Modern Academy
for Engineering and Technology in Maadi
Manufacturing Engineering & Production Technology Department

Manufacturing Engineering and Production Technology B.Sc. Program Specification By Law 2020

August 2020

مقدمة

الهندسة هى المعرفة بالعلوم الطبيعية والرياضية، والتي تكتسب بالدراسة والخبرة والممارسة، وتطبق بوعي لتطوير أساليب تستخدم اقتصاديا لتطويع المواد وقوى الطبيعة لصالح البشريّة. وهي أيضا المقدرة على الشروع في النشاط والسلوك المرتبط بالعمليات الهندسية والنظم والمشاكل والفرص، والتاريخ، والمستقبل، والتأثيرات، والأخلاق، والمردودات. كما أنها تنطوي على المعرفة، وطرق التفكير، والتصرفات، والقدرات. كما تساعد الهندسة في إعداد الأفراد لتقديم خيارات مدروسة في إطار كونهم مستهلكين أو عمالا أو مواطنين وأعضاء في المجتمع الدولي. وينبغي أن يحقق التعليم الهندسي التميز والتفوق في التعليم العالي والدراسات العليا والبحوث، والخدمة العامة، وتطوير المعارف الهندسية. ويهدف التعليم الهندسي الى تخريج مهندسين متميزين موهوبين، واسعي المعرفة وعلى درجة عالية من الكفاءة، بالإضافة إلى إنتاج بحوث وتقنيات مفيدة وخلاقة، تساهم في حل المشاكل الحياتية وتيسير الخدمات، من خلال التفوق والتميز الأكاديمي. علاوة على ذلك فإن التعليم الهندسي يهدف إلى تحفيز الطلاب وأعضاء هيئة التدريس على التعلم والنمو، كذلك تحقيق وتلبية احتياجات المجتمع قوميًّا وإقليميًّا ودوليًّا. كما يهدف أيضا إلى إعداد الطّلبة لمهنة منتجة ومفيدة في المجال الهندسي مبنية على أسس علمية وأخلاقية ومعنوية قوية.

ويختص المهندسون بحل المشاكل الواقعيّة، ويعملون على إيجاد أفضل الحلول لها عن طريق تطبيق مجمل معارفهم وخبراتهم ومهاراتهم. كما يساعد المهندسون على تعريف وتحسين نمط الحياة بتوفير وسائل حياتية ذات أداء عالي مبتكر، أكثر أمانًا وملائمة للاستعمال اليومي. كما يسعون إلى التطوير من خلال الاختراع، والتصميم، والتصنيع، والبناء. كما تهدف مجمل الأنشطة الهندسية إلى الحصول على نتائج إيجابية لتحسين المعيشة بيد ان هناك عوائق تصاحب هذه الأنشطة مثل تلوث المياه والهواء والبيئة والتلوث الصوتي الناتج عن الإنجازات الهندسية المبهرة خلال العقود الماضية. كذلك يصطدم عمل المهندس أثناء مواجهة المشكلات بقيود متنامية نتيجة تشابك وتقارب المشكلات الاجتماعية والتقنية. وعلى سبيل المثال فإن مشكلة تلوّث الهواء لا يمكن أن تُحَلّ بدون اعتبار التناقضات الأخلاقيّة، والسّياسيّة، والقانونيّة، والاجتماعيّة. علاوة على ذلك، يجب أن يؤخذ في الاعتبار تأثير الحلول الهندسية المتاحة على مصالح الأفراد والمجموعات.

وتقدم دراسة الهندسة للطلاب تعليما فعالا ومبنيا على أسس تكنولوجية، آخذا في الاعتبار التوقعات المستقبلية للعلم والتكنولوجيا. وهي أيضا توفر المعارف التقنية والمهارات الضرورية لحل المشاكل التي تسمح بمواجهة التحديات المستقبلية في المجالات العلمية والتكنولوجية. وتحدد المعايير الأكاديمية المرجعية القومية (NARS) للهندسة مفاهيما شاملة تمثل التوقعات والطموحات العامة بخصوص معايير درجة البكالوريوس في العلوم الهندسية، كما توضح هذه المفاهيم المواصفات والخصائص التي يتمتع بها خريج البرامج الدراسية الهندسية خاصة:

- منح الدرجة يتفق مع الإطار العام للتعليم الهندسي الحديث.
- الدرجات الهندسية تتوافق مع التوجهات القومية.
- الدرجات الممنوحة تلبى الاحتياجات الفعلية لسوق العمل.

وقد تم تصميم برنامج هندسة التصنيع وتكنولوجيا الإنتاج لإعداد المهندسين المتميزين في مجالات التصميم الميكانيكي وتكنولوجيا الإنتاج إضافة إلى هندسة التصنيع التي تدرس من خلال مجموعة من المواد التمييزية والتي تعطى لخريج البرنامج تأهيلا متميزا مقارنة بخريجي البرامج المثيلة لسد احتياجات سوق العمل.

وقد تم إعداد مواصفات البرنامج بتعاون جاد وأداء احترافي لنخبة متميزة من أعضاء هيئة التدريس المتخصصين في مجالات مقررات البرنامج. وقسم هندسة التصنيع وتكنولوجيا الإنتاج إذ يقدم هذه الوثيقة الهامة فإنه يتقدم بالشكر لجميع أعضاء هيئة التدريس الذين تضافرت جهودهم لإنجازها كما يقدم الشكر والتقدير لمكتب الجودة بالأكاديمية الذي وفر الخبرات اللازمة والتدريب والاستشارات لإتمام مواصفات البرنامج.

والله ولى التوفيق،،،

د. متولي عبد الغفار
رئيس قسم الهندسة الميكانيكية

Content

Manufacturing Engineering and Production Technology
B.Sc. Program Specifications

1. General

1.1. Basic Information

Program Title: Manufacturing Engineering and Production Technology BSc Program.
Program Type: Single.
Department: Manufacturing Engineering and Production Technology Department.
Coordinator: Dr. Metwally Abd Elghaffar
Assistant Coordinator: Dr. Maher Khalifa
External Evaluators: Prof. Dr. Tawfik Tawfik M. El-Midani, Prof. of Production Engineering, Production Engineering and Mechanical Design Department, Faculty of Engineering, Mansoura University.
Prof. Dr. Hesham Ali Abdelhamid Sonbol, Prof. of Mechanical Engineering, Design and Production Engineering Department, Ain Shams University.
Academic Standard: The current program fulfills the requirements of the National Academic Reference Standards (NARS) Engineering, 2nd Edition, 2018, for the BASIC MECHANICAL Engineering graduate and similar programs.
Program Started on: 2020-2021
Dates of program specifications approval: August 2020

1.2. Staff Members

The Manufacturing Engineering and Production Technology BSc Program is taught by 43 highly qualified faculty members (Professors, Assistant Professors, Lecturers, and Teaching Assistants). They are qualified to teach the courses allocated to them. Their personnel resume is included in the course's files.

1.3. Program External Reviewing

The program specifications' evaluation by two external evaluators is currently in action

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, and more comfortable day-use facilities for human beings. They seek improvement through the processes of research, development, invention, design, manufacturing, and construction.

The engineer's problem-solving complexity grows as the world's social, political, 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.

Mechanical engineers should be curious about how things are made and work. They have a desire to solve problems and a talent for understanding the operation of mechanical devices. Mechanical engineers conceive, plan, design and direct the production, distribution, and operation of a wide variety of devices, machines and systems, environmental control and materials processing, transportation, and handling. Manufacturing engineering and production technology program graduates analyze their design using the principles of motion, energy, and momentum to ensure that the product functions safely, efficiently, reliably, and manufactured at a competitive cost with minimized environmental hazards.

Mechanical Engineering, Manufacturing Engineering, and Production Technology are broad disciplines, which cover the fields of solid and fluid mechanics, thermodynamics, mechanical engineering design, production technology, economics, and production management. Basic studies are devoted to mechanical properties of materials, machine design, dynamics and control, instrumentation, fundamentals of fluid flow, energy, and power systems. Mechanical Engineering covers the design, analysis, testing and manufacturing of products that are used in every facet of modern society. Production Engineering covers the principles of manufacturing technology, metal cutting analysis, CNC programming and machine tools, flexible manufacturing systems, Computer Integrated Manufacturing, Automation of Production Lines, Advanced Manufacturing Technology, and Production Planning and Control. Undergraduate educational programs in mechanical engineering design and production are, therefore, specifically designed to provide a wide variety of topics. These include power systems, fluid and thermal sciences related to discipline, automatic control, reliability, quality assurance and control, mechanical design, and manufacturing.

The current program fulfills the requirements of the National Academic Reference Standards (NARS) Engineering, 2nd Edition for the BASIC MECHANICAL Engineering graduate and similar programs.

A B.Sc. degree in Manufacturing Engineering and Production Technology 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 Mission and Aims

2.2.1. Academy mission

The academy mission is providing students with modern advanced technological knowledge, concepts, and skills via various programs, within a frame of cultural, social and ethical values.

2.2.2. Academy aims

The Modern Academy for engineering and Technology aims at preparing distinguished engineering cadres capable of competing scientifically and professionally on the local and regional levels to meet the needs of the society in the various sectors of the country

2.2.3. Program mission

The mission of the Bachelor of Science in manufacturing engineering and production technology program is to prepare innovative graduates able to interact with the challenges in diverse domains of his specialty, locally and regionally. He should satisfy the requirements of the society- within a frame of cultural, social and ethical values- in governmental authorities and public and private sectors.

2.2.2. Program aims

The manufacturing engineering and production technology program aims at providing future engineers with appropriate theoretical knowledge and technical skills to respond to professional market demands in the fields of **Mechanical Design and**, **Production Technology** (Major), with the following Minors

1. Materials Engineering
2. Industrial Engineering
3. Mechanical Power Engineering

2.2.5. Conformity of the program mission to the modern academy mission

		Modern Academy Mission Keywords			
		The graduates can compete scientifically and professionally on the local and regional levels	The graduate's qualification meets the needs of the society in the various sectors of the country	The graduates are provided with modern technological knowledge, concepts, and skills	The graduated qualification is achieved within a frame of cultural, social, and ethical values
Key words of the program mission	Innovative graduates			●	
	Interaction with challenges	●	●		
	Challenges on local level	●	●		
	Challenges on regional level	●	●		
	Satisfaction of the requirements of the society		●		
	Governmental, private and public sectors.		●		
	Cultural values				●
	Social values				●
	Ethical values				●

2.2.6. Conformity of the program aims to its mission

		Program Mission Keywords			
		Innovative graduates	Challenges on local & level regional levels	Governmental, private and public sectors.	Cultural, Social, and ethical values
Key words of the program aims	appropriate theoretical knowledge	•			
	appropriate technical skills	•			
	professional market demands		•	•	•
	mechanical design	•	•	•	
	production technology	•	•	•	

2.2.7. Graduate career opportunities

Manufacturing Engineering and Production Technology engineer may work in: private and governmental firms, where it is required to design, manufacture, Operate, develop, or maintain mechanical systems and production lines. The graduate is able to work in industries using flexible manufacturing systems where CNC machines are introduced and also advanced non-traditional metal processing technology. The graduate is also ready for participating in production planning and control in the different engineering industries such as automotive, aerospace, power engineering equipment and iron and steel industries.

2.3. The attributes of the graduate

The Engineering Graduate must:

1. Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.
2. Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.
3. Behave professionally and adhere to engineering ethics and standards.
4. Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.
5. Recognize his/her role in promoting the engineering field and contribute to the development of the profession and the community.
6. Value the importance of the environment, both physical and natural, and work to promote sustainability principles.
7. Use techniques, skills and modern engineering tools necessary for engineering practice.
8. 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.
9. Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.
10. Demonstrate leadership qualities, business administration and entrepreneurial skills.

2.4. Competencies

The manufacturing Engineering and Production Technology BSc graduate must be able to:

NARS Competencies of Engineering Graduate	C1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics. C2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions. C3. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development. C4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles. C5. Practice research techniques and methods of investigation as an inherent part of learning. C6. Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements. C7. Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams. C8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools. C9. Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations. C10. Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.
NARS Competencies of Basic Mechanical Engineering & similar prog	C11. Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics, and Vibrations. C12. Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field. C13. Select conventional mechanical equipment according to the required performance. C14. Adopt suitable national and international standards and codes; and integrate legal, economic, and financial aspects to design, build, operate, inspect, and maintain mechanical equipment and systems.
ARS Competencies of Mechanical Engineering Program	C15. Understand the role of technological advances in providing support for mechanical engineers, such as information technology, new materials technologies, and advanced manufacturing technologies. C16. Apply advanced technologies in manufacturing, automation, and product testing to solve manufacturing problems by computer numerically controlled machines.

