Revised description for the MS in Chemical Engineering:

M.S. in Chemical Engineering

Degree Requirements

A minimum of 30 credits is required. Students must attain a minimum GPA of 3.0 in the core courses listed below, and a minimum overall GPA of 3.0.

~~**Degree Options**~~

M.S. in Chemical Engineering (courses only)

Course List

Code	Title	Credits
Core Courses		
CHE 611	Thermodynamics	3
CHE 612	Kinetics of Reactions and Reactor Design	3
CHE 624	Transport Phenomena I	3
CHE 626	Mathematical Methods in Chemical Engineering	3
Elective Courses		
~~Three 600 or 700-level Chemical Engineering courses~~Two electives in chemical engineering		96
~~Chemical Engineering, Pharmaceutical Engineering, or Chemistry course~~Two electives in any engineering, science, or mathematics area including but not limited to chemical engineering		~~36~~
Two ~~Elective~~elective courses (any subject area)		6
~~Total Credits~~		~~30~~
Total Credits		30

[1] ~~500-level courses offered in the department do not count toward degree requirements.~~

M.S. in Chemical Engineering (~~students receiving departmental or research-based support~~thesis option)

Course List

Code	Title	Credits
Core Courses		
CHE 611	Thermodynamics	3
CHE 612	Kinetics of Reactions and Reactor Design	3

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Course List

Code	Title	Credits
CHE 624	Transport Phenomena I	3
CHE 626	Mathematical Methods in Chemical Engineering	3
Thesis [1]		
CHE 701 Master's Thesis		6
Seminar		
CHE 791	Graduate Seminar [2]	0
Elective Courses		
~~600 or 700-level Chemical Engineering course~~One elective in chemical engineering		3
~~Chemical Engineering, Pharmaceutical Engineering, or Chemistry course~~One elective in any engineering, science, or mathematics area including but not limited to chemical engineering		3
Two ~~Elective~~elective courses (any subject area)		6
Total Credits		30

[1] Before deciding on a thesis topic and advisor, students must discuss thesis topics with at least three faculty members and get their signature on a form provided by the department. The signed form with the name of advisor selected and tentative title of thesis topic must be returned to the department for approval. Change of advisor requires consent of the previous advisor and departmental approval. The completed thesis must be examined and signed by three faculty members at least two of which must be on the department faculty. An oral presentation is also required. The MS thesis committee must be formed and submitted to the department for approval at least one semester before the expected graduation date. The department provides a form for the formation of the MS thesis committee.

~~Total Credits~~ ~~30~~

~~[1] Before deciding on a thesis topic and advisor, students must discuss thesis topics with at least three faculty members and get their signature on a form provided by the department. The signed form with the name of advisor selected and tentative title of thesis topic must be returned to the department for approval. Change of advisor requires consent of the previous advisor and departmental approval. The completed thesis must be examined and signed by three faculty members at least two of which must be on the department faculty. An oral presentation is also required. The MS thesis committee must be formed and submitted to the department for approval at least one semester before the expected graduation date. The department provides a form for the formation of the MS thesis committee.~~

[2] All students who receive departmental or research-based support must enroll each semester in CHE 791 Graduate Seminar.

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[3] 500-level courses offered in the department do not count toward degree requirements.

M.S. in Chemical Engineering (Master's thesis)

Course List

Code	Title	Credits
Core Courses		
CHE 611	Thermodynamics	3
CHE 612	Kinetics of Reactions and Reactor Design	3
CHE 624	Transport Phenomena I	3
CHE 626	Mathematical Methods in Chemical Engineering	3
Thesis [1]		
CHE 701 Master's Thesis		6
Elective Courses		
600 or 700-level course(s) in Chemical Engineering		3
Chemical Engineering, Pharmaceutical Engineering, or Chemistry course		3
Two elective courses		6
Total Credits		30

[1] Before deciding on a thesis topic and advisor, students must discuss thesis topics with at least three faculty members and get their signature on a form provided by the department. The signed form with the name of advisor selected and tentative title of thesis topic must be returned to the department for approval. Change of advisor requires consent of the previous advisor and departmental approval. The completed thesis must be examined and signed by three faculty members at least two of which must be on the department faculty. An oral presentation is also required. The MS thesis committee must be formed and submitted to the department for approval at least one semester before the expected graduation date. The department provides a form for the formation of the MS thesis committee.

