Mansoura University
Faculty of Engineering
Production and Mechanical Design Engineering Department

B.Sc. Program Specifications

Contents

Production and Mechanical Design Engineering
B.Sc. Program Specifications

1. Introduction

1.1 Basic Information

Program Title: Production and Mechanical Design Engineering
Program Type: Single
Department: Production and Mechanical Design Engineering
Coordinator: Prof. Hassan Ali Mohammed Soltan
Assistant Coordinator: Dr. Noha Foda Ibrahim Salamah
Date of Program Specification Approval:

1.2 Staff Members

The Production and Mechanical Design Engineering Program is taught by highly qualified staff members, full time employed. **Appendix 1** shows the staff members' names, resume and the subjects taught by each of them.

1.3 Internal Evaluators

The program was evaluated by three external evaluators. Their evaluation showed that the program specification agrees with the National Academic Reference Standards, **Appendix 2**.

1.4 External Evaluators

The program was evaluated by three external evaluators. Their evaluation showed that the program specification agrees with the National Academic Reference Standards, **Appendix 3**.

2. Professional Information

2.1 Preamble

Engineers solve real–life problems. They find the best solutions through the application of their knowledge, experience and skills. Engineers help to define and refine the way of life by providing innovative, higher–performance, safer, cleaner or more comfortable day–use facilities for human beings. They seek improvement through the processes of invention, design, manufacturing and construction. The engineer's problem–solving complexity grows as the world's social and technological problems become more closely related. The engineering study provides the students with the advanced, effective, technology–based education justifying the expectations of the future of science and technology. It should also provide the technical understanding and problem–solving skills which allow coping with the challenges of tomorrow.

Production and Mechanical Design Engineering is a broad discipline that involves the design, control, and continuous improvement of integrated systems in order to provide customers with high–quality goods and services in a timely, cost–effective manner.

A B.Sc. degree in Production and Mechanical Design Engineering is designed for students who seek careers as engineers in industry, army, consulting firms and private and governmental agencies. This degree is also appropriate for students who plan to be researchers or who intend to pursue an advanced degree in engineering. A typical program curriculum incorporates analytical tools, creative thought and diversity of skills as well as the state of art of the profession.

2.2 Program Vision, Mission and Aims

2.2.1 Program Vision

The program will be competitive and acceptable by regional, national, and international communities at industrial and service levels in the field of production and mechanical design.

2.2.2 Program Mission

The program provides education for those students who are able to compete internationally, able to produce creative solutions to the society's needs, conscious to the universal moral values, adherent to the professional ethical code, and to generate and disseminate knowledge and technologies essential to the local and global needs.

2.2.3 Program Objectives

The Production and Mechanical Design Engineering program has several explicit and implicit objectives. The main program objectives are

1. Maintaining a high standard of education through outstanding teaching in the field. That is in addition to innovative curricula, and research training that reflects the changing needs of society.
2. Attracting highly motivated students with enthusiasm, aptitude and interest in the field.
3. Pursuing excellence in research and technology transfer.
4. Recruiting, retaining, and developing the members of the department through tackling the program.
5. Increasing the public awareness of the activities of the field at regional, national and international levels.

2.3 Attributes

The Production and Mechanical Design Engineering program aims at providing future engineers with appropriate theoretical knowledge and technical skills to respond to professional market demands. The following are the aimed graduate attributes

01. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
02. Design a system; component and process to meet the required needs within realistic constraints.
03. Design and conduct experiments as well as analyze and interpret data.
04. Identify, formulate and solve fundamental engineering problems.
05. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
06. Work effectively within multi–disciplinary teams.
07. Communicate effectively.
08. Consider the impacts of engineering solutions on society & environment.
09. Demonstrate knowledge of contemporary engineering issues.
10. Display professional and ethical responsibilities; and contextual understanding
11. Engage in self– and life–long learning.
12. Work with mechanical design and manufacturing systems.
13. Use of mathematics and physical and engineering sciences and systems analysis tools in components and machines and produce design and manufacture.
14. Use different instruments appropriately and carry–out experimental design, automatic data acquisition, data analysis, data reduction and interpretation, and data presentation, both orally and in the written form.

15. Use the computer graphics for design, communication and visualization.
16. Use and/or develop computer software, necessary for the design, manufacturing and management of industrial systems and projects.
17. Analyze multi–disciplinary mechanical, electrical, thermal and hydraulic systems.
18. Lead or supervise a group of designers or technicians and other work force.