2.5. Curriculum Structure and Contents

The curriculum of the Manufacturing Engineering and Production Technology BSc program consists of 165 credits spread over 68 courses, covering topics in Humanities and Social (HSS), Business Administration (BAS) Sciences, Mathematics and Basic Science (MBS), Engineering Culture Sciences (ECS), Basic Engineering Sciences (BES), Applied Engineering and Design Sciences (AEDS), and Project and Industrial Training (PIT) as required by the Supreme Council of Universities (SCU) in Egypt.

2.5.1. University Requirements (General cultural courses requirements)

The main purpose of a university education is not only to prepare students for successful careers but also to provide them with the knowledge and skills to develop a rational, well-rounded, and successful personal identity through:

a) Acquiring knowledge of non-engineering fields that strengthen the consciousness of the engineer of the society and its culture, including business, marketing, wellness, 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 the society.

The university requirements courses are unified for all the programs of the Modern Academy. They consist of 16 credits (9.7 % of total 165 credits), which are satisfied by completing eight (8) courses:

1. Six (6) compulsory courses equivalent to 12 credits (7.27%), as listed in table 1- a.
2. Two (2) elective course equivalent to 4 credits (2.42%), as listed in table 1- b.

Table 1-a Compulsory Courses of University Requirements (12 credit Hours, 7.27% of total 165 credits).

Course Code	Total Credit	Contact Hours				Course Title	Prerequisites	Subject Area						
		L	T	P	Total			Hum. & Soc. Sc.	Business Admins.	Math. & B. Sc.	Engineering Culture	Basic Eng. Sc.	App. Eng. & Des.	Proj. & Ind. Training
GENn041	2	2	-	-	2	Contemporary Social Issues	None	2						
GENn042	2	2	-	-	2	English Language.	None	2						
GENn043	2	2	-	-	2	History of Engineering and Technology.	None	2						
GENn141	2	2	-	-	2	Presentation Skills.	None	2						
GENn142	2	2	-	-	2	Technical Report Writing.	None	2						
GENn341c	2	2	-	-	2	Project Management.	None		2					
Total	**12**	**12**	**-**		**12**	**7.27 %**		**10**	**2**					

Table 1-b Elective Courses of University Requirements (4 Credits Hours, 2.42% of total 165 credits).

	Course Code	Total Credit	Contact Hours				MTHn Course Title	Prerequisites	Subject Area						
			L	T	P	Total			Hum. & Soc. Sc.	Business Admins.	Math. & B. Sc.	Engineering Culture	Basic Eng. Sc.	App. Eng. & Des.	Proj. & Ind. Training
Elective 1	GENn351c	2	2	-	-	2	Technical English.	GENn042							
	GENn352	2	2	-	-	2	Risk Management	None	2						
	GENn353a	2	2	-	-	2	Industrial Psychology.								
Elective 2	GENn451	2	2	-	-	2	Environmental Effects of Electromagnetic Waves.								
	GENn452b	2	2	-	-	2	Civilization and heritage	None		2					
	GENn453	2	2	-	-	2	Marketing								
Total		**4***	**4**			**4**	**2.42 %**		**2***	**2***					

The University Requirements for all programs make 9.69% of the total credit hours.

2.5.2. Faculty/Institute requirements (Mathematics, Basic Science, and Engineering Culture Courses)

Mathematics

Institute requirements provide students with the knowledge and skills that are essential to develop a successful engineer. The Institute core that is common to all credit hours programs is implemented through:

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 Electronic Engineering and Communication Technology.

c) The ability to analyze and model engineering components, systems, and processes specific to the Electronic Engineering and Communication Technology.

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 Science as applicable in each engineering disciplinary context.

d) The ability to adopt scientific evidence-based techniques in problems solving.

Engineering culture

a) Acquiring knowledge in the areas related to different engineering trends.

b) The ability to overview basic knowledge about different engineering specializations.

The Institute Requirements (Mathematics, Basic Science, and Engineering Culture Courses) courses are unified for all the programs of the Modern Academy. They consist of fifteen (15) courses with 40 credits (24.24 % of total 165 credits), as listed in table 2.

Table 2 Courses of Institute Requirements (40 credits, 24.24% of total 165 credits)

Course Code	Total Credit	Contact Hours				Course Title	Prerequisites	Subject Area						
		L	T	P	Total			Hum. & Soc. Sc.	Business Admins.	Math. & B. Sc.	Engineering Culture	Basic Eng. Sc.	App. Eng. & Des.	Proj. & Ind. Training
CHEn001	3	2	1	2	5	Chemistry.	None			3				
MECn001	2	1	3	-	4	Mechanics -1.	None			2				
MECn002	2	1	3	-	4	Mechanics-2.	MECn001			2				
MTHn001	3	2	3	-	5	Mathematics-1(Algebra and Calculus).	None			3				
MTHn002	3	2	3	-	5	Mathematics-2(Integration and Analytic Geometry).	MTHn001			3				
PHYn001	3	2	1	2	5	Physics-1.	None			3				
PHYn002	3	2	1	2	5	Physics -2.	PHYn001			3				
MNFn001	2	1	3	-	4	Engineering Graphics 1	None				1	1		
MNFn002	2	1	3	-	4	Engineering Graphics 2	MNFn001				1	1		
MNFn003	3	2	-	3	5	Principles of Production Engineering.	None				1	2		
CMPn010	4	2	3	2	7	Program Design and Computer Languages.	None				4			
MTHn107	3	2	2	-	4	Mathematics -7 (Introduction to Prob. and Statistics)	MTHn002			3				
ENGn213a	3	2	-	2	4	Advanced Computer Systems Implementation	CMPn010					2	1	
ENGn311	2	2	1	-	3	Engineering Economy.	None		1			1		
ENGn312a	2	2	-	-	2	Engineering Laws and Professional ethics.	None					2		
Total	**40**	**26**	**27**	**13**	**66**	**24.24%**			**1**	**22**	**7**	**9**	**1**	

*Additional prerequisites will be added, approved by the relevant department council and Modern Academy council and stated in the course and program specifications.

2.5.3. Requirements of the general specialization of the program (Basic Engineering Courses)

The general specialization of the program enables the students to:

a) Integrate knowledge and understanding of mathematics and physical sciences to develop basic engineering laws and concepts related to the Manufacturing Engineering and Production Technology.
b) Extend knowledge and develop models and methods and use techniques, principles, and laws of engineering sciences in order to lead to engineering applications across disciplinary boundaries.
c) Deal effectively with numbers and concepts to identify/solve complex and open-ended engineering problems.

The requirements of the general specialization of Manufacturing Engineering and Production Technology bachelor program consist of 59credits (35.76% of total 165 credits), as shown in table 3.

Table 3 Requirements of the general specialization of the program (59 credits, 35.76% of total 165 credits)

Course Code	Total credit	Contact Hours				Course Title	Prerequisites	Subject Area						
		L	T	P	Total			Social & Hum. Sc.	Business Administration	Math. & B. Science	Engineering Culture	Basic Engineering Sc.	Applied Eng.& Design	Project & Ind. Training
MTHn103	3	2	3	-	5	Math-3 (Differential Equations and Transforms)	MTHn002			3				
MTHn105	3	2	2	-	4	Math-5 (Numerical Analysis)	MTHn103			3				
MTHn209	3	2	2	-	4	Mathematics 9 (Applications of Advanced Calculus)	MTHn103			3				
MNFn111	3	2	3	-	5	Mechanics of Materials	MECn001					3		
MNFn112	3	2	1	2	5	Fundamentals of Materials Science	None					3		
MNFn113	2	1	3	-	4	Mechanics of Machines-1	MECn002					2		
MNFn114	3	2	3	-	5	Machine Drawing-1	MNFn002, MNFn060					2	1	
MNFn115	2	1	3	-	4	Mechanics of Machines-2	MNFn113					2		
MNFn116	3	2	3	-	5	Machine Drawing-2	MNFn114					2	1	
MNFn121	3	2	1	2	5	Metal Cutting Processes	MNFn003					1	2	
MNFn122	3	2	1	2	5	Materials Technology and Testing	MNFn111, MNFn112				1	1	1	
MNFn211	3	2	2	1	5	Fluid Mechanics	MTHn002	1				1	1	
MNFn213	2	1	-	3	4	Computer Applications	ENGn213a						2	
MNFn214	3	2	2	1	5	Thermodynamics	PHYn002	1				1	1	
ELCn216	3	2	1	2	5	Electro Engineering	PHYn002			1		2		
ELCn217	3	2	1	2	5	Electric Machines	ELCn216			1		2		
MNFn221	3	2	1	2	5	Metals Cutting Theory	MNFn121				1	2		
MNFn225	2	1	1	2	4	Engineering Metrology	MNFn121					1	1	
MNFn311	3	2	1	2	5	Mechanical Measurements	MNFn111					2	1	
MNFn312	3	2	3	-	5	Industrial Operation Research	None			2				1
MNFn313	3	2	2	1	5	Automatic Control	MTHn103					2	1	
Total	**59**	**38**	**39**	**22**	**99**	**35.76%**		**2**		**13**	**2**	**29**	**12**	**1**

2.5.4. Requirements of the specific specialization of the program

Applied Engineering and Design

Applied engineering sciences Courses give the following knowledge and understanding and skills:

a) Attaining knowledge of operational practice, engineering codes and design techniques relevant to the Course
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, considering time, economy, health and safety, social and environmental factors, and applicable laws.

Projects & Training

The projects give the following knowledge and understanding and skills:

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 Manufacturing Engineering and Production Technology over an extended period, 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.

The requirements of the specific specialization (Applied Engineering and Design) of the Manufacturing Engineering and Production Technology bachelor program consist of 50 credits (30.3% of total 165 credits), which are satisfied by completing Twenty-four (24) courses:

1. Twenty (20) Compulsory Applied Engineering, Projects, and Industrial Training Compulsory Courses equivalent to 40 credits (24.24%), as listed in table 4- a.
2. Four (4) Applied Engineering and Design Elective Courses equivalent to 10 credits (6.06%), as listed in table 4- b.

Table 4-a Requirements of the specific specialization of the program **Compulsory Courses**
(40 credits, 24. 24% of total 165 credits)

Course Code	Total credit	Contact Hours				Course Title	Prerequisites	Subject Area						
		L	T	P	Total			Social & Hum. Sc.	Business	Math. & B. Science	Engineering Culture	Basic Engineering	Applied Eng.&	Project & Ind.
MNFn060	-	-	-	-	-	Summer Training (1)	None							
MNFn160	-	-	-	-	-	Summer Training (2)	MNFn060							
MNFn222	3	2	3	-	5	MachineDesign-1	MNFn116					1	2	
MNFn223	3	2	1	2	5	Foundry Technology	MNFn112				1		1	1
MNFn224	3	2	3	-	5	Machine Design-2	MNFn222					1	2	
MNFn261	1	-	2	-	2	Seminar-1.	+66 Credit, GENn141, GENn142						1	
MNFn262	1	-	2	-	2	Seminar-2.	MNFn261						1	
MNFn260	-	-	-	-	-	Industrial Training (1)	+66 Credit MNFn160							
MNFn321	3	2	1	2	5	Joining Processes	MNFn112					1	2	
MNFn322	3	2	1	2	5	Computer Numerical Control, CNC Machines	MNFn213, MNFn121						3	
MNFn323	3	2	1	2	5	Computer Aided Design (CAD)	MNFn224					1	2	
MNFn324	3	2	1	2	5	Advanced Composite Materials	MNFn122					1	1	1
MNFn325	3	2	1	2	5	Modern Manufacturing Methods	MNFn221					1	2	

MNFn361	2	-	2	4	6	Project-1	MNFn262						1	1
MNFn360	-	-	-	-	-	Industrial Training (2)	+99 Credit MNFn260							
MNFn421	3	2	-	3	5	Computer Aided Manufacturing (CAM)	MNFn322					1	2	
MNFn422	3	2	2	1	5	Hydraulic Power Systems	MNFn211					1	2	
MNFn423	2	1	2	1	4	Production Aids Design	MNFn221						1	1
MNFn461	2	-	2	4	6	Project-2a	+132 credit MNFn361						1	1
MNFn462	2	-	2	4	6	Project-2b	MNFn461						1	1
Total	**40**	**21**	**26**	**29**	**76**	**24.24%**		**-**	**-**	**-**	**1**	**8**	**25**	**6**

