Benha University Benha Faculty of Engineering

Electromechanical Engineering Program











Benha University - Benha Faculty of Engineering







2023-2024

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1. Faculty Mission Vs. Program Mission Matrix

To judge the compatibility of faculty mission with the program mission, the following matrix is used:

			Program Mission	
				o graduate engineers with an up with the rapid developing
Food	ty Mission	trends, and providing research		
racui	ty Wission	Program is committed to		
		graduate engineers with an outstanding knowledge and		Providing research to serve society and community
		specialized skills	rapid developing trends	society and community
Benha Faculty of Engineering	Benha Faculty of Engineering -			
- Benha University is	Benha University is committed			
committed to graduate well prepared engineers equipped	to graduate well prepared engineers equipped with	*		
with knowledge and skills	knowledge and skills necessary			
necessary to compete in labor	to compete in labor market			
market, and capable of using	Capable of using and developing		*	
and developing modern	modern technology			
technology, and providing research in engineering fields	Providing research in			
to serve society and	engineering fields to serve			*
community.	society and community			

2. <u>Program Mission Vs. Program Objectives Matrix</u>

To judge the compatibility of program objectives with its mission, the following matrix is used:

Duogs	om Mission			Program	n Objec	tives	
Frogr	ram Mission	PO1	PO2	PO3	PO4	PO5	PO6
Electromechanical Engineering Program is	Program is committed to graduate engineers with	*				*	*
committed to graduate engineers with an	an outstanding knowledge and specialized skills	•				•	•
outstanding knowledge, keeping up with the	Keeping up with the rapid developing trends		*	*	*	*	*
rapid developing trends, and providing research to serve society and the community.	Providing research to serve society and community.				*		*

3. Program Competencies Vs. (NARS 2018) CBE Matrix

To judge the compatibility of program competencies and the CBE (NARS 2018), the following matrix is used:

							(N.	ARS 2	2018)	CBE M	latrix							
Program Competences					A - L	evel						Mech	anical			Elec	trical	
1 Togram competences	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	В3	B4	B2	В3	B4	B5
A 1	*																	
A 2		*																
A 3			*															
A 4				*														
A 5					*													
A 6						*												
A 7							*											
A 8								*										
A 9									*									
A 10										*								
B 1											*							
B 2												*						
В 3													*					
B 4														*				
D1															*			
D 2																*		
D 3																	*	
D 4																		*

4. Program Learning Outcomes Vs. (NARS 2018) CBE Matrix

							(NA	RS 20)18) (CBE M	latrix							
Program Learning Outcomes				A	- Le	vel]	Mech	anica	al		Elec	trical	l
1 Togram Learning Outcomes	A1	A 2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	В3	B4	B2	В3	B4	B5
PLO 1	*																	
PLO 2		*																
PLO 3			*															
PLO 4				*														
PLO 5					*													
PLO 6						*												
PLO 7							*											
PLO 8								*										
PLO 9									*									
PLO 10										*								
PLO 11											*							
PLO 12												*						
PLO 13													*					
PLO 14														*				
PLO 15															*			
PLO 16																*		
PLO 17																	*	
PLO 18																		*

5. ARS of Program Vs. B-Level Electrical (NARS 2018) Matrix

		B-L	evel Electrica	al (NARS 2	018) (CBF	E)
		B1	B2	В3	B4	B5
	D1		*			
ARS of	D2			*		
Program	D3				*	
	D4					*

6. Program Learning Outcomes Vs. Program Competencies

To judge the compatibility of program competencies and its learning outcomes, the following matrix is used:

							P	rogra	am C	ompet	encies	S						
				A	1 – Le	evel						B-L	evel			D-L	evel	
Program Learning Outcomes	A1	A2	A3	A4	A 5	A6	A7	A8	A9	A10	B1	B2	В3	B4	D1	D2	D3	D4
PLO 1	*																	
PLO 2		*																
PLO 3			*															
PLO 4				*														
PLO 5					*													
PLO 6						*												
PLO 7							*											
PLO 8								*										
PLO 9									*									
PLO 10										*								
PLO 11											*							
PLO 12												*						
PLO 13													*					
PLO 14														*				
PLO 15															*			
PLO 16																*		
PLO 17																	*	
PLO 18																		*

7. Program Mission Vs. (NARS 2018) CBE Matrix

To judge the compatibility of program mission with its competencies, the following matrix is used:

Риссиом	Mission							J	Progr	am C	Compet	tencie	es						
Program 1	WIISSIOII	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	В3	B4	D1	D2	D3	D4
Electromechanical Engineering Program is committed to graduate engineers with an outstanding knowledge, keeping up with the rapid	Program is committed to graduate engineers with an outstanding knowledge and specialized skills	*	*	*	*		*	*	*	*		*	*	*	*	*	*	*	*
developing trends, and providing research to serve	Keeping up with the rapid developing trends	*	*	*	*	*				*	*	*	*	*	*	*	*	*	*
society and the community.	Providing research to serve society and community.	*	*			*	*		*		*	*	*	*		*			*

8. Program Objectives Vs. Program Competencies Matrix

To judge the compatibility of program objectives with its competencies, the following matrix is used:

Dunguam Ohioatiyaa								Progr	am Co	mpete	ncies							
Program Objectives	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	В3	B4	D 1	D2	D3	D4
PO1	*	*							*		*	*	*	*	*	*	*	
PO2			*				*											
PO3							*	*	*		*	*		*				
PO4					*			*		*			*		*			
PO5			*	*			*	*	*			*				*	*	*
PO6	*	*				*					*	*	*		*			*

9. Program Objectives Vs. Graduate Attributes Matrix

To judge the compatibility of program objectives with its graduate attributes, the following matrix is used:

Program						(Graduat	e Attrib	utes					
Program Objectives	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12	GA13	GA14
PO1	*	*									*			
PO2			*		*	*							*	
PO3				*						*				
PO4								*	*					
PO5							*				*	*		*
PO6							*					*		*

10. Graduate Competencies Vs. Graduate Attributes

To judge the compatibility of program graduate attributes with its competencies, the following matrix is used:

						G	Fraduat	e Attrib	utes					
Program Competencies	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12	GA13	GA14
A1	*	*									*			*
A2		*												*
A3			*		*	*						*		
A4						*	*						*	
A5								*					*	
A6				*										
A7				*										
A8									*			*		
A9										*				
A10	_							*		_		*		_
B1												*		*
B2											*	*		*

