# Department of Mechanical Engineering

## Mechanical Engineering [MEN]

Mechanical Engineering deals with numerous systems and has a variety of important applications such as automobiles, aircraft, ships, home appliances, electronic devices, power plants and so on. The mechanical systems and the fundamental science and technology of mechanical engineering have made dramatic advances and high impacts on the global economies and the standard of living. In the track of mechanical engineering, students are educated and trained to learn the underlying principles of mechanical engineering and to apply the knowledge to real-world examples and case studies hands-on. Disciplines include thermodynamics, fluid mechanics, solid mechanics, dynamics, machine design, advanced materials processing, laser-assisted manufacturing, micro/nano machining, MEMS, biomedical products, controls and mechatronics, acoustics, tribology and so on.

## Credit Requirement

| Program | Total Credits required | Course Credit | Research Credit |
|---|---|---|---|
| **Master's Program** | at least 28 credits | at least 18 credits | at least 10 credits |
| **Doctoral Program** | at least 60 credits | at least 18 credits | at least 42 credits |
| **Combined Master's-Doctoral Program** | at least 60 credits | at least 30 credits | at least 30 credits |

## Curriculum

### ▶ Mechanical Engineering [MEN]

| Course is | Course No. | Classification | Course Title | Course Title (Kor.) | Cred.-Lect.-Exp. | Pre-requisite | Convergence |
|---|---|---|---|---|---|---|---|
| Required | MEN590 | Research | The Seminars | 세미나 | 1-1-0 | | |
| | MEN690 | | Master's Research | 석사논문연구 | Value of credit | | |
| | MEN890 | | Doctoral Research | 박사논문연구 | Value of credit | | |
| Elective | MEN500 | Lecture | Advanced Numerical Methods | 수치해석특론 | 3-3-0 | | |
| | MEN501 | | Continuum Mechanics | 연속체역학 | 3-3-0 | | |
| | MEN502 | | Advanced Mechanical Engineering Analysis | 기계공학해석특론 | 3-3-0 | | |
| | MEN510 | | Advanced Thermodynamics | 열역학특론 | 3-3-0 | | |

| Course is | Course No. | Classification | Course Title | Course Title (Kor.) | Cred.-Lect.-Exp. | Pre-requisite | Convergence |
|---|---|---|---|---|---|---|---|
| Elective | MEN511 | Lecture | Advanced Heat Transfer | 열전달특론 | 3-3-0 | | |
| | MEN512 | | Advanced Combustion | 연소특론 | 3-3-0 | | O |
| | MEN513 | | Convection Heat Transfer | 대류열전달 | 3-3-0 | MEN310 | |
| | MEN520 | | Advanced Fluid Mechanics | 유체역학특론 | 3-3-0 | | |
| | MEN521 | | Microfluidics and Nanofluidics | 미세유체역학 | 3-3-0 | | O |
| | MEN522 | | Computational Thermofluid Engineering | 전산열유체공학 | 3-3-0 | | |
| | MEN523 | | Advanced Therofluid Measurement | 열유동계측특론 | 3-3-0 | | O |
| | MEN524 | | Aerosol Technology | 에어로졸특론 | 3-3-0 | | O |
| | MEN525 | | Turbulence | 난류특론 | 3-3-0 | | |
| | MEN526 | | Experimental Methods in Fluid Mechanics | 실험유체역학 | 3-3-0 | | |
| | MEN530 | | Advanced Solid Mechanics | 고체역학특론 | 3-3-0 | | |
| | MEN531 | | Finite Element Method | 유한요소법특론 | 3-3-0 | | O |
| | MEN532 | | Mechanics of Composites | 복합재역학특론 | 3-3-0 | MEN432 | |
| | MEN535 | | Computational Nanomechanics | 전산나노역학 | 3-3-0 | | O |
| | MEN540 | | Advanced MEMS | MEMS특론 | 3-3-0 | | O |
| | MEN541 | | Bio MEMS | 바이오MEMS | 3-3-0 | | O |
| | MEN542 | | Unconventional Nanomanufacturing | 비전통적 나노가공기술 | 3-3-0 | | O |
| | MEN551 | | Computer-Aided Design | 전산기원용설계 | 3-3-0 | | O |
| | MEN552 | | Manufacturing Processes and Systems | 생산공정 및 시스템 | 3-3-0 | | |
| | MEN553 | | Manufacturing and Process Engineering | 생산공학특론 | 3-3-0 | | |
| | MEN554 | | Machine Tool Analysis and Control | 공작기계 해석 및 제어 | 3-3-0 | | |
| | MEN556 | | Laser Material Interaction and Processing I | 레이저 재료 상호작용 및 가공 I | 3-3-0 | | O |
| | MEN557 | | Polymer and Composite Manufacturing | 고분자 및 복합재료 제조공정 | 3-3-0 | | |
| | MEN558 | | Reliability Engineering | 신뢰성 공학 | 3-3-0 | | O |
| | MEN570 | | Advanced Dynamics | 동역학특론 | 3-3-0 | | |
| | MEN571 | | Robotics | 로봇공학 | 3-3-0 | | O |
| | MEN572 | | Nonlinear Systems | 비선형 시스템 | 3-3-0 | | |
| | MEN573 | | Advanced Control Systems I | 고급제어 I | 3-3-0 | | O |
| | MEN574 | | Real-Time Applications of Control Systems | 제어 시스템 구현 | 3-3-0 | | O |
| | MEN575 | | Electromechanical dynamics | 전자기기 동력학 | 3-3-0 | | O |
| | MEN576 | | Biomechanics of Movement for Rehabilitation Robots | 생체역학과 재활로봇 | 3-3-0 | | O |