Table 4-b Requirements of the specific specialization of the program
Elective Courses (10 credits, 6.06% of total 165 credits)

Course Code	Total credit	Contact Hrs				Course Title	Prerequisites	Subject Area						
		L	T	P	Total			Social & Hum. Sc.	Business Administration	Math. & B. Science	Engineering Culture	Basic Engineering Sc.	Applied Eng.& Design	Project & Ind. Training
Elective 3	2	1	2	1	4	• MNFn331 Heat Transfer	MNFn214				1	1		
						• MNFn332 Mechanical Vibrations	MNFn115							
						• MNFn333 Production & Operations Management	None							
Elective 4	3	2	1	2	5	• MNFn434 Automation in Production & CIM	MNFn421					1	2	
						• MNFn437 Electro-Hydraulic and Pneumatic Systems.	MNFn313 MNFn422							
						• MNFn438 Advanced Casting Technology	MNFn223							
Elective 5	3	2	1	2	5	• MNFn430 Advanced Forming Technology	MNFn122					1	2	
						• MNFn431 Modeling and Simulation	MNFn213							
						• MNFn435 Advanced Facility Planning	MNFn312							
						• MNFn411 Quality Control and Quality Management	MTHn107							
Elective 6	2	1	2	1	4	• MNFn424 Industrial Thermal Systems	MNFn214					1	1	
						• MNFn432 Failure Analysis & Fracture	MNFn111							
						• MNFn436 Industrial Robotics	MNFn115 MNFn313							
Total	**10**	**6**	**6**	**6**	**18**	**6.06%**					**1**	**4**	**5**	

2.5.5. A SAMPLE STUDY PLAN

First Semester (Level zero)

Code	Subject	Total Credits	Contact Hours			
			L	T	P	Total
CMPn010	Program Design and Computer Languages.	4	2	3	2	7
GENn041	Contemporary Social Issues	2	2	-	-	2
MNFn001	Engineering Graphics-1	2	1	3	-	4
GENn043	History of Engineering and Technology	2	2	-	-	2
MECn001	Mechanics -1	2	1	3	-	4
MTHn001	Mathematics -1 (Algebra and Calculus)	3	2	3	-	5
PHYn001	Physics -1	3	2	1	2	5
	Total	18	12	13	4	29

Second Semester (Level zero)

Code	Subject	Total Credits	Contact Hours			
			L	T	P	Total
CHEn001	Chemistry.	3	2	1	2	5
MNFn002	Engineering Graphics-2	2	1	3	-	4
GENn042	English Language.	2	2	-	-	2
MECn002	Mechanics-2	2	1	3	-	4
MTHn002	Mathematics -2(Integration and Analytic Geometry)	3	2	3	-	5
PHYn002	Physics-2.	3	2	1	2	5
MNFn003	Principles of Production Engineering	3	2	-	3	5
Total		18	12	11	7	30

Summer Training

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MNFn060	Summer Training-1	-	-	-	-	-
	Total	-	-	-	-	-

Third Semester (Level One)

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MTHn103	Math-3 (Differential Equations and Transforms)	3	2	3	-	5
MNFn111	Mechanics of materials	3	2	3	-	5
MNFn112	Fundamentals of Materials Science	3	2	1	2	5
MNFn113	Mechanics of Machines-1	2	1	3	-	4
GENn142	Technical Report Writing	2	2	-	-	2
MNFn114	Machine Drawing-1	3	2	3	-	5
	Total	16	11	13	2	26

Fourth Semester (Level One)

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MTHn105	Math-5 (Numerical Analysis)	3	2	2	-	4
MNFn115	Mechanics of Machines-2	2	1	3	-	4
MNFn122	Materials Technology and Testing	3	2	1	2	5
GENn141	Presentation Skills	2	2	-	-	2
MNFn121	Metal Cutting Processes	3	2	1	2	5
MNFn116	Machine Drawing-2	3	2	3	-	5
	Total	16	11	10	4	25

Summer Training

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MNFn160	Summer Training-2	-	-	-	-	-
	Total	-	-	-	-	-

Fifth Semester (Level Two)

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MTHn209	Mathematics 9 Applications of Advanced Calculus	3	2	2	-	4
MNFn211	Fluid Mechanics	3	2	2	1	5
MNFn221	Metals Cutting Theory	3	2	1	2	5
ENGn213a	Advanced Computer Systems Implementation.	3	2	-	2	4
MNFn222	Machine Design-1	3	2	3	-	5
	Total	15	10	8	5	23

Sixth Semester (Level Two)

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MTHn107	Math-7 (Introduction to Probability and Statistics)	3	2	2	-	4
MNFn223	Foundry Technology	3	2	1	2	5
MNFn224	Machine Design-2	3	2	3	-	5
MNFn214	Thermodynamics	3	2	2	1	5
ELCn216	Electro Engineering	3	2	1	2	5
MNFn261	Seminar-1	1	-	2	-	2
	Total	16	10	11	5	26

Summer Training

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MNFn260	Industrial Training (1)	-	-	-	-	-
	Total	-	-	-	-	-

Seventh Semester (Level Three)

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MNFn262	Seminar-2.	1	-	2	-	2
MNFn225	Engineering Metrology	2	1	1	2	4
MNFn213	Computer Applications	2	1	-	3	4
ELCn217	Electric Machines	3	2	1	2	5
MNFn321	Joining Processes	3	2	1	2	5
MNFn312	Industrial Operations Research	3	2	3	-	5
Elective 1	**Elective course of University Requirements** • GENn351c Technical English • GENn352 Risk Management. • GENn353a Industrial Psychology	2	2			2
Total		16	10	8	9	27

Eighth Semester (Level Three)

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MNFn323	Computer Aided Design (CAD)	3	2	1	2	5
MNFn311	Mechanical Measurements	3	2	1	2	5
MNFn322	Computer Numerical Control (CNC) Machines	3	2	1	2	5
MNFn313	Automatic Control	3	2	2	1	5
MNFn325	Modern Manufacturing Methods	3	2	1	2	5
MNFn361	Project-1	2		2	4	6
	Total	17	10	8	13	31

Summer Training

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MNFn360	Industrial Training (2)	-	-	-	-	-
	Total	-	-	-	-	-

Ninth Semester (Level Four)

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MNFn421	Computer Aided Manufacturing (CAM)	3	2	-	3	5
MNFn461	Project-2a	2	-	2	4	6
GENn341c	Project Management.	2	2	-	-	2
MNFn422	Hydraulic Power Systems	3	2	2	1	5
ENGn311	Engineering Economy.	2	2	1	-	3
Elective 2	**Elective course of University Requirements** • GENn451 Environmental Effects of Electromagnetic Waves • GENn452 Civilization and heritage • GENn453 Marketing	2	2	-	-	2
Elective 3	**Elective Course of Specific Specialization** • MNFn331 Heat Transfer • MNFn332 Mechanical Vibrations • MNFn333 Production and operation control.	2	1	2	1	4
	Total	16	11	7	9	27

Tenth Semester (Level Four)

Code	Course	Credit Hours	Contact Hours			
			L	T	P	Total
MNFn423	Production Aids Design	2	1	2	1	4
ENGn312a	Engineering Laws and Professional ethics.	2	2	-	-	2
MNFn324	Advanced Composite Materials	3	2	1	2	5
MNFn462	Project-2b	2	-	2	4	6
Elective 4	**Elective Course of Specific Specialization** • MNFn434 Automation in Production &CIM • MNFn437 Electro- Hydraulic and Pneumatic Systems • MNFn438 Advanced casting techniques	3	2	1	2	5
Elective 5	**Elective Course of Specific Specialization** • MNFn430 Advanced Forming Techniques • MNFn431 Modeling and Simulation • MNFn435 Advanced Facility Planning • MNFn411 Quality Control and Quality Management	3	2	1	2	5
Elective 6	**Elective Course of Specific Specialization** • MNFn424 Industrial Thermal Systems • MNFn432 Failure Analysis & Fracture • MNFn436 Industrial Robotics	2	1	2	1	4
	Total	17	10	9	12	31

2.5.6. CONFORMITY to the ENGINEERING SECTOR of the SCU

The Manufacturing Engineering and Production Technology BSc program includes 68 courses of total 165 credit hours, equivalent to **275** contact hours (the contact hours of the industrial training are not included in this number). These courses are classified according to the requirements of the engineering sector of the supreme council of Universities (SCU) to the following subject areas:

	Achieved	**Range**
1) University Requirements	9.7%	(6-10%)
2) Faculty/Institute requirements	24.24%	(22-30%)
3) Requirements of the general specialization of the program	35.76%	(30-35%)
4) Requirements of the specific specialization of the program	30.3%	(20-30%)

The program credit hours were also classified according to the Reference framework approved by the (SCU) on 2016 to the following subject areas:

	Achieved	**Range**
1. Social & Humanitarian Science	8.48%	(8-12%)
2. Business Administration	3.03%	(2-4%)
3. Mathematics and Basic Science	21.21%	(18-22%)
4. Engineering Culture	6.67%	(4-6%)
4. Basic Engineering Science	30.30%	(25-30 %)
6. Applied Engineering and Design	26.06%	(25-30 %)
7. Project Industrial Training	4.24%	(4-6%)

The collective credit hours are shown in the following table. This table shows that the Credit hours' distribution of the Manufacturing Engineering and Production Technology BSc program agrees with the requirements of the Engineering Sector of the Supreme Council of Universities (SCU) as well as the reference framework approved by the (SCU) in 2016.

Table 1.4.5 **Conformity to the Engineering Sector of the SCU**

		Subject Area									
		Social & Hum. Sc.	**Business**	**Math. & B. Science**	**Engineering Culture**	**Basic Engineering Sc.**	**Applied Eng.& Design**	**Project & Ind. Training**	**Total Credit Hours**	**Percentage**	**Eng. Sec. Requirements for subject area %**
Requirements of the Eng. Sector of the SCU	University Requirements (General cultural courses requirements)	12	4						16	9.7	6-10%
	Faculty/Institute requirements (Mathematics & Basic Science Courses)		1	22	7	9	1		40	24.24	22-30%
	Requirements of the general specialization of the program (Basic Engineering Courses)	2	0	13	2	29	12	1	59	35.76	30-35%
	Requirements of the specific specialization of the program (Applied Engineering and Design)	0	0	0	2	12	30	6	50	30.3	20-30%
	Total Credit Hours	14	5	35	11	50	43	7	165	100	
	Percentage	8.5	3	21.2	6.7	30.3	26.1	4.2	100		
	Requirements for subject areas%	8-10	2-4	18-22	4-6	25-30	25-30	4-6			

2.6. Course Competencies Mapping / Program competencies

The contribution of the individual courses to the program competencies are indicated in the courses specifications and revised following the evaluation of the mapping matrix.