						G	raduat	e Attrib	utes					
Program Competencies	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12	GA13	GA14
В3													*	
B4													*	
D1														*
D2											*	*		*
D3											*	*		
D4													*	

11. Graduate Attributes Vs. Requirements Matrix

	Key '	Words of	Requiren	nents
Graduate Attributes	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
GA1. Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.		√	√	
GA2. Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.			$\sqrt{}$	V
GA3. Behave professionally and adhere to engineering ethics and standards.		$\sqrt{}$		
GA4. Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.		√		

	Key	Words of	Require	nents
Graduate Attributes	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
GA5. Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.				√
GA6. Value the importance of the environment, both physical and natural, and work to promote sustainability principles.	V			
GA7. Use techniques, skills, and modern engineering tools necessary for engineering practice.		√	V	
GA8. Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.	√			
GA9. Communicate effectively using different modes, tools, and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.	√			
GA10. Demonstrate leadership qualities, business administration and entrepreneurial skills.	V			
GA11. Communicate effectively with experience to the use of computer applications in various electromechanical engineering disciplines.				V
GA12. Produce a design system that satisfies a given specification in electromechanical system.				√
GA13. Evaluate the sustainability and environmental issues related to electromechanical systems.				$\sqrt{}$
GA14. Solve problems in the areas of integrated mechanics, electronics, computers, and software systems, and analyze and investigate the inter-disciplinary characteristics of mechanical, electrical, and hydraulic systems.				V

12. Program Objectives Vs. Requirements Matrix

Program Objectives	Key V	Key Words of Requirements						
Program Objectives	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements				
PO1. Apply a wide spectrum of engineering knowledge, science and specialized skills with analytic, critical and systemic thinking to identify and solve engineering problems in real life situation.		V						
PO2. Behave professionally and adhere to engineering ethics and standards and work to develop the profession and the community and promote sustainability principles.		√	V					
PO3. Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.				$\sqrt{}$				
PO4. Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields	√							
PO5. Solve problems in the areas of integrated mechanics, electronics, computers, and software systems.			V	$\sqrt{}$				
PO6. Capable of analyzing and investigating the inter-disciplinary characteristics of mechanical, electrical, and hydraulic systems.				√				

13. Program Objectives Vs. Subject Area

			Key W	ords of Subj	ect Area		
Program Objectives	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary (Institution character- identifying) subject
PO1. Apply a wide spectrum of engineering knowledge, science and specialized skills with analytic, critical and systemic thinking to identify and solve engineering problems in real life situation.	$\sqrt{}$	V		$\sqrt{}$		V	
PO2. Behave professionally and adhere to engineering ethics and standards and work to develop the profession and the community and promote sustainability principles.	V			V			V
PO3. Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.			V		V		V
PO4. Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields	√	V	V			V	
PO5. Solve problems in the areas of integrated mechanics, electronics, computers, and software systems.				V		V	V

			Key W	ords of Subj	ect Area		
Program Objectives	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary (Institution character- identifying) subject
PO6. Capable of analyzing and investigating the inter-disciplinary characteristics of mechanical, electrical, and hydraulic systems.				V		\checkmark	V

14. Graduates Attributes Vs. Subject Area

			Key Wor	ds of Subjec	t Area		
Graduate Attributes	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary (Institution character- identifying) subject
GA1. Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.	V	V		~			
GA2. Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.				V		V	V
GA3. Behave professionally and adhere to engineering ethics and standards.	$\sqrt{}$		$\sqrt{}$				√
GA4. Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.			V		V		V

			Key Wor	ds of Subjec	t Area		
Graduate Attributes	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary (Institution character- identifying) subject
GA5. Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.		V	V			√	
GA6. Value the importance of the environment, both physical and natural, and work to promote sustainability principles.	V	V	V				
GA7. Use techniques, skills, and modern engineering tools necessary for engineering practice.					V		√
GA8. Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in postgraduate and research studies.	V	V	V				
GA9. Communicate effectively using different modes, tools, and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.	V		V		V		
GA10. Demonstrate leadership qualities, business administration and entrepreneurial skills.				√	V		
GA11. Communicate effectively with experience to the use of computer applications in various electromechanical engineering disciplines.					V		√
GA12. Produce a design system that satisfies a given specification in electromechanical system.				V		V	V
GA13. Evaluate the sustainability and environmental issues related to electromechanical systems.			V	V			√

			Key Wor	ds of Subject	t Area		
Graduate Attributes	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary (Institution character- identifying) subject
GA14. Solve problems in the areas of integrated mechanics, electronics, computers, and software systems, and analyze and investigate the inter-disciplinary characteristics of mechanical, electrical, and hydraulic systems.				V	V		V

15. Subject Area

15.1 Table of % of Subject Area

	Program Tota	al Credit Hours	NARS
Subject Area	Cr.Hrs. of Five Levels	% Cr.Hrs. of Five Levels	Requirements
Humanities and Social Sciences (Univ. Req.)	18	10.11	9-12%
Mathematics and Basic Sciences	36	20.22	20-26%
Basic Engineering Sciences (Faculty/Spec. Req.)	39	21.91	20-23%
Applied Engineering and Design	39	21.91	20-22%
Computer Applications and ICT	15	9	9-11%
Projects and Practice	18	10.11	8-10%
Discretionary (Institution character-identifying) subjects	12	6.74	6-8%
Total	177	100	100%

15.2 Program Courses Vs. Subject Area

			Courses		We	ekly (Conta	ict Ho	ours	Credit Hours of Subject Area						
Year	Term	Code	Course Title	Prerequisites	Cr. Hrs.	Lect.	Tut.	Lab.	Total	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
		FRB101	Mathematics I		3	2	2	0	4		3					
	ш	FRB103	Mechanics I	•••••	3	2	2	0	4		3					
	1st Term	FRB105	General Chemistry		3	2	1	2	5		3					
	lst [FRB107	Physics I	•••••	3	2	2	2	6		3					
	, ,	FRM109	Engineering Graphics		4	2	4	1	7			4				
ear		HS101	English language	•••••	2	2	0	0	2	2						
First Year		FRB102	Mathematics II	FRB101	3	2	2	2	6		3					
Ē		FRB104	Mechanics II	FRB103	3	2	2	0	4		3					
	2nd Term	FRM106	Production Engineering	•••••	3	2	0	3	5			3				
	2nc	FRB108	Physics II	FRB107	3	2	2	2	6		3					
		FRE110	Computer Programming		3	2	0	3	5		3					
		HS102	Human Rights	• • • • •	2	2	0	0	2	2						
	u	FRB201	Mathematics III	FRB102	3	2	2	0	4		3					
p	1st Term	EMM201	Computer Aided Drafting (CAD)	FRM109	3	2	0	3	5					3		