[2] 500-level courses offered in the department do not count toward degree requirements.

M.S. in Pharmaceutical Engineering

Depending on the background of the applicant this bridge program may consist of up to (but generally speaking less, at least for students with engineering degrees) three 3-credit courses specifically designed to provide non-chemical engineers with the necessary prerequisites to enter the program.

A grade point average of at least 3.0 must be achieved in the bridge courses. Students should pay special attention to the successful completion of the bridge courses, since failure to do so may preclude them from enrolling in regular PhEn courses. Students must take the bridge courses before taking any other PhEn courses, with the exception of PHEN 601 Principles of Pharmaceutical Engineering and PHEN 604 Validation and Regulatory Issues in the Pharmaceutical Industry, which can be taken concurrently with the bridge courses. As already mentioned, admission conditions may also include taking additional undergraduate or graduate courses, if needed.

Degree Requirements

The Master of Science in Pharmaceutical Engineering is a 30-credit program structured along two different tracks. The two tracks have a common 15-credit core. Each track has an additional 6-credit track-core, as described below. Each track has 9 credits of electives selected by the student in consultation with, and subject to, the approval of the program advisor for the selected track

Students have the option of fulfilling 6 of the 9 credits of electives by doing a Master's Thesis. The thesis option is primarily, but not exclusively, meant for full-time students. Full-time students receiving support (full or partial) must complete a Master's Thesis. Part-time students working in the pharmaceutical industry are encouraged to pursue a Master's Thesis, possibly conducted at their site and in collaboration with their supervisor.

Students must maintain an overall cumulative grade point average of at least 3.0 throughout their academic career. Students are certified for graduation only if they:

- achieve an OVERALL cumulative grade point average of at least 3.0; and
- achieve a grade point average of at least 3.0 in the required seven CORE COURSES; and
- achieve a grade point average of at least 3.0 in the BRIDGE COURSES.

Students may not repeat a course without approval of both the Program Director and the Office of Graduate Studies, located in the East Building, Suite 140. The grade received in a repeated

course will replace the original grade in the calculation of the cumulative grade point average, although the first grade will still appear on the transcript. A MAXIMUM OF TWO COURSES MAY BE REPEATED. Students who receive an F in a course are required to repeat the course.

Program of Study

The program of study includes common core courses, track-specific core courses, elective courses, and, if the students so chooses, a thesis (in lieu of some elective courses), as specified below. The common core courses cover a variety of topics ranging from drug dosage forms to drug manufacturing processes, validation and regulatory issues, design criteria and unit operations for pharmaceutical processes, pharmacokinetics and drug delivery.

The program has two tracks, i.e.:

- Track 1 - Process Development and Design for Drug Substance Manufacturing. This track is focused on the engineering aspects of chemical reaction and separation processes required for the manufacturing of active pharmaceutical ingredients.
- Track 2 - Process Development and Design for Drug Product Manufacturing. This track is focused on the engineering aspects of processes required for the manufacturing of final drug products.

All students must take the same five (5) common core courses as well as the two (2) track-specific core courses for the track that they have selected. Irrespective of the track selected, the total number of core courses (7) and the corresponding core credits (21) are the same for both tracks.

Course Requirements

M.S. in Pharmaceutical Engineering, Process Development and Design for Drug Substance Manufacturing (applicants with science background or engineering degree other than chemical or mechanical, courses only)

Course List

Code	Title	Credits
Bridge Courses		
PHEN 500	Pharmaceutical Engineering Fundamentals I [1]	3
PHEN 501	Pharmaceutical Engineering Fundamentals II [1]	3
PHEN 502	Pharmaceutical Engineering Fundamentals III	3
Total Credits		9

[1] PHEN 500 Pharmaceutical Engineering Fundamentals I and PHEN 501 Pharmaceutical Engineering Fundamentals II are offered in the fall and should be taken concurrently.

