

## Program Specification

1. Awarding institution	: Universitas Sebelas Maret
2. Faculty	: Engineering
3. Study program	: Bachelor in Mechanical Engineering
4. Final award	: S.T. (Sarjana Teknik)
5. Years of operation	: 1998 – Now (Establishment certificate number: 53/DIKTI/Kep/1998)
6. Minimum credits	: 144
7. Number of semesters	: 8
8. Certification/accreditation	: BAN (National Accreditation Board) with "A" (Very Good) Qualification (2015 - 2019), Certificate number: 204/BAN-PT/Akred/S/VII/2014
9. Method of study	: Full-time
10. Admission criteria or requirements to the program	: <a href="http://spmb.uns.ac.id">http://spmb.uns.ac.id</a>
11. Departmental web page address:	: <a href="http://mesin.ft.uns.ac.id/">http://mesin.ft.uns.ac.id/</a>
12. Date specification was written	: 4 June 2015
13. Program educational objective	:
<p>The program educational objectives of <b>Bachelor Program in Mechanical Engineering</b> program are to educate graduates to be capable of applying:</p> <p>PEO-1: engineering foundation for success in:</p> <ol style="list-style-type: none"> <li>a. Technical careers in industry, government, research institution, educational institutions or engineering consultant.</li> <li>b. Graduate school in engineering</li> <li>c. Careers involving management or entrepreneurship</li> </ol> <p>PEO-2: Soft skill for:</p> <ol style="list-style-type: none"> <li>a. Adapting to world demands</li> <li>b. Developing new knowledge and skills</li> </ol>	

**14. Expected learning outcomes** :

Students in the **Bachelor Program in Mechanical Engineering** program are prepared to attain the program educational objectives by the time they are graduated based on the following expected learning outcomes such as:

1. Able to apply the knowledge of fundamental mathematics, basic science, and basic engineering, to identify, formulate, and complete the field of mechanical engineering,
2. Being able to design components, operate, manage, and maintain machinery and systems related to machinery,
3. Being able to design, conduct experiments, analyze and interpret data obtained,
4. Being able to utilize methods, skills, and modern engineering tools required for engineering practice,
5. Able to communicate effectively, not only with fellow engineering scholars but also with the wider community, including proficiency in foreign language (English),
6. Able to work effectively both individual and team,
7. Having knowledge of entrepreneurship and processes to generate innovation
8. Having knowledge of contemporary issues,
9. Commitment to ethics & profession,
10. Able to engage in life-long learning.

**15. The Courses list** :

## Semester 1

Code	Course Name	Credits
MS11012-15	Religion	2
MS11022-15	Engineering English Language	2
MS12013-15	Physics 1	3
MS12023-15	Calculus 1	3
MS12032-15	Chemistry	2
MS12042-15	Engineering Drawing	2
MS14012-15	Engineering Materials	2
MS14021-15	Engineering Materials Lab.	1
MS15012-15	Manufacturing Processes 1	2
MS15021-15	Manufacturing Processes Lab. 1	1
Total Credits		20

## Semester 2

Code	Course Name	Credits
MS22012-15	Physics 2	2
MS22021-15	Physics Lab.	1
MS22032-15	Calculus 2	2
MS26013-15	Thermodynamics 1	3
MS22052-15	Mechanical Drawing	2
MS21012-15	Fundamentals Social & Cultural Science	2
MS23013-15	Statics	3
MS25012-15	Manufacturing Processes 2	2
MS25021-15	Manufacturing Processes Lab. 2	1
MS21012-15	Entrepreneurship	2
Total Credits		20

## Semester 3

Code	Course Name	Credits
MS31012-15	Indonesian Language	2
MS32013-15	Engineering Mathematics 1	3
MS33013-15	Kinematics	3
MS33013-15	Strength of Materials	3
MS32022-15	Computer Programming	2
MS36032-15	Thermodynamics 2	3
MS36012-15	Fluid Mechanics 1	2
MS35012-15	Industrial Metrology	2
Total Credits		20

## Semester 4

Code	Course Name	Credits
MS42013-15	Engineering Mathematics 2	3
MS43012-15	Dynamics	2
MS43023-15	Machine Elements 1	3
MS46013-15	Fluid Mechanics 2	3
MS47012-15	Measurement Engineering	2
MS44012-15	Physical Metallurgy	2
MS44021-15	Physical Metallurgy Laboratory	1
MS46023-15	Heat Transfer 1	3
Total Credits		19

## Semester 5

Code	Course Name	Credits
MS52012-15	Research Methodology	2
MS53013-15	Mechanical Vibrations	3
MS53023-15	Machine Elements 2	3
MS55012-15	Industrial Managements	2
MS56022-15	Heat Transfer 2	2
MS57012-15	Electric Power Engineering	2
MS57021-15	Electric Power Engineering Lab.	1
MS55012-15	Casting and Welding	2
MS55021-15	Casting and Welding Laboratory	1
MS51012-15	Pancasila	2
Total Credits		20

## Semester 6

Code	Course Name	Credits
MS62022-15	Internship Program	2
MS62012-15	Computational & Numerical Methods	3
MS65012-15	Material and Process Selections	2
MS61012-15	Community Service	2
MS66022-15	Energy Conversion Machines	2
MS67032-15	Pneumatic and Hydraulic Systems	1
MS67041-15	Pneumatic and Hydraulic Systems Lab.	1
MS66012-15	Basic Machine Phenomenon Lab.	2
MS63012-15	Mechanical Engineering Design	2
	Elective Course 1	3
Total Credits		20

## Semester 7

Code	Course Name	Credits
MS71012-15	Citizenship	2
MS77012-15	Control Engineering	2
MS76012-15	Machine Performance Laboratory	2
MS72031-15	Final Project Proposal	2
MS77012-15	Mechatronics	2
MS77021-15	Mechatronics Laboratory	1
	Elective Course 2	3
	Elective Course 3	3
	Elective Course 4	3
Total Credits		20

## Semester 8

Code	Course Name	Credits
MS82011-15	Self-Development Program	1
MS82044-15	Final Project	4
Total Credits		5

## Elective Courses:

Code	Course Name	Credits
MS06013-15	Internal Combustion Engines	3
MS06023-15	Engineering refrigeration	3
MS06033-15	Aerodynamics	3
MS04043-15	Turbine	3
MS06053-15	Computational Heat Transfer	3
MS06063-15	Two-phase Flow	3
MS06073-15	Computational Fluid Dynamics	3
MS06083-15	Steam and Gas Generator	3
MS06093-15	Solar Energy	3
MS06103-15	Pumps and Compressors	3
MS06113-15	Heat exchanger	3
MS06123-15	Energy management	3
MS06133-15	Nano Generator	3
MS06143-15	Nano Fluids	3
MS03023-15	Piping Systems	3
MS05063-15	Technopreneurship	3

Code	Course Name	Credits
MS04013-15	Casting Technology	3
MS04023-15	Powder Technology	3
MS04033-15	Composite Technology	3
MS05013-15	Machining Process and Technology	3
MS05033-15	Metal Forming	3
MS05053-15	Welding Technology	3
MS04063-15	Biomaterial Engineering	3
MS04053-15	Heat and Surface Treatment	3
MS05043-15	Product Design and Development	3
MS05023-15	Design for Manufacturing	3
MS03013-15	Finite Element Method	3
MS03043-15	Predictive Maintenance	3
MS03033-15	Mechanics of Robot	3
MS03073-15	Rheology	3
MS03074-15	Shock Absorbers Technology	3