

MASTER OF SCIENCE IN ENGINEERING AND MANAGEMENT

System Design and Management Program (<https://catalog.mit.edu/interdisciplinary/graduate-programs/system-design-management>)

Subject Requirements

Core		Units
EM.411	Foundations of System Design and Management	15
EM.412	Foundations of System Design and Management II	6
EM.413	Foundations of System Design and Management III	15
Management Foundations¹		12
Engineering Depth¹		12
Management Electives¹		15
Engineering Electives¹		15
Thesis		
EM.THG	EM Graduate Thesis	24
Total Units		114

¹ Choose subjects from the SDM restricted subjects lists.

Management Foundations Subjects

1.266	Supply Chain and Demand Analytics ¹	6
15.034	Econometrics for Managers: Correlation & Causality in a Big Data World	9
15.071	The Analytics Edge	12
15.072	Advanced Analytics Edge	12
15.218	Global Economic Challenges and Opportunities	9
15.310	People, Teams, and Organizations	9
15.320	Strategic Organizational Design	9
15.364	Innovation Ecosystems for Regional Entrepreneurship Acceleration Leaders (iEco4REAL)	9
15.374	Organizing for Innovation	6
15.394	Entrepreneurial Founding and Teams	9
15.401	Managerial Finance	9
15.431	Entrepreneurial Finance and Venture Capital	9
15.439	Quantitative Investment Management	9
15.515	Financial Accounting	9
15.516	Corporate Financial Accounting	12
15.521	Accounting Information for Decision Makers	6

15.535	Business Analysis Using Financial Statements	9
15.665	Power and Negotiation	9
15.761	Introduction to Operations Management	9
15.768	Management of Services: Creating Value for Customers, Employees, and Investors	9
15.762[[]]	Supply Chain Analytics ¹	12
15.774	The Analytics of Operations Management	12
15.814	Marketing Innovation	9
15.818	Pricing	6
15.833	Business-to-Business Marketing	6
15.871	Introduction to System Dynamics	6
15.873	System Dynamics for Business and Policy	9
15.900	Competitive Strategy	9
15.910	Innovation Strategy	6
15.911	Entrepreneurial Strategy	9
15.915	Business Strategies for a Sustainable Future	9
15.C57[[]]	Optimization Methods ¹	12
EM.S21	Special Subject in Engineering Management ¹	

¹ Units are split between engineering depth and management foundation subjects. Splits vary based on the subject and unit value.

Engineering Depth Subjects

1.200[[]]	Transportation: Foundations and Methods	12
1.266	Supply Chain and Demand Analytics ¹	6
2.702	Systems Engineering and Naval Ship Design	12
2.83	Energy, Materials and Manufacturing	12
2.854	Introduction to Manufacturing Systems	12
6.5840	Distributed Computer Systems Engineering	12
6.5900	Computer System Architecture	12
16.391	Statistics for Engineers and Scientists	12
15.C57[[]]	Optimization Methods ¹	12
15.762[[]]	Supply Chain Analytics ¹	12
16.453[[]]	Human Systems Engineering	12
16.863[[]]	System Safety Concepts	12
EM.422	System Design and Management for a Changing World: Combined	12