			Courses		We	ekly (Conta	ct Ho	ours		Cred	it Hour	s of Su	bject A	rea	
Year	Term	Code	Course Title	Prerequisites	Cr. Hrs.	Lect.	Tut.	Lab.	Total	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
		EMM203	Fluid Mechanics I	FRB104	3	2	1	1	4			3				
		EMM205	Mechanics of Machinery	FRB104	3	2	1	1	4			3				
		EME207	Electric Circuits I	FRB108	3	2	1	1	4			3				
		EMM209	Measurements and Instrumentation	FRB108	3	2	1	2	5				3			
		HS201	Technical Writing		2	2	0	0	2	2						
		FRB202	Math IV	FRB201	3	2	2	0	4		3					
		EMM202	Strength and properties of Materials	FRB104	3	2	1	1	4			3				
	2nd Term	EME204	Logic Circuits and Micro processors	EME207	3	2	1	1	4			3				
	pu;	EMM206	Thermodynamics I	FRB107	3	2	1	1	4			3				
	7	EME208	Electric Circuits II	EME207	3	2	1	1	4			3				
		EMM210	Manufacture Technology	FRM106	3	2	2	1	5				3			
		HS202	Engineering Economics		2	2	0	0	2	2						
.		FRB301	Numerical Methods	FRB201	3	2	2	0	4		3					
Yea	Term	EMM301	Fluid Mechanics II	EMM203	3	2	2	1	5			3				
Third Year	t Te	EMM303	Projects Management		2	2	0	0	4			2				
Thi	1st	EMM305	Heat Transfer	EMM206	3	2	2	1	5			3				
_		EME307	Electrical Power Systems	EME208	3	2	2	1	5				3			

			Courses		We	ekly (Conta	ct Ho	ours		Cred	it Hour	rs of Su	bject A	rea	
Year	Term	Code	Course Title	Prerequisites	Cr. Hrs.	Lect.	Tut.	Lab.	Total	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
		EMM309	Design of Machine Elements	FRM109, EMM202	3	2	2	0	4				3			
		FRB302	Probabilities & Statistics	FRB201	3	2	2	0	4		3					
		EMM302	Thermodynamics II	EMM206	3	2	2	1	5			3				
	2nd Term	EMM304	Vibrations and System Dynamics	EMM205	3	2	2	1	5				3			
	2nd	EME306	Electronic Devices and Circuits	EME208	3	2	2	1	5				3			
		EMM308	Solid Mechanics	FRB103	3	2	2	1	5				3			
		HS3XX	Humanities-Elective 1	••••	2	2	0	0	2	2						
		EMM401	Refrigeration	EMM302	3	2	2	1	5				3			
		EMM403	Fluid Machinery	EMM301	3	2	2	1	5				3			
	m.	EME405	Automatic Control	EMM304	3	2	2	1	5					3		
ear	Теі	EMM407	Plumbing Systems	EMM301	3	2	2	1	5						3	
Fourth Year	1st Term	EME409	Electric Power Distribution Systems I	EME307	3	2	2	1	5						3	
Fou		HS401	Legislation & Engineering Ethics		2	2	0	0	2	2						
	n n	EMM402	Air Conditioning Systems	EMM302	3	2	2	1	5				3			
	2nd Term	EME404	Low Current Distribution Systems	EME208	3	2	2	1	5					3		

			Courses		We	ekly (Conta	ct Ho	ours		Cred	it Hour	s of Su	bject A	rea	
Year	Term	Code	Course Title	Prerequisites	Cr. Hrs.	Lect.	Tut.	Lab.	Total	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
		EMM406	Fire Fighting Systems	EMM301	3	2	2	1	5						3	
		EME410	Electric Power Distribution Systems II	EME409	3	2	2	1	5						3	
		EMM408	Combustion and Engines	EMM302	3	2	2	1	5				3			
		HS4XX	Humanities – Elective 2	••••	2	2	0	0	2	2						
		EME501	Process Control and Building management System	EME405	3	2	2	1	5					3		
	1st Term	EMM503	Refrigeration and AC Systems/Components	EMM401, EMM402	3	2	2	1	5				3			
	st 1	EMM5XX	Elective I	*	3	2	2	1	5							3
ı	1	EME5XX	Elective II	*	3	2	2	1	5							3
Fifth Year		HS5XX	Humanities –Elective 3	••••	2	2	0	0	2	2						
fth		EM507	Project I	**	3	3	0	1	4						3	
Fi		EME502	Electrical Machines	EME208	3	2	2	1	5				3			
	rm	EME504	Computer Applications in El/Mec System	EMM402, EME409	3	2	2	1	5					3		
	Te	EME5XX	Elective III	*	3	2	2	1	5							3
	2nd Term	EMM5XX	Elective IV	*	3	2	2	1	5							3
	` '	HS5XX	Humanities –Elective 4	•••••	2	2	0	0	2	2						
		EM508	Project II	**	3	3	0	1	4						3	

			Courses		We	eekly (Conta	ct Ho	ours		Cred	it Hou	rs of Su	bject A	rea	
Year	Term	Code	Course Title	Prerequisites	Cr. Hrs.	Lect.	Tut.	Lab.	Total	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
	FT	FT 103	Field Training I	***												
	ГІ	FT 203	Field Training II	***												
			Total hours of fiv	ve years						18	36	39	39	15	18	12
			% Hours of five	years						10.1 1	20.22	21.9 1	21.91	9	10.1 1	6.7 4
			Reference Ratio fro	om NARS						9-12%	20-26%	20-23%	20-22%	9-11%	8-10%	6-8%

^{**} The student can register for the Project I and Project II courses after passing 125 hr, as well as passing FT103 and FT203.