2.4 Intended Learning Outcomes (ILO's)

2.4.1 Knowledge and Understanding

The graduates of the Production and Mechanical Design Engineering program should be able to demonstrate the knowledge and understanding of

01. Concepts and theories of mathematics and sciences, appropriate to the discipline.
02. Basics of information and communication technology (ICT).
03. Characteristics of engineering materials related to the discipline.
04. Principles of design including elements design, process and/or a system related to specific disciplines.
05. Methodologies of solving engineering problems, data collection and interpretation.
06. Quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
07. Business and management principles relevant to engineering.
08. Current engineering technologies as related to disciplines.
09. Topics related to humanitarian interests and moral issues.
10. Technical language and report writing.
11. Professional ethics and impacts of engineering solutions on society and environment.
12. Contemporary engineering topics.
13. Concepts, principles and theories relevant to Mechanical Engineering and manufacture.
14. The constraints within which his/her engineering judgment will have to be exercised.
15. The specifications, programming and range of application of CAD and CAD/CAM facilities.
16. Relevant contemporary issues in mechanical engineering.
17. Basic electrical, control and computer engineering subjects related to the discipline.
18. The role of information technology in providing support for mechanical engineers.
19. Engineering design principles and techniques.
20. Management and business techniques and practices appropriate to engineering industry.

2.4.2 Intellectual Skills

The graduates of the Production and Mechanical Design Engineering program should be able to

01. Select appropriate mathematical and computer–based methods for modeling and analyzing problems.
02. Select appropriate solutions for engineering problems based on analytical thinking.
03. Think in a creative and innovative way in problem solving and design.
04. Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.
05. Assess and evaluate the characteristics and performance of components, systems and processes.
06. Investigate the failure of components, systems, and processes.

07. Solve engineering problems, often on the basis of limited and possibly contradicting information.
08. Select and appraise appropriate ICT tools to a variety of engineering problems.
09. Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
10. Incorporate economic, societal, environmental dimensions and risk management in design.
11. Analyze results of numerical models and assess their limitations.
12. Create systematic and methodic approaches when dealing with new and advancing technology.
13. Apply the principles of mathematics, science and technology in problem solving scenarios in mechanical engineering.
14. Analyze and interpret data, and design experiments to obtain primary data.
15. Evaluate and appraise designs, processes and products, and propose improvements.
16. Interpret numerical data and apply analytical methods for engineering design purposes.
17. Use the principles of engineering science in developing solutions to practical mechanical engineering problems.
18. Select appropriate manufacturing method considering design requirements.

2.4.3 Professional and Practical Skills

The graduates of the Production Engineering and Mechanical Design program should be able to

01. Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.
02. Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services.
03. Create and/or re–design a process, component or system, and carry out specialized engineering designs.
04. Practice the neatness and aesthetics in design and approach.
05. Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results.
06. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.
07. Apply numerical modeling methods to engineering problems.
08. Apply safe systems at work and observe the appropriate steps to manage risks.
09. Demonstrate basic organizational and project management skills.
10. Apply quality assurance procedures and follow codes and standards.
11. Exchange knowledge and skills with engineering community and industry.
12. Prepare and present technical reports.
13. Prepare engineering drawings, computer graphics and specialized technical reports and communicate accordingly.
14. Employ the traditional and modern CAD and CAD/CAM facilities in design and production processes.
15. Use basic workshop equipment safely.
16. Analyze experimental results and determine their accuracy and validity.
17. Use laboratory equipment and related computer software.
18. Operate and maintain mechanical equipment.
19. Prepare the process plan for manufacturing.

2.4.4 General and Transferrable Skills

The graduates of the Production and Mechanical Design Engineering program should be able to

01. Collaborate effectively within multidisciplinary team.
02. Work in stressful environment and within constrains.
03. Communicate effectively.
04. Demonstrate efficient IT capabilities.
05. Lead and motivate individuals.
06. Manage tasks and resources efficiently.
07. Search for information and adopt life–long self learning.
08. Acquire entrepreneurial skills.
09. Refer to relevant literature effectively.

2.5 Curriculum Structure and Contents

2.5.1 Program Contents

The duration of study for obtaining the Bachelor of Science (B.Sc.) degree in Production and Mechanical Design Engineering is five years, each divided into two terms. The given courses in the program are distributed on both terms of each academic year.

The courses are detailed in the tables below. These tables also shows the courses' codes; number of allocated hours for lectures, laboratory and theoretical exercises; allocated hours for the courses' final examinations; maximum ends of marks for practical and written examinations; and the scientific content of each given course. The scientific content of the program courses is classified into seven subject areas, these subject areas are detailed in **Appendix 4**.

