ACET programme specification

Training major: Automation and Control Engineering Technology (ACET)
Training level: Bachelor
Major code: 52510303

1. Awarding institution:

HCMC University of Technology and Education (HCMUTE)

2. Name of the final award:

Bachelor of Engineering (in Automation and Control Engineering Technology)

3. Mode of study: Full time

Type of study: Campus-based

4. Training time:

The normal period of study for a full-time bachelor's degree is four years and the maximum period is eight years.

5. Admission criteria:

High school graduate candidates have total score of Mathematics, Physics, and Chemistry (group A) or Mathematics, Physics, and English (group A1), or Mathematics, Literature, English (group D1) in an annual National High School Graduation Examination held in July by MOET higher than the cut-off score set by the HCMUTE based on the student admission quota from MOET. The cut-off score will be published in August. Candidates, who graduated from specialized high schools, have an average score of five consecutive terms of high school larger than 7.5 and are in the top 10% of the HCMUTE annual admission quota.

6. Programme Expected Objectives:

PEO-01	Effectively utilize fundamental mathematics, scientific, and engineering technology principles together with modern tools in solving automation and control engineering problems. (ELO-1.1, ELO-1.2, ELO-1.3).
PEO-02	Have self-confidence in technical and management skills, roles of responsibility in professional activities, participating effectively in multidisciplinary teams and appreciate the importance of life-long learning. (ELO-2.1, ELO-2.2, ELO-2.3, ELO-2.4, ELO-2.5)
PEO-03	Adapt effectively in the professional environment, leadership, and teamwork in the context of automation and control engineering to fulfill the needs of society. (ELO-3.1, ELO-3.2, ELO-3.3).
PEO-04	Apply this knowledge and skills via professional activities and training to design, development, and manufacturing of automation and control engineering technology fields. (ELO-4.1, ELO-4.2, ELO-4.3, ELO-4.4, ELO-4.5, ELO-4.6).

7. Reference points used to inform the programme specification:

The CDIO-based education that engineering graduates should be able to Conceive – Design – Implement – Operate engineering systems and stakeholders' surveys.

8. Expected learning outcomes:

ELO-1.1	An ability to apply knowledge of mathematics, science, information technology, and engineering.
ELO-1.2	An ability to analyze the fundamental knowledge of automation and control engineering.
ELO-1.3	An ability to analyze advanced knowledge of automation and control engineering.
ELO-2.1	An ability to analyze and solve the problems of the automation and control engineering field.
ELO-2.2	An ability to identify, formulate and solve engineering problems to design a system, component, or process to meet desired needs.
ELO-2.3	An ability to select possible solutions for automation and control engineering within the context of society, enterprise, and technique.
ELO-2.4	A recognition of the importance of the global, economic, environmental and societal context in automation and control engineering to engage in life-long learning.
ELO-2.5	An ability to perceive professional practice skills in automation and control engineering including professional and ethical responsibility.
ELO-3.1	An ability to evaluate the goals and characteristics of individuals to engage technical collaboration with team members in multi-disciplinary projects.
ELO-3.2	An ability to select various communication skills in both technical and none technical environments.
ELO-3.3	An ability to demonstrate the capacity to use English in automation and control engineering with the emphasis on reading and writing skills.
ELO-4.1	An ability to judge the impact of automation and control engineering solution in global, economic, environmental, and societal context, and vice versa.
ELO-4.2	An ability to adapt different enterprise and business cultures and develop professional behaviors to achieve the success.
ELO-4.3	An ability to propose appropriate systems in the automation and control field to match the realistic demands.
ELO-4.4	An ability to use the techniques, skills, and modern engineering tools to design a part or complete of the automation and control systems.
ELO-4.5	An ability to participate effectively in the development, organization, operation, and management of automation and control projects.
ELO-4.6	An ability to operate the automation and control systems in the factory including inspection, maintenance, repair, and upgrade.

9. Block of knowledge

Name	Credits		
	Total	**Compulsion**	**Elective**
General knowledge	**56**	**45**	**11**
Political Education	12	12	0
Social Science	6	0	6
English	9	9	0
Mathematics and Natural Sciences	23	18	5
Informatics	3	3	0
Introduction to ACET	3	3	0

	Professional knowledge	94	88	6
	Broad knowledge for the group of majors and deep knowledge for the major	37	37	0
	Specialized knowledge	27	21	6
	Practice and Internship	20	20	0
	Graduation Thesis	10	10	0

