TRAINING PROGRAM FOR MASTER OF AUTOMOTIVE ENGINEERING

Coursework (Practice-oriented)
Name of the program: Master of Automotive Engineering
Code: 8520130

1	**Name of program**	Master of Automotive Engineering
2	**Code**	8520130
3	**Management unit**	Faculty of Vehicle Engineering
4	**Input standard**	
4.1	**Fields not requiring supplement courses**	– Automotive Engineering Technology – Automotive Engineering – Power Mechanical Engineering
4.2	**Fields requiring supplement courses**	– Mechanical engineering technology – Mechatronics engineering technology – Control and automation engineering – Machine building technology – Thermal Engineering Technology – Ship Engineering Technology – Industrial maintenance – Mechanical Engineering – Mechatronics Engineering – Thermal Engineering – Industrial Engineering – Industrial Systems Engineering – Aeronautical Engineering – Ship engineering
4.3	**General requirement**	University degree (equivalent or higher) in a relevant discipline; good grade. Have a foreign language level of B1 (level 3/6) according to the 6-level Foreign Language Competency Framework for Vietnam or equivalent.
5	**General objectives**	To train masters in Automotive Engineering with good professional qualifications in the field of automotive engineering, grasp interdisciplinary knowledge; be able to work independently or work in scientific research groups in the fields of industry or interdisciplinary; have scientific thinking, ability to approach, analyze and solve scientific problems and offer solutions; Ability to conduct scientific

			research and present scientific contents, publish research results before the Council.
		Specific objectives	a. Having relevant interdisciplinary knowledge of power mechanical engineering and automotive engineering technologies; applying in-depth expertise to solve scientific and technological problems in the dynamic industry and the automotive industry;
			b. Skilled in analyzing, synthesizing, evaluating data, organizing, identifying, and solving scientific and technological problems in the dynamic industry and the automotive industry;
			c. To undertake scientific research in the training, research and development (R&D) departments, and be able to develop in-depth research at the doctoral level.
			d. Demonstrate being a responsible, confident, dynamic person at work.
6	**Graduate Performance Standards**		
6.1	Knowledge		a. General knowledge: Applying philosophy and English knowledge to work practically. b. Industry knowledge: + **PO1**: Apply advanced knowledge of technology engineering to solve problems in automotive engineering and power mechanical engineering. c. Specialized knowledge: + **PO2**: Relevant interdisciplinary knowledge such as engineering, modern automotive technology, basic knowledge of management, organization of automobile production, application of 4.0 technology to production, and scientific research. d. Scientific research knowledge: Ability to develop research outlines and organize the implementation of independent scientific research projects
6.2	Skill		a. **PO3**: Ability to search, synthesize and self-update new knowledge in automotive engineering and power mechanical engineering; b. **PO4**: Ability to survey, analyze, evaluate, and solve problems of science and technology in automotive engineering and power mechanical engineering;

		c. **PO5:** Ability to plan, project, organize, operate, and manage engineering in the production of automotive engineering and power mechanical engineering;
		d. **PO6:** Ability to work independently, and effectively work in teams to solve problems in the field of the industry. Ability to research, and come up with initiatives to solve practical situations related to technical problems, and management,... in the automotive industry.
		e. **PO7:** Have foreign language ability equivalent to level 4/6 of Vietnam's foreign language proficiency framework. Lifelong active learning skills and strategies and acceptance of the need to maintain current developments in the field of automotive engineering expertise.
		f. **PO8:** Ability to apply industrial revolution 4.0 achievements and specialized software in solving automotive engineering problems.
6.3	Attitude/Self-responsibility	a. **PO9**: Comply with state regulations and laws, live and work responsibly with the community and society, respect the moral values of the nation; Adapt, self-orient, and guide others to face stresses and problems arising to develop successful projects and contribute to sustainable business development.
		b. **PO10**: Honesty in work, study, and scientific research; Have bravery, scientific ethical qualities, and professional ethics with integrity and objectivity. Show up as a responsible, confident, dynamic person at work.
6.4	Foreign language before thesis defense	Self-study to achieve B2 certificate (level 4/6) according to the 6-level Foreign Language Competency Framework for Vietnam or equivalent.
7	**Training program structure**	- General knowledge: 9 credits + Philosophy: 3 credits; + Foreign languages (English level B2): Standard graduation requirements + Scientific research method: 3 credits - Basic and specialized knowledge: 36 credits - Graduation thesis: 15 credits

8	**Required supplement courses in Section 4.2**	The right industry group to supplement knowledge
		- Number of modules: 03; total credits: 8 credits
		- Module names *(name, HP number, credit number)*
		  1. Automotive theory: 3 credits
		  2. Automotive structure: 2 credits
		  3. Fundamental of Internal combustion engine:3 credits
		The remaining majors in the Mechanical Engineering Technology group, subjects supplement knowledge:
		- Number of modules: 05; total credits: 12 credits
		- Module names *(name, HP number, credit number)*
		  1. Introduction to automotive engineering technology: 2 credits
		  2. Automotive theory: 3 credits
		  3. Automotive structure: 2 credits
		  4. Fundamental of internal combustion engine:3 credits
		  5. Modern vehicles: 2 credits