EM.423[J]	System Design and Management for a Changing World: Tools	6	15.286	Communicating with Data	6
EM.424[J]	System Design and Management for a Changing World: Projects	6	15.318	Discovering Your Leadership Signature	9
EM.S21	Special Subject in Engineering Management ¹		15.321	Improvisational Leadership: In-the-Moment Leadership Skills	6
¹ Units are split between engineering depth and management foundations. Splits vary based on the subject and unit value.					
Management Electives					
<i>Managerial Economics</i>					
15.308	Leading the Way: Interpersonal and Organizational Strategies for Advancing DE&I	9	15.365	Overcoming Obstacles to Entrepreneurial Success	9
<i>Operations Research/Statistics</i>					
15.068	Statistical Consulting	9	15.366	Climate & Energy Ventures	12
15.095	Machine Learning Under a Modern Optimization Lens	12	15.367[J]	Healthcare Ventures	12
<i>Health Care Management</i>					
15.128[J]	Revolutionary Ventures: How to Invent and Deploy Transformative Technologies	9	15.369	Corporate Entrepreneurship Lab	9
15.141[J]	Economics of Health Care Industries	6	15.378	Building an Entrepreneurial Venture: Advanced Tools and Techniques	12
<i>Global Economics and Management</i>					
15.216	Central Banks, Monetary Policy and Global Financial Markets	9	15.385	Innovating for Impact	6
15.223	Global Markets, National Policies and the Competitive Advantages of Firms	6	15.386	Leading in Ambiguity: Steering Through Strategic Inflection Points	6
15.226	Modern Business in Southeast Asia: ASEAN Lab	12	15.387	Entrepreneurial Sales	12
15.232	Breakthrough Ventures: Effective Business Models in Frontier Markets	6	15.388	Venture Creation Tactics	12
15.235	Blockchain and Money	6	15.389	Global Entrepreneurship Lab	12
15.236	Global Business of Artificial Intelligence and Robotics (GBAIR)	6	15.390	Entrepreneurship 101: Systematic Approach to New Venture Creation	12
15.248	MENA Lab: Promoting Innovation & Entrepreneurship in the Middle East and North Africa	12	15.392	Scaling Entrepreneurial Ventures	6
<i>History, Environment, Ethics</i>					
15.269	Leadership Stories: Literature, Ethics, and Authority	9	15.398	Corporations at the Crossroads: Leading an Organization Through Change & Challenge	6
<i>Communication</i>					
15.270	Ethical Practice: Leading Through Professionalism, Social Responsibility, and System Design	6	15.399	Entrepreneurship Lab	12
15.281	Advanced Leadership Communication	9	<i>Finance</i>		
15.283	Social Media Management: Persuasion in Networked Culture	9	15.402	Corporate Finance	9
			15.426[J]	Real Estate Finance and Investment	12
			15.434	Advanced Corporate Finance	9
			15.437	Options and Futures Markets	9
			15.451	Proseminar in Capital Markets/ Investment Management	6
			15.453	Finance Lab	9
			15.456	Financial Engineering	9
			15.458	Financial Data Science and Computing	9
			15.492	Practice of Finance: Crypto Finance	6
			15.497	FinTech Ventures	9
			15.499	Practice of Finance: Climate and Social Impact Investing	9
			<i>Information Technologies</i>		
			15.561	Digital Revolution: From Foundations to Future Trends	9
			15.562	Web3 and Strategy: Blockchain, Metaverse, and NFT Essentials	6