Table Program competencies/Course Competencies Mapping

Courses		Program Competencies															
Code	Title	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CHEn001	Chemistry.	1	1	1	1	1	1	1	1	1	1						
CMPn010	Program Design and Computer Languages.	1	1	1		1	1			1	1						
ELCn216	Electro Engineering	1	1	1	1			1	1	1	1		1	1			
ELCn217	Electric Machines	1	1	1	1	1	1	1	1	1		1	1	1	1		
ENGn213a	Advanced Computer Systems Implementation	1	1	1	1	1		1	1	1	1	1	1	1	1		
ENGn311	Engineering Economy	1	1	1	1	1		1	1	1	1	1	1		1		
ENGn312a	Engineering Laws and Professional Ethics		1	1	1	1	1	1	1	1	1						
GENn041	Contemporary Social Issues		1	1	1	1		1	1	1	1						
GENn042	English Language.					1			1	1	1						
GENn043	History of Engineering and Technology.							1	1	1	1						
GENn141a	Presentation Skills.					1		1	1		1						
GENn142	Technical Report Writing.					1	1		1								
GENn341c	Project Management.	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
GENn351c	Elective1 Technical English.	1	1	1	1	1		1	1	1	1				1		
GENn352	Elective1 Risk Management.		1	1	1	1	1	1	1	1	1						
GENn353a	Elective1 Industrial Psychology			1	1	1		1	1	1	1						
GENn451a	Electuve2 Environments Effects of Electromagnetic Waves.		1	1	1	1	1	1	1	1	1						
GENn452a	Elective2 Civilization and heritage	1		1		1		1	1	1	1		1		1		
GENn453	Elective2 Marketing	1	1					1	1	1	1						
MECn001	Mechanics-1.	1				1		1	1	1	1						
MECn002	Mechanics-2.	1	`			1		1	1	1	1						
MNFn001	Engineering Graphics 1.	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn002	Engineering Graphics 2.	1	1	1	1	1	1	1	1	1	1						
MNFn003	Principles of Production Engineering.	1	1	1	1	1	1	1	1	1	1	1	1	1			
MNFn060	Summer training for level zero	1	1			1		1	1	1	1				1		
MNFn111	Mechanics of Materials	1	1	1	1			1	1			1	1		1		
MNFn112	Fundamentals of Materials Science	1	1	1	1	1	1	1	1	1	1		1	1			
MNFn113	Mechanics of Machines-1	1	1	1				1	1		1	1	1				
MNFn114	Machine Drawing-1	1			1			1	1		1	1	1	1	1		
MNFn115	Mechanics of Machines-2	1	1	1		1		1			1	1	1				
MNFn116	Machine Drawing-2	1		1	1			1	1	1	1	1	1	1	1		
MNFn121	Metal Cutting Processes	1	1	1	1	1		1	1	1	1	1		1			
MNFn122	Materials Technology and Testing	1	1	1		1	1		1	1	1	1	1	1		1	
MNFn160	Summer training for level one	1	1			1		1	1	1	1				1		
MNFn211	Fluid Mechanics	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn213	Computer Applications	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MNFn214	Thermodynamics	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn221	Metals Cutting Theory	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn222	Machine Design-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn223	Foundry Technology	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn224	Machine Design-2	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn225	Engineering Metrology	1	1	1	1	1		1		1	1	1	1	1	1		
MNFn260	Industrial Training (1)	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn261	Seminar-1.	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn262	Seminar-2.	1	1	1	1	1	1	1	1	1	1	1	1	1	1		

Courses		Program Competencies															
Code	**Title**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
MNFn311	Mechanical Measurements	1	1	1	1	1		1		1	1	1	1	1	1		
MNFn312	Industrial Operations Research	1	1	1		1	1	1	1	1	1						
MNFn313	Automatic Control	1	1	1		1			1		1	1	1		1		
MNFn321	Joining Processes	1	1	1	1	1	1	1	1	1	1		1	1	1		
MNFn322	Computer Numerical Control, CNC Machines	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MNFn323	Computer Aided Design (CAD)	1	1	1	1					1	1	1	1			1	1
MNFn324	Advanced Composite Materials	1	1	1	1	1		1		1	1	1	1	1	1		
MNFn325	Modern Manufacturing Methods	1	1	1	1	1		1	1	1	1	1		1		1	1
MNFn331	Elective3 Heat Transfer	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn332	Elective3 Mechanical Vibrations	1		1		1				1	1	1	1	1	1		
MNFn333	Elective3 Production and Operations Management	1	1	1		1	1		1		1						
MNFn360	Industrial Training (2)	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn361	Project-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn411	Elective 6: Quality Control and Quality Management	1	1		1			1	1	1	1						
MNFn421	Computer Aided Manufacturing (CAM)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MNFn422	Hydraulic Power Systems	1	1	1		1		1	1	1	1	1	1	1			
MNFn423	Production Aids Design	1	1	1	1	1	1	1	1	1	1		1	1	1		
MNFn424	Elective 6: Industrial Thermal Systems	1	1	1	1	1	1	1	1	1	1	1		1			
MNFn430	Elective5 Advanced Forming Techniques	1	1	1	1	1	1	1	1	1	1		1	1	1		
MNFn431	Elective5 Modeling and Simulation	1	1	1	1	1	1	1	1	1	1	1	1			1	1
MNFn432	Elective 6: Failure Analysis & Fracture	1	1	1		1		1	1	1	1	1	1	1			
MNFn434	Elective4 Automation in Production & CIM	1	1	1	1	1		1	1	1	1			1		1	1
MNFn435	Elective5 Advanced Facility Planning	1	1	1	1	1	1	1	1	1	1						
MNFn436	Elective 6: Industrial Robotics	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MNFn437	Elective4 Electro- Hyd. and Pneumatic Systems	1	1					1	1		1	1	1				
MNFn438	Elective4 Advanced casting techniques	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn461	Project-2a	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MNFn462	Project-2b	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MTHn001	Mathematics-1(Algebra and Calculus).	1				1		1	1	1	1						
MTHn002	Mathematics-2(Integration and Analytic Geometry).	1	1			1		1	1	1	1						
MTHn103	Mathematics -3(Differential Equations and Transforms).	1	1			1		1	1	1	1						
MTHn105	Mathematics-5 (Numerical Analysis)	1	1			1		1	1	1	1						
MTHn107	Mathematics -7 (Introduction to Prob. &Statistics)	1	1			1		1	1	1	1						
MTHn209	Mathematics 9 (Applications of Advanced Calculus)	1	1			1		1	1	1	1						
PHYn001	Physics-1	1	1	1	1	1		1	1	1	1				1	1	1
PHYn002	Physics -2.	1	1	1	1	1		1	1	1	1				1	1	1
Number of Contributing Courses		72	69	63	54	71	40	73	74	72	78	44	46	42	41	11	10
Percentage of Contributing Courses		89	85	78	67	88	49	90	91	89	96	54	57	52	51	14	12

The contribution of the individual courses to the program competencies are marked in the courses specifications and revised following the evaluation of the mapping matrix. Therefore, the courses specifications are approved by the department scientific council following the program specification approval.

2.7. Courses Specifications

The detailed program courses specifications are given in **Appendix 1.** These courses specifications were revised and approved in **August 2020**. The contribution of each course to the program competencies were considered during this revision.

3. Program Admission Requirements

- Admission is fully organized by the admission office of the Ministry of Higher Education.
- Secondary School Certificate Graduates of other countries are eligible to join this program if they met the minimum grades set by Admission Office of the Ministry of Higher Education.
- The study begins with the first year for all students before specialization in different disciplines. Students' departmental allocation is in accordance with the student's desire and the Academy Council regulations.

4. Regulations for Progression and Program Completion

1) Attendance of program is on full-time basis.
2) The study follows the credit hour system with two major semesters, 15-Week each and one, 8-Week- semesters per year.
3) A minimum of 75 % student attendance to lectures, tutorials and laboratory exercises per course is conditional for taking the final exams of the course, in accordance with the Departmental Board recommendation approved by the Faculty Council, otherwise students would be deprived from taking their final exam(s).
4) If a course includes written and oral / lab tests, the course evaluation is made according to the total mark of all tests in addition to the academic standing throughout the semester.
5) No mark is recorded for the student who fails to appear in the written examination.

The details of program progression and grades evaluation are explained by **Appendix 3**.

5. Teaching, learning and assessment Methods

Program Competencies	Teaching Methods							Learning Methods					Assessment Method					
	Lecture	Tutorials	Lab. Experiments	Projects	Problem solving	Brain storming	Sketches	Modeling & Simulation	Research & Reports	Discovering	Cooperative	Self-learning	Written Exam	Practical Exam	Quizzes	Term papers	Research & Presentations	Assignments
C1	1	1	1		1		1		1	1	1		1	1	1			1
C2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1
C3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C4	1	1	1	1	1	1	1	1	1	1	1		1	1	1		1	1
C5		1	1	1	1	1			1	1	1	1		1		1	1	1
C6			1	1	1	1	1		1	1	1	1		1		1	1	
C7		1	1	1	1	1	1	1	1	1	1	1		1		1	1	1
C8	1	1	1	1	1	1	1	1	1	1	1			1		1	1	
C9	1	1	1	1	1	1			1	1	1	1		1		1	1	
C10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C11	1	1	1	1	1			1	1	1	1		1	1	1		1	1
C12	1	1	1	1	1			1	1	1	1	1	1	1	1		1	1
C13	1		1	1	1	1	1		1	1	1			1			1	
C14	1	1	1	1	1				1	1	1		1	1	1			
C15	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1
C16		1	1	1	1		1	1	1	1	1		1	1			1	

6. Evaluation of Quality of teaching and learning

Evaluator	Tool
1- Senior students	Questionnaires
2- Alumni	Questionnaires
3- Stakeholders	Questionnaires
4- External Evaluator(s) (External Examiner (s))	Reports
5- Other societal parties	Questionnaires

Appendix 1
Courses Specifications

The courses of the Manufacturing Engineering and Production Technology BSc Program are given in Table A2-1, Followed by the course's description.

Table A2-1 Manufacturing Engineering and Production Technology BSc Program Courses

SN	Course Code	Course Title	
1.	CHEn001	Chemistry.	
2.	CMPn010	Program Design and Computer Languages.	
3.	ELCn216	Electro Engineering	
4.	ELCn217	Electric Machines	
5.	ENGn213a	Advanced Computer Systems Implementation	
6.	ENGn311	Engineering Economy	
7.	ENGn312a	Engineering Laws and Professional Ethics	
8.	GENn041	Contemporary Social Issues	
9.	GENn042	English Language.	
10.	GENn043	History of Engineering and Technology.	
11.	GENn141a	Presentation Skills.	
12.	GENn142	Technical Report Writing.	
13.	GENn341c	Project Management.	
14.	GENn351c	Elective1 Technical English.	
15.	GENn352	Elective1 Risk Management.	
16.	GENn353a	Elective1 Industrial Psychology	
17.	GENn451a	Elective2 Environments Effects of Electromagnetic Waves.	
18.	GENn452a	Elective2 Civilization and heritage	
19.	GENn453	Elective2 Marketing	
20.	MTHn001	Mathematics-1(Algebra and Calculus).	
21.	MTHn002	Mathematics-2(Integration and Analytic Geometry).	
22.	MTHn103	Mathematics -3(Differential Equations and Transforms).	
23.	MTHn105	Math-5 (Numerical Analysis)	
24.	MTHn107	Mathematics -7 (Introduction to Prob. &Statistics)	
25.	MTHn209	Mathematics 9 (Applications of Advanced Calculus)	
26.	PHYn001	Physics-1	
27.	PHYn002	Physics -2.	
28.	MECn001	Mechanics -1.	
29.	MECn002	Mechanics-2.	
30.	MNFn001	Engineering Graphics 1.	
31.	MNFn002	Engineering Graphics 2.	
32.	MNFn003	Principles of Production Engineering.	
33.	MNFn060	Summer training for level zero	
34.	MNFn111	Mechanics of Materials	
35.	MNFn112	Fundamentals of Materials Science	
36.	MNFn113	Mechanics of Machines-1	
37.	MNFn114	Machine Drawing-1	
38.	MNFn115	Mechanics of Machines-2	
39.	MNFn116	Machine Drawing-2	
40.	MNFn121	Metal Cutting Processes	
41.	MNFn122	Materials Technology and Testing	
42.	MNFn160	Summer training for level one	
43.	MNFn211	Fluid Mechanics	
44.	MNFn213	Computer Applications	
45.	MNFn214	Thermodynamics	
46.	MNFn221	Metals Cutting Theory	
47.	MNFn222	Machine Design-1	
48.	MNFn223	Foundry Technology	
49.	MNFn224	Machine Design-2	

50.	MNFn225	Engineering Metrology	
51.	MNFn260	Industrial Training (1)	
52.	MNFn261	Seminar-1.	
53.	MNFn262	Seminar-2.	
54.	MNFn311	Mechanical Measurements	
55.	MNFn312	Industrial Operation Research	
56.	MNFn313	Automatic Control	
57.	MNFn321	Joining Processes	
58.	MNFn322	Computer Numerical Control, CNC Machines	
59.	MNFn323	Computer Aided Design (CAD)	
60.	MNFn324	Advanced Composite Materials	
61.	MNFn325	Modern Manufacturing Methods	
62.	MNFn331	Elective3 Heat Transfer	
63.	MNFn332	Elective3 Mechanical Vibrations	
64.	MNFn333	Elective3 Production and Operations Management	
65.	MNFn360	Industrial Training (2)	
66.	MNFn361	Project-1	
67.	MNFn411	Elective 6: Quality Control and Quality Management	
68.	MNFn421	Computer Aided Manufacturing (CAM)	
69.	MNFn422	Hydraulic Power Systems	
70.	MNFn423	Production Aids Design	
71.	MNFn424	Elective 6: Industrial Thermal Systems	
72.	MNFn430	Elective5 Advanced Forming Techniques	
73.	MNFn431	Elective5 Modeling and Simulation	
74.	MNFn432	Elective 6: Failure Analysis & Fracture	
75.	MNFn434	Elective4 Automation in Production & CIM	
76.	MNFn435	Elective5Advanced Facility Planning	
77.	MNFn436	Elective 6: Industrial Robotics	
78.	MNFn437	Elective4 Electro- Hyd. and Pneumatic Systems	
79.	MNFn438	Elective4 Advanced casting techniques	
80.	MNFn461	Project-2a	
81.	MNFn462	Project-2b	

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Course Specification
CHEn001: Chemistry

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology BSc program
Department offering the course:	Basic Science Department
Date of specifications approval:	August 202٠

B - Basic Information

Title: Chemistry | **Code:** CHEn001 | **Level:** ZERO
Credit Hours: 3 | **Lectures:** 2 | **Tutorial/Exercise:**1 | **Practical:** 2
Pre-requisite: None

C - Professional information
1 – Course Learning Objectives:

By the end of this course the students should be able to demonstrate the knowledge and understanding of the basic concepts and theory of Chemical Engineering subjects such as: gas laws, gas liquidation, electro chemistry and its applications, thermo chemistry and its applications, solutions, and antifreezes to understand some of chemical industries in different fields such as polymers, lubricants, Soaps and detergents, petrochemicals, cement Industry, water treatments and desalination.

