



SCHOOL OF ENGINEERING AND COMPUTING

# BACHELOR OF SCIENCE IN MANUFACTURING DESIGN ENGINEERING

## Apply Engineering Design to Real-World Problems

During the course of this program you'll work with a team in understanding the theories and practical application of manufacturing design engineering. You'll use state-of-the-art computer-aided tools and simulation modeling techniques to design complex engineering devices while developing a realistic awareness of product life cycles and engineering systems. While applying standard concepts of engineering design, you'll also explore the impact of human factors such as ergonomics and safety issues required in engineering systems, products, and services design. Your team will study actual production and design problems to develop useful and effective manufacturing systems. The course

develops communication skills and provides the global and team awareness needed to succeed as a manufacturing design engineering professional.

### Program highlights:

- Entire program can be completed online
- Apply innovative engineering skills to real-life projects
- Use computer-aided engineering tools and engineering graphics techniques
- Employ engineering project management standards for effective and leading-edge competitive design

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## MAJOR IN MANUFACTURING DESIGN ENGINEERING

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The Bachelor of Science in Manufacturing Design Engineering provides students with the theoretical foundations, hands-on experience, and teaming skills required for effective conceptual, logistical, developmental, and interdisciplinary design of complex engineering devices, product life cycles, and engineering systems through integration of state-of-the-art computer-aided tools, concurrent engineering standards, and simulation modeling techniques. Graduates of this program will have competency in the fundamentals of evolving automated manufacturing technology and provide the industry with a source for qualified graduates to apply engineering principles in the design of automated and computer integrated manufacturing systems.

Upon completion of this degree, students will be prepared to hold positions such as manufacturing system design engineer, design supervisor for engineering projects, and product design engineer. The program blends together professional components from the traditional engineering curricula with the practical aspects of programming applications, engineering project management standards, and simulation modeling techniques. It also combines knowledge and practices needed for professionals working on engineering projects that require innovative and interdisciplinary background, skills, and experience.

### Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Combine knowledge and practices needed to work on engineering projects that require innovative and interdisciplinary skills.
- Utilize product reliability and design optimization concepts in engineering applications.
- Apply state-of-the-art computer-aided engineering tools and engineering graphics techniques and methodologies.
- Integrate engineering project management standards for efficient and competitive design of engineering products and processes.
- Apply the concepts of engineering experiment design and analysis.
- Analyze human factors, ergonomics, and safety issues as part of the requirements for design of engineering systems, products, and services.
- Analyze a production problem and design and/or develop a manufacturing system.
- Develop oral and written communication skills appropriate for engineering professionals.
- Demonstrate global awareness and team skills needed in manufacturing design engineering.

### Degree Requirements

To receive a Bachelor of Science in Manufacturing Design Engineering, students must complete at least 180 quarter units, 76.5 of which must be completed at the upper-division level and 45 of which must be taken in residence, including the research project classes, and a minimum of 70.5 units of the University General Education requirements. In the absence of transfer credit, students may need to take additional general electives to satisfy the total units for the degree. Students should refer to the section on undergraduate admission procedures for specific information on admission and evaluation. All students receiving an undergraduate degree in Nevada are required by state law to complete a course in Nevada Constitution.

### Preparation for the Major

(11 courses; 43.5 quarter units)

- MTH 215\* College Algebra & Trigonometry  
*Prerequisite: Accuplacer test placement evaluation or MTH 12A and MTH 12B*
- PHS 104\* Introductory Physics  
*Prerequisite: 2 years of high school algebra and MTH 204 or MTH 215 or MTH 216A and MTH 216B*
- PHS 104A\* Introductory Physics Lab (1.5 quarter units)  
*Prerequisite: PHS 104 or PHS 171 for science majors*
- OR**
- PHS 130A Physics Lab for Engineering (1.5 quarter units)
- CHE 101\* Introductory Chemistry  
*Recommended Preparation: MTH 204 or MTH 215 or MTH 216A and MTH 216B*
- CHE 101A\* Introductory Chemistry Lab (1.5 quarter units)  
*Prerequisite: CHE 101 or CHE 141 for science majors*
- OR**
- CHE 120A Intro to Chemistry Lab for Eng (1.5 quarter units)  
*Prerequisite: CHE 101*

- EGR 219 Intro to Graphics and Auto CAD  
*Prerequisite: MTH 215*
- EGR 220 Engineering Mathematics  
*Prerequisite: MTH 215*
- EGR 225 Statics & Strength of Material  
*Prerequisite: EGR 220*
- EGR 230 Electrical Circuits & Systems  
*Prerequisite: MTH 215*
- CSC 208\* Calculus for Comp. Science I  
*Prerequisite: MTH 215*
- CSC 220 Applied Probability & Stats.  
*Prerequisite: MTH 215*

\* May be used to satisfy a General Education requirement.

### Requirements for the Major

(15 courses; 64.5 quarter units)

- EGR 316 Legal Aspects of Engineering
- EGR 320 Scientific Problem Solving  
*Prerequisite: CSC 208 or EGR 220*
- EGR 320L Scientific Problem Solving-LAB  
*Prerequisite: EGR 320*
- DEN 308 Computer Aided Engineering I  
*Prerequisite: EGR 219*
- EGR 310 Engineering Economics  
*Prerequisite: MTH 215*
- DEN 411 Computer Aided Engineering II  
*Prerequisite: EGR 219*
- DEN 417 Computer Aided Engineering IV  
*Prerequisite: EGR 219*
- DEN 420 Computer Aided Engineering V  
*Prerequisite: EGR 219*
- DEN 422 Materials and Manufacturing  
*Prerequisite: EGR 225*
- DEN 423 Human Factors in Engineering  
*Prerequisite: MTH 215*
- DEN 426 Reliability Engineering  
*Prerequisite: MTH 215*
- DEN 429 Product Design Optimization  
*Prerequisite: MTH 215*
- DEN 432 Concurrent Design Engineering  
*Prerequisite: MTH 210 or CSC 220*
- DEN 435 Design & Analysis of Experiment
- EGR 440 Project Management Fundamental

### Engineering Senior Project

(2 courses; 9 quarter units)

- DEN 496A Senior Capstone Project I  
*Prerequisite: EGR 440 and satisfactory completion of courses as specified by Academic Program Director*
- DEN 496B Senior Capstone Project II  
*Prerequisite: DEN 496A*