Learning Goals of Degree Programs
Cullen College of Engineering

Department of Chemical Engineering

B.S.
1. Students will apply the fundamentals of chemical engineering to the synthesis and analysis of processes in both traditional chemical engineering as well as emerging disciplines.
2. Students will use computers effectively to solve problems in chemical engineering and related interdisciplinary areas.
3. Students will communicate effectively, orally or in writing, with technical and nontechnical audiences.
4. Students will design, perform, and analyze the results of experiments relevant to the analysis or synthesis of chemical processes.
5. Students will demonstrate understanding of the intertwining among chemical engineering, society, and the environment, and show awareness of the ethical responsibilities of engineers.

M.P.E. Masters of Petroleum Engineering
1. Students will have the knowledge and flexibility to keep pace with the changing technical environment.
2. Students will be able to evaluate oil and gas reservoirs through borehole measurements.
3. Students will know the processes and techniques for extraction of oil and gas from underground reservoirs.
4. Students will demonstrate mastery of the processes and techniques required for optimum production operations.

M.Ch.E
1. Students will demonstrate understanding of advanced process economics.
2. Students will demonstrate mastery of the technology employed in process operations as practiced today.
3. Students will demonstrate familiarity with the technology available for operation research.
4. Students will develop master of one area of specialization from the following areas: management, reaction engineering, energy, petroleum production operations.
Ch.E.E. M.S. (thesis option)
1. Students will demonstrate ability to conduct research with faculty supervision (not applicable for non-thesis MS students).
2. Students will demonstrate ability to analyze problems using chemical engineering techniques.
3. Students will demonstrate awareness of current research in chemical engineering

Ch.E.E. M.S. (non-thesis option)
1. Students will demonstrate ability to analyze problems using chemical engineering techniques.
2. Students will demonstrate awareness of current research in chemical engineering

Ch.E.E. Ph.D.
1. Students will conduct high quality independent research results according to discipline standards.
2. Students will effectively analyze problems using chemical engineering techniques.
3. Students will effectively communicate research results.

Department of Electrical and Computer Engineering

B.S. Electrical and Computer Engineering
1. Students will demonstrate an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
2. Students will demonstrate an ability to apply knowledge of mathematics, science, and engineering
3. Students will demonstrate an understanding of professional and ethical responsibility
4. Students will demonstrate an ability to communicate effectively.

M.E.E. (non-thesis) Electrical Engineering
1. All M.E.E. graduates will demonstrate in-depth knowledge in at least one of the following technical areas: electromagnetism, power/controls, microelectronics/computers, signals/communication.
2. All M.E.E. graduates will demonstrate breadth in their knowledge of engineering and science by having completed at least two courses outside ECE but in the College of Engineering or the College of Natural Sciences and Mathematics.
3. All M.E.E. graduates will be able to convert their graduate learning experience into employable skills.
M.S. Electrical and Computer Engineering
1. All M.S. graduates will demonstrate competence in at least one technical area.
2. All M.S. graduates will be able to conduct high quality research under the supervision of a faculty mentor.
3. All M.S. graduates will be able to convert their graduate learning experience into employable skills or will be admitted to quality-PhD programs.

M. S. in Computer & Systems Engineering, Computer Engineering Option
1. Students will obtain a solid foundation in the fundamentals of Computer Engineering, while giving the choice through many electives to broaden knowledge in related areas such as microelectronics, data communications and computer networks, software design, control theory, signal processing, etc.
2. Acquire a sufficiently broad and rigorous education in state-of-the art computer architecture and hardware design.
3. Students will cultivate effective communications both oral and written in technical subject matters.
4. Graduates should be able to translate their education into employable skills.