2 – Competencies:

c1. Identify and formulate key facts, concepts, principles and techniques of Gas and Liquid states of Matter. (C1, C2)
c2. Identify theories relevant to Electrochemistry, solutions and thermo chemistry. (C1, C2, C3)
c3. Apply some chemical industries in different fields such as Eng. practices and regulatory farm works in chem. Eng. Industry. (C1, C3)
c4. Technology Supporting water treatments and Desalination Techniques and Scientific principles of petroleum extraction and refining. (C1, C2, C4)
c5. Basic principles for fuel classification and knowing its optimum characteristics, also identify advantage and disadvantage of them. (C1, C2)
c6. Apply chem. Principles and analytical thinking to problems of Gases, Liquids and electrochemistry and determine its effective solutions. (C3, C4, C5)
c7. Select and develop appropriate Some petrochemical Technologies. (C4)
c8. Overlap different scientific subjects to reach a new scientific system with a better quality. (C5, C6, C7)
c9. Select appropriate solutions for corrosion problems based on analytical thinking. (C5, C6, C7)
c10. Apply knowledge of scientific equipment and instrumentation competently to determine known concentration and solve its problem. (C1, C2, C3, C6)
c11. Employ computational facilities, measuring instruments, Laboratory tools and equipment to design an experiment to treat underground water and make it safe for Human use. (C1, C4, C5, C9)
c12. Improve plan and execute project work including the preparation of descriptive and interpretative technical reports. (C8, C9, C10)
c13. Apply experimental facilities to investigate the system performance. (pH and water hardness degree). (C8, C9, C10)
c14. Prepare and present technical materials. (Soaps, detergents, and some polymeric samples). (C2, C3, C5)

c15. Observe, record, and analyze data in lab. As well as in Field (Lab Fresh water and underground water). (C3, C4)
c16. Use appropriate tools to measure system performance. (C3, C4)
c17. Present work both in written and oral form. (C9, C10)
c18. Improving own learning and performance, personal skills, working with others. (C9, C10)
c19. Search for information from references, journals, and internet. (C8, C9, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9 & C10

3 – Contents

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Gas law and gas liquefaction.	4	2	-
2	Liquid state, Refrigeration & heat pump.	4	1	-
3	Electrochemistry	2	1	-
4	Metallic corrosion.	2	1	
5	Solution & Antifreezes	2	1	-
6	Thermo chemistry & solar heat, Rocket.	2	1	-
7	Assessment (M.T)	2	1	-
8	Water treatment and destitution	2	1	10
9	Polymer and Industry	2	1	-
10	Fuels and combustion	2	1	-
11	Chemistry and tech. of petroleum new trends in energy resource	2	1	-
12	Industrial detergents chemistry such cement, lubricants, soap	2	1	6
13	Acid - base titration	-	-	8
14.15	Revision and sheets	2	2	6
	Total hours	**30**	**15**	**30**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																		
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
Gas law and gas liquefaction.	1					1												1	
Liquid state, Refrigeration & heat pump.						1												1	
Electrochemistry &Metallic corrosion.		1				1			1									1	
Solution & Antifreezes		1																1	
Thermo chemistry & solar heat, Rocket.		1																	
Pollution																			1
Water treatment and destitution				1						1	1		1		1	1			
Polymer and Industry												1							
Fuels and combustion					1														
Chemistry and tech. of petroleum new trends in energy resource							1	1											1
Industrial detergents chemistry such cement, lubricants, soap			1					1		1				1			1		
Acid - base titration										1						1	1		
Revision and sheets												1					1		
Topics Covering Competencies	1	3	1	1	1	3	1	2	1	3	3	2	1	1	1	1	3	4	2
% Topics Covering Competencies	8	23	8	8	8	23	8	15	8	23	23	15	8	8	8	8	23	31	15

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1			1	١		١			1	1		1		
c2	1	1		١	١			1		1	1	١	١		
c3	1	1	١			١	١			1				١	
c4	1	1	١	١	١	١		١		1	1	١	١		
c5	1	1		1				1					1	١	
c6	1	1	١	1	1					1	1		1		
c7	1	1	١					١		1	1		1	١	
c8	1	1			١	1	1						1	1	
c9	1	1					1	1	1	1	1		1	1	
c10	1			1	1	١				1	1		1		
c11	1		١			1	١	1		1	1		1		
c12	1			١		1	1	1						١	
c13	1	1	1				1		1					1	
c14	١		١			١	1	1				١		1	
c15						1	١	1				1		1	
c16						1	١	١						١	
c17	١		١			١	1	١							
c18	١		١					1						1	
c19	١		1					1						1	
∑	١٧	٩	١٠	٧	٦	١٠	١١	١٣	2	٩	٨	٤	10	١٢	0
%	89	47	53	37	32	53	58	68	11	47	42	21	53	63	0

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	2 Quizzes (one each 4 Weeks)	10
	Assignments	3 assignments per semester	5
	report	One report per semester	5
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Goda, S. and Assran, A. Chemistry for Engineering & Applied Sciences, Lecture note, 2012.

7-2 Required books

- Sunita Rattan (2013), A Textbook of Engineering Chemistry, Kaston Books, New Delhi

7-3 Recommended books: None

7-4 Periodicals, Web sites, etc.

- www.seciensedaily.com
- www.encyclopedia.com
- www.nasa,com
- www.science.com

8 – Facilities required for teaching and learning:

- Chemistry lab.
- Computer, Data show.
- Computer programs.

Course coordinator:	Dr. Shaaban Ragab Goda
Head of the Department:	Prof. Dr. Ashraf Taha
Date:	August 2020

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Course Specification
CMPn010: Program Design and Computer Languages

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology BSc program
Department offering the course:	Computer Engineering and Information Technology Department.
Date of specifications approval:	August 2020

B - Basic Information

Title: Program Design and Computer Languages	**Code:** CMPn010	**Level:** Freshman / Fall	
Credit Hours: 4	**Lectures:** 2	**Tutorial/Exercise:** 3	**Practical:** 2
	Pre-requisite: None		

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competences related to the construction and operation of the concepts of programming, the steps of solving problems using flowcharts or using the C++ programming language. They should be able to develop and enhance programming using the Microsoft Visual C++ software (embedded in the Microsoft Visual Studio software package). also takes up various programming techniques such as design, implementation, testing, troubleshooting and documentation.

2 – Competencies:

c1- Use programming methodologies to design and implement programs. (C1, C2, C3
c2- Utilize codes of practice and contemporary technologies of programming(C4)
c3- explain fundamental concepts such as classes, information hiding, constructors, methods, and other related, object-oriented concepts (C9, C10),
c4- Practice research to updates new algorithms and method of programming(C5)
c5- Understand dynamic and static memory management(C3)
c6- Plan, supervise and carry out testing and troubleshooting (C6
c7- Explain how to compile and run programs (C2, C3).
c8- Acquire and apply new application programs; and practice self-learning (C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C9 & C10

3 – Contents:

Weeks	Topics	Lecture hours	Tutorial hours	Practical hours
1	Steps for solving programs by computer programs	2	3	2
2	Program documentation and flow charts	2	3	2
3	Program structure in C++	2	3	2
4	Data types and declaration in C++	2	3	2
5	Input/output in C++ and I/O stream class, I/O manipulation	2	3	2
6	Operators and precedence in C++, Decision (Selection) Constructs in C++	2	3	2
7	Assessment (Mid-Term Exam)	2	3	2
8	Loops (Iterations) in C++	2	3	2
9	Arrays, Pointers, References, and dynamic allocation	2	3	2
10	Functions in C++, calling functions (by value, by reference)	2	3	2
11	Structures, Unions, Enumeration, and user-defined data types	2	3	2
12	Abstract data types (ADT), Concepts and Terminologies of Object-Oriented Programming (OOP)	2	3	2
13	Classes and objects	2	3	2
14	Constructors, destructors, friend functions	2	3	2
15	Polymorphism, encapsulation, inheritance,	2	3	2
	Total hours	**30**	**45**	**30**

4 – Course content/Course Competencies mapping matrix:

Topics	c1	c2	c3	c4	c5	c6	c7	c8
Steps for solving programs by computer programs	1						1	1
Program documentation and flow charts	1							1
Program structure in C++	1			1				
Data types and declaration in C++		1						
Input/output in C++ and I/O stream class, I/O manipulation				1		1	1	
Operators and precedence in C++, Decision (Selection) Constructs in C++		1		1				
Assessment (Mid-Term Exam)	1		1			1	1	
Loops (Iterations) in C++								
Arrays, Pointers, References, and dynamic allocation				1	1			
Functions in C++, calling functions (by value, by reference)			1	1		1	1	
Structures, Unions, Enumeration, and user-defined data types			1					

Abstract data types (ADT), Concepts and Terminologies of Object-Oriented Programming (OOP)		1	1	1	1			1
Classes and objects, Constructors, destructors, friend functions		1	1	1		1		
Polymorphism, encapsulation, inheritance,		1	1	1				
Carry out testing and troubleshooting						1		1
Topics Covering Competencies	4	5	6	8	2	5	4	4
% Topics Covering Competencies	27	33	40	53	13	33	27	27

5 - Teaching and Learning and Assessment methods:

Course Competences	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1			1	1	1				1		1	1		1
c2	1			1	1	1				1		1	1		1
c3	1			1	1	1				1		1	1		1
c4	1			1	1	1				1		1	1		1
c5	1			1	1	1	1	1		1		1	1		1
c6	1			1	1	1	1	1		1		1	1		1
c7	1			1	1	1	1	1		1		1	1		1
c8	1			1			1	1							
$\sum$	8	0	0	8	7	7	4	4	0	7	0	7	7	0	7
%	100	0	0	100	88	88	50	50	0	88	0	88	88	0	88

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	6
	Reports/Research	Two reports per semester	4
	Tutorials	3 Assignments per semester	6
	Mini project	Once per semester	4
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Lecture notes and handouts

7-2 Required books:

- Walter Savitch, (2006) Problem Solving with C++, Pearson Education Inc.
- Deitel & Deitel, (2001) C++ How to program, Prentice Hall.
- Al Stevens, (2000) C++ Programming Bible, IDG.

7-3 Recommended books:

- C++ Essentials, Sharam Hekmat, (2005) Programming Soft Corporation, www.pragsoft.com

7-4 Periodicals, Web sites, etc.:

- http://www.cplusplus.com/.

8 – Facilities required for teaching and learning:

- Computer Lab.
- Lecture and Exercise rooms equipped with projection and sound systems.
- High speed internet and communication facilities for distance learning.

Course coordinator:	Dr. Ehab El-Shimy
Head of the Department:	Dr. Abdel-Moneam Foda
Date:	August 2020

Modern Academy
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Course Specification
ELCn216: Electro Engineering

A- Affiliation

Relevant program:	Electronic Engineering and Communication Technology BSc Program Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Electronic Engineering and Communication Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Electro Engineering	**Code:** ELCn216	**Level:** 2nd Fall	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:**1	**Practical:** 2
	Pre-requisite: PHYn002		

C - Professional information

1 – Course Learning Objectives:

The objective of this course is to provide the students the relevant competencies (knowledge, skills, and attitudes) needed to understand and handle electromechanical equipment. They should compete on the theory and practice related to electric and magnetic quantities and elements, electric and magnetic forces and fields, electromagnetic induction, electric and magnetic circuits' analysis, and the electromagnetic field formation and propagation.