	Entrance exam courses (if choosing the test option)	1. Automotive theory 2. Fundamentals of Internal combustion engine
10	**Admission conditions** (if choosing the admission evaluation option)	University graduate from a relevant disciplines with good grades. Have a foreign language proficiency of 3/6 (B1) according to the 6-level Foreign Language Competency Framework for Vietnam or equivalent

Training program

Total credits	60 credits
Training period	2 years

	Name of courses	Number of credits				
		Total	Theory	Field work	Practice	Self study
	Part 1: General knowledge (9 credit)					
1	Philosophy	3	3			90
2	Scientific research methodology	3	2		1	90
	Technical English	3	3			90
	Part 2: Specialized compulsory courses (21 credits)					
4	Combustion process in internal combustion engine	3	3			90
5	Multi-body dynamics	3	3			90
6	Advanced automotive dynamics	3	3			90
7	Electric and smart vehicle	3	2		1	90

8	Automotive mechatronic	3	2		1	90
9	Automotive research and development	3	3			90
10	Numerical methods and modeling in engineering	3	3			90
Part 3: Specialized elective courses (15 credits – from 10 courses)						
11	Automobiles and environmental pollution	3	3			90
12	New energy and alternative fuels for vehicle	3	3			90
13	Advanced internal combustion engine	3	3			90
14	New systems on modern vehicles	3	3			90
15	Vehicle body engineering	3	2		1	90
16	Automotive simulation techniques	3	2		1	90
17	Automotive testing methods	3	2		1	90
18	Advanced material in automotive engineering	3	2		1	90
19	Automotive manufacturing projects management	3	2		1	90
20	4.0 Technology application in the automotive industry	3	2		1	90
Part 4: Scientific research						
21	Graduation thesis	15			15	90
	Total	**60**				

Relation of training objectives and graduate performance standards

Training objectives (5)	Graduate performance standards (6)												
	Knowledge (6.1)				Skill (6.2)						Self resposibility (6.3)		Foreign language (6.4)
	a	b	c	d	a	b	c	d	e	f	a	b	
a	3		2		2	2						3	3
b		3		3	3	3	2	2	2	2		2	
c			2		3	3	2	2	2	2	3	3	3
d		2	3		2	2					3	3	3

Relation of course objectives and graduate performance standards

TRAINING PROGRAM GRADUATE PERFORMANCE STANDARDS (PO)											
-	Courses	Knowledge (6.1)		Skill (6.2)						Attitude/Self responsibility	
				Hard skills			Soft skills				
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
1	Philosophy	2						2			2
2	Scientific research methodology	2		2	3		4	2	2		
3	Technical English						3	3		3	
4	Combustion process in internal combustion engine	3	3	3	3		2			3	
5	Multi-body dynamics	2	3		3			2	3		2

	TRAINING PROGRAM GRADUATE PERFORMANCE STANDARDS (PO)									
-	Courses	Knowledge (6.1)		Skill (6.2)						Attitude/Self responsibility	
				Hard skills			Soft skills				
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
6	Advanced automotive dynamics	3	3	2	3						
7	Electric and smart vehicle	3	3	2	3						
8	Automotive mechatronic	3	3	2				3			
9	Automotive research and development	2	3	2	3	3			3		
10	Numerical methods and modeling in engineering	2	3	2	3	3	4		3		
11	Automobiles and environmental pollution	2	3	2		3					
12	New energy and alternative fuels for vehicle	2	3	2		3	3				
13	Advanced internal combustion engine	2	3	2		3	3				
14	New systems on modern vehicles	2	3	2	3						
15	Vehicle body engineering	3	3	2		3				3	3
16	Automotive simulation techniques		3	2	3		3		4		
17	Automotive testing methods	3	3	2		3					
18	Advanced material in automotive engineering	3	3	2		2		2			
19	Automotive manufacturing projects management	3	3	2		4				3	
20	4.0 Technology application in the automotive industry	3		2	2		3		4	3	
21	Graduation thesis	3	3	3	3	3	2	3			2

Matrix of teaching methods of courses

	Codes	Name of courses	Teach direct			Teach indirect			Learn experience				Teach interaction			Self-study
			Specific explanations	Preaching	Presentations	Suggestive question	Problem solving	According to the	Model	Internships, real-life	Experiment	Team	Argue	Discuss	Group learning	Homework
Part 1: General knowledge (9 credits)																
1		Philosophy		X										X		
2		Scientific research methodology		X	X	X	X	X				X		X		X
3		Technical English	X	X		X		X	X				X	X		X
Part 2: Basic and specialized knowledge required (21 credits)																
1		Combustion process in internal combustion engine	X	X		X	X					X	X	X	X	X
2		Multi-body dynamics	X	X								X				X
3		Advanced automotive dynamics	X	X			X					X		X	X	
4		Electric and smart vehicle	X	X				X				X				X
5		Automotive mechatronic	X	X								X				X
6		Automotive research and development	X	X	X		X	X				X		X	X	X
7		Numerical methods and modeling in engineering	X	X				X	X			X				X
Part 3: Specialized elective courses (15 credits – from 10 courses)																
1		Automobiles and environmental pollution	X	X		X	X					X		X	X	X
2		New energy and alternative fuels for vehicle	X	X		X	X					X		X	X	X
3		Advanced internal combustion engine		X	X		X						X	X	X	X
4		New systems on modern vehicles		X	X		X						X	X	X	X
5		Vehicle body engineering	X	X				X	X		X					X
6		Automotive simulation techniques	X	X		X	X				X			X	X	X
7		Automotive testing methods	X			X			X							X
8		Advanced material in automotive engineering	X	X				X			X					X
9		Automotive manufacturing projects management	X	X				X			X					X

