

Endorsed with Academic Council resolution
Record № 9 dated 29.05.2012

Approved by
Rector /s/

QUALIFICATION REFERENCE

Degree course: **HEAT, VENTILLATION, AIR-CONDITIONING AND GAS- TRANSFER ENGINEERING**
Educational-qualification degree: **BACHELOR**
Field of higher education: **TECHNICAL SCIENCES**
Professional trend: **5.1. MECHANICAL ENGINEERING**
Professional qualification: **MECHANICAL ENGINEER**

ANNOTATION

This degree course meets the need of specialists and helps to implement EU energy strategy 2020 which aims at developing competitive, sustainable and reliable energy sector. Special emphasis is laid on energy technologies and innovations in that particular field. Training is carried out in conformity with endorsed curriculum which meets the required EU standards in the field of higher education.

VOCATIONAL PURPOSE

Successful graduates of the course in “Heat, ventilation, air-conditioning and gas-transfer engineering”(HVGE) are well able to carry out following activities:

- design of systems for ventilation and dust removal in industrial and administrative buildings and complexes;
- design of systems for air-conditioning of administrative and commercial centers, hotels, restaurants and residential buildings;
- design of heating, drying and thermo-pump installations;

- design of systems for renewable energy sources;
- deal with research work in the area of heating, ventilation, air-conditioning and gas engineering.
- design of gas-transfer systems and equipment.

TRAINING REQUIREMENTS

The training of energy engineers in “Heat, ventilation, air-conditioning” is carried out in accordance with the Bachelor degree curriculum. Successful graduates of the bachelor degree course are eligible to continue their studies in Master’s degree courses and after that in doctoral degree courses.

Training encompasses a broad spectrum subjects which ensure solid scientific, theoretic and practical base. The first four semesters of study include disciplines which are common for each machine engineer and include : Calculus, Physics, Mechanics, Mechnics of fluids, Heat and mass transfer, Engineering graphics, Materials science, Machine parts, Strenght of materials, Thermodynamics, Electrical engineering and electronics. It also includes language classes and classes in humanities.

During V, VI, VIII and VIII semester studies are concentrated on subjects such as “ Applied hydro and gas dynamics”, „Structural and thermal engineering features of buildings ”, „Heat and gas supply ”, „ Air-conditioning of air ”, „Fuel handling facilities ”, ”Refrigeration equipment,, „Industrial ventilation and dust removal” all of which enable students to reach the level of knowledge that corresponds to Bachelor degree. Training closes with thesis work during the last semester.

PROSPECTIVE AREAS OF REALIZATION

Bachelor degree holders who have majored in HVGE could follow careers as:

- specialists in the field of energy research and introduction of energy saving technologies;
- designers of air-conditioning, heating, ventilation, gas supplying, refrigerating systems and installations;
- engineers in maintenance and operation of energy systems;
- experts and coordinators in projects on energy efficiency and renewable energy sources in state and private companies.

This qualification reference was endorsed by the Faculty Council with Record № 5 dated 15.05.2012.

Department Chair /s/

Dean /s/

TECHNICAL UNIVERSITY OF GABROVO
FACULTY OF MECHANICAL AND PRECISION ENGINEERING

Endorsed with Academic Council resolution
Record № 9 dated 29.05.2012

Approved by
Rector /s/

Updated with Academic Council resolution
Records № 11 dated 08.07.2014 and № 6 dated 03.02.2015

CURRICULUM

Degree course: **HEAT, VENTILLATION, AIR-CONDITIONING AND GAS- TRANSFER ENGINEERING**
Academic degree: **BACHELOR**
Higher education area: **TECHNICAL SCIENCES**
Professional trend: **MACHINE ENGINEERING**
Professional qualification: **MACHINE ENGINEER**
Form of training: **FULL-TIME**
Duration of training: **8 (EIGHTH) SEMESTERS**