Course List

Code	Title	Credits
Core Courses		
PHEN 601	Principles of Pharmaceutical Engineering	3
PHEN 603	Pharmaceutical Unit Operations: Processing of Liquid and Dispersed Phase Systems	3
PHEN 604	Validation and Regulatory Issues in the Pharmaceutical Industry	3
PHEN 606	Pharmaceutical Unit Operations: Solids Processing	3
PHEN 618	Principles of Pharmacokinetics and Drug Delivery	3
Track Core Courses		
PHEN 612	Pharmaceutical Reaction Engineering	3
PHEN 614	Pharmaceutical Separation Processes	3
Electives		
Elective courses [1]		9
Total Credits		30

[1] Partial list of approved electives is in Electives table. Electives can be selected from among pharmaceutical engineering courses (such as the courses in the track not chosen by the student), as well as appropriate courses in disciplines such as chemical engineering, mechanical engineering, industrial engineering, biomedical engineering, chemistry, biology, mathematics, and others.

M.S. in Pharmaceutical Engineering, Process Development and Design for Drug Substance Manufacturing (applicants with science background or engineering degree other than chemical or mechanical, Master's thesis)

Course List

Code	Title	Credits
Bridge Courses		
PHEN 500	Pharmaceutical Engineering Fundamentals I [1]	3
PHEN 501	Pharmaceutical Engineering Fundamentals II [1]	3
PHEN 502	Pharmaceutical Engineering Fundamentals III	3
Total Credits		9

[1] PHEN 500 Pharmaceutical Engineering Fundamentals I and PHEN 501 Pharmaceutical Engineering Fundamentals II are offered in the fall and should be taken concurrently.

Course List

Code	Title	Credits
Core Courses		
PHEN 601	Principles of Pharmaceutical Engineering	3
PHEN 603	Pharmaceutical Unit Operations: Processing of Liquid and Dispersed Phase Systems	3

Course List

Code	Title	Credits
PHEN 604	Validation and Regulatory Issues in the Pharmaceutical Industry	3
PHEN 606	Pharmaceutical Unit Operations: Solids Processing	3
PHEN 618	Principles of Pharmacokinetics and Drug Delivery	3
Track Core Courses		
PHEN 602	Pharmaceutical Facility Design	3
PHEN 605	Pharmaceutical Packaging Technology	3
Thesis		
PHEN 701	Master's Thesis [1]	6
Electives		
Elective courses [2]		3
Total Credits		30

[1] A student must register for thesis during the last semester before graduation, even if this requires taking additional thesis credit beyond the required 6.

[2] Partial list of approved electives is in Electives table. Electives can be selected from among pharmaceutical engineering courses (such as the courses in the track not chosen by the student), as well as appropriate courses in disciplines such as chemical engineering, mechanical engineering, industrial engineering, biomedical engineering, chemistry, biology, mathematics, and others.

M.S. in Pharmaceutical Engineering, Process Development and Design for Drug Substance Manufacturing (courses only)

Course List

Code	Title	Credits
Core Courses		
PHEN 601	Principles of Pharmaceutical Engineering	3
PHEN 603	Pharmaceutical Unit Operations: Processing of Liquid and Dispersed Phase Systems	3
PHEN 604	Validation and Regulatory Issues in the Pharmaceutical Industry	3
PHEN 606	Pharmaceutical Unit Operations: Solids Processing	3
PHEN 618	Principles of Pharmacokinetics and Drug Delivery	3
Track Core Courses		
PHEN 612	Pharmaceutical Reaction Engineering	3
PHEN 614	Pharmaceutical Separation Processes	3
Electives		
Elective courses [1]		9
Total Credits		30

[1] Partial list of approved electives is in Electives table. Electives can be selected from among pharmaceutical engineering courses (such as the courses in the track not chosen by the student), as well as appropriate courses in disciplines such as chemical engineering, mechanical engineering, industrial engineering, biomedical engineering, chemistry, biology, mathematics, and others.