Preparatory Year–First Term

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
BAS1011	Mathematics (1)	4	3	0	7	3	45	0	130	175		5	2				
BAS1012	Physics*	4	1	1	6	3	40	10	100	150		3	2			1	
BAS1013	Mechanics*	3	2	0	5	2	35	0	90	125		3	2				
BAS+PRE1014	Engineering drawing and Projection*	2	3	0	5	2	40	0	60	100			3	2			
BAS1015	Chemistry	3	1	1	5	3	35	10	80	125		2	2			1	
BAS1016	Technical Language (English)	0	2	0	2	2	10	0	40	50	2						
Total		16	12	2	30	15	205	20	500	725	2	13	11	2	0	2	0

Preparatory Year–Second Term

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours		Year Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
BAS1021	Mathematics (2)	4	3	0	7	3	45	0	130	175		5	2				
BAS1022	Physics*	4	1	1	6	3	40	10	100	150		3	2			1	
BAS1023	Mechanics*	2	2	0	4	2	30	0	70	100		2	2				
BAS+PRE1024	Engineering drawing and Projection*	1	3	0	4	4	35	0	90	125			2	1			1
PRE1025	Production engineering	2	2	0	4	2	20	10	70	100			2	2			
CSE1026	Introduction to Computer	2	1	0	3	2	25	0	50	75				1	2		
BAS1027	Humanities (1)	2	0	0	2	2	0	0	50	50	2						
Total		17	12	1	30	18	195	20	560	775	2	10	10	4	2	1	1

** Continued course. Results of both Terms are summed at the end of the academic year.*

First Year–First Term

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours		Term Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
BAS5211	Mathematics (3)	4	2	—	6	3	40	—	110	150		4	1	1			
BAS5112	Mechanics	4	2	—	6	3	40	—	110	150		3	2	1			
PRE5113	Engineering Materials (1)	2	—	—	2	2	10	—	40	50			1	1			
PRE5114	Mechanical Drawing*	1	3	—	4	—	25	—	—	25	1		1	1			1
PRE5115	Computer Application in Production Engineering (1)	2	2	—	4	3	30	10	60	100		1	1		2		
MPE5116	Heat Engineering	2	2	—	4	3	30	—	70	100	1	1	2				
PRE5117	Engineering Economy	3	1	—	4	3	30	—	70	100	2		1				1
Total		18	12	—	30	17	205	10	460	675	4	9	9	4	2	0	2

First Year–Second Term

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours		Term Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
BAS5121	Mathematics (4)	4	2	—	6	3	40	—	110	150		4	1	1			
PRE5122	Strength of Material	4	1	—	5	3	25	10	90	125		1	2	2			
PRE5123	Machining Techniques & Equipment (1)	3	2	—	5	3	35	—	90	125	1	1	1	2			
PRE5124	Mechanical Drawing*	1	2	—	3	4	30	10	110	150	1		1				1
PRE5125	Shaping Techniques & Equipment (1)	4	2	—	6	3	40	—	110	150	1	1	2	2			
MPE5126	Fluid Mechanics	2	1	—	3	2	15	—	60	75		1	1	1			
PRE5127	Technical Reports in Production Engineering	—	2	—	2	2	—	—	50	50	2						
Total		18	12	—	30	20	185	20	620	825	5	8	8	8	0	0	1

** Continued course. Results of both Terms are summed at the end of the academic year.*

Second Year–First Term

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours		Term Work	Practical/Oral Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
PRE5211	Machine Design (1)	4	2	—	6	3	40	10	100	150		2	2	1			1
PRE5212	Theory of Machine (1)	4	2	—	6	3	40	—	110	150		2	3	1			
PRE5213	Stress Analysis Systems	2	2	—	4	3	30	—	70	100		1	1	1	1		
EE5214	Electric & Electronic Engineering	4	2	—	6	3	40	—	110	150		3	2	1			
PRE5215	Computer Application in Production Engineering (2)	4	2	—	6	3	40	10	100	150		1	1	2	2		
PRE5216	Engineering Management (1)	2	—	—	2	2	—	—	50	50			1			1	
Total		**20**	**10**	**—**	**30**	**15**	**190**	**20**	**540**	**750**	**0**	**9**	**10**	**6**	**3**	**1**	**1**

Second Year–Second Term

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours		Term Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
BAS5221	Mathematics (5)	3	1	—	4	3	30	—	70	100		3		1			
PRE5222	Machining Processes and Equipment (2)	4	2	—	6	3	40	10	100	150	1		1	2		1	1
PRE5223	Shaping Processes and Equipment (2)	4	2	—	6	3	40	10	100	150	1	1	1	2			1
PRE5224	Machine Design (2)	3	2	—	5	3	40	5	80	125			1	2	1	1	
PRE5225	Measurements	2	2	—	4	3	30	—	70	100		1	2	1			
PRE5226	Engineering Materials (2)	4	1	—	5	3	25	10	90	125		1	2	1		1	
Total		**20**	**10**	**—**	**30**	**18**	**205**	**35**	**510**	**750**	**2**	**6**	**7**	**9**	**1**	**3**	**2**