^{***} Completion of 120 Credit Hours

16. Program Courses Vs. Requirements

16.1 Compulsory Courses Vs. Requirements

			Courses	20	V	Veekly	Conta	ct Hou	rs		Credit H Requir		f
Year	Term	Code	Course Title	Prerequisites	Cr. Hrs.	Lect.	Tut.	Lab.	Total	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirement
		FRB101	Mathematics I		3	2	2	0	4		3		
	В	FRB103	Mechanics I	•••••	3	2	2	0	4		3		
	st Term	FRB105	General Chemistry		3	2	1	2	5		3		
	st]	FRB107	Physics I		3	2	2	2	6		3		
ar	1	FRM109	Engineering Graphics	••••	4	2	4	1	7		4		
Yea		HS101	English language	•••••	2	2	0	0	2	2			
First Year		FRB102	Mathematics II	FRB101	3	2	2	2	6		3		
臣	я	FRB104	Mechanics II	FRB103	3	2	2	0	4		3		
	2nd Term	FRM106	Production Engineering	•••••	3	2	0	3	5		3		
	ld J	FRB108	Physics II	FRB107	3	2	2	2	6		3		
	21	FRE110	Computer Programming	•••••	3	2	0	3	5		3		
		HS102	Human Rights		2	2	0	0	2	2			
ır		FRB201	Mathematics III	FRB102	3	2	2	0	4		3		
Yea	Œ	EMM201	Computer Aided Drafting (CAD)	FRM109	3	2	0	3	5			3	
nd ,	Term	EMM203	Fluid Mechanics I	FRB104	3	2	1	1	4			3	
Second Year	1st	EMM205	Mechanics of Machinery	FRB104	3	2	1	1	4			3	
Š		EME207	Electric Circuits I	FRB108	3	2	1	1	4			3	

			Courses	70	V	Veekly	Conta	ct Hou	rs	(Credit I Requir	Hours of ements	f
Year	Term	Code	Course Title	Prerequisites	Cr. Hrs.	Lect.	Tut.	Lab.	Total	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirement
		EMM209	Measurements and Instrumentation	FRB108	3	2	1	2	5			3	
		HS201	Technical Writing	•••••	2	2	0	0	2	2			
		FRB202	Math IV	FRB201	3	2	2	0	4		3		
		EMM202	Strength and properties of Materials	FRB104	3	2	1	1	4			3	
	2nd Term	EME204	Logic Circuits and Micro processors	EME207	3	2	1	1	4			3	
	pu	EMM206	Thermodynamics I	FRB107	3	2	1	1	4			3	
	2	EME208	Electric Circuits II	EME207	3	2	1	1	4			3	
		EMM210	Manufacture Technology	FRM106	3	2	2	1	5			3	
		HS202	Engineering Economics		2	2	0	0	2	2			
		FRB301	Numerical Method	FRB201	3	2	2	0	4		3		
		EMM301	Fluid Mechanics II	EMM203	3	2	2	1	5			3	
	1st Term	EMM303	Projects Management		2	2	0	0	4			2	
ear	t Te	EMM305	Heat Transfer	EMM206	3	2	2	1	5			3	
d Y	1s	EME307	Electrical Power Systems	EME208	3	2	2	1	5			3	
Third Year		EMM309	Design of Machine Elements	FRM109, EMM202	3	2	2	0	4			3	
	_ u	FRB302	Probabilities & Statistics	FRB201	3	2	2	0	4		3		
	2nd Term	EMM302	Thermodynamics II	EMM206	3	2	2	1	5			3	
	L	EMM304	Vibrations and System Dynamics	EMM205	3	2	2	1	5			3	

			Courses	100	V	Veekly	Conta	ct Hou	rs		Credit I Requir	Hours of ements	f
Year	Term	Code	Course Title	Prerequisites	Cr. Hrs.	Lect.	Tut.	Lab.	Total	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirement
		EME306	Electronic Devices and Circuits	EME208	3	2	2	1	5			3	
		EMM308	Solid Mechanics	FRB103	3	2	2	1	5			3	
		HS3XX	Humanities-Elective 1	••••	2	2	0	0	2	2			
		EMM401	Refrigeration	EMM302	3	2	2	1	5				3
		EMM403	Fluid Machinery	EMM301	3	2	2	1	5				3
	ırm	EME405	Automatic Control	EMM304	3	2	2	1	5			3	
	1st Term	EMM407	Plumbing Systems	EMM301	3	2	2	1	5				3
ar	1s.	EME409	Electric Power Distribution Systems I	EME307	3	2	2	1	5				3
1 Xe		HS401	Legislation & Engineering Ethics		2	2	0	0	2	2			
Fourth Year		EMM402	Air Conditioning Systems	EMM302	3	2	2	1	5				3
For	_	EME404	Low Current Distribution Systems	EME208	3	2	2	1	5				3
	erm	EMM406	Fire Fighting Systems	EMM301	3	2	2	1	5				3
	2nd Term	EME410	Electric Power Distribution Systems II	EME409	3	2	2	1	5				3
	` '	EMM408	Combustion and Engines	EMM302	3	2	2	1	5			3	
		HS4XX	Humanities – Elective 2	••••	2	2	0	0	2	2			
Year	erm	EME501	Process Control and Building management System	EME405	3	2	2	1	5				3
Fifth Year	1st Term	EMM503	Refrigeration and AC Systems/Components	EMM401, EMM402	3	2	2	1	5				3
		EMM5XX	Elective 1	*	3	2	2	1	5				3

			Courses	50	V	Veekly	Conta	ct Hou	ırs			Hours of ements	f
Year	Term	Code	Course Title	Prerequisites	Cr. Hrs.	Lect.	Tut.	Lab.	Total	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirement
		EME5XX	Elective 2	*	3	2	2	1	5				3
		HS5XX	Humanities – Elective 3	••••	2	2	0	0	2	2			
		EM507	Project I	**	3	3	0	1	4				3
		EME502	Electrical Machines	EME208	3	2	2	1	5			3	
	u.	EME504	Computer Applications in El/Mec System	EMM402, EME409	3	2	2	1	5				3
	Term	EME5XX	Elective III	*	3	2	2	1	5				3
	2nd	EMM5XX	Elective IV	*	3	2	2	1	5				3
	7	HS5XX	Humanities –Elective 4	•••••	2	2	0	0	2	2			
		EM508	Project II	**	3	3	0	1	4				3
_	Y	FT 103	Field Training I	***			•				<u> </u>		
F	T	FT 203	Field Training II	***									
			Total hours of five	e years						18	43	65	51
			% Hours of five							10.17	24.29	36.72	28.81
			Reference Ra							Min 8%	Min 20%	Min 35%	Max 30%
	** [The student ca	an register for the Project I and Pro					hr, as w	ell as pa	assing F	T103 an	d FT203	3.
			*** Cor	npletion of 1	20 Cre	dit Hou	ırs						