2 – Competencies:

- c1- Identify and clarify the significance of electro-mechanical interaction in industry. (C1, C2)
- c2- Identify the formulas, standard units of measurements, and basic dimensions for the electric and magnetic quantities and elements. (C1, C2)
- c3- Utilize Coulomb's law and its derivatives to calculate the electric force, field, potential energy, and potential for different configurations of point and line charges in different mediums. (C4, C12)
- c4- Utilize Lorentz's law and its derivatives to derive and calculate the magnetic force on a wire carrying-current, and to derive the motor equation. (C3, C13)
- c5- Explain the construction, operation, specification, and integration of the basic parts of the DC motor (C1, C2)
- c6- Utilize Biot & Savart's law, and Ampere`s law to derive and calculate the magnetic field outside and inside a wire carrying-current, a solenoid, and a toroid. (C3, C12)
- c7- Utilize Faraday's law, and Lenz's law to derive and calculate the induced emf, current, mutual induction, and self-induction. (C3, C12)
- c8- Analyze and compare the values of different parameters of different structures of magnetic circuits. (C3, C12)
- c9- Explain and formulate the electromagnetic field formation and propagation (C1, C2)
- c10- Apply relevant circuits analysis methodologies to Resistive, RL, RC, and RLC circuits in steady state and/or transient state. (C3, C12)
- c11- Practice self-learning and communicate effectively orally and in written form (C8, C10)
- c12- Collaborate effectively within multidisciplinary team. (C7, C9)

This course contributes to the following competencies: C1, C2, C3, C4, C7, C8, C9, C10, C12, & C13

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	**Introduction:** Significance of electro-mechanical interaction in industry Electric and Magnetic Quantities, Elements, Basic Dimensions, and Standards.	2	1	2
2	**Electricity:** Electric Force (Coulomb's law)	2	1	2
3	Electric Field	2	1	2
4	Electric Potential Energy, and Electric Potential	2	1	2
5	**Magnetism:** Magnetic Force (Lorentz's Law, and Motor Equation) Construction, operation, specification, and integration of the basic parts of the DC motor (Min-Project)	2	1	2
6	Magnetic Field (Biot & Savart's law, and Ampere`s law)	2	1	2
7	Assessment (Mid-Term Exam)	-	-	-
8	Electromagnetic Induction (Faraday's Law, and Lenz's Law)	2	1	2
9	Magnetic Circuits	2	1	2
10	Electromagnetic field formation and propagation	2	1	2
11	**Circuit Analysis:** Circuit Elements, Schematics, and Analysis Concept Ohm's Law, KCL, and KVL	2	1	2
12	Node Voltage Analysis Mesh Current Analysis	2	1	2
13	Superposition Analysis Thevenin's and Norton's theorems	2	1	2
14	RLC Circuits	2	1	
15	**Electrical Machines** Electrical Machine Types, Functions, and Applications. (Report)	4	2	4
Total hours		**30**	**15**	**30**

4 – Course content/Course Competencies mapping matrix.

Topics	Course Competencies											
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	C11	C12
1. The significance of electromechanical interaction in industry	1											
2. Electric and Magnetic Quantities, Elements, Basic Dimensions, and Standards.		1										
3. Electric Force (Coulomb's law)			1									
4. Electric Field			1									
5. Electric Potential Energy, and Electric Potential			1									
6. Magnetic Force (Lorentz's Law, and Motor Equation)				1	1							
7. Construction, operation, specification, and integration of the basic parts of the DC motor (Min-Project)					1							1

8. Magnetic Field (Biot & Savart's Law, and Ampere`s law)						1						
9. Electromagnetic Induction (Faraday's Law, and Lenz's Law)							1					
10. Magnetic Circuits								1				
11. Electromagnetic field formation and propagation									1			
12. Circuit Elements, Schematics, and Analysis Concept										1		
13. Ohm's Law, KCL, and KVL										1		
14. Node Voltage Analysis										1		
15. Mesh Current Analysis										1		
16. Superposition Analysis										1		
17. Thevenin's and Norton's theorems										1		
18. RLC Circuits										1		
19. Electrical Machines Types, Functions, and Applications. (Report)											1	
Topics Covering Competencies	1	1	3	1	2	1	1	1	1	7	1	1
% Topics covering Competencies	5	5	16	5	11	5	5	5	5	37	5	5

5- Teaching, Learning and Assessment methods:

Course Competences	Teaching Methods					Learning Methods			Assessment Method					
	Lecture	**Tutorials**	**Problem solving**	**Laboratory & Experiments**	**Discussions & seminars**	**Self-Learning**	**Research & Report**	**Assignments**	**Written Exam**	**Practical Exam**	**Quizzes**	**Assignments**	**Research & Report**	**Mini - Project**
c1					1		1	1					1	
c2	1	1	1						1		1			
c3	1	1	1	1					1			1		
c4	1	1	1	1					1	1	1			1
c5	1	1	1	1					1	1	1			1
c6	1	1		1					1	1		1		
c7	1	1		1					1	1	1			
c8	1	1	1	1					1			1		
c9	1	1							1			1		
c10	1	1	1	1					1	1		1		
c11				1	1				1			1	1	
c12				1										1
$\sum$	**9**	**9**	**6**	**9**	**2**	**1**	**1**	**1**	**10**	**5**	**4**	**6**	**2**	**3**
%	**47**	**47**	**32**	**47**	**11**	**5**	**5**	**5**	**52**	**26**	**21**	**32**	**11**	**16**

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work:	Assignments	2 Assignments per semester	10
	Quizzes	2 Quizzes per semester	10
	Mini-Project/Report	Once per semester	5 (Bonus)
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Mostafa AFIFI, (2018) ELCN 216, Electro-Engineering, Cairo, Egypt.
- Mostafa AFIFI, (2018) ELCN 216, Electro-Engineering (Lab.), Cairo, Egypt.

7-2 Required books:

- Allan Hambley, Electrical Engineering, Principles and Applications, Prentice Hall, 6th Edition, 2016.
- R. Feynman, R. Leighton, and M.L. Sand, "Feynman lecture on physics, Reading Mass", Addison-Wesley.1989.

7-3 Recommended books:

- Allan Hambley, Electrical Engineering, Principles and Applications, Prentice Hall, 2002.

7-4 Periodicals, Web sites, etc.:

- MIT Open Courseware
- https://ocw.mit.edu/index.htm (Last accessed January 2020)
- https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/ (Last accessed January 2020)

8 – Facilities required for teaching and learning:

- Circuit Lab, MATLAB, and machinery Lab.
- Computers, Data show and Computer programs; within the lecture room.

Course coordinator:	Prof. Dr. Ir. Mostafa S. Afifi
Head of the Department:	Prof.: Shouman S.E.I.
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
ELCn217: Electrical Machines

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology B.Sc. Program.
Department offering the program:	Manufacturing Engineering and Production Technology Department.
Department offering the course:	Electronic Engineering and Communication Technology Department.
Date of specifications approval:	August 2020.

B - Basic information

Title: Electrical Machines	**Code:** ELCn217	**Level:** Level 2 (Junior), Second Semester	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:** 1	**Practical:** 2
	Pre-requisite: ELCn216		

C - Professional information

1 – Course Learning Objectives:

A study of this course will enable the student to be familiar with all kinds of machines and transformers, and the application theory of their operations.

2 – Competencies:

- c1- Ampere's law and Magnetic fields properties. (C1)
- c2- Self-inductance and mutual inductance definition and equations. (C1)
- c3- Magnetic materials characteristics. (C6)
- c4- Magnetic circuits analysis. (C2, C9)
- c5- Construction and theory of operation of transformers. (C1, C2)
- c6- Ideal and real transformers analysis. (C2, C9)
- c7- Construction of direct current machines. (C1, C2)
- c8- Classification of direct current machines (shunt, series, and compound connections). (C4)
- c9- Rotational motions equations, equivalent circuits, and the speed control of alternating current machines. (C6, C9)
- c10- Three phase induction machine theory of operation, equivalent circuit, performance, torque speed characteristics. (C1, C9)
- c11- Synchronous machine operation, equivalent circuit, and voltage regulation. (C1, C9)
- c12- Automobile alternators performance and operations with variable loads (C1, C2).
- c13- Single phase motors construction, equivalent circuit, and torque-speed characteristics (C1, C9).
- c14- Stepper motors operation and control (C6).
- c15- Find the equivalent circuits of transformer and machines (C11).
- c16- Allocate any fault and know its reason (C3, C14).
- c17- Calculate the suitable machine parameters necessary for specific load (C11).
- c18- Choose the suitable operating torque-speed point for best machine performance (C12).
- c19- Calculate transformer and machines efficiency (C11).
- c20- Design a simple stepper motor controller (C12).
- c21- Measure equivalent circuit parameters of transformer and machines. (C3, C13)
- c22- Measure efficiency of transformer and machines. (C3, C13)
- c23- Measure voltage-current characteristics of generators. (C3, C12, C13)
- c24- Measure torque-speed characteristics of motors. (C3, C12)
- c25- Control torque-speed characteristic of three phase induction machines. (C4)
- c26- Test synchronous generator synchronization with grid. (C4)
- c27-Communicate effectivity through assignment (C8).
- c28-Work in stressful environment and within constraints (C7).
- c29-Effectively manage tasks, time, and resources (C9).
- c30-Search for information and engage in life-long self-learning discipline (C5).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C11, C12, C13 & C14

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3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Basic magnetic field laws.	2	1	-
2	Magnetic material characteristics.	1	-	-
3	Magnetic circuit and transformer analysis.	3	2	4
4	DC machine construction and operation.	2	2	3
5	DC machine classification and applications	4	2	4
6	AC machine operation and equivalent circuit.	3	2	2
7	Assessment (Mid-Term Exam)	-	-	-
8	Speed control of AC motors.	2	-	3
9	Three phase motors operation and equivalent circuit.	3	2	2
10	Toque-speed characteristics of AC motors.	1	-	3
11	Synchronous machine operation and equivalent circuit.	2	2	4
12	Automobile alternators.	2	-	2
13	Single phase motors.	3	2	2
14	Stepper motor operation	1	-	1
15	Revision	1	-	-
Total hours		**30**	**15**	**30**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																	
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
Basic magnetic field laws.	1	1																
Magnetic material characteristics.						1			1									
Magnetic circuit and transformer analysis.	1	1	1					1	1		1		1	1				
DC machine construction and operation.	1	1																
DC machine classification and applications			1	1	1	1		1	1		1		1					
AC machine operation and equivalent circuit.	1		1					1	1		1		1	1				
Speed control of AC motors.				1	1	1		1				1						
Three phase motors operation and equivalent circuit.	1							1	1		1		1					
Toque-speed characteristics of AC motors.	1								1			1						
Synchronous machine operation and equivalent circuit.	1		1	1				1	1		1		1	1				
Automobile alternators.	1	1	1		1									1				
Single phase motors.	1		1					1	1		1			1				
Stepper motor operation			1			1					1	1		1				

Topics	Course Competencies																	
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
Topics Covering Competencies	9	4	7	3	3	4	0	7	8	0	7	3	5	6	0	0	0	0
% Topics Covering Competencies	69	44	78	23	23	31	0	54	62	0	78	23	38	46	0	0	0	0

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1			1	1				1				
c2	1			1	1				1				1
c3	1								1			1	1
c4	1			1	1					1	1		
c5	1	1		1		1	1		1			1	
c6	1										1	1	
c7	1	1				1			1		1		
c8	1			1	1	1			1	1		1	
c9	1			1	1				1		1		1
c10	1			1	1	1			1	1			1
c11	1	1		1	1	1			1	1			1
c12	1								1				
c13	1			1	1				1		1	1	
c14	1			1					1				1
c15	1			1	1	1			1		1		1
c16	1					1			1	1			
c17	1			1					1				1
c18	1					1			1	1			1
c19	1			1		1			1		1		1
c20				1		1				1			
c21						1				1			
c22						1				1			
c23						1				1			
c24						1				1			

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c25	1			1		1				1		1	
c26	1					1				1			
c27	1			1						1		1	
c28						1				1			
c29						1							
c30	1												
∑	23	3	0	16	9	18	1	0	17	15	7	7	10
%	77	10	0	53	30	60	3	0	57	50	23	23	33

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	10
		12th Week	10
Semester Work	Quizzes	4 Quizzes (every 3 Weeks)	10
	Assignments	Bi-Weekly	10
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- H. Gamal, Electrical Machines, Cairo, 2012.
- H. Gamal, Electrical Machines, Practical Part, Cairo, 2012.

7-2 Required books

- "Electrical Engineering, Principle and Application", 2nd edition, Part-4, 2002.

7-3 Recommended books:

- None.

7-4 Periodicals, Web sites, etc.

- http://www.slideshare.net/jayleong111/electrical-machines-drives-and-power-systems.
- http://www.amazon.com/Electrical-Machines-Drives-Systems-Edition/dp/0131776916.