M. S. in Computer & Systems Engineering, Computer Controlled Systems Option
1. Students will obtain a solid foundation in the fundamentals of Computer Controlled Systems, while giving the choice through many electives to broaden knowledge in related areas such as computer architecture, software engineering, control theory, signal processing, etc.
2. Students will acquire a sufficiently broad and rigorous education in state-of-the art computer controlled systems.
3. Students will exercise competence, creativity and imagination in research.
4. Graduates should be able to translate their education into employable skills or admission to a Ph.D. program.

M. S. in Computer & Systems Engineering, Computer Controlled Systems Option, non-thesis option
1. Students will obtain a solid foundation in the fundamentals of Computer Controlled Systems, while giving the choice through many electives to broaden knowledge in related areas such as computer architecture, software engineering, control theory, signal processing, etc.
2. Students will acquire a sufficiently broad and rigorous education in state-of-the art computer-aided control system design.
3. Graduates should be able to translate their education into employable skills.
Ph.D. Electrical Engineering
1. All Ph.D. graduates will demonstrate competence in at least one technical area.
2. All Ph.D. graduates will be able to conduct independent and high quality research.
3. All PhD graduates will be able to present their research results in a professional forum.

Department of Industrial Engineering

B.S. (not complete yet)

M.I.E.
1. Upon completion of the M.I.E. degree requirements, graduates will be able to secure employment in industrial engineering related areas.
2. M.I.E. graduates will gain knowledge in industrial engineering fundamental areas such as optimization, simulation, manufacturing and production planning, statistics, economic analysis and ergonomics.
3. Students will demonstrate breadth in management science or other related fields pertaining to their industrial engineering skills.

M.S.I.E.
1. Upon completion of the M.S.I.E. degree requirements, graduates will be able to secure employment in industrial engineering related areas, or to pursue a Ph. D. degree in the area.
2. M.S.I.E. graduates will gain fundamental knowledge in industrial engineering fundamental areas such as optimization, simulation, manufacturing and production planning, statistics, economic analysis and ergonomics.
3. Students will demonstrate breadth in industrial engineering skills.

Ph.D.
1. Upon completion of the Ph.D. degree requirements, graduates will be able to pursue a teaching or research career in academic institutions or industry.
2. Ph.D. graduates will gain fundamental knowledge in industrial engineering fundamental areas such as optimization, simulation, manufacturing and production planning, statistics, economic analysis and ergonomics.
3. Students will demonstrate mastery in industrial engineering skills by presenting and authoring articles for peer refereed journals and international conferences.
Department of Mechanical Engineering

B.S.M.E.

1. Students will be able to secure professional employment upon graduation, if desired.
2. Students, working on teams, will demonstrate the ability to design and fabricate devices given constraints and goals.
3. Students, working in teams, will demonstrate the ability to design, fabricate, and validate artifacts for a client.
4. Students will demonstrate an ability communicate effectively in a technical environment.

M.M.E. Master of Mechanical Engineering (non-thesis)

1. Students will be able to secure professional employment upon graduation if desired.
2. Students will demonstrate a broad knowledge and understanding of business and technical skills associated with engineering practice.
3. Students will be well versed in mathematics as applied to engineering problems.
4. Students will demonstrate expertise in one of the following areas: Materials Science, Fluid Mechanics, Heat Transfer, Controls and Dynamics, Design, Solid Mechanics, Nanosciences.
5. Students will have breadth to their graduate education beyond their area of expertise.

M.S. in Mechanical Engineering (non-thesis)

1. Students will be able to secure professional employment upon graduation if desired.
2. Students will be well versed in mathematics as applied to engineering problems.
3. Students will demonstrate a broad knowledge of engineering science fundamental to research, with expertise in one of the following areas: Materials Science, Fluid Mechanics, Heat Transfer, Controls and Dynamics, Design, Solid Mechanics, Nanosciences.
4. Students will have breadth to their graduate education beyond their area of expertise.