| Courseis | Course No. | Classification | Course Title | Course Title (Kor.) | Cred.-Lect.-Exp. | Pre-requisite | Convergence |
|---|---|---|---|---|---|---|---|
| Elective | MEN656 | Lecture | Laser Material Interaction and Processing II | 레이저 재료 상호작용 및 가공 II | 3-3-0 | | O |
| | MEN732 | | Failure Analysis and Design for Reliability | 파괴해석과 신뢰성 설계 | 3-3-0 | | |
| | MEN733 | | Mechanics of Polymer Solids and Fluids | 고분자역학 | 3-3-0 | | |
| | MEN734 | | Scanning Probe Microscopy | 주사 탐침 현미경 | 3-3-0 | | |
| | MEN741 | | Bioinspired Technology | 생체모사공학 | 3-3-0 | | O |
| | MEN755 | | Net Shape Manufacturing | 소성가공 | 3-3-0 | | |
| | MEN772 | | Advanced Analytic Kinematics | 해석기구학특론 | 3-3-0 | | |
| | MEN773 | | Advanced Control Systems II | 고급제어 II | 3-3-0 | | O |
| | MEN774 | | System Identification and Adaptive Control | 시스템식별 및 적응제어 | 3-3-0 | | O |
| | MEN791 | | Special Topic Ⅰ | 기계공학특론 Ⅰ | 3-3-0 | | |
| | MEN792 | | Special Topic Ⅱ | 기계공학특론 Ⅱ | 3-3-0 | | |
| | MEN793 | | Special Topic Ⅲ | 기계공학특론 Ⅲ | 3-3-0 | | |
| | MEN794 | | Special Topic Ⅳ | 기계공학특론 Ⅳ | 3-3-0 | | |
| | MEN795 | | Special Topic Ⅴ | 기계공학특론 Ⅴ | 3-3-0 | | |
| | MEN796 | | Special Topic Ⅵ | 기계공학특론 Ⅵ | 3-3-0 | | |
| | MEN797 | | Special Topic Ⅶ | 기계공학특론 Ⅶ | 3-3-0 | | |
| | MEN798 | | Special Topic Ⅷ | 기계공학특론 Ⅷ | 3-1-4 | | |
| | MEN799 | | Special Topic Ⅸ | 기계공학특론 Ⅸ | 3-1-4 | | |

1) Rule of Course no.: The second number indicates the characteristics of the subject.
MEN*0*: Common subjects
MEN*1*: Thermal engineering
MEN*2*: Fluid engineering
MEN*3*: Mechanics
MEN*4*: Nano / Bio engineering
MEN*5*, MEN*6*: Design / Manufacturing
MEN*7*: Dynamics / Control / Robotics

## □ Description

### MEN500 Advanced Numerical Methods [수치해석특론]

This course focuses on the modern computational and mathematical techniques needed for solving engineering problems. In this course, numerical methods for solving sets of nonlinear algebraic equations, ordinary differential equations, and differential-algebraic (DAE) systems are covered. The use of these techniques will be demonstrated.