10. Program contents

a. *General knowledge: 56 Credits*

No.	Code	Course name	Credits	Note
A	**Political Education and General Laws**		**12**	
1	LLCT150105	Principles of Marxist-Leninism	5	
2	LLCT120314	Ho Chi Minh's Ideology	2	
3	LLCT230214	Vietnamese Communist Party Policy of Revolution	3	
4	GELA220405	General Laws	2	
B	**Introduction to ACET**		**3**	
1	IACT130046	Introduction to ACET	2+1	
C	**Informatics**		**3**	
1	CPRL130064	C Program Language	2+1	
D	**Foreign Language**		**9**	
1	ENGL130137	English 1	3	
2	ENGL230237	English 2	3	
3	ENGL330337	English 3	3	
E	**Mathematics and Natural Sciences**		**23**	
1	MATH130101	Advanced Mathematics 1	3	
2	MATH130201	Advanced Mathematics 2	3	
3	MATH130301	Advanced Mathematics 3	3	
4	MATH130401	Applied Probability	3	
5	PHYS120102	Fundamental Physics A1	3	
6	PHYS120202	Fundamental Physics A2	2+1	
7	MATH121201	Complex Functions and Laplace Transforms	2	
8	GCHE130103	Fundamental Chemistry A1	3	
F	**Social Science** (*choose 03 among the 11 courses*)		**6**	
1	GEEC220105	General Economics	2	
2	PLSK320605	Planning Skill	2	
3	INMA220305	Introduction to Management	2	
4	INSO321005	Introduction to Sociology	2	
5	IQMA220205	Introduction to Quality Management	2	
6	INLO220405	Introduction to Logic	2	
7	PRSK320705	Presentation Skills	2	
8	SYTH220505	Systems Thinking	2	
9	ULTE121105	University Learning Method	2	
10	IVNC320905	Vietnamese Culture	2	
11	TDTS320805	Technical Writing	2	

No.	Code	Subject's name	Credits	Note
G	**Physical Education**		**5**	
1	PHED110513	Physical Education 1	1	
2	PHED110613	Physical Education 2	1	
3	PHED130715	Physical Education 3 (compulsory)	3	
H	**National Defense Education**		**11**	

b.   Professional education knowledge: 94 credits

No.	Code	Subject's name	Credits	Note
A	**Electrical and Electronics Core**		**25**	
1	ELCI140144	Electric Circuit	4	
2	BAEL340662	Basic Electronics	4	
3	DIGI330163	Digital Systems	3	
4	EMIN330244	Electrical Measurement and Instruments	3	
5	MICR330363	Microprocessor	3	
6	ELSA320245	Electrical Safety	2	
7	POEL330262	Power Electronics	3	
8	ACSY330346	Automatic Control Systems	3	
B	**Electrical and Electronics Advanced Core**		**9**	
1	ELMA240344	Electrical Machines	4	
2	MASC220146	Modeling and Simulation using Computer	2	
3	ELDR320545	Automatic Electric Drive	3	
C	**Automation and Control Area Core**		**21**	
1	PLCS330846	Programmable Logic Controller	3	
2	ROBO320246	Robotics	3	
3	EEPN320446	Electrical Equipment and Pneumatics	2	
4	ELPS330345	Electrical Power System	3	
5	SCDA420946	Data acquisition system and SCADA	2	
6	DPLC431046	Data Transmission and PLC Networks	3	
7	AACS320546	Advance Automatic Control Systems	2	
8	PRTO412446	Professional Development Topics	1	
9	MCPR310646	Project 1	1	
10	ARPR310746	Project 2	1	
11	PLCR311146	Project 3	1	
D	**Automation and Control Area Electives**		**6**	
1	INCO321546	Intelligent control	2	
2	EMSY427764	Embedded Systems	2	
3	CADA321646	CAD in ACET	2	
4	IDMA322245	Industry management	2	
5	IMPR322046	Industrial Image Processing	2	
E	**Practice and Internship**		**20**	
1	ELPR210644	Electric in Practice	1	

2	ELPR320762	Basic Electronics in Practice		2	
3	PMEM310844	Measurement Engineering in Practice		1	
4	PRDI320263	Digital Systems in Practice		2	
5	PRMI320463	Microprocessor in Practice		2	
6	PREM221244	Electric Machine in Practice		2	
7	POEP320262	Power Electronics in Practice		2	
8	PPLC321346	Programmable Logic Controller in Practice		2	
9	ROPR311246	Robotic in Practice		1	
10	ELEC322645	Electric Drive in Practice		2	
11	PACS321446	Automatic Control Systems in Practice		1	
12	ININ422346	Internship		2	
F	**Graduation Thesis**			**10**	
1	FIPR4102546	Graduation Thesis		10	

11. Teaching plan

Semester	No.	Code	Course Name	Credit Theory	Credit Practice	Credit Total
1	1	IACT130046	Introduction to ACET	2	1	3
	2	CPRL130064	C Program Language	2	1	3
	3	ENGL130137	English 1	3	0	3
	4	MATH130101	Advanced Mathematic A1	3	0	3
	5	MATH130201	Advanced Mathematic A2	3	0	3
	6	PHYS130102	Fundamental Physics A1	2	1	3
	7	GCHE130103	Fundamental Chemistry A1	3	0	3
	8	PHED110513	Physical education 1	1	0	1
Total credits in Semester 1						**22**
2	9	LLCT150105	Fundamental Principles Marxism – Leninism	5	0	5
	10	ENGL230237	English 2	3	0	3
	11	MATH130301	Advanced Mathematic A3	3	0	3
	12	MATH121201	Complex Variable Functions & Laplace Transforms	2	0	2
	13	PHYS120202	Fundamental Physics A2	2	1	2
	14	PHYS110302	Physics Experiment	0	1	1
	15	PHED110613	Physical Education 2	1	0	1
	16	ELCI140144	Electric Circuit	4	0	4
Total credits in Semester 2						**21**
3	17	ENGL330337	English 3	3	0	3
	18	ELSA320245	Electrical Safety			2
	19	MATH130401	Applied Statistics Probability	3	0	3