M.S. in Pharmaceutical Engineering, Process Development and Design for Drug Substance Manufacturing (Master's thesis)

Course List

Code	Title	Credits
Core Courses		
PHEN 601	Principles of Pharmaceutical Engineering	3
PHEN 603	Pharmaceutical Unit Operations: Processing of Liquid and Dispersed Phase Systems	3
PHEN 604	Validation and Regulatory Issues in the Pharmaceutical Industry	3
PHEN 606	Pharmaceutical Unit Operations: Solids Processing	3
PHEN 618	Principles of Pharmacokinetics and Drug Delivery	3
Track Core Courses		
PHEN 602	Pharmaceutical Facility Design	3
PHEN 605	Pharmaceutical Packaging Technology	3
Thesis		
PHEN 701	Master's Thesis [1]	6
Electives		
Elective courses [2]		3
Total Credits		30

[1] A student must register for thesis during the last semester before graduation, even if this requires taking additional thesis credit beyond the required 6.

[2] Partial list of approved electives is in Electives table. Electives can be selected from among pharmaceutical engineering courses (such as the courses in the track not chosen by the student), as well as appropriate courses in disciplines such as chemical engineering, mechanical engineering, industrial engineering, biomedical engineering, chemistry, biology, mathematics, and others.

M.S. in Pharmaceutical Engineering, Process Development and Design for Drug Product Manufacturing (applicants with science background or engineering degree other than chemical or mechanical, courses only)

Course List

Code	Title	Credits
Bridge Courses		

Course List

Code	Title	Credits
PHEN 500	Pharmaceutical Engineering Fundamentals I [1]	3
PHEN 501	Pharmaceutical Engineering Fundamentals II [1]	3
PHEN 502	Pharmaceutical Engineering Fundamentals III	3
Total Credits		9

[1] PHEN 500 Pharmaceutical Engineering Fundamentals I and PHEN 501 Pharmaceutical Engineering Fundamentals II are offered in the fall and should be taken concurrently.

Course List

Code	Title	Credits
Core Courses		
PHEN 601	Principles of Pharmaceutical Engineering	3
PHEN 603	Pharmaceutical Unit Operations: Processing of Liquid and Dispersed Phase Systems	3
PHEN 604	Validation and Regulatory Issues in the Pharmaceutical Industry	3
PHEN 606	Pharmaceutical Unit Operations: Solids Processing	3
PHEN 618	Principles of Pharmacokinetics and Drug Delivery	3
Track Core Courses		
PHEN 602	Pharmaceutical Facility Design	3
PHEN 605	Pharmaceutical Packaging Technology	3
Electives		
Elective courses [1]		9
Total Credits		30

[1] Partial list of approved electives is in Electives table. Electives can be selected from among pharmaceutical engineering courses (such as the courses in the track not chosen by the student), as well as appropriate courses in disciplines such as chemical engineering, mechanical engineering, industrial engineering, biomedical engineering, chemistry, biology, mathematics, and others.

M.S. in Pharmaceutical Engineering, Process Development and Design for Drug Product Manufacturing (applicants with science background or engineering degree other than chemical or mechanical, Master's thesis)

Course List

Code	Title	Credits
Bridge Courses		
PHEN 500	Pharmaceutical Engineering Fundamentals I [1]	3
PHEN 501	Pharmaceutical Engineering Fundamentals II [1]	3
PHEN 502	Pharmaceutical Engineering Fundamentals III	3
Total Credits		9

[1] PHEN 500 Pharmaceutical Engineering Fundamentals I and PHEN 501 Pharmaceutical Engineering Fundamentals II are offered in the fall and should be taken concurrently.

Course List

Code	Title	Credits
Core Courses		
PHEN 601	Principles of Pharmaceutical Engineering	3
PHEN 603	Pharmaceutical Unit Operations: Processing of Liquid and Dispersed Phase Systems	3
PHEN 604	Validation and Regulatory Issues in the Pharmaceutical Industry	3
PHEN 606	Pharmaceutical Unit Operations: Solids Processing	3
PHEN 618	Principles of Pharmacokinetics and Drug Delivery	3
Track Core Courses		
PHEN 602	Pharmaceutical Facility Design	3
PHEN 605	Pharmaceutical Packaging Technology	3
Thesis		
PHEN 701	Master's Thesis [1]	6
Electives		
Elective course [2]		3
Total Credits		30

[1] A student must register for thesis during the last semester before graduation, even if this requires taking additional thesis credit beyond the required 6.