Third Year–First Term

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours		Term Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
PRE5311	Theory of Machine (2)	4	2	—	6	3	40	—	110	150		2	1		1	1	1
PRE5312	Machine Tool Design (1)*	2	2	—	4	—	40	10	—	50		1		2		1	
PRE5313	Metrology	4	2	—	6	3	40	10	100	150		1	1	1	1	1	1
PRE5314	Theory of Metal Cutting	4	2	—	6	3	40	—	110	150		1	1	2	1	1	
PRE5315	Theory of Metal Forming	4	1	—	5	3	35	—	90	125		2	1	2			
PRE5316	Elective Course (1)	2	1	—	3	3	15	—	60	75	1			1			1
Total		**20**	**10**	**—**	**30**	**15**	**210**	**20**	**470**	**700**	**1**	**7**	**4**	**8**	**3**	**4**	**3**

Third Year–Second Term

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours		Term Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
PRE5321	Numerical Control of Machine Tool	2	2	—	4	3	30	—	70	100			1	1	2		
PRE5322	Machine Tool Design (1)*	3	2	—	5	4	40	5	130	175				1	1	1	2
PRE5323	Factory Planning and Production Processes	4	2	—	6	3	40	—	110	150	1				2	2	1
PRE5324	Applied Statistics in Production Engineering	3	1	—	4	3	30	—	70	100		3		1			
PRE5325	Machining Techniques and Equipment (3)	2	2	—	4	3	30	—	70	100			1	3			
PRE5326	Engineering Management (2)	3	1	—	4	3	30	—	70	100	1			2	1		
PRE5327	Elective Course (2)	2	1	—	3	3	15	—	60	75	1			1			1
Total		**19**	**11**	**—**	**30**	**22**	**215**	**5**	**580**	**800**	**3**	**3**	**2**	**9**	**6**	**3**	**4**

** Continued course. Results of both Terms are summed at the end of the academic year.*

Forth Year–First Term

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours		Term Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
PRE5411	Production System Analysis	3	1	—	4	3	30	—	70	100				1	1	2	
PRE5412	Production Tools and Equipment Design	4	2	—	6	4	40	—	110	150	2		1	3			
CSE5413	Automatic Control	4	1	—	5	3	35	—	90	125	1	1	1	1	1		
PRE5414	Elective Course (3)	4	2	—	6	3	50	—	100	150			1	2	2		1
PRE5415	Design and Production Engineering Laboratory	—	3	—	3	—	75	—	—	75			1	1		1	
PRE5416	Project*	4	2	—	6	—	40	10	—	50	1			1	1	2	1
Total		19	11	—	30	13	270	10	370	650	4	1	4	9	5	5	2

Forth Year–Second Term

Code	Course Name	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
		Lectures	Exercises	Practical	Total Hours		Term Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
PRE5421	Machine Tool Design (2)	4	3	—	7	4	45	10	120	175	1	1		1		2	2
PRE5422	Quality Control	3	2	—	5	3	30	—	95	125	1				2	2	
PRE5423	Mechanical Maintenance and Faults Monitoring	3	2	—	5	3	30	—	95	125	1			1	2	1	
PRE5424	Elective Course (4)	3	2	—	5	3	35	—	90	125			1	2			2
PRE5425	Fine Measurements	2	2	—	4	3	20	10	70	100		1		1	1	1	
PRE5426	Project*	2	2	—	4	—	40	10	150	200	1				1	2	
Total		17	13	—	30	16	200	30	620	850	4	2	1	5	6	8	4

** Continued course. Results of both Terms are summed at the end of the academic year.*

Total teaching hours and subjects distribution over the subject areas

Semester	Teaching Hours				Wr. Exam Dur.	Marking				Subject Area						
	Lectures	Exercises	Practical	Total Hours		Y Term Work	Practical Exam	Written Exam	Total	Hum. & Soc. Sc.	Math. & B. Sc.	B. Eng. Sc.	App. Eng. & Des.	Comp. App. & ICT	Proj. & Practice	Discretionary
Preparatory year/ 1st term	16	9	5	30	15	205	20	500	725	2	13	11	2	0	2	0
Preparatory year/ 2nd term	17	12	1	30	18	195	20	560	775	2	10	10	4	2	1	1
First year/1st term	18	12	—	30	17	205	10	460	675	4	9	9	4	2	0	2
First year/ 2nd term	18	12	—	30	20	185	20	620	825	5	8	8	8	0	0	1
Second year/1st term	20	10	—	30	15	190	20	540	750	0	9	10	6	3	1	1
Second year/ 2nd term	20	10	—	30	18	205	35	510	750	2	6	7	9	1	3	2
Third year/1st term	20	10	—	30	15	210	20	470	700	1	7	4	8	3	4	3
Third year/ 2nd term	19	11	—	30	22	215	5	580	800	3	3	2	9	6	3	4
Fourth year/1st term	19	11	—	30	13	270	10	370	650	4	1	4	9	5	5	2
Fourth year/ 2nd semester	17	13	—	30	16	200	30	620	850	4	2	1	5	6	8	4
Total of Five Years	184	110	6	300	169	2080	190	5230	7500	27	68	66	64	28	27	20
% of Five Years	61.33	36.67	2	—	—	27.73	2.533	69.73	—	9	22.67	22	21.33	9.33	9	6.67
% NARS										9–12	20–26	20–23	20–22	9–11	8–10	6–8

This table shows the agreement with NARS requirements.