№	SUBJECTS TAUGHT	FORMS OF ASSESSMENT	COURSE-WORK	WORKLOAD IN NUMBER OF ACADEMIC HOURS				WEEKLY DISTRIBUTION	TYPE OF SUBJECT	ECTS CREDITS
				LECT-URES	LECT-URES	LABORATORY CLASS-ES	TOTAL	L + SC + LC		
1	2	3	4	5	6	7	8	9	10	11
	<i>First Semester</i>									
1.	Calculus, part 1	E		30	30	0	60	2+2+0	C	5/2.3
2.	Informatics	E	CW	30	0	30	60	2+0+2	C	6/2.3
3.	Chemistry	E		30	0	15	45	2+0+1	C	4/1.7
4.	Engineering Graphics I		CA CW	15	0	30	45	1+0+2	C	5/1.7
5.	Materials Science	E		30	0	30	60	2+0+2	C	6/2.3
6.	Placement			0	0	30	30	0+0+2	C	1/1
7.	Foreign Language /English, German and Russian			0	30	0	30	0+2+0	E	3/1.1
8.	Physical Education			0	(30)	0	(30)	(0+2+0)	E	(3/1.1)
	<i>First year, first semester</i>	<i>4 E 1CA</i>	<i>2 CW</i>	<i>135</i>	<i>60</i>	<i>135</i>	<i>330</i>	<i>9+4+9=22</i>		<i>30/12.4</i>

1	2	3	4	5	6	7	8	9	10	11
Second Semester										
9.	Calculus, part 2	E		30	30	0	60	2+2+0	C	5/2.3
10.	Physics	E		30	0	30	60	2+0+2	C	5/2.3
11.	Mechanics, part 1	E	CW	30	30	0	60	2+2+0	C	6/2.3
12.	Technology of Engineering Materials	E		30	0	30	60	2+0+2	C	6/2.3
13.	Engineering Graphics II		CA CW	0	0	30	30	0+0+2	C	4/1.1
14.	Placement			0	0	30	30	0+0+2	C	1/1
15.	Foreign Language /English, German and Russian		CA	0	30	0	30	0+2+0	E	3/1.1
16.	Physical Education			0	(30)	0	(30)	(0+2+0)	E	(3/1.1)
First year, second semester		4 E	2 CA	2 CW	120	90	120	330	8+6+8=22	
Third Semester										
17.	Calculus, part 3	E		30	30	0	60	2+2+0	C	5/2.3
18.	Mechanics, part 2		CA CW	30	0	30	60	2+0+2	C	5/2.3
19.	Strength of Materials	E		30	15	15	60	2+1+1	C	6/2.3
20.	Fluid Mechanics	E		30	0	30	60	2+0+2	C	5/2.3
21.	Thermodynamics, part 1	E		30	0	30	60	2+0+2	C	5/2.3
22.1	Projects Management		CA	30	15	0	45	2+1+0	E	4/1.7
22.2	Industrial Marketing		CA	30	15	0	45	2+1+0	E	4/1.7
23.	Physical Education			0	(30)	0	(30)	(0+2+0)	E	(3/1.1)
24.	Foreign Language - specialized course		CA	0	60	0	60	0+4+0	O	5/2.3
Second year, third semester		4 E	2 CA	2 CW	180	60	105	345	12+4+7=23	
Fourth Semester										
25.	Electrical Engineering and Electronics		CA	30	0	15	45	2+0+1	C	4/1.7
26.	Quality Management Systems		CA	30	15	0	45	2+1+0	C	5/1.7
27.	Metrology	E		30	0	30	60	2+0+2	C	5/2.3
28.	Heat and Mass Transfer	E		30	0	30	60	2+0+2	C	5/2.3
29.	Machine Elements	E	CW	30	0	30	60	2+0+2	C	6/2.3
30.	CAD Systems	E		30	0	30	60	2+0+2	C	5/2.3
31.	Physical Education			0	(30)	0	(30)	(0+2+0)	E	(3/1.1)
32.	Work Placement, part 1			0	0	0	(120)		C	(4/0)
Second year, fourth semester		4 E	2 CA	1 CW	180	15	135	330	12+1+9=22	
Fifth Semester										
33.	Thermodynamics, part 2		CA	45	15	15	75	3+1+1	C	6/2.8
34.	Heat Exchangers	E		30	0	30	60	2+0+2	C	5/2.3
35.	Pumps, Compressors and Fans	E		45	0	30	75	3+0+2	C	7/2.8
36.	Measurement of Hydro-Pneumatic and Thermal Quantities	E		30	0	30	60	2+0+2	C	5/2.3