8 – Facilities required for teaching and learning:

- Electrical Machines Lab.
- Data Show.

Course coordinator: Dr. Haytham Gamal Mohamed.
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
ENGn213a: Advanced Computer Systems Implementation

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department
Date of specifications approval: August 2020

B - Basic Information

Title: Advanced Computer Systems Implementation
Code: ENGn213a **Level:** Sixth Semester (Level two)
Credit Hours: 3
Lectures: 2 **Tutorial/Exercise: -** **Practical:** 2
Pre-requisite: CMPn010

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to recognize the need of using computers as a tool in the engineering problem solving approach. They should compete on:

- Utilizing computer's software as a solving tool in the engineering problem.
- Understand different aspects of computer applications in mechanical engineering.
- Learn the basics of computer aided graphics and drafting.
- Use specialized computer packages in engineering graphics and analysis

2 – Competencies:

c1. Identify the role of computer applications in mechanical engineering (C1, C4).
c2. Learn the basic steps to use computer packages (such as SolidWorks) in solid modeling of parts, assemblies and in detail drawings (C1, C2).
c3. Acquire and apply new knowledge on understanding the numerical symbolic and programming capabilities of available mathematical software (such as MATLAB) in engineering analysis. (C11, C12)
c4. Use appropriate techniques for solid modeling approach and steps in part design and assemblies as well as in the preparation of detail drawings. (C3, C12)
c5. Assess the formulation of a real problem into a simulation model (C1, C4)
c6. Practice solving mechanical engineering problems using mathematical computer codes (C5, C10, C12).
c7. Recognize the importance of using computers and available software in mechanical engineering in cooperation with other to share, import and export technical data (C12, C13)
c8. View the general scope of available computer packages that can be used in mechanical engineering. (C10)
c9. Collaborate effectively within multidisciplinary team (C5, C7, C9).
c10. Practice self-learning and communicate effectively orally and in written form (C8, C10).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C8, C9, C10, C11, C12 & C13

3 – Contents

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• Introduction to Computer Applications for Mechanical Engineering	2		2
	• Introduction to: Computer Graphics (SolidWorks)	14		14
2 - 6	• Advanced solid modeling techniques in art design • Extrusion and revolve • Applications • Sweep and blend • Advanced Assemblies			

	• Working with configurations • Detail drawing (Drafting)			
7	Assessment (Mid-Term Exam)	2		
8 - 15	• Introduction to MATLAB • Engineering analysis • Introduction and basic vector and matrix • Polynomials and solution of linear systems • Programming and applications	12		12
	Total hours	**30**		**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies									
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**
Introduction to Computer Applications	1	1					1			
Introduction to: Computer Graphics	1	1					1			
Solid modeling techniques in art design		1	1	1						
Extrusion and revolve		1	1							
Applications	1	1		1	1	1		1	1	1
Sweep and blend		1	1							
Assemblies	1	1		1	1	1			1	1
Detail drawing (Drafting)										
Introduction to MATLAB	1	1					1			
Engineering analysis	1		1		1			1		
Introduction and basic vector and matrix	1		1					1		
Polynomials and solution of linear systems	1		1					1		
Topics Covering Competencies	8	8	6	3	3	2	3	4	2	2
% Topics Covering Competencies	67	67	50	25	25	17	25	33	17	17

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method				
	Lecture	**Presentations & Movies**	**Discussions & seminars**	**Tutorials**	**Problem solving**	**Laboratory & Experiments**	**Research, Reports & Assignments**	**Self-Learning**	**Modeling and Simulation**	**Written Exam**	**Tutorials**	**Practical Exam**	**Quizzes**	**Research & Presentations**
c1	1	1		1					1	1	1		1	
c2	1	1		1					1	1	1		1	
c3	1	1		1					1	1	1		1	
c4	1	1		1	1				1	1	1		1	
c5	1	1		1	1				1	1	1		1	
c6	1	1		1	1				1	1	1		1	
c7	1	1		1					1	1	1		1	
c8	1	1		1					1	1	1		1	
c9									1					
c10									1					
$\sum$	8	8	0	8	3	0	0	0	10	8	8	0	8	0
%	80	80	0	80	30	0	0	0	100	80	80	0	80	0

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	4 Quizzes (one each 3 Weeks)	10
	Reports/Research	Weekly	10
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes

- N. Gadallah, Lecture notes of Computer Applications for Mechanical Engineers, Modern Academy,2008

7-2 Required Book:

- None.

7-3 Recommended Books:

- Mortenson M. E. "Geometric Modeling", New York, John Wiley.
- Ralston, A. A., (1985), "First Course in Numerical Analysis" New York, McGraw-Hill.

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and learning:

- Computer lab. equipped with projection and sound systems.
- Computer, Data show and computer programs.
    - SolidWorks software package**.**
    - MATLAB software package**.**
- High speed internet and communication facilities for distance learning.

Course coordinator: Dr. Yahia Elattar
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
ENGn311: Engineering Economy

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc Program Electronic Engineering & Communication Technology BSc Program Computer Engineering & Information Technology BSc Program
Department offering the program:	Manufacturing Engineering & Production Technology Department. Electronic Engineering & Communication Technology Department. Computer Engineering & Information Technology Department.
Department offering the course:	Manufacturing Engineering & Production Technology Department.
Date of specifications approval:	August 2020

B - Basic Information

Title: Engineering Economy | **Code:** ENGn311 | **Level:** 2nd /Fall
Credit Hours: 2 | **Lectures:** 2 | **Tutorial/Exercise:**1 | **Practical:** -
Pre-requisite: None

C - Professional information

1 – Course Learning Objectives:

A study of this course will enable the student to:

- Evaluate the present and future money investment that devoted to the mechanics of time-value.
- Calculate and compare between alternatives based on their equivalent annual worthy, present worth, and rate of return.
- Account the effects of depreciation and taxes on economic evaluations in extensively treatment.

2 – Competencies:

c1- Apply mathematics, economics, and engineering principles to to identify, formulate, analyze, and solve engineering economic problems (C1, C4).
c2- Use the basics to the mechanics of time-value calculations and comparisons of alternatives based on their equivalent annual worthy, present worth, and rate of return. (C1, C10)
c3- Estimate and calculate the effects of both depreciation and taxes as well on economic evaluations (C2)
c4- Develop an understanding of managerial accounting and economic principles. (C3)
c5- Use appropriate techniques, skills, and tools to identify, formulate, analyze, and solve engineering economic problems. (C1, C9)
c6- Communicate effectively – graphically, verbally and in writing – the results of the modeling process to solve engineering economy problems with specialist users of engineering analyses. (C8)
c7- Adopt creative, innovative and flexible thinking for modeling solution process for economic problems. (C14)
c8- Use modern computer tools, such as spreadsheets, in financial realities from the business world including both opportunities and restrictions- that influence economic decisions. (C9, C10, C14)
c9- Use graphics effectively for justifying solutions to engineering economics problems. (C11)
c10- Search for information in references and internet. (C10, C12)
c11- Practice self-learning (C5, C10).
c12- Work in a team and involve in group discussion and seminars. (C7)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C8, C9, C10, C11, C12 & C14

3 – Contents

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• **Cash Flow**: Cash flow table, Cash flow diagram,	1	1	
1	➢ Equivalence and time Value of Money,	1		
2	• **Interest**: Simple & compound interest	2		
3	➢ Forms of payments: Single payment, Uniform payment.	2	1	
4	➢ Arithmetic series payment, Geometric series payment	2	1	
5	➢ Nominal & effective Interest rate	2		
6	• **Economic Analysis of Engineering Problems:** ➢ : Present worth method,	2	1	
7	**Assessment (Mid-Term Exam)**	2		
8	➢ Equivalent uniform annual method	2	1	
9	➢ Rate of return method	2	1	
10	• **Depreciation** ➢ Straight- line method	2	2	
11	➢ Sum – of- years digits method,	2	1	
12	➢ Double- declining balance method	2	1	
13	• **Tax Effects** ➢ Types of taxes	1		
13	➢ Tax credit	1	1	
14	➢ Marginal taxes.	1	1	
15	➢ Effect of taxes on economic decision.	3	2	
	Total hours	**30**	**14**	

4 – Course content/Course Competencies mapping matrix

Topics	Course Competencies											
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12
Cash Flow: Cash flow table, Cash flow diagram,	1			1	1							1
Equivalence and time Value of Money,	1			1	1							1
Interest: Simple & compound interest	1			1	1		1	1	1			1
Forms of payments: Single payment, Uniform payment.				1	1		1	1	1			1
Arithmetic series payment, Geometric series payment				1	1		1	1	1			1
Nominal & effective Interest rate				1	1		1	1				1
• **Economic Analysis of Engineering Problems:** Present worth method,	1	1			1	1		1	1			1
Equivalent uniform annual method	1	1			1	1		1	1			1
Rate of return method	1	1			1	1		1	1			1
• **Depreciation** Straight- line method	1		1		1	1			1	1		1
Sum – of- years digits method,	1		1		1	1			1	1		1
Double- declining balance method	1		1		1	1			1	1		1
• **Tax Effects** Types of taxes			1		1						1	
Tax credit			1		1					1	1	
Marginal taxes.			1		1					1	1	
Effect of taxes on economic decision.	1		1		1	1			1			1
Topics Covering Competencies	10	3	7	6	16	7	4	7	10	5	3	13
% Topics Covering Competencies	63	19	44	38	100	44	25	44	63	31	19	81

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1			1	1		1			1	1		1		
c2	1			1	1		1			1	1		1		
c3	1			1	1		1			1	1		1		
c4		1	1					1						1	
c5	1	1	1	1	1		1		1	1	1		1	1	
c6		1	1				1	1						1	1
c7	1	1	1	1	1		1	1	1	1	1		1	1	1
c8	1	1	1	1	1		1			1	1		1	1	
c9	1	1	1	1	1		1			1	1		1	1	
c10		1	1				1	1						1	1
c11		1	1				1	1						1	1
c12	1	1	1	1	1		1		1		1				
∑	8	9	9	8	8	0	11	5	3	7	8	0	7	8	4
%	67	75	75	67	67	0	92	42	25	58	67	0	58	67	33

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: ➢ Assignments, ➢ Quizzes ➢ Reports	 Bi-Weekly 4 Quizzes per semester 1 Report per semester	 10 20 10
Mid-Term Exam	6-th Week	20
Final Written Exam	16th Week	40
Total		**100**

7 – List of references:

7.1 Course notes

- Lecture notes and handouts.

7.2 Required books

- Matcolm H., "Engineering Economy Principle", USA, McGraw-Hill, 1982

7.3 Recommended books

- Sullivan W. G., Wicks E. M., and Luxhoj J. t., "Engineering Economy", 12th ed., Prentice Hall, 2003
- Barish N. B., "Economic Analysis for Engineering and Managerial Decision Making", McGraw-Hill, 1982

7.4 Periodical, Web sites, etc.:

- http://www.isr.umd.edu/~austin/ence202.d/economics.html
- http://mysite.du.edu/~jcalvert/econ/enecon.htm
- http://www.slideshare.net/ngduyquang1001/basics-of-engineering-economy

8 – Facilities required for teaching and learning:

- Modern Academy Library
- Lecture and Exercise rooms equipped with projector and sound systems.
- Computer, Data show and Computer programs.
- High speed internet and communication facilities for distance learning.

Course coordinator: Dr. Metwally Hussein Metwally
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
ENGn312a: القوانين الهندسية والأخلاق المهنية

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Electronic Engineering and Communication Technology BSc Program
Computer Engineering and Information Technology BSc Program

Department offering the program: Manufacturing Engineering and Production Technology Department
Electronic Engineering and Communication Technology Department
Computer Engineering and Information Technology Department

Department offering the course: Basic Science Department

Date of specifications approval: August 2020

B - Basic Information

Title: القوانين الهندسية والأخلاق المهنية   **Code:** ENGn312a   **Level:** 3rd and 4th Fall and Spring

Credit Hours: 2   **Lectures:** 2   **Tutorial/Exercise:** -   **Practical:** -

Pre-requisite: None

C - Professional information

1 – Course Learning Objectives:

مع نهاية هذا المقرر يكون الطالب قد تمكن من فهم وتحليل وتطبيق المصطلحات والمفاهيم القانونية والتشريعات الصناعية المصرية - قوانين وتشريعات اعمال البناء والتخطيط العمراني و قوانين وتشريعات بيئية لحماية البيئة المصرية و المناقصات والعطاءات- قانون تنظيم المناقصات والعطاءات و العقود الهندسية الدولية و العقود الهندسية المحلية و المطالبات والتحكيم. بالإضافة إلى ذلك، فإنه يوضح دور ومسؤوليات المهندس مع الأخذ في الاعتبار القواعد واللوائح التي تتحكم في عمله، وحقوقه وواجباته، وإلى علاقته مع الاستشاريين من العمل المتخصص وأخيراً مسؤوليات المالك والمقاول والعقود الهندسية. وتهدف الدورة أيضًا إلى دراسة التدريب وقوانين النقابات، مع التأكيد على أهمية تحقيق أخلاقيات المهنة ومبادئها من خلال تقديم مقدمة لها وايضا علامات اكتساب تلك الاخلاقيات وكيفية ترسيخها وتنميتها. كما يتطرق الي تخصيص مهنة الهندسة باختلاف تخصصاتها على انها من المهن الحساسة والدقيقة لاحتياجها الي الاخلاقيات المهنية.