16.2 Elective Courses Vs. Requirements

			Courses		Wee	ekly (Conta	ct H	ours			Hour reme	
Lev	el	Code	Course Title	Pr. Req.	Cr.Hrs	Lect.	Lab.	Tut.	Total	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
ve e I		EMM505	Renewable Energy	EMM206	3	2	1	2	5				3
Elective Course I	Five	EMM507	Elevators and Escalators		3	2	1	2	5				3
国 ご		EMM509	Solar Thermal and PV systems	EMM305	3	2	1	2	5				3
ve B II		EME511	Advanced Industrial Electronics	EME306	3	2	1	2	5				3
Elective Course II	Five	EME513	Communications Engineering	EME404	3	2	1	2	5				3
E C		EME515	Electrostatic and Electromagnetic Fields	EME208	3	2	1	2	5				
'e III		EME506	Electro-hydraulic circuits	EMM501	3	2	1	2	5				3
Elective Course III	Five	EME508	Codes and Specification of Electromechanical Systems		3	2	1	2	5				3
J		EME510	Computer Network		3	2	1	2	5				3
ve IV		EMM512	Cold Stores and Industrial Refrigeration	EMM401	3	2	1	2	5				3
Elective Sourse IV	Five	EMM514	Automotive Engineering	EMM408	3	2	1	2	5				3
Elective Course IV	F	EMM516	Thermal power stations	EMM302	3	2	1	2	5				3

17. Program Competencies Vs. Courses

		Compu	ılsory Courses							Pı	rogra	m C	ompet	encie	es						
Ye	ear	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B 1	B2	В3	B4	D1	D2	D3	D4
		FRB101	Mathematics I	1	1																
		FRB103	Mechanics I	1	1																
	1st Term	FRB105	General Chemistry	1	1																
	1st 7	FRB107	Physics I	1	1																
.		FRM109	Engineering Graphics						1		1										
Yea		HS101	English language					1			1		1								
First Year		FRB102	Mathematics II	1	1																
	_	FRB104	Mechanics II	1	1																
	[ern	FRM106	Production Engineering				1		1												
	2nd Term	FRB108	Physics II	1	1																
	7	FRE110	Computer Programming	1	1																
		HS102	Societal Issues					1		1			1								
		FRB201	Mathematics III	1	1																
ar	ı	EMM201	Computer Aided Drafting (CAD)	1			1				1										
d Ye	1st Term	EMM203	Fluid Mechanics I		1									1							
Second Year	1st [EMM205	Mechanics of Machinery	1											1						
Š		EME207	Electric Circuits I	1														1	1		
		EMM209	Measurements and		1												1			1	

		Compu	llsory Courses							P	rogra	m C	ompet	enci	es						
Ye	ear	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B 1	B2	В3	B4	D1	D2	D3	D4
			Instrumentation																		
		HS201	Technical Writing								1	1									
		FRB202	Math IV	1	1																
		EMM202	Strength and properties of Materials		1									1							
	2nd Term	EME204	Logic Circuits and Microprocessors		1	1												1	1		
	nd T	EMM206	Thermodynamics I	1	1									1							
	2	EME208	Electric Circuits II	1														1	1		
		EMM210	Manufacture Technology											1	1						
		HS202	Engineering Economics	1								1									
		FRB301	Numerical Method	1	1																
	_	EMM301	Fluid Mechanics II											1		1					
	1st Term	EMM303	Projects Management												1						
٤	1st 7	EMM305	Heat Transfer		1									1							
Yea		EME307	Electrical Power Systems															1		1	
Third Year		EMM309	Design of Machine Elements											1	1						
I		FRB302	Probabilities & Statistics	1	1																
	erm	EMM302	Thermodynamics II	1	1									1	1						
	2nd Term	EMM304	Vibrations and System Dynamics											1	1				1		
		EME306	Electronic Devices and	1			27											1	1		

Compulsory Courses							Pı	rogra	ım C	ompet	tenci	es						
Code Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	В3	B4	D1	D2	D3	D4
Circuits																		
MM308 Solid Mechanics											1	1						
S3XX Humanities-Elective 1				1	1													
MM401 Refrigeration		1									1	1						
MM403 Fluid Machinery	1	1									1		1					
ME405 Automatic Control	1														1		1	
MM407 Plumbing Systems	1	1									1							
ME409 Electric Power Distribution Systems I															1			1
Legislation & Engineering Ethics									1	1								
MM402 Air Conditioning Systems	1	1									1	1						
ME404 Low Current Distribution Systems																	1	1
MM406 Fire Fighting Systems				1								1		1				
MM408 Combustion and Engines	1	1									1							
ME410 Electric Power Distribution Systems II															1			1
S4XX Humanities-Elective 2					1	1			1									
ME501 Process Control and Building Management											1	1				1	1	
MM503 Refrigeration and AC Systems / Components	1	1									1	1						
											1			1	1	1		1
MM5XX Elect	ive I	ive I	ive I	ive I	ive I	ive II	ive II	ive II	ive II	ive II	ive II	ive II	ive II	ive II	ive II	ive II 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ive I 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ive I 1 1 1 1 1 ive II

			Compu	lsory Courses							Pı	rogra	m C	ompet	enci	es						
Y	'ear		Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	В3	B4	D1	D2	D 3	D4
]	HS5XX	Humanities –Elective 3								1	1									
]	EM507	Project I		1	1			1	1			1		1	1	1		1		
		l	EME502	Electrical Machines					1										1			1
	, E]	EME504	Computer Applications in Elec./Mech. Systems											1	1		1				
	Term		EME5XX	Elective III				1							1	1						1
	2nd		EMM5XX	Elective IV											1	1	1					
			HS5XX	Humanities –Elective 4				1				1										
]	EM508	Project II		1	1			1	1			1		1	1	1		1		
	FT]	EMM/E380	Field Training I							1			1		1						
	ГТ]	EMM/E480	Field Training II							1			1		1						