M.S. in Mechanical Engineering (thesis)

1. Students will be able to secure professional employment upon graduation if desired.
2. Students will be well versed in mathematics as applied to engineering problems.
3. Students will demonstrate a broad knowledge of engineering science fundamental to research, with expertise in one of the following areas: Materials Science, Fluid Mechanics, Heat Transfer, Controls and Dynamics, Design, Solid Mechanics, Nanosciences.

4. Students will have breadth to their graduate education beyond their area of expertise.

5. Thesis based research students will develop fundamental research skills in an area of mechanical engineering.

**Ph.D. in Mechanical Engineering**

1. Students will be able to secure professional employment upon graduation if desired.

2. Students will be well versed in mathematics as applied to engineering problems.

3. Students will demonstrate expertise in one of the following areas: Materials Science, Fluid Mechanics, Heat Transfer, Controls and Dynamics, Design, Solid Mechanics, Nanosciences.

4. Students will have breadth to their graduate education beyond their area of expertise.

5. Students will develop advanced research skills in an area of mechanical engineering.

**Aerospace M.S. (non-thesis)**

1. Students will develop skills pertinent to the employment, career advancement, or further graduate study in Aerospace Engineering.

2. Students will be able to demonstrate competence in at least one core area from the four core areas of the Program: (A) aerodynamics and heat transfer, (B) structural mechanics and materials, (C) dynamics and orbital mechanics, and (D) flight controls and mechanics.

3. Students will acquire some basic knowledge of all four core areas of the Program: (A) aerodynamics and heat transfer, (B) structural mechanics and materials, (C) dynamics and orbital mechanics, and (D) flight controls and mechanics.

**Aerospace M.S. (thesis)**

1. Students will develop skills pertinent to the employment, career advancement, or further graduate study in Aerospace Engineering.

2. Students will be able to demonstrate competence in at least one core area from the four core areas of the Program: (A) aerodynamics and heat transfer, (B) structural mechanics and materials, (C) dynamics and orbital mechanics, and (D) flight controls and mechanics.

3. Students will acquire some basic knowledge of all four core areas of the Program: (A) aerodynamics and heat transfer, (B) structural mechanics and materials, (C) dynamics and orbital mechanics, and (D) flight controls and mechanics.
4. M.S. thesis option students will develop research skills in an area of Aerospace Engineering.

**Aerospace Ph.D.**

1. Students will develop skills pertinent to the employment, career advancement, or further graduate study in Aerospace Engineering.

2. Students will be able to demonstrate competence in at least one core area from the four core areas of the Program: (A) aerodynamics and heat transfer, (B) structural mechanics and materials, (C) dynamics and orbital mechanics, and (D) flight controls and mechanics.

3. Students will acquire some basic knowledge of all four core areas of the Program: (A) aerodynamics and heat transfer, (B) structural mechanics and materials, (C) dynamics and orbital mechanics, and (D) flight controls and mechanics.

4. Ph.D. students will develop fundamental research and innovative skills in an area of Aerospace Engineering.

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**Department of Civil and Environmental Engineering**

**B.S. Civil and Environmental Engineering**

1. Students will acquire basic skills in learning and critical thinking.

2. Students will acquire a knowledge of the elements of civil engineering.

3. Students will acquire an ability to integrate knowledge and synthesize solutions to civil engineering problems.

**M.C.E. Environmental Engineering**

1. Students will acquire advanced knowledge in environmental engineering.

2. Students will acquire an ability to work independently.

**M.S. Environmental Engineering**

1. Students will acquire advanced knowledge in environmental engineering.

2. Students will acquire an ability to work independently and produce a publishable work.

**M.S. Civil Engineering**

1. Students will acquire advanced knowledge in civil engineering.

2. Students will acquire an ability to work independently and produce a publishable work.

**Ph.D. Environmental Engineering**

1. Students will acquire advanced knowledge in environmental engineering.

2. Students will acquire an ability to work independently and produce a publishable work.
Ph.D. Civil Engineering

1. Students will acquire advanced knowledge in civil engineering.
2. Students will acquire an ability to work independently and produce a publishable work.