# M.S. in Critical Infrastructure Systems

## Degree Requirements

A minimum of 30 degree credits, not including any bridge courses, is required. Candidates must consult with the graduate advisor (not thesis advisor) in designing appropriate programs of study.

Students must attain a minimum GPA of 3.0 in the core courses listed below, and a minimum overall GPA of 3.0.

## Master of Science in Critical Infrastructure Systems

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Courses</strong></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>CE 671</td>
<td>Performance and Risk Analysis of Infrastructure Systems</td>
<td></td>
</tr>
<tr>
<td>CE 672</td>
<td>Security Management of Critical Infrastructure</td>
<td></td>
</tr>
<tr>
<td>EM 602</td>
<td>Management Science</td>
<td></td>
</tr>
<tr>
<td>MIP 675</td>
<td>Elements of Infrastructure Planning</td>
<td></td>
</tr>
</tbody>
</table>

### Electives

Select six courses (or 4 courses and a Thesis) from the following: 18

#### Critical Infrastructure Life-Cycle Management (CILC)

**Planning and Facilities Management:**
- CE 602 Geographic Information System
- CE 615 Infrastructure and Facilities Remediation

**Engineered Systems:**
- TRAN 705 Mass Transportation Systems
- ECE 610 Power System Steady-State Analysis
- ECE 637 Internet and Higher-Layer Protocols
- ECE 683 Computer Network Design and Analysis
- ECE 673 Random Signal Analysis I
- ECE 642 Communication Systems I

**Program/Impact Management:**
- CE 610 Construction Management
- CE 611 Project Planning and Control
- CE 616 Construction Cost Estimating
- IE 651 Industrial Simulation
- IE 605 Engineering Reliability
- IE 614 Safety Engineering Methods
- ENE 662 Site Remediation
- ENE 663 Water Chemistry
- ENE 671 Environmental Impact Analysis
- HRM 601 Organizational Behavior

#### Critical Infrastructure Security and Emergency Management (CISE)

**Emergency and Preparedness Management (Joint UMDNJ):**
- IS 613 Design of Emergency Management Information Systems
- IS 614 Command and Control Systems

**Enabling Systems and Technologies:**
- MGMT 635 Data Mining and Analysis
- MIS 648 Decision Support Systems for Managers
- TRAN 615 Traffic Studies and Capacity
- TRAN 752 Traffic Control
- TRAN 755 Intelligent Transportation Systems
- EM 771 Operations Cost and Management Control
- ECE 636 Network Security and Management
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 650</td>
<td>Knowledge Management</td>
</tr>
<tr>
<td>CS 631</td>
<td>Data Management System Design</td>
</tr>
<tr>
<td>CS 632</td>
<td>Advanced Database System Design</td>
</tr>
<tr>
<td>CS 782</td>
<td>Pattern Recognition and Applications</td>
</tr>
<tr>
<td>IE 706</td>
<td>A Queueing Approach to Performance Analysis</td>
</tr>
<tr>
<td>IE 621</td>
<td>Systems Analysis and Simulation</td>
</tr>
</tbody>
</table>

**Public Health Systems and Emergency Preparedness:**

- RBHS Courses
  - Principles and Methods of Epidemiology
  - Introduction to Environmental Health
  - Public Health Preparedness I: Agents of Mass Injury or Destruction
  - Public Health Preparedness II: Emergency Management and Response
  - Health/Risk Communications

**Other Electives: Master's Thesis**

Total Credits: 30

1. Students receiving financial aid at any point in their studies must complete 6 credits of CE 701 Masters Thesis.
2. Other suitable electives may be taken subject to approval of program advisor, particularly in the area of Public Health Systems and Emergency Preparedness.