18. Program Competencies Vs. Learning and Teaching Methods

					Pro	ogram	Comp	petenc	ies (Pr	rogram	Learn	ing O	utcom	es)				
Teaching and Learning Methods	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	В3	B4	D1	D2	D3	D4
Lecture	*		*	*		*		*			*	*	*	*	*	*	*	*
Tutorials	*		*	*		*		*			*	*	*	*	*	*	*	*
Computer-based Instruction		*		*								*			*		*	
Problem-based Learning	*			*					*		*	*		*				*
Project-based Learning			*			*	*		*			*		*	*	*		*
Interactive Learning		*					*	*	*	*		*	*					
Presentations		*	*	*	*				*						*	*		
Report					*		*		*	*			*	*				*
Co-operative Learning					*		*									*	*	
Brain Storming				*			*	*	*				*	*				*
Projects			*			*	*	*	*				*	*	*	*	*	*
Discussion	*	*	*					*		*	*		*	*			*	*
Self-Learning					*					*					*	*	*	
Case Study			*	*					*	*			*	*	*	*	*	*
Practical-based Learning		*		*		*	*	*			*					*	*	
Hybrid Learning	*		*	*	*				*	*	*	*	*	*	*	*	*	*

19. Program Competencies Vs. Assessment Methods

	43K (1 1					Pı	ogran	n com	petenc	ies (Pr	rogram	Learn	ing Ou	ıtcome	es)				
ASS	sessment Methods	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	В3	B4	D1	D2	D3	D4
Forma	ative Assessment M	ethod																	
	Oral Test	*	*	*		*	*	*	*	*	*	*							
Tests	Mid-term	*		*	*		*		*			*	*	*	*	*	*	*	*
	Experimental Quizzes		*					*				*					*	*	
	Quizzes		*	*	*		*		*			*	*	*	*	*	*	*	*
Report	S	*	*	*	*	*		*	*	*	*	*			*				*
Observ	ration	*	*		*	*		*	*	*		*							
Discus	sions	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Project	Projects	*	*	*	*	*	*	*	*	*	*	*			*	*	*	*	*
,	Mini Projects	*	*	*		*	*	*	*	*	*	*			*	*	*	*	*
Assign	ments	*	*	*	*		*		*	*		*	*	*	*	*	*	*	*
Present	tations			*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
Summ	native Assessment M	Iethod																	
Practic	al		*		*		*					*	*				*	*	
Oral Ex	xam	*	*	*		*	*	*	*	*	*	*							
Final E	Exam	*		*	*		*		*		*	*	*	*	*	*	*	*	*

20. Assessment Methods Vs. Teaching and Learning Methods

							Tea	ching a	and Le	earning	Meth	ods					
Asses	sment Methods	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Report	Co-operative Learning	Brain Storming	Projects	Discussion	Case Study	Practical-based Learning	Self-Learning	Hybrid Learning
	Oral Test					*		*	*			*	*	*	*	*	*
Tasta	Mid-term	*	*										*				*
Tests	Experimental			*											*		
	Quizzes	*	*										*				*
Reports								*	*				*			*	*
Observation					*		*			*	*						
Discussions		*	*		*	*		*	*		*		*	*			*
Duoisata	Projects				*		*	*	*	*		*	*	*	*	*	*
Projects	Mini Projects				*	*	*	*		*			*	*	*		*
Assignments			*	*	*						-	-	-			-	*
Presentations		*				*		*	*			*		*		*	*
Practical				*											*		
Oral Exam						*		*	*			*	*		*	*	*
Final Exam		*	*										*				*

21. Courses Vs. Teaching and Learning Methods

21.1 <u>Compulsory Courses Vs. Teaching and Learning Methods</u>

		Co	mpulsory Courses					Te	eachi	ng a	nd Le	earni	ng N	Ieth o	ds				
Yo	ear	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Reports	Co-operative Learning	Brain Storming	Projects	Discussion	Self-Learning	Case Study	Practical based learning	Hybrid Learning
		FRB101	Mathematics I	*	*		*												
	_ =	FRB103	Mechanics I	*	*														
]err	FRB105	General Chemistry	*	*		*		*									*	
	1st Term	FRB107	Physics I	*	*													*	
Ħ		FRM109	Engineering Graphics	*	*										*			*	
Yes		HS101	English language	*					*						*	*			
First Year		FRB102	Mathematics II	*	*	*													
室	ш	FRB104	Mechanics II	*	*											_			
	Term	FRM106	Production Engineering	*	*		*				*			*	*				
	2nd	FRB108	Physics II	*	*													*	
	2	FRE110	Computer Programming	*		*									*				
		HS102	Societal Issues	*							*					*			*
pu ;	Te	FRB201	Mathematics III	*	*	*	*								*				

		Con	mpulsory Courses					To	eachi	ng a	nd L	earni	ng N	1eth o	ds				
Ye	ear	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Reports	Co-operative Learning	Brain Storming	Projects	Discussion	Self-Learning	Case Study	Practical based learning	Hybrid Learning
		EMM201	Computer Aided Drafting (CAD)	*		*									*				
		EMM203	Fluid Mechanics I	*	*										*				
		EMM205	Mechanics of Machinery	*	*										*				
		EME207	Electric Circuits I	*	*							*							
		EMM209	Measurements and Instrumentation	*	*		*											*	
		HS201	Technical Writing	*					*										
		FRB202	Math IV	*	*	*	*								*				
		EMM202	Strength and properties of Materials	*	*										*		Ì	*	
	Term	EME204	Logic Circuits and Microprocessors	*	*							*		*					
	I Te	EMM206	Thermodynamics I	*	*										*				
	2nd	EME208	Electric Circuits II	*	*							*							
		EMM210	Manufacture Technology	*	*	*					*			*	*				
		HS202	Engineering Economics	*	*		*	*			*				*				
ar	u	FRB301	Numerical Method	*	*		*												
Third Year	Term	EMM301	Fluid Mechanics II	*	*										*	*			
nird	1st T	EMM303	Projects Management	*											*				
II	1	EMM305	Heat Transfer	*	*										*			_	

		Con	mpulsory Courses					Te	eachi	ng a	nd L	earni	ng N	Ieth o	ds				
Ye	ear	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Reports	Co-operative Learning	Brain Storming	Projects	Discussion	Self-Learning	Case Study	Practical based learning	Hybrid Learning
		EME307	Electrical Power Systems	*	*						*								
		EMM309	Design of Machine Elements	*	*										*				
		FRB302	Probabilities & Statistics	*	*					*					*				
	н	EMM302	Thermodynamics II	*	*										*				
	2nd Term	EMM304	Vibrations and System Dynamics	*	*									*	*				
	l pu	EME306	Electronic Devices and Circuits	*	*														
	2	EMM308	Solid Mechanics	*	*										*			*	
		HS3XX	Humanities-Elective 1					R	efer to	o the	matriz	k after	the r	next o	ne				
		EMM401	Refrigeration	*	*										*				
	п	EMM403	Fluid Machinery	*	*		*								*			*	
1	st Term	EME405	Automatic Control	*	*														
Yea	st 1	EMM407	Plumbing Systems	*	*										*				
th		EME409	Electric Power Distribution Systems I	*	*														
Fourth Year		HS401	Legislation & Engineering Ethics	*					*										
<u> </u>	ırm	EMM402	Air Conditioning Systems	*	*										*				
	2nd Term	EME404	Low Current Distribution Systems	*	*														
	2nc	EMM406	Fire Fighting Systems	*	*					*					*				

