Suggested Courses for IE Ph.D. with Emphasis in OR / Stochastics
S. Hunter, updated September 26, 2015. (Always ask the course instructor about prerequisite knowledge.)

EXAMPLE PLAN OF STUDY FOR Ph.D.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Sem.</th>
<th>Description</th>
<th>Prereq</th>
<th>Course No.</th>
<th>Sem.</th>
<th>Description</th>
<th>Prereq*</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE535</td>
<td>Fa,Sp</td>
<td>Linear Prog.</td>
<td></td>
<td>IE536</td>
<td>Sp</td>
<td>Stoch. Models</td>
<td>STAT516*</td>
</tr>
<tr>
<td>STAT519</td>
<td>Fa,Sp</td>
<td>Probability</td>
<td></td>
<td>STAT528†</td>
<td>Fa,Sp</td>
<td>Inference</td>
<td>STAT519</td>
</tr>
<tr>
<td>MA341‡</td>
<td>Fa</td>
<td>Intro to Real Analysis</td>
<td></td>
<td>MA504†</td>
<td>Sp</td>
<td>Real Analysis</td>
<td>MA341*</td>
</tr>
<tr>
<td>IE537</td>
<td>Fa</td>
<td>Discrete Opt.</td>
<td></td>
<td>IE538</td>
<td>Sp</td>
<td>Nonlinear Prog.</td>
<td>IE535</td>
</tr>
<tr>
<td>IE580</td>
<td>Fa</td>
<td>Systems Simulation</td>
<td></td>
<td>IE581</td>
<td>Sp</td>
<td>Simulation Analysis</td>
<td>STAT516*</td>
</tr>
<tr>
<td>IE???</td>
<td></td>
<td>IE Breadth Elective 1</td>
<td></td>
<td>STAT538</td>
<td>Sp</td>
<td>Pr. Theory I</td>
<td>MA504</td>
</tr>
<tr>
<td>IE???</td>
<td></td>
<td>IE Breadth Elective 2</td>
<td>IE633</td>
<td></td>
<td>Sp</td>
<td>Dynamic Prog.</td>
<td>IE535, IE536</td>
</tr>
<tr>
<td>IE???</td>
<td></td>
<td>IE Breadth Elective 3</td>
<td></td>
<td></td>
<td></td>
<td>Research/Electives</td>
<td></td>
</tr>
<tr>
<td>Research/Electives</td>
<td></td>
<td></td>
<td></td>
<td>Research/Electives</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: I would consider courses in bold as “core” OR courses. Undergraduate knowledge of computer programming and linear algebra is assumed.
* Prerequisites indicated with an asterisk are suggested but not required.
† For master’s level students, the master’s level sequence STAT516/517 may be taken before the PhD level sequence STAT519/528. STAT516 text is Hogg, McKean, and Craig. STAT519 text is A First Course in Probability by Ross. STAT538 text is Durrett or Billingsley.
‡ MA341 text is Bartle & Sherbert. MA 504 text is Rudin. Students with sufficient mathematical preparation may skip to MA504. If MA341 is too advanced, MA301 may be taken first. MA301 & MA341 do not count for graduate credit.

This plan front-loads mathematical courses to ensure appropriate prerequisite knowledge for research.

OTHER SUGGESTED OR-AREA ELECTIVES (not necessarily a comprehensive list):

- CS158 or CS159 [Fa,Sp,Su] or CS180 [Fa,Sp] or CS240 (CS158 & CS240 recommended)
- STAT532 [Sp] Elements of Stochastic Processes (Pre: STAT519); may substitute for IE536
- MA544 [Fa,Sp] Real Analysis and Measure Theory (Pre: MA504 or equiv.)
- STAT539 [Fa] Probability Theory II (Pre: STAT538 and MA530 Functions of a Complex Variable I)
- IE634 [Sp] Integer Programming (Pre: IE535, IE537)
- IE636 [Sp] Stochastic Models in Operations Research II (Pre: IE536)

IE PLAN OF STUDY REQUIREMENTS (please double-check with official sources):

Master’s Non-thesis (30 credits)
- 30 (10 × 3) credit hours of courses, with at least 21 (7 × 3) credit hours in IE

Master’s Thesis (30 credits)
- 21 (7 × 3) credit hours of courses, with at least 12 (4 × 3) credit hours in IE
- 9 (3 × 3) credit hours of MS Thesis Research

Direct Ph.D. (90 credits)
- Breadth requirement: one from each of the following categories, with grade B or better.
  - Engineering Economics/Decisions: IE545, IE546
  - Human Factors: IE556, IE559, IE577
  - Mfg Processes / Production: IE566, IE570, IE575, IE579
- 6 (2 × 3) credits of 600-level IE courses (excludes IE690 / IE699)
- 3 (1 × 3) credits in a related area outside IE
- 18 (6 × 3) credits of courses related to research area
– 51 or more credits of PhD Thesis Research

**Ph.D. with Previous Master’s Degree** (90 credits)

– Up to 30 (10 × 3) credit hours of courses from master’s degree
– Breadth requirement (see Direct Ph.D. requirements)
– 6 (2 × 3) credits of 600-level IE courses (excludes IE690 / IE699)
– 3 (1 × 3) credits in a related area outside IE