

Master Program Mechanical Engineering (MPMS)

Name of the program (original language)	Program Studi Magister Teknik Mesin
Name of the program (English translation)	Master Program of Mechanical Engineering (MPMS)
Final degree	Magister Teknik (MT)/Master of Science (M.Sc.)
Standard period of study	2 years
Credit points (according to ECTS)	36 credit points, equivalent 90- ECTS credit points
Type (several can be indicated)	Full time / part time / distance learning / dual degree / cooperative or sandwich course / intensive program/ etc.
Website of the higher education institution	https://www.ftmd.itb.ac.id/kurikulum-program-studi-teknik-mesin-s2/
Programs start date within the academic year	August and January
Program Inception	1990
Intake rhythm	Fall semester / summer semester / etc.
Expected intake number of students	75 students a year
Faculty/department	Faculty of Mechanical and Aerospace Engineering
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Last accreditation issued by	National Accreditation Agency for Higher Education in Indonesia (BAN-PT)
Duration of the last accreditation	20 May 2016 - 20 May 2021

Mechanical engineering is a scientific discipline that applies the basic science of engineering, physics, mathematics, industrial experience, and basic materials science to design, analysis, manufacture and maintenance of mechanical systems, and also in the power generation system and thermo-fluid engineering. In addition, research and development activities are also carried out to deepen the scientific field, which involves other disciplines. Mechanical Engineering is one of the branches of science with the oldest and widest coverage in the field of engineering.

Scientific fields of Mechanical Engineering that are often encountered include Solid Mechanics, Dynamics and Control, Design and Manufacturing (including: Production Process and Systems), Material Engineering, Thermal-Fluid and Power Engineering. This science is conveyed through both analytical and empirical methods in order to reach certain cognitive level, from the level of understanding to application.

In Master Program of Mechanical Engineering (MPMS), students are directed to pursue their knowledge in a more specific field and/or develop it with other scientific disciplines. Therefore, in its implementation, there are three option that were specifically developed in the ITB MPMS, namely:

1. Automation and Production Engineering

In this option, students will concentrate on automation processes and production system engineering which are oriented towards continuous improvement of product quality following the times.

2. Design, Dynamics, and Control
This line of mechanical engineering branch focus in the mechanical design process involving the latest industrial fields, sports, and medical sciences, as well as industrial applications of the phenomenon of vibration and control systems.
3. Sustainable Energy Engineering
In this Option, students will learn more about energy engineering process that prioritizes sustainable aspects. Students will focus on studying the energy generation process that relies on new and renewable energy sources, and engineering techniques to improve efficiency in existing systems. In addition, this Option provides options for students who want to develop knowledge on efficient refrigeration and air conditioning processes.

In addition to specific engineering abilities as described in the three Options above, students are also equipped with basic abilities as prospective researchers such as advanced engineering mathematics, research methods, and scientific paper writing techniques. With this provision, master students have good attributes in terms of publishing the results of their work/research in a wider community, be it the professional or scientific community or the community.

Program Educational Objective (PEO)

Referring to the latest curriculum document of Kur2019-S2-MS, MPMS is committed to produce graduates who can contribute positively to academic or professional society, both at national and international level, with general qualities that are reflected in the program educational objectives (PEO).

- PEO1 Moral integrity, discipline; respectful, just, and responsible behavior
- PEO2 A good understanding and an ability to apply knowledge and skills of math science, and engineering in various fields of Mechanical Engineering.
- PEO3 An ability to be creative and innovative, to work individually (independently) and in a team effectively, to communicate effectively, to conduct lifelong learning, and to adapt to a career environment.

The PEOs are also relevant with the Indonesian National Qualification Framework (KKNI), as shown in the following table.

Table 1 Relationship between PEOs of the MPMS and Indonesian National Qualification Framework (KKNI)

PEO	Indonesian National Qualification Framework (KKNI)			
	Capable to apply science, technology, and/or art in their expertise and adaptable to various situations	Mastering in-depth general and specific theoretical concepts of a certain knowledge and capable to formulate	Capable to make strategic decisions build upon data and information analysis and be able to give a clue in choosing	Responsible for own work and can be held accountable for the achievement of the organization's work

	faced during solving a problem.	related problem solving procedure	several alternative solutions	
Objective 1				V
Objective 2	V	V	V	
Objective 3	V	V	V	V

Program Learning Outcome (PLO)

Learning outcomes are designed based on the Program Educational Objectives of MPMS. Learning outcomes are targets that must be achieved by students of the MPMS so that by the time they graduate from the MPMS, graduates will have the ability in accordance with the Program Educational Objectives of the MPMS. The learning outcomes of MPMS ITB are published and updated on a regular basis. the learning outcomes for graduates from MEMSP based on curriculum document Kur2019-S2-MS program are:

- A. An ability to identify, formulate, and solve complex mechanical engineering problems by applying innovative methods and tools of engineering, science, and mathematics.
- B. An ability to consolidate and deepen knowledge in interdisciplinary field.
- C. An ability to apply analysis, synthesis, optimization, and creativity in the engineering design process, resulting in designs that meet desired needs.
- D. An ability to design, develop and conduct appropriate experimentation, analyze and interpret data, and use engineering/scientific judgment to draw conclusions.
- E. An ability to communicate effectively orally and written with a range of scientific audiences in national and international contexts.
- F. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- G. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty to integrate them into their actions in a responsible manner.
- H. An ability to recognize the ongoing need for additional knowledge and locate, evaluate, integrate, and apply this knowledge appropriately.

Each learning outcome should be achieved in order to attain the educational objectives of MPMS. Each point is detailed so that the reachability of each learning outcome becomes more visible. The detailed points are described under 3 points: knowledge, skills, and competences.

The learning outcomes of MPMS are reviewed by the Faculty of Mechanical and Aerospace Engineering at the end of each semester through a course achievement assessment, a student questionnaire, and lecturer portfolios.