15.567	The Economics of Information: Strategy, Structure and Pricing	6	1.472[[]]	Innovative Project Delivery in the Public and Private Sectors	6
15.570	Digital Marketing and Social Media Analytics	6	1.541	Mechanics and Design of Concrete Structures	12
15.572	Analytics Lab: Action Learning Seminar on Analytics, Machine Learning, and the Digital Economy	9	1.573[[]]	Structural Mechanics	12
			1.818[[]]	Sustainable Energy	12
<i>Law</i>			<i>Mechanical Engineering</i>		
15.615	Essential Law	9	2.096[[]]	Introduction to Modeling and Simulation	12
15.655[[]]	Law, Technology, and Public Policy	12	2.111[[]]	Quantum Computation	12
<i>Industrial Relations and Human Resources</i>			2.120	Introduction to Robotics	12
15.661	Building Successful Careers and Organizations	6	2.131	Advanced Instrumentation and Measurement	12
15.662[[]]	People and Profits: Shaping the Future of Work	12	2.140	Analysis and Design of Feedback Control Systems	12
15.669	Strategies for People Analytics	6	2.151	Advanced System Dynamics and Control	12
15.677[[]]	Labor Markets and Employment Policy	12	2.154	Maneuvering and Control of Surface and Underwater Vehicles	12
<i>Operations Management</i>			2.156	Artificial Intelligence and Machine Learning for Engineering Design	12
15.764[[]]	The Theory of Operations Management	12	2.160	Identification, Estimation, and Learning	12
15.769	Operations Strategy	9	2.165[[]]	Robotics	12
15.777	Healthcare Lab: Introduction to Healthcare Delivery in the United States	15	2.183[[]]	Biomechanics and Neural Control of Movement	12
15.784	Operations Laboratory	9	2.22	Design Principles for Ocean Vehicles	12
15.785	Product Management	6	2.42	General Thermodynamics	12
<i>Marketing</i>			2.55	Advanced Heat and Mass Transfer	12
15.815	Applied Behavioral Economics	9	2.62[[]]	Fundamentals of Advanced Energy Conversion	12
15.819	Marketing and Product Analytics	9	2.680	Unmanned Marine Vehicle Autonomy, Sensing, and Communication	12
15.846	Branding	6	2.720	Elements of Mechanical Design	12
15.847[[]]	Consumer Behavior	9	2.737	Mechatronics	12
<i>System Dynamics</i>			2.740	Bio-inspired Robotics	12
15.878	Sustainable Business Lab	9	2.75[[]]	Medical Device Design	12
Engineering Electives			2.76	Global Engineering: Green Machines	12
<i>Civil and Environmental Engineering</i>			2.782[[]]	Design of Medical Devices and Implants	12
1.001	Engineering Computation and Data Science	12	2.788	Mechanical Engineering and Design of Living Systems	12
1.125	Architecting and Engineering Software Systems	12	2.798[[]]	Molecular, Cellular, and Tissue Biomechanics	12
1.208	Resilient Networks	12	2.810	Manufacturing Processes and Systems	12
1.261[[]]	Case Studies in Logistics and Supply Chain Management	6	2.821[[]]	Structural Materials	12
1.263[[]]	Urban Last-Mile Logistics	6	2.83	Energy, Materials and Manufacturing	12
1.275[[]]	Business and Operations Analytics	6			
1.286[[]]	Urban Energy Systems and Policy	12			

2.888	Professional Seminar in Global Manufacturing Innovation and Entrepreneurship	3	6.7910[[]]	Statistical Learning Theory and Applications	12
2.98	Sports Technology: Engineering & Innovation	6	6.8110[[]]	Cognitive Robotics	12
<i>Materials Science and Engineering</i>			6.7900	Machine Learning	12
3.207	Innovation and Commercialization	12	6.7910[[]]	Statistical Learning Theory and Applications	12
3.22	Structure and Mechanics of Materials	12	6.7930[[]]	Machine Learning for Healthcare	12
3.371[[]]	Structural Materials	12	6.8210	Underactuated Robotics	12
3.560	Industrial Ecology of Materials	12	6.8110[[]]	Cognitive Robotics	12
3.70	Materials Science and Engineering of Clean Energy	12	6.8210	Underactuated Robotics	12
3.963[[]]	Biomaterials Science and Engineering	12	6.8300	Advances in Computer Vision	12
<i>Electrical Engineering and Computer Science</i>			6.8420	Computational Design and Fabrication	12
6.3102	Dynamical System Modeling and Control Design	12	6.8510	Intelligent Multimodal User Interfaces	12
6.3702	Introduction to Probability	12	6.8610	Quantitative Methods for Natural Language Processing	12
6.3952	AI, Decision Making, and Society	12	6.8620[[]]	Spoken Language Processing	12
6.4132[[]]	Principles of Autonomy and Decision Making	12	6.8800[[]]	Biomedical Signal and Image Processing	12
6.4822[[]]	Quantitative and Clinical Physiology	12	<i>Chemical Engineering</i>		
6.4832[[]]	Fields, Forces, and Flows in Biological Systems	12	10.392[[]]	Fundamentals of Advanced Energy Conversion	12
6.4861[[]]	Medical Device Design	12	10.524	Pharmaceutical Engineering	9
6.5080	Multicore Programming	12	10.53[[]]	Advances in Biomanufacturing	3
6.5160[[]]	Classical Mechanics: A Computational Approach	12	10.551	Systems Engineering	9
6.5400[[]]	Theory of Computation	12	10.552	Modern Control Design	9
6.5610	Applied Cryptography	12	10.595	Molecular Design and Bioprocess Development of Immunotherapies	9
6.5660	Computer Systems Security	12	10.626	Electrochemical Energy Systems	12
6.5810	Operating System Engineering	12	<i>Aeronautics and Astronautics</i>		
6.5820	Computer Networks	12	16.31	Feedback Control Systems	12
6.5830	Database Systems	12	16.32	Principles of Optimal Control and Estimation	12
6.5940	TinyML and Efficient Deep Learning Computing	12	16.363	Communication Systems and Networks	12
6.6010	Analysis and Design of Digital Integrated Circuits	12	16.422	Human Supervisory Control of Automated Systems	12
6.6020	High-Frequency Integrated Circuits	12	16.423[[]]	Aerospace Biomedical and Life Support Engineering	12
6.6300	Electromagnetics	12	16.511	Aircraft Engines and Gas Turbines	12
6.6330	Fundamentals of Photonics	12	16.512	Rocket Propulsion	12
6.6400	Applied Quantum and Statistical Physics	12	16.522	Space Propulsion	12
6.6500[[]]	Integrated Microelectronic Devices	12	16.851	Introduction to Satellite Engineering	6
6.7300[[]]	Introduction to Modeling and Simulation	12	16.885	Aircraft Systems Engineering	12
6.7410	Principles of Digital Communication	12	16.89[[]]	Space Systems Engineering	12
6.7810	Algorithms for Inference	12	16.895[[]]	Engineering Apollo: The Moon Project as a Complex System	12