2.4.2 Elective Courses

Third–Year Elective Courses

Code	Course Name	Code	Course Name
Elective Course (1)		**Elective Course (2)**	
PRE5316	Robot Arm Engineering	PRE 5327	Heat Treatment
PRE5316	Production Technology	PRE 5327	Industrial Oil Engineering
PRE5316	Nontraditional Measurements	PRE 5327	Advanced Production Technology
PRE5316	Packing and Packaging Engineering	PRE 5327	Work Study
PRE5316	Product Design	PRE 5327	Industrial Relation and Regulation Laws
PRE5316	Environmental Engineering	PRE 5327	Design of Mechanical Equipment
PRE5316	Industrial and Professional Safety	PRE 5327	Engineering Materials Selection
PRE5316	Biomedical Engineering		

Fourth–Year Elective Courses

Code	Course Name	Code	Course Name
Elective Course (1)		**Elective Course (2)**	
PRE5414	Methods and Techniques of Design	PRE5424	Computer Aided Manufacturing
PRE5414	Scientific Management Systems	PRE5424	Optimum Design
PRE5414	Design and Production of Dies	PRE5424	Operations Research
PRE5414	Tribology	PRE5424	Non–Traditional Machining Processes
PRE5414	Non–Traditional Shaping Processes	PRE5424	Feasibility Study
PRE5414	Reverse Engineering in Mechanical Design	PRE5424	Composite Materials
PRE5414	Mechatronics	PRE5424	Hydraulic Control System
PRE5414	Design and Production of Cutting Tools		

2.5.3 Curriculum Mapping

Appendix 5 gives the contribution of the individual courses to the program Aims and Intended Learning Outcomes in a matrix form. This matrix was developed by the program coordinator, assistant coordinators and professional staff members. The mapping matrix shows that the program courses present balanced contribution to the program ILO's. **Appendix 5** also includes a matrix summarizing the contribution of the program ILO's to the program Aims (attributes).

2.5.4 Courses Specifications

The detailed program courses specifications are shown in the curriculum mapping. These courses specifications were revised and approved on 2013. The contribution of each course to the program ILO's were considered during this revision.

3. Student Assessment

Method	Assessed ILO's
1– Written exam	A, B & C
2– Quizzes and reports	A, B & C
3– Oral exams	A, B & C
4– Practical	A & C
5– Project applied on a practical field problem	A, B, C & D

4. Program Evaluation

Evaluator	Method
1– Senior students	questionnaire
2– Alumni	questionnaire
3– Stakeholders	questionnaire
4– External Evaluator(s)	report
5– Other societal parties	none