[2] Partial list of approved electives is in Electives table. Electives can be selected from among pharmaceutical engineering courses (such as the courses in the track not chosen by the student), as well as appropriate courses in disciplines such as chemical engineering, mechanical engineering, industrial engineering, biomedical engineering, chemistry, biology, mathematics, and others.

Course List

Code	Title	Credits
Core Courses		
PHEN 601	Principles of Pharmaceutical Engineering	3
PHEN 603	Pharmaceutical Unit Operations: Processing of Liquid and Dispersed Phase Systems	3
PHEN 604	Validation and Regulatory Issues in the Pharmaceutical Industry	3
PHEN 606	Pharmaceutical Unit Operations: Solids Processing	3
PHEN 618	Principles of Pharmacokinetics and Drug Delivery	3
Track Core Courses		
PHEN 602	Pharmaceutical Facility Design	3
PHEN 605	Pharmaceutical Packaging Technology	3
Electives		

Course List

Code	Title	Credits
Elective courses [1]		3
Thesis		
PHEN 701 Master's Thesis [2]		6
Total Credits		30

[1] Partial list of approved electives is in Electives table. Electives can be selected from among pharmaceutical engineering courses (such as the courses in the track not chosen by the student), as well as appropriate courses in disciplines such as chemical engineering, mechanical engineering, industrial engineering, biomedical engineering, chemistry, biology, mathematics, and others.

[2] A student must register for thesis during the last semester before graduation, even if this requires taking addition thesis credit beyond the required 6.

M.S. in Pharmaceutical Engineering, Process Development and Design for Drug Product Manufacturing (courses only)

Course List

Code	Title	Credits
Core Courses		
PHEN 601	Principles of Pharmaceutical Engineering	3
PHEN 603	Pharmaceutical Unit Operations: Processing of Liquid and Dispersed Phase Systems	3
PHEN 604	Validation and Regulatory Issues in the Pharmaceutical Industry	3
PHEN 606	Pharmaceutical Unit Operations: Solids Processing	3
PHEN 618	Principles of Pharmacokinetics and Drug Delivery	3
Track Core Courses		
PHEN 602	Pharmaceutical Facility Design	3
PHEN 605	Pharmaceutical Packaging Technology	3
Electives		
Elective courses [1]		9
Total Credits		30

[1] Partial list of approved electives is in Electives table. Electives can be selected from among pharmaceutical engineering courses (such as the courses in the track not chosen by the student), as well as appropriate courses in disciplines such as chemical engineering, mechanical engineering, industrial engineering, biomedical engineering, chemistry, biology, mathematics, and others.

M.S. in Pharmaceutical Engineering, Process Development and Design for Drug Product Manufacturing (Master's thesis)

Course List

Code	Title	Credits
Core Courses		
PHEN 601	Principles of Pharmaceutical Engineering	3
PHEN 603	Pharmaceutical Unit Operations: Processing of Liquid and Dispersed Phase Systems	3
PHEN 604	Validation and Regulatory Issues in the Pharmaceutical Industry	3
PHEN 606	Pharmaceutical Unit Operations: Solids Processing	3
PHEN 618	Principles of Pharmacokinetics and Drug Delivery	3
Track Core Courses		
PHEN 602	Pharmaceutical Facility Design	3
PHEN 605	Pharmaceutical Packaging Technology	3
Thesis		
PHEN 701	Master's Thesis [1]	6
Electives		
Elective course [2]		3
Total Credits		30

[1] A student must register for thesis during the last semester before graduation, even if this requires taking additional thesis credit beyond the required 6.

[2] Partial list of approved electives is in Electives table. Electives can be selected from among pharmaceutical engineering courses (such as the courses in the track not chosen by the student), as well as appropriate courses in disciplines such as chemical engineering, mechanical engineering, industrial engineering, biomedical engineering, chemistry, biology, mathematics, and others.