<i>Biological Engineering</i>			15.657[J]	Technology, Globalization, and Sustainable Development	12
20.201	Fundamentals of Drug Development	12	15.770[J]	Logistics Systems	12
20.203[J]	Neurotechnology in Action	12	15.783[J]	Product Design and Development	12
20.405[J]	Principles of Synthetic Biology	12	16.855[J]	Systems Architecting Applied to Enterprises	12
20.410[J]	Molecular, Cellular, and Tissue Biomechanics	12	16.891	Space Policy Seminar	6
20.420[J]	Principles of Molecular Bioengineering	12	EM.425	Research Seminar on Engineering Projects and Teamwork	6
20.445[J]	Methods and Problems in Microbiology	12	EM.426	Model-building and Analysis Lab for Engineering Project Teamwork	6
20.463[J]	Biomaterials Science and Engineering	12	EM.427[J]	Technology Roadmapping and Development	12
20.554[J]	Advances in Chemical Biology	12	SCM.256	Data Science and Machine Learning for Supply Chain Management	12
<i>Nuclear Science and Engineering</i>			SCM.290	Sustainable Supply Chain Management	6
22.13	Nuclear Energy Systems	6			
22.55[J]	Radiation Biophysics	12			
22.611[J]	Introduction to Plasma Physics I	12			
22.811[J]	Sustainable Energy	12			
<i>Institute for Data, Systems and Society</i>					
IDS.131[J]	Statistics, Computation and Applications	12			
IDS.521[J]	Energy Systems for Climate Change Mitigation	12			
IDS.522	Mapping and Evaluating New Energy Technologies	12			
Engineering and Management Electives—Split Credits					
¹					
6.7700[J]	Fundamentals of Probability	12			
6.9820	Practical Internship Experience	1			
10.807[J]	Innovation Teams	12			
15.029[J]	United States Energy Policy: Lessons Learned for the Future	6			
15.054[J]	The Airline Industry	12			
15.070[J]	Discrete Probability and Stochastic Processes	12			
15.081[J]	Introduction to Mathematical Programming	12			
15.084[J]	Nonlinear Optimization	12			
15.085[J]	Fundamentals of Probability	12			
15.094[J]	Robust Modeling, Optimization, and Computation	12			
15.136[J]	Principles and Practice of Drug Development	9			
15.379[J]	Mobility Ventures: Driving Innovation in Transportation Systems	12			
15.480[J]	Science and Business of Biotechnology	9			
15.563[J]	Artificial Intelligence for Business	9			

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