MATRIX OF TEACHING METHODS OF MODULES

	Codes	Name of courses	Teach direct			Teach indirect			Learn experience				Teach interaction			Self-study
			Specific explanations	Preaching	Presentations	Suggestive question	Problem solving	According to the	Model	Internships, real-life	Experiment	Team	Argue	Discuss	Group learning	Homework
10		4.0 Technology application in automotive industry	X	X		X	X							X	X	X
		Part 4: Graduation thesis (15 credits)														
11		Graduation thesis				X	X		X							X

Evaluating methods of courses

	Code	Name of courses	Process evaluation				Summary/periodic assessment					
			Attendance assessment	Assess assignments	Presentation evaluation	Evaluate real-world experience	Written test	Multiple choice test	Security and oral exams	Thematic reports	Presentation evaluation	Teamwork assessment
		Part 1: General knowledge (9 credits)										
1		Philosophy	X				X					X
2		Scientific research methodology	X	X	X		X		X	X		X
		Technical English	X	X	X		X		X			
		Part 2: Basic and specialized knowledge required (21 credits)										
1		Combustion process in the internal combustion engine	X				X			X		X
2		Multi-body dynamics	X	X			X			X		X
3		Advanced automotive dynamics	X				X			X		X
4		Electric cars and smart cars	X	X			X			X		X
5		Mechatronics in cars	X	X			X			X		X
6		Automotive research and development	X				X			X		X
7		Numerical methods and modeling in engineering	X	X		X	X			X		X
		Part 3: Specialized elective courses (15 credits – from 10 courses)										

	Code	Name of courses	Course evaluation method matrix									
			Process evaluation				Summary/periodic assessment					
			Attendance assessment	Assess assignments	Presentation evaluation	Evaluate real-world experience	Written test	Multiple choice test	Security and oral exams	Thematic reports	Presentation evaluation	Teamwork assessment
1		Automobiles and environmental pollution	X	X		X	X			X		X
2		New energy and alternative fuels for vehicle	X				X			X		X
3		Advanced internal combustion engine	X		X		X			X		X
4		New systems on modern vehicles	X				X			X		X
5		Vehicle body engineering	X				X			X		X
6		Automotive simulation techniques	X	X		X	X			X		X
7		Automotive testing methods	X		X		X				X	X
8		Advanced material in automotive engineering	X				X			X		X
9		Automotive manufacturing projects management	X				X				X	X
10		4.0 Technology application in automotive industry	X				X			X		X
Part 4: Graduation thesis (15 credits)												
		Graduation thesis							X	X	X	

Teaching plan

Semester 1	Semester 2	Semester 3	Semester 4
Philosophy (3 TC)	Advanced automotive dynamics (3 TC)	Automotive Research and development (3 TC)	Graduation thesis (15 TC)
Scientific research methodology (3 TC)	Electric and smart vehicle (3 TC)	Numerical methods and modeling in engineering (3 TC)	

Technical English (3 TC)	Mechatronics in a car (3 TC)	Elective course 03 (3 TC)
Combustion in internal combustion engines (3 TC)	Elective course 01 (3 TC)	Elective course 04 (3 TC)
Multi-body dynamics (3 TC)	Elective course 02 (3 TC)	Elective course 05 (3 TC)

Comparison with training programs of other universities

Description	DNC		VLUTE		UTE		TNUT		IUH		HCMUT	
	Credit	(%)	Credit	(%)	Credit	(%)	Credit	(%)	Credit	(%)	Credit	(%)
General knowledge	9	15	15	27,8	6	10	8	17,8	9	15	9	15
Compulsory specialized knowledge	21	35	9	16,7	21	35	19	42,2	21	35	18	30
Elective specialized knowledge	15	25	14	25,9	24	40	10	22,2	15	25	24	40
Thesis	15	25	16	29,6	9	15	8	17,8	15	25	9	15
Total	60	100	54	100	60	100	45	100	60	100	60	100

Note: DNC = Nam Can Tho University; VLUTE = Vinh Long University of Technology and Education; UTE = Ho Chi Minh City University of Technology and Education; TNUT = Thai Nguyen University of Technology; IUH = Industry University of Ho Chi Minh City University; HCMUT=Ho Chi Minh City University of Technology