Appendix 1

Staff Members

أعضاء هيئة التدريس بقسم هندسة هندسة الإنتاج و التصميم الميكانيكي

م	الإسم	الدرجة	المواد التى يمكن أن يدرسها
١	**أ.د. حسن على محمد سلطان**	**أستاذ**	**PRE5323 - PRE5324 - PRE5326 - PRE5327**
٢	**أ.د. السيد محمد السيد عبد الرسول**	**أستاذ متفرغ**	**PRE5414 - PRE5424**
٣	**أ.د. توفيق توفيق محمد الميدانى**	**أستاذ متفرغ**	**PRE5123 - PRE5127 - PRE5314 - PRE5321 - PRE5325**
٤	**أ.د. إبراهيم محمد عليوه**	**أستاذ متفرغ**	PRE 5225 - PRE 5313 – PRE 5425
٥	**أ.د. محمد احمد نصر شباره**	**أستاذ متفرغ**	**PRE5122 - PRE5213 - PRE5414 - PRE5423 - PRE5415**
٦	أ.د. **احمد مصطفى محمد البهلول**	**أستاذ متفرغ**	**PRE5114 - PRE5124 - PRE5312 - PRE5322 - PRE5424**
٧	**أ.د. احمد عبد الفتاح عبد الرحمن السيد**	**أستاذ متفرغ**	**PRE5213 - PRE5225 - PRE5313 - PRE5425**
٨	**أ.د. مجدى صموئيل غطاس ابراهيم**	**أستاذ متفرغ**	**PRE5113 - PRE5125 - PRE5223 - PRE5226 - PRE5315**
٩	**أ.م.د. محمد احمد محمد فنى**	**أستاذ مساعد**	**PRE5211 - PRE5212 - PRE5224 - PRE5316 - PRE5424**
١٠	**أ.م.د. احمد عبد الحميد احمد عبد الشافى**	**أستاذ مساعد متفرغ**	**PRE5117 - PRE5216 - PRE5422 - PRE5424**
١١	**د. محمد سامى عبد الغفار الجيار**	**مدرس**	**PRE5211 - PRE5212 - PRE5224 - PRE5311 - PRE5316**
١٢	**د. نهى فوده ابراهيم سلامه**	**مدرس**	**PRE5113 - PRE5122 - PRE5212 - PRE5311**
١٣	**د. احمد محمد جلال عبد المنعم**	**مدرس**	**PRE5115 - PRE5211 - PRE5215 - PRE5222 - PRE5327**
١٤	د. **حازم السيد عمر الشوربجى**	**مدرس متفرغ**	**PRE5325 - PRE5327 - PRE5412 - PRE5421**
١٥	د. **محمد صبيح السيد حسين**	**مدرس متفرغ**	**PRE5216 - PRE5326 - PRE5323 - PRE5411**
١٦	**د. عبد الله سند الطوخي**	**مدرس متفرغ**	**PRE6122**

أعضاء الهيئة المعاونة بقسم هندسة الإنتاج و التصميم الميكانيكي

م	الإسم	الدرجة	المواد التى يمكن أن يدرسها
١	**م. منى أبو العز محمد ابو العز**	**مدرس مساعد**	**PRE5213 - PRE5225 - PRE5313 - PRE5414 - PRE5423**
٢	**م. محمد طاهر حامد عراقى**	**مدرس مساعد**	**PRE5122 - PRE5211 - PRE5224 - PRE5414**
٤	**م. وائل صلاح الدين احمد بدر**	**معيد**	**PRE5114 - PRE5124 - PRE5414 - PRE5415**
٥	**م. عبد الخالق محمد أحمد أحمد العدل**	**معيد**	**PRE5125 - PRE5223 - PRE5315 - PRE5327**
٦	**م. محمد حسين محمد عيسى الشافعى**	**معيد**	**PRE5212 - PRE5311 - PRE5325 - PRE5412**
٧	**م. محمد جمعة منصور ذكى الخطيب**	**معيد**	**PRE5123 - PRE5222 - PRE5321 - PRE5325**
٨	**م. محمد جودة رمضان السيد القلا**	**معيد**	**PRE5211 - PRE5312 - PRE5316 - PRE5322**
٩	**م. أحمد سامح عبد العزيز إسماعيل**	**معيد**	**PRE5122 - PRE5211 - PRE5212 - PRE5311**
١٠	**م. إبراهيم نبيل إبراهيم الدسوقى إبراهيم**	**معيد**	**PRE5223 - PRE5315 - PRE5412 - PRE5421**
١١	**م. سارة احمد مصطفي محمد البهلول**	**معيد**	**PRE5115 - PRE5215 - PRE5311 - PRE5325**
١٢	**م. خالد محمد توفيق جناده**	**معيد**	**PRE5323 - PRE5324 - PRE5411 - PRE5424**
١٤	**م. احمد عبدالتواب السيد مصطفى**	**معيد**	**PRE5211 - PRE5312 - PRE5322 - PRE5421**
١٥	**م. محمد أحمد عبد الفتاح القيران**		**PRE5115 – PRE 5122 - PRE5215**
١٦	**م. آلاء عبدالغني أحمد السعيد**		**PRE5117 - PRE5326 - PRE5422**
١٧	**م. مصطفى أحمد مصطفى البهلول**		**PRE 5123 – PRE 5123**

Appendix 4

Scientific Contents of the Program Courses

The scientific content of the program courses is classified into seven subject areas, these subject areas are

A-Humanities and Social Science

a) Acquiring knowledge of non–engineering fields that strengthen the consciousness of the engineer of the society and its culture, including business, marketing, welfare, ethics, law, arts, etc.
b) The ability to consider and evaluate the impact of the technology on the society, public health, and safety.
c) The ability to appreciate and engage in social and entrepreneurial activities essential to the engineering practice and reflect on the management of the economics and social science.
d) The ability to engage in life–long learning and respond effectively to the needs of society.

B-Mathematics and Basic Science

-Mathematics

a) Acquiring knowledge in mathematical and analytical methods.
b) The ability to reason about and conceptualize engineering components, systems or processes using analytical methods as related to the discipline.
c) The ability to analyze and model engineering components, systems and processes specific to the discipline.
d) The skill of using probability and statistical methods.

