Boston University College of Engineering
Division of Systems Engineering
MS (Non-Thesis) Program Planning Sheet

Student Name:

Advisor Signature: _____ BU ID _____

MS (Non-Thesis) students must take 32 credits, all of which must be at the 500 level or higher. The coursework requirements for the MS (Non-Thesis) are as follows: **Core** (3 courses), **Concentration** (2 courses), and **Elective** (3 courses). Among the 32 credits, the **Practicum Requirement** is satisfied by up to two courses from the approved list. Electives are chosen, with advisor approval, to meet an individual student's academic needs. MS students must also satisfy the **Advanced Technical Course requirement** by taking at least two 700-level or higher courses from the Systems courses below, on the reverse, or courses approved by the Systems Engineering Graduate Committee in advance. MS students must maintain a cumulative GPA of 3.00 to remain in good academic standing and to graduate. Grades of "C–" or lower are not acceptable for the MS degree.

NOTE: Courses are color coded to indicate when they are usually offered, in Fall, Spring, either semester (subject to change). Courses may be offered every other year or in longer intervals.

CORE Select one course from each of the following three Core areas (12 credits).

A. SE/EC/ME 501 Dynamic Systems Theory, **or** SE/EC/ME 710 Dynamic Programming and Stochastic Control **Semester/Grade**
B. SE/EC 524 Optimization Theory and Methods **Semester/Grade**
C. SE/ME 714 Adv Stoch Modeling and Sim, **or** EC 505 Stoch Processes, **or** EK 500 Probability with Statistical Applications **Semester/Grade**

CONCENTRATION Select two courses from one Concentration area (8 credits).

A. Computational and Systems Biology
ENG BE 505 Molecular Bioengineering I
ENG BE 561 DNA and Protein Sequence Analysis
ENG BE 562 Computational Biology: Genomes, Networks, Evolution
ENG BE 567 Nonlinear Dynamics in Biological Systems
ENG BE 747 Adv. Signals and Systems Analysis for Biomedical Eng

B. Control Systems
ENG SE/EC/ME 501 Dynamic Systems Theory
ENG ME/ME 507 Process Modeling and Control
ENG ME 560 Precision Machine Design and Instrumentation
ENG ME 570 Robot Motion Planning
ENG SE/EC/ME 701 Optimal and Robust Control
ENG EC 702 Recursive Estimation and Optimal Filtering
ENG SE/ME 704 Adaptive Control
ENG SE/ME/EC 710 Dynamic Programming and Stochastic Control
ENG SE/EC/ME 733 Discrete Event and Hybrid Systems*
ENG SE/ME/EC 734 Hybrid Systems
ENG SE/ME 740 Vision Robotics and Planning
ENG SE/ME 762 Nonlinear Systems and Control

C. Energy and Environmental Systems
CAS EC 513 Game Theory (both semesters)
ENG ME 533 Energy Conversion
ENG SE/EC/ME 543 Sustainable Power Systems
ENG ME/MS 545 Electrochemistry of Fuel Cells and Batteries
CAS EC 571 Energy and Environmental Economics
CAS EC 572 Public Control of Business
ENG EC/MS 573 Solar Energy Systems
GRS EE 712 Regional Energy Modeling
GRS EC 716 Game Theory
QST OM 845 Clean Technology Business Models

D. Network Systems
ENG EC 541 Computer Communication Networks
ENG SE/EC/ME 544 Networking the Physical World
ENG EC 715 Wireless Communications
ENG SE/EC/ME725 Queuing Systems
ENG SE/EC 741 Randomized Network Algorithms
ENG EC 744 Mobile Ad Hoc Networking and Computing
ENG SE 755 Communication Networks Control

E. Operations Research
ENG EC 503 Intro to Learning from Data
ENG ME/EC 514 Simulation
ENG EC/SE 523 Deep Learning
ENG SE/EC 524 Optimization Theory and Methods
ENG SE/EC 674 Optimization Theory and Methods II (PhD students only)
CAS CS 542 Machine Learning
ENG SE/EC/ME 710 Dynamic Programming and Stochastic Control
ENG SE/ME 714 Advanced Stochastic Modeling and Simulation
ENG SE/EC/ME 724 Advanced Optimization Theory and Methods
ENG SE/EC/ME 725 Queuing Systems
ENG SE/EC 732 Combinatorial Optimization and Graph Algorithms
ENG SE/EC/ME 733 Discrete Event and Hybrid Systems*
ENG SE/ME 766 Advanced Scheduling Models and Methods