1	2	3	4	5	6	7	8	9	10	11
37.	Applied Hydro-and Gas Dynamics	E		30	15	15	60	2+1+1	C	5/2.3
38.	Heat Exchangers - Project		CA						C	2/0
39.	Physical Education			0	(30)	0	(30)	(0+2+0)	O	(3/1.1)
	Third year, fifth semester	4 E	2 CA	180	30	120	330	12+2+8=22		30/12.5
	Sixth Semester									
40.	Energy Performance of Buildings	E		30	0	30	60	2+0+2	C	5/2.3
41.	Heating Equipment	E		45	15	15	75	3+1+1	C	6/2.8
42.	Heat and Gas Supply	E		30	15	15	60	2+1+1	C	5/2.3
43.	Refrigeration Engineering	E		45	0	30	75	3+0+2	C	6/2.8
44.	Heating Equipment - Project		CA						C	2/0
45.	Industrial Ventilation and Dust Cleaning		CA	45	0	15	60	3+0+1	C	6/2.3
46.	Physical Education			0	(30)	0	(30)	(0+2+0)	O	(3/1.1)
47.	Manufacture Practice, part 2			0	0	0	(120)		C	(4/0)
	Third year, sixth semester	4 E	2CA	195	30	105	330	13+2+7=22		30/12.5
	Seventh Semester									
48.	Control System Engineering	E		45	0	30	75	3+0+2	C	7/2.8
49.1	Hydro and Pneumatic Power Transition		CA	30	0	15	45	2+0+1	E	4/1.7
49.2	Hydro and Pneumatic Conveying Systems		CA	30	0	15	45	2+0+1	E	4/1.7
50.	Combustion and Combustion Equipment	E		30	15	15	60	2+1+1	C	5/2.3
51.	Air Conditioning	E		45	15	15	75	3+1+1	C	7/2.8
52.	Air Conditioning– Project		CA						C	2/0
53.	Electric Drives and Equipment	E		30	0	30	60	2+0+2	C	5/2.3
54.	Physical Education			0	(60)	0	(60)	(0+4+0)	O	(5/2.3)
	Fourth year, seventh semester	4 E	2 CA	180	30	105	315	12+2+7=21		30/11.9
	Eighth Semester									
55.1	Heat and Mass Transfer Equipment	E		40	0	30	70	4+0+3	E	5/2.3
55.2	Drying Equipment	E		40	0	30	70	4+0+3	E	5/2.3
56.1	Gas Equipment	E		30	0	30	60	3+0+3	E	4/2
56.2	Industrial and Domestic Gas Equipment	E		30	0	30	60	3+0+3	E	4/2
57.	Safety Engineering		CA	20	0	10	30	2+0+1	C	2/1
58.	Renewable Energy Sources	E		40	0	30	70	4+0+3	C	5/2.3
59.	Graduation Practice									4/0
60.	Graduation Thesis									10/0
	Fourth year, eighth semester	3 E	1CA	130	0	100	230	13+0+10=23		30/7.6
	Total for the entire course of study	31 E	14 CA	7CW	1300	315	925	2540		240/95.1

ABBREVIATIONS USED

C – compulsory subjects according to the curriculum

E – elective subjects

O – optional subjects

SUBJECTS		WORKLOAD	
Type	Number	Hours	%
C	46	2260	89
E	10	280	11
TOTAL:	56	2540	100
O	4	180	

Endorsed with Faculty Board resolution, Record No 5 dated 15.05.2012.

Updated with Faculty Board resolution, Records № 3 dated 23.04.2014 and № 1 dated 28.01.2015

Department Chair /s/

Dean /s/