-Basic Science

a) Acquiring knowledge of physics, chemistry, mechanics, earth sciences, biological sciences, and other specific subjects which focus on understanding the physical world.
b) The ability to select and apply scientific principles in practical problem solving.
c) The ability to analyze, model and reason about engineering components, systems or processes using principles and knowledge of the basic sciences as applicable in each engineering disciplinary context.
d) The ability to adopt scientific evidence–based techniques in problems solving.

C-Basic Engineering Science

a) Integrating knowledge and understanding of mathematics, physical sciences to develop basic engineering laws and concepts related to the discipline.
b) The ability to extend knowledge and develop models and methods and use techniques, principles and laws of engineering science in order to lead to engineering applications across disciplinary boundaries.
c) The ability to deal effectively with numbers and concepts to identify/solve complex and open ended engineering problems.

D-Applied Engineering and Design

a) Attaining knowledge of operational practice, engineering codes and design techniques relevant to the subject
b) The ability to apply engineering knowledge and creative, iterative and open–ended procedures when conceiving and developing components, systems and processes.
c) The ability to integrate engineering knowledge, engineering codes, basic and mathematical sciences in designing a component, a system or a process.

d) The ability to work under constraints, taking into account time, economy, health and safety, social and environmental factors and applicable laws.

E-Computing and ICT

a) Attaining knowledge of ICT principles.
b) The ability to use computers, networks and software to support engineering activity, and to enhance personal/team productivity.
c) The ability to assess, use and validate results produced by packages and create software as required in discipline.
d) The ability to use general ICT tools effectively

F-Project

a) Gaining the knowledge and experience of applying the different principles and techniques introduced in the program of study.
b) The ability to work within defined constraints, tackle work which lacks a well-defined outcome or which has a wide range of possible solutions and exhibit creativity in dealing with unfamiliar real-life problems.
c) The ability to investigate, plan and execute technical research specific to the discipline over an extended period of time; meeting deadlines and putting technical work in a social and commercial context.
d) The ability to work in a team, search published sources of information, interprets technical data and analyzes and presents findings in various ways.

G-Discretionary Subjects

a) Attaining knowledge and understanding of subjects selected by the institution to identify its character and/or satisfy the needs of the society.
b) The ability to recognize, appreciate and respond effectively to the needs of the society via utilizing the technical knowledge specific to the discipline.
c) The ability to lead and motivate people as well as organize and control tasks, people and resources.

Appendix 6

Admission Requirements, program Progression and Grades Evaluation

Ministerial Decision
No. (2210) at 28 / 10 / 2004
Mansoura University
Bachelor Stage

The minister of higher education and state for scientific research and the head of the highest council of universities

- After looking at the rule no. (49) for the year 1972, about coordinating universities and its modification
- And at the presidential decision no. (809) for the year 1975 about producing the curriculum plan for the coordinating universities rule and its modification decisions.
- And at the ministerial decision no. (613) at 10 / 6 / 1997 about producing the Mansoura University – Faculty of Engineering curriculum plan and its modification decisions.
- And at the agreement of Mansoura University Council at 31 / 5 / 2004, and 28 / 9 / 2004.
- And at the agreement of the committee of engineering studies sector at 29 / 7 / 2004.
- And at the decision of the highest council of universities at 9, 10 / 9 / 1998, negotiated by the minister of higher education and state for scientific research and the head of the heist council of universities, to produce the curriculum plans for faculties and institutes and its modifications.

Decided
FIRST ARTICLE

– Mansura University – Faculty of Engineering works according to its curriculum plan and any other opposite text is canceled.

SECOND ARTICLE

– All regions have to execute this decision.

The Minister of Higher Education
and The State for Scientific Research
Prod. Dr. Amr Ezzat Salamah

CHAPTER TWO
STUDY FOR THE BACHELOR SCIENCE DEGREE

Article 3

Upon request from the Faculty of Engineering Council, Mansoura University grants the Bachelor of Science (B.Sc.) degree to students who successfully pass the examinations of the applied courses in one the following areas of specialty

1. Electrical Power and Machine Engineering
2. Electronics and Communications Engineering
3. Computers and Systems Engineering
4. Mechanical Power Engineering
5. **Production Engineering and Mechanical Design**
6. Textile and Spinning Engineering
7. Civil Engineering
8. Architectural Engineering

Article 4

The student is fettered to the Bachelor degree and any of its scientific departments after making sure that he/she obtained his/her secondary degree or its equivalent, according to article (75) of The Universities Coordinating Rules.

Article 5

The duration of study for obtaining the Bachelor of Science (B.Sc.) degree is five years, each divided into two terms. Next to a preparatory year that is obligatory for all students, specialization to all scientific departments takes place in respect of the announced tables for each curricula.

