

# Engineering MS

1. **Program Description:** The Master of Science in Engineering prepares individuals to apply mathematical and scientific principles to solve a wide variety of practical problems in industry. Includes an engineering core along with specialization track options in different fields of engineering.

Graduates of the MS in Engineering will have the ability to:

- Utilize advanced engineering principles, mathematical models, and computational tools to solve complex technical problems.
- Design, execute, and analyze experiments or simulations to advance engineering knowledge.
- Identify, formulate, and address real-world engineering problems with creative and effective solutions.
- Present engineering concepts, research findings, and project outcomes clearly in written, oral, and visual formats.
- Adhere to ethical standards, regulatory requirements, and best practices in engineering.
- Adapt to evolving technologies and methodologies through continuous learning and professional development.

Semester Credit Hours required for completion is 36 SCH. This is for both the thesis and non-thesis option. There will be an engineering core (18 SCH) and three specialization tracks (EE- Electrical Engineering, IE-Industrial Engineering and ConE- Construction Engineering)

## Master of Science in Engineering (Non-thesis option) 36 semester hours

### Core (15 semester hours)

|          |                                                     |   |
|----------|-----------------------------------------------------|---|
| ENGR 510 | Advanced Probability and Statistics for Engineers   | 3 |
| ENGR 520 | Design of Experiments                               | 3 |
| ENGR 530 | Project Management                                  | 3 |
| ENGR 540 | Engineering Management                              | 3 |
| MATH 546 | Numerical Analysis and Elements of Machine Learning | 3 |

### Research (3 semester hours)

|          |                                |   |
|----------|--------------------------------|---|
| ENGR 595 | Research Methods for Engineers | 3 |
|----------|--------------------------------|---|

Select one of the following tracks:

### Industrial Engineering Track (18 semester hours)

3 semester hours from:

|        |                             |   |
|--------|-----------------------------|---|
| IE 516 | Advanced Production Systems | 3 |
|--------|-----------------------------|---|

plus 15 semester hours from the following:

|          |                                    |   |
|----------|------------------------------------|---|
| IE 503   | Human Factors Engineering          | 3 |
| IE 510   | Advanced Simulation and Automation | 3 |
| IE 512   | Advanced Operations Research       | 3 |
| IE 514   | Quality Control Systems            | 3 |
| CSCI 513 | Python Programming for AI          | 3 |

Or

### Construction Engineering Track (18 semester hours)

3 semester hours from:

|          |                              |   |
|----------|------------------------------|---|
| CONE 501 | Productivity in Construction | 3 |
|----------|------------------------------|---|

plus 15 semester hours from the following:

|          |                                                                  |   |
|----------|------------------------------------------------------------------|---|
| CONE 510 | Bridge Engineering                                               | 3 |
| CONE 512 | Dynamic Loads and Structural Behavior                            | 3 |
| CONE 514 | Behavior and Design of Composite Structures                      | 3 |
| CONE 515 | Behavior and Design of Prestressed Concrete Structures           | 3 |
| CONE 516 | Machine Intelligence and Applications in Civil Engineering       | 3 |
| CONE 520 | Finite Element Theory and Applications in Structural Engineering | 3 |
| CONE 522 | Advanced Construction Technology                                 | 3 |
| CONE 524 | Sustainability in Construction                                   | 3 |
| CONE 526 | Building Information Modelling                                   | 3 |
| CSCI 513 | Python Programming for AI                                        | 3 |

Or

### Electrical Engineering Track (18 semester hours)

|                                       |                                 |           |
|---------------------------------------|---------------------------------|-----------|
| 18 semester hours from the following: |                                 |           |
| EE 501                                | Digital Communications Systems  | 3         |
| EE 502                                | Cellular Communications Network | 3         |
| EE 510                                | Advanced Wireless Communication | 3         |
| EE 512                                | Adaptive Signal Processing      | 3         |
| EE 514                                | Digital Image Processing        | 3         |
| EE 516                                | Antenna Theory and Design       | 3         |
| EE 520                                | RF & Microwave Circuits         | 3         |
| EE 522                                | Information Theory and Coding   | 3         |
| EE 524                                | Advanced Control Systems        | 3         |
| EE 526                                | Digital Control Systems         | 3         |
| CSCI 513                              | Python Programming for AI       | 3         |
| <b>Total Hours</b>                    |                                 | <b>36</b> |