F. Production and Service Systems
ENG ME 510 Production Systems Analysis
ENG ME 518 Product Quality
ENG SE/EC/ME 543 Sustainable Power Systems
ENG SE/EC/ME 733 Discrete Event and Hybrid Systems
ENG SE/ME 765 Production System Design
ENG SE/ME 766 Advanced Scheduling Models and Methods
QST OM 726 Creating Value Through Operations and Technology
QST OM 854 Operations Analysis and Innovation

Concentration/Course/Semester/Grade

Concentration/Course/Semester/Grade

ELECTIVE Select 3 courses from the Concentrations listed above, if not used to satisfy the Concentration Requirement; from the other Suggested Electives listed on the reverse; or no more than one Engineering Management Course from the approved list (12 credits).

Course/Sem/Grade   **Course/Sem/Grade**   **Course/Sem/Grade**

PRACTICUM Indicate up to two courses (8cr), from the approved list on the next page, used to satisfy Core, Concentration, or Elective requirements.

Course/Sem/Grade   **Course/Sem/Grade**

ELECTIVE COURSES

Other Suggested Electives:
CAS CS 511 Formal Methods I
CAS CS 542 Machine Learning
ENG EC 504 Advanced Data Structures
CAS EC 611 Object-oriented Software Principles and Design
ENG SE 700 Advanced Special Topics
QST OM 855 Project Management
ENG SE 951 Independent Study
ENG SE 952 Mentored Project

Engineering Management Courses
ENG EK 731 Bench-to-Bedside:Translating BME Innov from Lab to Marketplace
ENG ME 502 Invention: Techonology Creation, Protection, & Commercialization
ENG ME 517 Product Development
ENG ME 525 Technology Ventures
ENG ME 583 Product Management
ENG ME 584 Manufacturing Strategy
QST MO 848 The Leadership Challenge
QST SI 839 Design Thinking and Innovation
QST SI 852 Starting New Ventures
QST SI 870 Strategies for Sustainable Development

Approved Practicum Courses:

1. SE 951 Independent Study, SE 952 Mentored Project, OR

2. Two of the following (indicated in the Concentration course list, above, with an asterisk*),
   - ENG ME/MS 507 Process Modeling and Control
   - ENG ME/EC 514 Simulation
   - ENG SE/EC/ME 543 Sustainable Power Systems
   - ENG SE/EC/ME 544 Networking the Physical World
   - ENG ME 570 Robot Motion Planning
   - ENG SE/EC/ME 701 Optimal and Robust Control
   - ENG EC 702 Recursive Estimation and Optimal Filtering
   - ENG SE/ME 704 Adaptive Control
   - ENG SE/EC/ME 710 Dynamic Programming and Stochastic Control
   - ENG SE/ME 714 Advanced Stochastic Modeling and Simulation
   - ENG SE/EC/ME 724 Advanced Optimization Theory and Methods
   - ENG SE/EC/ME 725 Queuing Systems
   - ENG SE/EC/ME 732 Combinatorial Optimization and Graph Algorithms
   - ENG SE/EC/ME 733 Discrete Event and Hybrid Systems*
   - ENG SE/ME/EC 734 Hybrid Systems
   - ENG SE/ME 740 Vision Robotics and Planning
   - ENG SE/EC 741 Randomized Network Algorithms
   - ENG EC 744 Mobile Networking and Computing
   - ENG SE 755 Communication Networks Control
   - ENG SE/ME 762 Nonlinear Systems and Control
   - ENG SE/ME 765 Production System Design
   - ENG SE/ME 766 Advanced Scheduling Models and Methods

3. OR, ONE Practicum Course from other College of Engineering departments (indicated in the Concentration course list, above, with two asterisks**):
   - ENG ME 526 Simulation of Physical Processes
   - ** ENG ME 560 Precision Machine Design and Instrumentation
   - ENG EC 601 Product Design in ECE
   - ENG BE 700 Advanced Topics in Biomedical Engineering
   - ENG EC 952 Directed Group Project