		Con	mpulsory Courses	Refer to the matrix after the next one * * * * * * * * * * * * * * * * * * *															
Ye	ear	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Reports	Co-operative Learning	Brain Storming	Projects	Discussion	Self-Learning	Case Study	Practical based learning	Hybrid Learning
		EMM408	Electric Power Distribution Systems * *																
		EME410 Electric Power Distribution Systems * *																	
		HS4XX	Humanities-Elective 2					R	efer t	o the	matriz	k aftei	r the r	next o	ne				
		EME501	Process Control and Building Management	*	*		*	*			*								
	ım	EMM503	Refrigeration and AC Systems / Components	*	*										*				
	1st Term	EM507	Project I	*						*					*				
	181	EMM5XX	Elective I						I	Refer	to the	next	matri	X					
ear		EME5XX	Elective II						I	Refer	to the	next	matri	X					
h Y		HS5XX	Humanities-Elective 3					R	efer t	o the	matriz	x after	r the r	next o	ne				
Fifth Year		EME502	Electrical Machines	*	*					*	*	*							
	rm	EME504	Computer Applications in Elec./Mech. Systems	*											*				
	Te	EM508	Project II	*						*					*				
	2nd Term	EMM5XX	Elective III							Refer									
	,	EME5XX	Elective IV							Refer									
		HS5XX	Humanities-Elective 4					R	efer to	o the	matriz	x after	the r	next o	ne				

21.2 Elective Courses Vs. Teaching and Learning Methods

		Elective Courses					Tea	achin	g an	d Lea	rnin	g Me	thod	s				
No.	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Reports	Co-operative Learning	Brain Storming	Projects	Discussion	Self-Learning	Case study	Practical based learning	Hybrid Learning
e 1	EMM505	Renewable Energy	*	*							*							
Elective 1	EMM507	Elevators and Escalators	*	*										*		*		
Ele	EMM509	Solar Thermal and PV systems	*	*							*							
2	EME511	Advanced Industrial Electronics	*	*					*		*		*					
tive	EME513	Communications Engineering	*	*			*		*		*							
Elective	EME515	Electrostatic and Electromagnetic Fields	*	*						*							*	
w.	EME506	Electro-hydraulic circuits	*	*										*			*	
Elective	EME508	Codes and Specification of Electromechanical Systems	*	*						*							*	
豆	EME510	Computer Network	*	*		*	*	*									*	
Elective 4	EMM512	Cold Stores and Industrial Refrigeration	*							*						*		
]lect	EMM514	Automotive Engineering	*							*						*		
五	EMM516	Thermal power stations	*							*						*		

21.3 <u>Humanity-Elective Courses Vs. Teaching and Learning Methods</u>

	H	umanity-Elective Courses				Te	each	ing	and	Lea	rniı	ng N	Ieth	ods				
No.	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Report	Co-operative Learning	Brain Storming	Projects	Discussion	Self-Learning	Case Study	Practical-based Learning	Hybrid Learning
ty-	HS302	Human Resource Management	*			*	*			*		*		*				
Humanity- Elective 1	HS304	Strategic Management	*			*				*				*				
[um	HS306	Computer and Society	*						*	*				*				
	HS308	Accounting	*						*	*				*				
Humanity- Elective 2	HS402	Foundations of Marketing	*			*						*		*				*
anit tive	HS404	Introduction to Finance	*			*						*		*				*
nm Zec	HS406	Human Computer Interaction	*			*						*		*				*
H	HS408	Sustainable Development	*						*	*				*				*
- - - - - -	HS501	Specifications and feasibility studies	*				*							*		*		*
Humanity- Elective 3	HS503	Analytical Skills and Critical Thinking	*							*								*
nm Ject	HS505	Communication Laws and Codes	*							*				*				*
H	HS507	Construction Contracts and Law	*											*				*
	HS502	Professional Communication Skills	*											*				*
iity. 7e 4	HS504	Principles of industrial health							*	*								*
Humanity- Elective 4	HS506	Social Risks and Security of Computer Systems	*											*				*
	HS508	Risk Management	*											*				*

22. Courses Vs. Assessment Methods

22.1 <u>Compulsory Courses Vs. Assessment Methods</u>

			Compulsory Courses					As	sessn	nent	Metł	ods					
Ύє	ear	Code	Course Title	Oral Test	Midterm	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini-Projects	Assignments	Presentations	Practical Exam	Oral Exam	Final Exam
		FRB101	Mathematics I		*					*							*
	l ¤	FRB103	Mechanics I		*		*						*				*
	1st Term	FRB105	General Chemistry		*	*			*								*
	st 1	FRB107	Physics I	*	*	*											*
ı.		FRM109	Engineering Graphics		*		*						*				*
Ye		HS101	English language		*			*	*	*							*
First Year		FRB102	Mathematics II		*								*				*
	8	FRB104	Mechanics II		*		*						*				*
	2nd Term	FRM106	Production Engineering		*			*		*		*					*
	nd	FRB108	Physics II	*	*	*											*
	7	FRE110	Computer Programming		*					*					*	*	
		HS102	Societal Issues		*			*						*			*
		FRB201	Mathematics III		*					*			*				*
ear	g	EMM201	Computer Aided Drafting (CAD)		*		*								*	*	
Second Year	st Term	EMM203	Fluid Mechanics I	*	*		*										*
Song	st 1	EMM205	Mechanics of Machinery		*								*				*
Sec	1	EME207	Electric Circuits I		*	*											*
		EMM209	Measurements and Instrumentation	*	*		*										*