	20	ELMA240344	Electrical Machines	4	0	4
	21	GELA220405	General Law	2	0	2
	22	SISY330164	Signals and Systems	3	0	3
	23	BAEL340662	Basic Electronics	4	0	4
	24	EMIN330244	Electrical Measurement and Instruments	3	0	3
	25	PHED130715	Physical Education 3	3	0	3
	26	ELFI220344	Electromagnetic Field	2	0	2
	27	ELEQ220944	Electrical Equipment	2	0	2
Total credits in Semester 3						**24**
4	28	LLCT120314	Ho Chi Minh's ideology	2	0	2
	29	DIGI330163	Digital Systems	3	0	3
	30	DACO430664	Data Communication	3	0	3
	31	POEL330262	Power Electronics	3	0	3
	32	ELPS330345	Power Supply System	3	0	3
	33	ACSY330346	Automatic Control Systems	3	0	3
	34	ELPR320762	Basic Electronics in Practice	0	2	2
	35	PMEM310844	Measurement Engineering in Practice	0	1	1
	36	ELPR210644	Electric in Practice	0	1	1
Total credits in Semester 4						**21**
5	37	LLCT230214	Vietnamese Communist Party Policy of Revolution	3	0 0	3
	38	ELDA323245	Electric Drive and Application	2	0	2
	39	MICR330363	Microprocessor	3	0	3
	40	ROBO320246	Robotics	2	0	3
	41	MASC220146	Modeling and Simulation using Computer	2	0	2
	42	AACS320546	Advance Automatic Control Systems	2	0	2
	43	MCPR310646	Project 1	1	0	1
	44	PREM221244	Electric Machine in Practice	0	2	2
	45	PRDI320263	Digital Systems in Practice	0	2	2
	46	PACS321446	Automatic Control Systems in Practice	0	1	1
Total credits in Semester 5						**21**
6	47	EEPN320446	Electrical Equipment and Pneumatics	2	03	2
	48	PLCS330846	Programmable Logic Controller	3	0	3
	49	ARPR310746	Project 2	1	0	1

	50	ROPR311246	Robotic in Practice	0	1	1
	51	POEP320262	Power Electronics in Practice	2	0	2
	52	PRMI320463	Microprocessor in Practice	0	2	2
		Electives (6 Credits)				
	53	GEEC220105	General Economics	2	0	2
	54	INSO321005	Introduction to Sociology	2	0	2
	55	IQMA220205	Introduction to Quality Management	2	0	2
	56	INMA220305	Introduction to Management	2	0	2
	57	IVNC320905	Vietnamese Culture	2	0	2
Total credits in Semester 6						**17**
7	58	SCDA420946	Data Acquisition System and SCADA	2	0	2
	59	DPLC431046	Data Transmission and PLC Networks	3	0	3
	60	PLCR311146	Project 3	1	0	1
	61	ELEC322645	Electric Drive in Practice	0	2	2
	62	PPLC321346	Programmable Logic Controller in Practice	0	2	2
		Electives (6 Credits)				
	63	INCO321546	Intelligent Control	2	0	2
	64	EMSY427764	Embedded Systems	2	0	2
	65	CADA321646	CAD in ACET	2	0	2
	66	IDMA322245	Industry Management	2	0	2
	67	IMPR322046	Industrial Image Processing	2	0	2
Total credits in Semester 7						**16**
8	68	ININ422346	Internship	0	2	2
	69	PRTO412446	Professional Development Topics	1	0	1
	70	FIPR4102546	Graduation Thesis	0	10	10
Total credits in Semester 8						**13**

12. Progression point

Students have to obtain a score of 5.0 out of 10.0 for all courses. If ACET student cannot match the progression requirements of HCMUTE (A minimum cumulative GPA of 3.0 for the first year, or 3.5 for the second year, or 4.0 for the third year or 4.5 from the fourth year or over allowable study time), then he/she is required to quit from the programme.

13. Job opportunities

After graduation, ACET students have opportunities to work in many fields as follows:

▪ ACET students can work in the Research and Development Section related to automation and control engineering technology such as designing the automation system, developing the automation applications for industry and routine life.

- ACET students can work in the manufacturing factories in which they will be in charge of the production lines and machines. They can work in the maintenance section for repairing and maintaining the machines.
- They have chances to work in the sale, service and training fields which are related to automation and control engineering technology.

14. Issued and revised date

The programme was issued in July 2012 and revised in 2014 and 2016.