Electives

The following is a non-exhaustive, partial list of courses that can be taken as elective courses:

Course List

Code	Title	Credits
PHEN 602	Pharmaceutical Facility Design	3
PHEN 605	Pharmaceutical Packaging Technology	3
PHEN 612	Pharmaceutical Reaction Engineering	3
PHEN 614	Pharmaceutical Separation Processes	3
PHEN 701	Master's Thesis	0
PHEN 702	Selected Topics in Pharmaceutical Engineering	3
PHEN 725	Independent Study	3
BME 672	Biomaterials	3
BME 675	Computer Methods in Biomedical Engineering	3

Course List		
Code	**Title**	**Credits**
CHE 611	Thermodynamics	3
CHE 624	Transport Phenomena I	3
CHE 626	Mathematical Methods in Chemical Engineering	3
CHE 627	Introduction to Biomedical Engineering	3
CHE 628	Biochemical Engineering	3
CHE 656	Industrial Catalysis: Fundamentals and Applications	3
CHE 675	Statistical Thermodynamics	3
CHE 681	Polymerization-Principles and Practice	3
CHEM 601	Special Topics in Chemistry I	3
CHEM 605	Advanced Organic Chemistry I: Structure	3
CHEM 606	Physical Organic Chemistry	3
CHEM 658	Advanced Physical Chemistry	3
CHEM 661	Instrumental Analysis Laboratory	3
CHEM 664		3
CHEM 673	Biochemistry	3
CS 610	Data Structures and Algorithms	3
CS 631	Data Management System Design	3
EM 636	Project Management	3
EM 637	Project Control	3
EM 640	Distribution Logistics	3
IE 604	Advanced Engineering Statistics	3
IE 605	Engineering Reliability	3
IE 618	Engineering Cost and Production Economics	3
IE 672	Industrial Quality Control	3
IE 673	Total Quality Management	3
IE 674	Quality Maintenance and Support Systems	3
IE 704	Sequencing and Scheduling	3
ME 624	Microlevel Modeling in Particle Technology	3
MNE 601	Computerized Manufacturing Systems	3
MNE 602	Flexible and Computer Integrated Manufacturing	3

M.S. Thesis

Part-time students working in the pharmaceutical industry are eligible and encouraged to pursue the thesis option.

Student Involvement in Research

In addition to taking courses, students have the opportunity to work, one-on-one, with faculty members on research projects in areas of common interest, allowing maximum flexibility for independent work, and providing students with valuable research experience. Students have the option to complete a Master's thesis. PART-TIME STUDENTS WORKING IN THE PHARMACEUTICAL INDUSTRY ARE ENCOURAGED TO PURSUE A MASTER'S THESIS, POSSIBLY CONDUCTED AT THEIR SITE AND IN COLLABORATION WITH THEIR SUPERVISOR.

Qualified and research oriented students have the option of continuing their studies at NJIT by pursuing a Ph.D. in chemical engineering, industrial engineering, chemistry, or related disciplines. The NJIT-Industry Collaborative Ph.D. Program allows greater flexibility to industrial students who are interested in pursuing their Ph.D. while working full-time in industry.

NOTE: **Adding the Proposed Curriculum for M.S. in Management with a Concentration in Financial Technology (FinTech) to MSM. Track Changes are used to reflect changes.** Description were copied from the web.

Master of Science in Management (MSM)

The MSM program blends technical expertise with fundamental management knowledge.

Concentration Areas:

- Business Analytics
- Global Project Management
- Web Systems and Media
- Financial Technology (FinTech)

Management: The Next Step for Professionals with Technical Backgrounds

At some point in their careers, successful professionals are faced with the prospect of moving into managerial positions as the next logical step in their career progressions. The MSM program is designed to facilitate this transition. It is more focused than is the MBA curriculum through a stronger emphasis on mastery of a clearly defined concentration area.

The MSM is best suited for candidates who wish to have more influence in their organizations by moving into managerial positions, but who also desire to retain their allegiance to an area of technical expertise.

A Fast Tracked Program for Fast Tracked Professionals

The MSM program is delivered with special attention to people on the move. Students can complete the degree requirements in two years of part-time study or in a single year of full-time study. Courses are offered during the evenings to accommodate the schedules of working professionals. In addition, the 15-credit MSM core is available on-line.