Article 6

The given courses are distributed on both terms for each academic year. These courses are detailed in the tables of curricula in the 4th Chapter of the Curriculum Plan. These tables also outline the allocated hours for lectures, laboratory and theoretical exercises, courses codes, maximum of marks, oral and practical examinations, number of hours of final examinations, and the scientific content of each given course, developed by the council of each scientific department, according to the decisions of the faculty council, article (4) of The Universities Coordinating Rules.

Article 7

The student may be exempted from attendance of some courses, except in the 3rd and 4th year, if he/she gives evidence of attending equivalent courses in another organized faculty, college, or scientific institute. Referring to article (170) of The Universities Coordinating Rules, this exemption is to be affected by a decision from the University President after an approval of the council of Education and Students' Affairs, according to the advice of the Faculty Council, based on the decision of the concerned departments.

Article 8

Examinations are to be held in the end of each term in the course taught during this term, according to the Tables of Curricula outlined at the 4th Chapter of this plan.

Article 9

Upon request from relevant department councils, the Faculty Council issues a resolution, prohibiting students who are not satisfying at least 75% attendance of the designated hours in each course from attending the term examination in this course. The student is considered failed in the course he/she has been prohibited from attending its examination unless he/she provides an excuse, which should be accepted by the Faculty Council. In this case, the student is considered absent with an acceptable excuse.

Article 10

The final grade of the student in courses that include written and/or oral and/or practical test of to be the summation of the scores obtained in these tests, in addition to the marks of the term work as stated in the courses' tables for each department. The student who is absent without excuse from the written paper exam is to be considered failed in this course. If the student provides an excuse, which should be accepted by the Faculty Council, he/she is to be considered absent with an acceptable excuse.

Article 11

The grades of the courses' exams and the general grade of the students are evaluated as follows:

– Excellent: From 85% of the total mark and above.
– Very Good: From 75% to less than 85% of the total mark.
– Good: From 65% to less than 75% of the total mark.
– Pass: From 50% to less than 65% of the total mark.

The student is considered failed if he/she obtains less than 50% of the total mark, and evaluated according to the following grades:

– Weak: From 30% to less than 50% of the total mark.
– Very Weak: Less than 30% of the total mark.

The course's grade of the student who fails in its exam or marks unacceptable absence from this exam are not to exceed "pass". The graduation general grade is to be determined after the student passes the 4^{th} year exams by adding up the aggregate scores obtained throughout the five–year study, according to the grades mentioned above.

Article 12

(a) The student is to be promoted from an academic year to the next one if he/she passes the examination in all courses of the original year, or if he/she fails in no more than two courses of his/her class of from lower classes. The divided course is considered one course if the student fails in one part or in both parts.
(b) In addition to the two subjects mentioned in the previous item, the student who fails in Humanities' exams is to be promoted to the next year. The student is to attend the supplementary exams of these courses according to the conditions set by the Faculty Council.
(c) The student who fails in a divided course is to repeat the examination in the whole course.

Article 13

Fourth year students are to implement a B.Sc. project on a subject to be determined by the relevant Department Councils, during a 4–week period after the end of the written exam of the fourth year's second term. These projects are to be set, supervised, and evaluated by staff members in each department, according to the executive internal regulations prepared by the Faculty Council.

Article 14

Re–set examinations are to be held yearly in October for the fourth–year students who fail or make absence in at most two courses from their class or from any lower level, in addition to one of Humanities' courses. This does not apply to the graduation project in which failing students should stay to repeat this project in the next year.

Article 15

Under supervision of scientific departments, the faculty is to arrange scientific visits to relevant industrial and construction projects for the third and fourth–year students, with respect to regulations set by the Faculty Council.

Article 16

A 4–week training in the summer vacation is regarded for students promoted to the 2^{nd}, 3^{rd}, and 4^{th}, academic years, under supervision of staff members of each scientific department as follows:

- **Professional Training:** Students promoted to the 2^{nd} year are to carry out professional training inside the faculty, or in specialized training centers.
- **Field Training**: Students promoted to the 3^{rd} and 4^{th} year are to carry out field training in specialized training sectors.

Students trained outside the country should be approved by relevant Department Councils. The student will not be able to obtain his/her B.Sc. Graduation Certificate until Professional and field Training are both accomplished successfully. The executive regulation of students' training is issued by the University Council based on advices from Scientific Departments, and the Council of Education and Student' Affairs.

CHAPTER THREE
TRANSFERENCE JUDGMENTS

Article 17

The curriculum plan is applying in sequence, starting from the next academic year on all students who are fettered to the preparatory year, both new or stayed to repeat, and keeping work the previous plan, produced with the Ministerial Decision No. (613) for the year 1997 and its modifications for the rest of students till finishing their study.