Advanced Chemical Science Elective (6 credit hours minimum)
- Chem 333/333L Analytical Chemistry/Lab (3/1)
- Chem 342/342L Organic Chemistry II (4/1)
- Chem 441/442/443 Instrumental Analysis I/II/III (2/2/2)
- Chem 471 Quantum Mechanics & Spectroscopy (3)
- Chem 455 Spectroscopy and Structure (3)

Technical Elective (3 credit hours minimum)
Any course listed for Advanced Chemical Science Elective and the following:
- BIMD 510 Basic Biomedical Statistics (2)
- ChE 397 Cooperative Education (if research intensive) (1-3)
- ChE 480 Undergraduate Research (1-3)
- ChE 501 Advanced Transport Phenomena (3)
- ChE 505 Biochemical Engineering (3)
- ChE 509 Advanced Chemical Engineering Thermodynamics (3)
- ChE 511 Advanced Chemical Engineering Kinetics (3)
- ChE 515 Design of Engineering Experiments (3)
- ChE 525 Polymer Reaction Engineering (3)
- Geol 540 Water Sampling and Analysis (3)
- ME 464 Computational Fluid Dynamics (3)
- ME 545 Fluidized-Bed Combustion Engineering (3)
- ME 574 Advanced Heat Transfer (3)
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TECHNICAL ELECTIVES
ENVIRONMENTAL ENGINEERING EMPHASIS

Advanced Chemical Science Elective (6 credit hours minimum)
Chem 333/333L Analytical Chemistry/Lab (3/1)
Chem 342/342L Organic Chemistry II (4/1)
Chem 441/442/443 Instrumental Analysis I/II/III (2/2/2)

Technical Elective (3 credit hours minimum)
Any course listed for Advanced Chemical Science Elective and the following:
ATSC 350 Atmospheric Thermodynamics (3)
ATSC 360 Dynamic Meteorology (4)
ATSC 505 Advanced Atmospheric Dynamics (4)
ATSC 520 Atmospheric Chemistry (3)
ATSC 525 Atmospheric Radiation (3)
ATSC 538 Advanced Earth System Sciences (3)
ATSC 565 Air Quality (3)
Biol 439 Conservation Biology (3)
ChE 397 Cooperative Education (1-3)
ChE 404 Air Emissions – Regulations and Control (3)
ChE 504 Air Pollution (3)
ChE 515 Design of Engineering Experiments (3)
CE 431 Environmental Engineering I (3)
CE 432 Environmental Engineering II (3)
CE 434 Environmental Engineering Lab (3)
CE 435 Hazardous Waste Management (3)
CE 531 Environmental Engineering III (3)
CE 532 Environmental Engineering IV (3)
CE 533 Industrial Wastes (3)
CE 535 Hazardous Waste Management (3)
Engr 501 Energy, Resources, and Policy (3)
Engr 502 Alternative Energy Systems (3)

Technical Elective (continued)
GeoE 302 Reclamation Engineering (3)
Geog 322 Environmental Hazards (3)
GeoE 417 Hydrogeology (3)
GeoE 419 Groundwater Monitoring and Remediation (3)
Geol 106 Global Warming: The Facts and Myths
Geol 322 Geology, Society, and the Environment (3)
Geol 342 Environmental and Conservation Hydrology (3)
Geol 540 Water Sampling and Analysis (3)
OSEH 395 Hazardous Material Management (3)
SEE 510 Process Design & Feasibility Assessment of Sustainable Technologies (3)
SPST 430 Earth System Science (3)
SPST 435 Global Change (3)
SPST 522 Remote Sensing Principles (3)
SPST 523 Remote Sensing Applications (3)
SPST 538 Space Environment and the Sun (3)
SPST 545 Space and the Environment (3)

Arts and Humanities (9 credits)
Phil 253 Environmental Ethics

Social Sciences (6 credit hours minimum)
ESSP 160 Sustainability and Society (3)
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TECHNICAL ELECTIVES