## Master of Science in Engineering (Thesis Option) 36 semester hours

### Core (15 semester hours)

|          |                                                     |   |
|----------|-----------------------------------------------------|---|
| ENGR 510 | Advanced Probability and Statistics for Engineers   | 3 |
| ENGR 520 | Design of Experiments                               | 3 |
| ENGR 530 | Project Management                                  | 3 |
| ENGR 540 | Engineering Management                              | 3 |
| MATH 546 | Numerical Analysis and Elements of Machine Learning | 3 |

### Research (6 semester hours)

|             |        |   |
|-------------|--------|---|
| IE 518      | Thesis | 6 |
| or EE 518   | Thesis |   |
| or CONE 518 | Thesis |   |

Select one Track from the Following:

### Industrial Engineering Track (15 semester hours)

3 semester hours from:

|        |                             |   |
|--------|-----------------------------|---|
| IE 516 | Advanced Production Systems | 3 |
|--------|-----------------------------|---|

Plus 12 semester hours from the following:

|          |                                    |   |
|----------|------------------------------------|---|
| IE 503   | Human Factors Engineering          | 3 |
| IE 510   | Advanced Simulation and Automation | 3 |
| IE 512   | Advanced Operations Research       | 3 |
| IE 514   | Quality Control Systems            | 3 |
| CSCI 513 | Python Programming for AI          | 3 |

Or

### Construction Engineering Track (15 semester hours)

3 semester hours from:

|          |                              |   |
|----------|------------------------------|---|
| CONE 501 | Productivity in Construction | 3 |
|----------|------------------------------|---|

Plus 12 semester hours from the following:

|          |                                                                  |   |
|----------|------------------------------------------------------------------|---|
| CONE 510 | Bridge Engineering                                               | 3 |
| CONE 512 | Dynamic Loads and Structural Behavior                            | 3 |
| CONE 514 | Behavior and Design of Composite Structures                      | 3 |
| CONE 515 | Behavior and Design of Prestressed Concrete Structures           | 3 |
| CONE 516 | Machine Intelligence and Applications in Civil Engineering       | 3 |
| CONE 520 | Finite Element Theory and Applications in Structural Engineering | 3 |
| CONE 522 | Advanced Construction Technology                                 | 3 |
| CONE 524 | Sustainability in Construction                                   | 3 |
| CONE 526 | Building Information Modelling                                   | 3 |
| CSCI 513 | Python Programming for AI                                        | 3 |

Or

### Electrical Engineering Track (15 semester hours)

|                                       |                                 |           |
|---------------------------------------|---------------------------------|-----------|
| 15 semester hours from the following: |                                 |           |
| EE 501                                | Digital Communications Systems  | 3         |
| EE 502                                | Cellular Communications Network | 3         |
| EE 510                                | Advanced Wireless Communication | 3         |
| EE 512                                | Adaptive Signal Processing      | 3         |
| EE 514                                | Digital Image Processing        | 3         |
| EE 516                                | Antenna Theory and Design       | 3         |
| EE 520                                | RF & Microwave Circuits         | 3         |
| EE 522                                | Information Theory and Coding   | 3         |
| EE 524                                | Advanced Control Systems        | 3         |
| EE 526                                | Digital Control Systems         | 3         |
| CSCI 513                              | Python Programming for AI       | 3         |
| <b>Total Hours</b>                    |                                 | <b>36</b> |

**Note:** Successful completion of the Comprehensive Exam is required of all students.