List of Compulsory Courses for Graduate Programs (Master Degree)
Department of Power Mechanical Engineering
National Tsing Hua University

1. Thermo-Fluids and Energy Cluster (Cluster A): Choose TWO of the following five courses.

   (1) Laminar Flow Theory [PME511100]

   (2) Heat Convection [PME512200]

   (3) Introduction to Combustion [PME513100]

   (4) Computational Fluid Dynamics [PME511300]

   (5) Radiative Heat Transfer [PME665000]

2. Electrical and Control Cluster (Cluster B): Complete at least FOUR courses (12 credits) numbered with prefix of PME 52---- or PME 62---- offered by faculty from the cluster.

   ※ New admitted graduate students of the cluster who have completed at least four PME 52---- or PME 62---- courses (or their equivalences) each with score of at least 70 over scale of 100 or with grade of at least B- prior to enrollment into graduate program may not take the aforementioned courses with the approval of student's advisor.

3. Solid and Nano Mechanics Cluster (Cluster C): Choose TWO of the following three courses.

   (1) Elasticity [PME534500]

   (2) Finite Element Methods [PME534300]

   (3) Advanced Mechanical Vibrations [PME534200]

   (4) Students without engineering background are required to take an additional undergraduate course in Machine Design (3 credits) to acquire competence in mechanical engineering.
   This regulation applies to students who registered since the Academic Year 1998.

4. Design and Manufacturing Cluster (Cluster D): Choose TWO of the following three courses.

   (1) Micro and Nano Fabrication Technology [PME544200]

   (2) Special Topics in Computer-Aided Manufacturing [PME543100]

   (3) Precision Machine Design I [PME543500]

5. Opto-Mechatronics System Cluster (Cluster E): Complete both (1) and (2).

   (1) Choose ONE of the following three courses.

   Opto Electronics [PME544300];

   Micro & Nano Technology [NEMS510000];

   Optics Transducers [NEMS586000]

   (2) Choose any ONE compulsory course of Cluster A, Cluster B, Cluster C, Cluster D, Cluster E, or Cluster F.

6. Biomedical System Cluster (Cluster F): Choose TWO courses from the following five research areas.

Core curriculum	1. Writing of Scientific Papers and Research Methods [PME500300] 2. Forum on Nano-/Microsystem Technology [PME 500600]
MEMS	3. Sensing and Actuation in Miniaturized Systems [PME523000] 4. Micro & Nano Technology [NEMS510000]
Microfluidics	5. Thermo-fluidics in Bio-MEMS [PME517000] 6. BioMEMS & BioNEMS [NEMS58400] 7. Advanced Microfluidic System [PME510300]
Biosensors	8. Biosensors and Bioelectronics [PME550200] 9. Electronic Biomedical Nanosensor [NEMS583000]
Detection & Analysis	10. Molecular Separation and Recognition for Detection and Analysis [NEMS587000] 11. Spectroscopic and Optical Detection and Analysis [NEMS588000]

7. AI & Mechatronic Informatics Cluster (Cluster G): Choose TWO of the following six courses.

   (1) Artificial Intelligence [PME 543900]

   (2) Mobile Robots and Self-Driving Cars [PME 525600]

   (3) Machine Learning and Applications [PME 570200]

   (4) Artificial Intelligence in Advanced Manufacturing [PME 570300]

   (5) Deep Learning and Applications [PME 520900]

   (6) Reinforcement Learning and Optimal Control [PME 520800]

   This regulation applies to students who registered since the Academic Year 2024, with retroactive effect.