PRE-HEALTH SCIENCES EMPHASIS

Advanced Chemical Science Elective (6 credit hours minimum)
*CHEM 342/L Organic Chemistry II/Laboratory (4/1)
*BMB 301 Biochemistry Lecture (3)
**MBio 302/302L General Microbiology Lecture/Lab (2/2)

Technical Elective (3 credit hours minimum)
Any course listed for Advanced Chemical Science Elective and the following:
**BIOL 315/R Genetics/Recitation (3/1)
**BIOL 341/341L Cell Biology/Laboratory (3/1)
BIOL 369/369L Histology/Lab (2/2)
BIOL 380 Disease Biology (3)

Arts and Humanities (9 credits)
All courses acceptable for ES Arts and Humanities (should be people-centered subjects)
*ART 120, 130, 151 (for dental school)

Social Sciences (6 credit hours minimum)
*PSYC 111 Intro. to Psychology (3)
**PSYC 250 Developmental Psychology (3)
**PSYC 270 Abnormal Psychology (3)
**SOC 110 Intro. to Sociology (3)
PHE 101 Introduction to Public Health (3)
PHE 102 Epidemiology in Public Health (3)

* Required for most medical/dental school admissions
** Recommended preparation for the MCAT/DAT

The MCAT/DAT should be taken May or June after junior year.
The application process begins June 1st before senior year.

For more information about the Pre-Med, Pre-Dental, and other Pre-Health programs at UND contact Kim Ruit (pre-health advisor, 777-2749, 125C Montgomery Hall)

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TECHNICAL ELECTIVES

PRE-LAW EMPHASIS

Advanced Chemical Science Elective (6 credit hours minimum)
Chem 333/333L Analytical Chemistry/Lab (3/1)

Technical Elective (3 credit hours minimum)
Any course listed for Advanced Chemical Science Elective and the following:
ChE 404 Air Emissions: Regulation and Control (3)
CE 444 Contracts and Specifications (3)

Arts and Humanities (9 credits)
Phil 110 Introduction to Logic (3)
THEA 110 Introduction to Theatre Arts

Social Sciences (6 credit hours minimum)
CJ 201 Intro to Criminal Justice (3)
ME 370 Engineering Disasters and Ethics (3)
PHIL 130 Intro to Political Philosophy (3)
POLS 116 State and Local Government (3)
POLS 225 Comparative Politics (3) (G)
POLS 318 American Political Thought (3) (U)
SOC 115 Social Problems (3)
SOC 253 Juvenile Delinquency (3)

Application date is April 1st for most law schools (take LSAT before applying).

For more information, visit http://www.lsac.org/
B.S. CHEMICAL ENGINEERING PROGRAM (2016-2017 Catalog)
TECHNICAL ELECTIVES
ENTREPRENEURSHIP EMPHASIS

Technical Elective (3 credit hours minimum)
Entr 290 Venture Initiation (3)
Entr 386 Entrepreneurship: The Numbers (3)

Business/Entrepreneurship Elective: (3 credit hours minimum)
Entr 250 Imagination, Creativity, and Entrepreneurial Thinking (3)
Engr 410 Technology Ventures (3)

Social Sciences (6 credit hours minimum)
Entr 101 Introduction to Entrepreneurship (3)
Econ 201 Principles of Microeconomics (3)
Econ 202 Principles of Macroeconomics (3)

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TECHNICAL ELECTIVES
MANAGEMENT EMPHASIS

Technical Elective (3 credit hours minimum)
Econ 414 Managerial Economics (3)

Business/Entrepreneurship Elective: (3 credit hours minimum)
Acct 200: Elements of Accounting I (3)*
Acct 315 Business Law I (3)
Entr 305 Marketing and Management Concepts for Entrepreneurs (3)
Entr 306 Accounting and Financial Concepts for Entrepreneurs (3)
Mgmt 300 Principles of Management (3)

Social Sciences (6 credit hours minimum)
Engr 460 Engineering Economy (3)* or
Econ 201 Principles of Microeconomics (3)* and
Econ 202 Principles of Macroeconomics (3)*

*The UND MBA program requires these core courses as a pre-requisite to enrolling in their program. This core can be met with the marked electives and including ChE 315.