MS in Management Curriculum

The **Master of Science in Management** is a 30 credit program that prepares graduates for managerial roles in organizations. Its emphasis is on melding business fundamentals and technical knowledge within specific areas of concentration including Business Analytics, Global Project Management, and Web Systems and Media, and **Financial Technology (FinTech)**.

Master of Science in Management (MSM)		
Course Code	**Course Title**	**Credits**
Module I: Core Courses (15 credits)		
ACCT 615	Management Accounting	3
FIN 600	Corporate Finance I	3
HRM 601	Organizational Behavior	3
MIS 645 / IS 677	Information Systems Principles	3
MRKT 620	Global Marketing Management	3
	Total Credits:	15
Module II: Concentration Areas (choose 15 credits from 1 area)		
Area 1: Global Project Management **Note: One course must be either ECON 610 or MGMT 641*		
*ECON 610 / FIN 610	Managerial Economics / Global Macro Economics	3
EM 636	Project Management	3
EM 637	Project Control	3
EM 691	Cost Estimating for Capital Projects	3
IE 618	Engineering Cost & Production Economics	3
IE 659	Supply Chain Engineering	3
IS 614	Command and Control Systems	3
IS 684	Business Process Innovation	3
*MGMT 641	Global Project Management	3
Area 2: Web Systems and Media **Note: Once course must be MRKT 637*		
IS 661	User Experience Design	3
IS 664	Customer Discovery	3
IS 688	Web Mining	3
IS 690	Web Services and Middleware	3
MRKT 637	Marketing Communications & Promotions	3
PTC 601	Advanced Professional & Technical Communication	3
PTC 605	Elements of Visual Design	3
PTC 606	Advanced Information Design	3
PTC 650	eLearning Design for Mobile	3
Area 3: Business Analytics **Note: One course must be MGMT 630 or MGMT 662, MGMT 635, MGMT 710, MIS 648, MIS 680, or MRKT 645*		
CS 634	Data Mining	3
IS 631	Enterprise Database Management	3
IS 687	Transaction Mining and Fraud Detection	3
IS 688	Web Mining	3
MATH 661	Applied Statistics	3
MGMT 625	Logistics Management	3
*MGMT 630 / MGMT 662	Decision Analysis / Managerial Science (formerly MIS 680 Management Science)	3
MGMT 650	Knowledge Management	3
*MGMT 635	Data Mining and Analysis	3
*MGMT 710	Forecasting Methods for Business Decisions	3
*MIS 648	Decisions Support Systems for Managers	3
*MRKT 645	Digital (Internet) Marketing Strategy	3

Area 4: Financial Technology		
***Note:** One course must be FIN 611 and two courses must be FIN 616, FIN 620 and ~~FIN~~ MGMT 735*		
FIN 611	Introduction to Topics in Financial Technology (new)	3
FIN 616	Data-Driven Financial Modeling (new)	3
FIN 620	Advanced Financial Data Analytics (new)	3
~~FIN~~MGMT 735	~~Data Mining and~~ Machine Learning and Deep Learning in Business (new)	3
FIN 641	Derivatives Markets	3
FIN 626	Financial Markets and Institutions	3
FIN 624	Corporate Finance II	3
MGMT 635	Data Mining and Analysis	3

The MSM curriculum puts it all together and prepares managers who know how to use technology to meet strategic objectives; who have business smarts; and who can meet the growing demand for technology savvy leadership

Curriculum Structure & Content

The MSM curriculum is divided into two modules: the business core and concentration area. The business core comprises one-half (15 credits) of the degree requirements with the remaining 15 credits focusing on the concentration's management knowledge component.

The Business Core: The business core provides the fundamental business knowledge needed to evaluate business models and to assume managerial positions. Coursework includes key functional areas in business: accounting, finance, marketing, information systems, and leadership and organizational behavior.

Management Concentration Area: Each student selects a management area with a technical focus for in-depth study. Concentration courses are designed to complement the concepts offered in the 15 credit business core. Current

concentration areas include: Business Analytics, Global Project Management, and Web Systems and Media, and **Financial Technology (FinTech)**.

Management Concentrations

Each student must select an area of concentration. The concentration consists of 5 classes for a total of 15 credits.