			Compulsory Courses					As	sessn	nent	Meth	ods					
Yo	ear	Code	Course Title	Oral Test	Midterm	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini-Projects	Assignments	Presentations	Practical Exam	Oral Exam	Final Exam
		HS201	Technical Writing		*				*								*
		FRB202	Math IV		*					*			*				*
		EMM202	Strength and properties of Materials		*						*		*				*
	ırm	EME204	Logic Circuits and Microprocessors	*	*	*											*
	2nd Term	EMM206	Thermodynamics I		*	*							*				*
	2nd	EME208	Electric Circuits II		*					*							*
		EMM210	Manufacture Technology	*	*		*	*					*				*
		HS202	Engineering Economics		*			*		*				*			*
		FRB301	Numerical Method		*					*							*
	g .	EMM301	Fluid Mechanics II	*	*								*				*
	1st Term	EMM303	Projects Management		*			*					*				*
	st 1	EMM305	Heat Transfer	*	*	*							*				*
ar		EME307	Electrical Power Systems	*	*					*							*
Third Year		EMM309	Design of Machine Elements		*						*		*				*
nird		FRB302	Probabilities & Statistics		*		*			*			*				*
Ī	я	EMM302	Thermodynamics II	*	*								*				*
	Term	EMM304	Vibrations and System Dynamics	*	*								*				*
	2nd 7	EME306	Electronic Devices and Circuits		*		*	*									*
	2	EMM308	Solid Mechanics	*	*	*							*				*
		HS3XX	Humanities-Elective 1				Ref	er to t	he ma	ıtrix a	fter tl	ne nex	kt one				
ar t	1st Term	EMM401	Refrigeration	*	*		*				*						*
) 	Te T	EMM403	Fluid Machinery	*	*	*											*

			Compulsory Courses					As	sessn	nent	Meth	ods					
Ye	ear	Code	Course Title	Oral Test	Midterm	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini-Projects	Assignments	Presentations	Practical Exam	Oral Exam	Final Exam
		EME405	Automatic Control	*	*	*	*										*
		EMM407	Plumbing Systems	*	*		*	*			*						*
		EME409	Electric Power Distribution Systems I	*	*		*										*
		UHS401	Legislation & Engineering Ethics		*												*
		EMM402	Air Conditioning Systems	* * * *												*	
	д	EME404	Low Current Distribution Systems													*	
	[eri	EMM406	Fire Fighting Systems	* * * * * * *												*	
	2nd Term	EMM408	Combustion and Engines	* * * * * * * * * * * * * * * * * * *												*	
	2	EME410	Electric Power Distribution Systems II	* * * * * * *												*	
		HS4XX	Humanities-Elective 2				Ref	er to t	he ma	atrix a	fter tl	he nex	kt one	,			
		EME501	Process Control and Building Management		*	*							*				*
		EMM503	Refrigeration and AC Systems / Components	*	*		*				*						*
	st Term	EM507	Project I					*		*				*		*	
	st 1	EMM5XX	Elective I					Re	fer to	the n	ext m	atrix					
ar		EME5XX	Elective II					Re	fer to	the n	ext m	atrix					
Fifth Year		HS5XX	Humanities-Elective 3				Ref	er to t	he ma	ıtrix a	fter tl	ne nez	kt one				
ifth		EME502	Electrical Machines		*	*		*									*
H	Е	EME504	Computer Applications in Elec./Mech. Systems		*						*						*
	2nd Term	EM508	Project II					*		*				*		*	
	nd	EMM5XX	Elective III						fer to								
	2	EME5XX	Elective IV					Re	fer to	the n	ext m	atrix					
		HS5XX	Humanities-Elective 4				Ref	er to t	he ma	atrix a	fter tl	ne nez	kt one				

22.2 <u>Elective Courses Vs. Assessment Methods</u>

		Elective Courses					As	ssessi	nent	Metl	ods					
No.	Code	Course Title	Oral Test	Midterm	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini-Projects	Assignments	Presentations	Practical Exam	Oral Exam	Final Exam
I	EMM505	Renewable Energy		*					*							*
Elective I	EMM507	Elevators and Escalators		*						*		*				*
Ele	EMM509	Solar Thermal and PV systems		*					*							*
Пе	EME511	Advanced Industrial Electronics	*	*	*											*
Elective	EME513	Communications Engineering	*	*	*						*					*
Ele	EME515	Electrostatic and Electromagnetic Fields		*	*							*				*
Ш	EME506	Electro-hydraulic circuits	*	*		*										*
Elective III	EME508	Codes and Specification of Electromechanical Systems		*	*											*
豆	EME510	Computer Network		*	*				*		*	*				*
N	EMM512	Cold Stores and Industrial Refrigeration	*	*		*	*									*
Elective IV	EMM514	Automotive Engineering	*	*		*	*									*
E	EMM516	Thermal power stations	*	*		*	*									*

22.3 <u>Humanity-Elective Courses Vs. Assessment Methods</u>

Humanity-Elective Courses				Assessment Methods												
No.	Code	Course Title	Oral Test	Midterm	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini-Projects	Assignments	Presentations	Practical Exam	Oral Exam	Final Exam
Humanity- Elective 1	HS302	Human Resource Management		*			*	*	*				*			*
	HS304	Strategic Management		*			*		*				*			*
	HS306	Computer and Society		*			*		*				*			*
H	HS308	Accounting		*			*						*			*
Humanity- Elective 2	HS402	Foundations of Marketing		*			*						*			*
	HS404	Introduction to Finance		*			*						*			*
	HS406	Human Computer Interaction		*			*				*					*
H	HS408	Sustainable Development		*			*		*				*			*
3.	HS501	Specifications and feasibility studies		*			*				*					*
anil	HS503	Analytical Skills and Critical Thinking		*			*									*
Humanity- Elective 3	HS505	Communication Laws and Codes		*			*		*							*
H	HS507	Construction Contracts and Law		*					*							*
Humanity- Elective 4	HS502	Professional Communication Skills		*			*									*
	HS504	Principles of industrial health		*			*									*
	HS506	Social Risks and Security of Computer Systems		*					*							*
田田田	HS508	Risk Management		*					*							*

Coordinator of Program Quality Assurance Committee

Beshoy Abdous

Dr. Beshoy Abdou Aziz Date: 12 / 9 / 2023 Assoc. Prof. Wael Abdel-Rahman Mohamed

Program Coordinator

Date: 12 / 9 / 2023

فريق توصيف البرنامج وتبنى المعايير الأكاديمية لبرنامج الهندسة الكهروميكانيكية (نظام الساعات المعتمدة) بالبرامج المتعددة التخصصات بكلية الهندسة ببنها – جامعة بنها.

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Netizo	عضو	3. د. محمد اسامة محمد حلمي				
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selinare	عضو	5. د. امیر عزیز مصطفی				