Global Project Management

What is Global Project Management about?

The Global Project Management specialization is focused on Manufacturing, Construction, Supply Chain, and Business Process Management. The areas include the expertise of the engineering resource planning function such as Production Planning, Global Project Planning, Engineering Management, and Construction Planning and Control.

Who is it for?

Professionals who are interested in the field of complex Project Management, relationship facilitation and coordination between project teams and customers, and harmonizing the demands among project scope, time, expenditures and quality of the end product. Many students who select Global Project Management have undergraduate degrees in International Business, Civil Engineering, and Architecture, and are seeking a career focused more on corporate and project management fields.

Where Can It Take Me?

Career tracks begin with managing focused projects and leading to work on larger international and national projects. Global Project Management professionals would then transition into managerial roles and run Operations departments. Sustained career progress tracks to the COO position.

Business Analytics

What is Business Analytics?

The Business Analytics specialization is focused on business development, solutions, product development and analysis of the customer requirements. Prized skills include expertise in business forecasting, project costing and accounting, business development, and structured solutions to customer complex business problems.

Who is it for?

Candidates who are interested in business solutions, consultation, business development and strategies, and infrastructure and planning management. Many students who select business analytics have undergraduate degrees in Engineering, Technology, and Applied Science and are seeking a career focused on business solutions development and management.

Where Can It Take Me?

The career track begins with managing focused projects as business analysts with technological, solution provider, governmental, and non-profit organizations. Business analysts then transition into managerial roles and lead business

development teams. Sustained career progress tracks to the director of operations, COO and CTO.

Web Systems and Media

What is Web Systems and Media?

The Web Systems and Media specialization is focused on the development of a revolutionized way of web applications and social media applications. They include expertise in marketing strategies, front end – user experience analysis, SEO (Search Engine Optimization) management, and working closely with development teams for final product design.

Who is it for?

Candidates who are interested in web development, graphics development, media and journalism, and online marketing strategy development. Many students who select Web Systems and Media have undergraduate degrees in Information Technology, Computer Science, Journalism, Graphic design, and professional and technical communications.

Where Can It Take Me?

The career track begins with work on focused projects as front end developer or content developer supporting web development teams. Web Systems and Media professionals then move into managerial roles, leading project development teams. Sustained career progress tracks to project lead and CTO.

Financial Technology

What is Financial Technology?

Financial Technology (FinTech) is a rapidly growing subsector of the financial services industry, which involves the application of new technologies including software tools, networking, user experience and interface platforms, and modern modeling and analytical techniques to improve the efficiency and deployment of traditional financial services. The rapid increase in the quantity, variety, and availability of new data and information sources has fundamentally changed legacy business practices in the financial services industry. Big data creates an increasing market need for talents who utilize new technologies and innovations to understand hidden patterns in investor habits and market behaviors as well as assist managers in making informed data-driven decisions. The requisite skillset required to process and analyze such information has resulted in considerable demand for staff with software development, mathematical and statistical modeling, and practical problem solving expertise. New financial technologies include, but are not limited to, crypto-currencies (e.g., bitcoin), blockchain, cloud computing, retail banking automation, machine learning and deep learning, automated investment advisement, algorithmic trading, and risk management framework development and associated visualization tools.

Who is it for?

Students who are interested in applying modern tools to improve financial activities, design new applications, processes, products or business models related to financial services. Typically, students who undertake the FinTech concentration have obtained undergraduate degrees in Engineering, Technology, Finance or the applied sciences and are seeking a career focused on applying technical tools for the development of new financial services.

What are Potential Career Prospects in FinTech?

There are various career paths one may pursue after completing the FinTech concentration. In particular, careers in finance, technology, and entrepreneurship such as investment banking, international finance, commercial banking, sales and trading, information technology, social entrepreneurship, etc. are vocations within the scope of this program. Graduates may work for FinTech startups as well which concentrate in cryptocurrency management and trading, blockchain technologies including smart contracts, open banking, insurtech, Robo-advisement, machine learning and data mining applications and cybersecurity. Some may work for traditional financial services companies, which are in need of staff with technical skillsets to improve existing business practices and/or develop new processes related to technological innovations.