2 – Competencies

c1- دراسة منهجيات حل المشاكل الهندسية ، وجمع البيانات وتفسيرها. (C٤, C٨)
c2- معرفة نظم ضمان الجودة ، ومدونات الممارسات والمعايير ومتطلبات الأمن الصناعي والقضايا البيئية. (C٩, C١٠)
c3 - الربط بين أخلاقيات المهنة والآثار المترتبة على الحلول الهندسية على المجتمع والبيئي. (C٤)
c4 - اجادة اللغة وكتابة التقارير الهندسية. (C١٠)
c5 – ان يفكر بطريقة خلاقة ومبتكرة في حل المشكلات القانونية والهندسية. (C٩)
c6 - ان يدمج ويستبدل ويقيم مختلف الأفكار والآراء من وجه النظر القانونية والهندسية. (C٢, C٤)
c7- تخطيط وإجراء وكتابة التقارير والتكاليف عن المشروعات المختلفة. (C٣, C٦, C7)
c8 - أن يعرض ويحل أحد المشاكل القانونية في احد الشركات. (C٢, C٦, C٧, C٩)
c9 - Work in a team and involve in group discussion. (C2, C3, C7)
c10 - Search for information in references and in internet. (C5, C9)
c1١ - Practice self-learning and communicate effectively orally and in written form. (C7, C8)

This course contributes to the following program competencies: C2, C3, C4, C5, C٦, C7, C8, C9, C10

3 – Contents

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ مصطلحات ومفاهيم قانونية	٢	-	-
2,3,4	➢ التشريعات الصناعية المصرية - قوانين وتشريعات اعمال البناء والتخطيط العمراني	٦	-	-

5	➢ قوانين وتشريعات بيئية لحماية البيئة المصرية	٢	-	-
6	➢ المناقصات والعطاءات. - قانون تنظيم المناقصات والعطاءات	2	-	-
7	➢ امتحان منتصف الفصل	٢	-	-
8,٩,	➢ العقود الهندسية المحلية - العقود الهندسية الدولية- المطالبات والتحكيم	4	-	-
10,11,12	➢ القواعد واللوائح التي تتحكم في عمل المهندس ، وحقوقه وواجباته	6	-	-
13,14,15	➢ دراسة التدريب وقوانين النقابات، مع التأكيد على أهمية تحقيق أخلاقيات المهنة ومبادئها من خلال تقديم مقدمة لها وتخصيص مهنة الهندسة بجميع تخصصاتها فى دراسة وترسيخ اخلاقيات المهنة.	٦	-	-
	Total Hours	**30**	**-**	**-**

4 – Course content/Course Competencies mapping matrix

Topics	Course Competencies										
	c1	c2	c3	c4	c5	c6	c7	C8	C9	c10	c11
مصطلحات ومفاهيم قانونية	١			١	١	١	١	١	١	١	١
التشريعات الصناعية المصرية - قوانين وتشريعات اعمال البناء والتخطيط العمرانى	١	١	١	١	١	١	١	١	١	١	١
قوانين وتشريعات بيئية لحماية البيئة المصرية	١	١	١	١	١	١	١	١	١	١	١
المناقصات والعطاءات. - قانون تنظيم المناقصات والعطاءات	١	١		١	١	١	١	١	١	١	١
العقود الهندسية المحلية - العقود الهندسية الدولية- المطالبات والتحكيم	١	١		١	١	١	١	١	١	١	١
القواعد واللوائح التي تتحكم في عمل المهندس ، وحقوقه وواجباته	١	١	١	١	١	١	١	١	١	١	١
دراسة التدريب وقوانين النقابات ، مع التأكيد على أهمية تحقيق أخلاقيات المهنة ومبادئها من خلال تقديم مقدمة لها وتخصيص مهنة الهندسة بجميع تخصصاتها في دراسة وترسيخ اخلاقيات المهنة.	١		١	١	١	١	١	١	١	١	١
Topics Covering Competencies	٧	٥	٤	٧	7	7	7	7	٧	٧	٧
% Topics Covering Competencies	100	71	57	100	100	100	100	100	100	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Assignments
c1	1	1			1	1	1	1
c2	1	1			1	1	1	1
c3	1	1			1	1	1	1
c4	1	1			1	1	1	1
c5	1	1			1	1	1	1
c6	1	1			1	1	1	1
c7	1	1			1	1	1	1
c8	1	1			1			
c9	١	1			1			
c10		1			1			
c11		1			1			
$\sum$	٩	١١	0	0	١١	٧	٧	٧

%	82	100	0	0	100	64	64	64

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7^{th} Week	20
Semester Work	Quizzes	5^{th} and 10^{th}	20
	Assignments/ Reports	Bi-2Weeks	20
Written Exam		Seventeenth Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- د. عبير حسن سراج الدين، قوانين وتشريعات هندسيه، الأكاديمية الحديثة للهندسة والتكنولوجيا، المعادي، ٢٠١٩

7-2 Required books:

- None

7-3 Recommended books:

- جمال الدين احمد نصار، محمد ماجد خلوصي، قانون وتشريعات وعقود الاتحاد الدولي للمهندسين الاستشاريين، القاهرة، ٢٠٠٨

7-4 Periodicals, Web sites, etc.

- www.alamiria.com

8 – Facilities required for teaching and learning:

- **Library.**
- **Internet.**

Course coordinator: Dr. Abeer Serag El-Deen
Head of the Department: Associate Prof. / Ashraf Taha EL-Sayed
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn041: Contemporary Social Issues

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic science department
Date of specifications approval:	August 2020

B - Basic information

Title Contemporary Social Issues: **Code:** GENn041 **Level:** ZREO /Fall

Credit Hours: 2 **Lectures:** 2 **Tutorial/Exercise:** - **Practical:** -

Pre-requisite: None

C - Professional information

1 – Course Learning Objectives:

في نهاية هذا المقرر يكون الطالب قد استوعب وحلل وطبق المعلومات والمعرفة بالآتي الانتماء وأهميته وأصول المجتمع وبناء الأسرة وتكوينها والمكونات الاجتماعية والاقتصادية للمجتمع وأساليب القيادة وكذلك أساليب ترشيد الموارد وتجديدها و أساليب تقييم المشروعات وكذلك مهارات العمل الجماعي وأهمية الفارق بين العمل الجماعي والفريقي و كيفية إعداد القادة و كذلك الضغوط والمؤثرات المعوقة والنظريات المفسرة للعمل الفريقي.

2 – Competencies:

c1- معرفة العلوم الانسانية واهمية دراستها وانواعها (C7, C8,C9)
c2-بناء الأسرة و تكوينها وتعريف التنشئة الاجتماعية والعوامل المؤثرة فيها(C7, C8 , C9)
c3- معرفة مفهوم القيادة والفرق بين القيادة والرئاسة وانواع القيادة (C8, C9)
c4-التعرف علي معني التفاوض وصفات الشخصية المفاوضة والمفاهيم التي تتداخل مع مفهوم التفاوض(C8, C9, C10)
c5-ان يكون الطالب قادر علي معرفة معني الراي العام واهمية وسائل الاعلام والوسائل المستخدمة لقياس هذا المفهوم(C8, C9)
c6- ان يتعرف علي مفهوم النفاق والكذب والفرق بينهم وتأثير هذه الصفة علي المجتمع(C8, C9, C10)
c7- ان يمارس مهارات العمل الجماعي و الفردي خلال الدراسة(C5, C9, C10)
c8- دراسة منهجيات حل المشاكل الهندسية ، وجمع البيانات وتفسيرها. (C٤, C٨)
c9- يبحث الطالب علي المعلومات من خلال شبكة المعلومات والمراجع(C5, C9)
c10- تدريب الطالب على التفكير و ايجاد التصميمات اللازمة لخلق كل ما هو جديد.(C7, C8, C10).
c11- اكساب الطالب الخبرة في ايجاد حلول عملية تخدم برامج خارج تخصصه (C7, C8).
c12-اكساب الطالب كيفية وضع المعايير اللازمة لتكوين فريف بحثى متكامل(C10, C2, C3)

This course contributes to the following program competencies:C2, C3, C4, C5, C7, C8, C9 & C10,

3 – Contents

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	تعريف العلوم الانسانية واهمية دراستها وانواعها	٤	-	-
2,3	تعريف التنشئة الاجتماعية والعوامل المؤثرة في هذه عملية التنشئة الاجتماعية	٤	-	--
4,5	تعريف القيادة والفرق بين القيادة والرئاسة والسمات الشخصية للقائد ووظائفه واساليب القيادة ومفهوم القيادة والمواقف	6	-	-

6	المفهوم اللغوي والاصطلاحي للتفاوض واهمية التفكير واللغة لإتمام عملية التفاوض وخصائص الشخصية المفاوضة	٦	-	-
7	امتحان منتصف الفصل	٢		
8,٩	وسائل الاعلام والسلوك الاجتماعي ومفهوم الراي العام ووسائل قياس الراي العام	٤	-	-
١٠,11	المنافق والسلوك الاجتماعي ومفهوم النفاق والفرق بين النفاق والكذب ودور المنافقين في العلاقات الاجتماعية	٤		
12	مناقشة الأبحاث			
١٣,14,15	مراجعة واجراء امتحان			
	Total hours	٣٠	-	-

4 – Course content/Course Competencies mapping matrix

Topics	Course Competencies											
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12
تعريف العلوم الانسانية واهمية دراستها وانواعها	1							١	١	1	1	1
تعريف التنشئة الاجتماعية والعوامل المؤثرة في هذه عملية التنشئة الاجتماعية		١						١	١	1	1	1
تعريف القيادة والفرق بين القيادة والرئاسة والسمات الشخصية للقائد ووظائفه واساليب القيادة ومفهوم القياده والمواقف			١				١	١	1	1	1	1
المفهوم اللغوي والاصطلاحي للتفاوض واهمية التفكير واللغة لإتمام عملية التفاوض وخصائص الشخصية المفاوضة				١				١	١	1	1	1
وسائل الاعلام والسلوك الاجتماعي ومفهوم الراي العام ووسائل قياس الراي العام					١			١	١	1	1	1
المنافق والسلوك الاجتماعي ومفهوم النفاق والفرق بين النفاق والكذب ودور المنافقين في العلاقات الاجتماعية						١		١	١	1	1	1
Topics Covering Competencies	1	1	1	1	1	1	1	6	6	6	6	6
% Topics Covering Competencies	17	17	17	17	17	17	17	100	100	100	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1		١				١	١		1			1	١	
c2	1	1	١				١	1		1			١	١	
c3	1	1	١				١			1			١	١	
c4	1	1	١				١	١		1			١	١	
c5	1	1	١				١	1		١			1	١	
c6	1	1	١				١	١		1			1		
c7	1	1	١				١	١		1			1	١	
c8	1	1											1	1	
c9	1	1						1		1			1	1	
c10	1		1				1	1						1	
c11	1		1				1	1					1	1	
c12	1		1				1	1					1	1	
$\sum$	12	8	10	0	0	0	10	11	0	8	0	0	11	12	0
%	100	67	83	0	0	0	83	92	0	67	0	0	92	100	0

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Assignments	Bi-Weekly	20
Quizzes	١٣th and 1٤th	20
Mid-Term Exam	٧th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Shimaa Esmail, Contemporary Social Issues, Lecture note, Modern Academy Press, 2014.

7-2 Required books

- S. Nasef (2007), Contemporary Social Issues, Cairo.

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.:

- www.bvsci.com
- www.mawdoo3.com
- www.aspdkw.com

8 – Facilities required for teaching and learning:

- Computer,
- Data show
- Computer programs

Course coordinator: Dr. Shimaa Nabih Ebrahim Esmail
Head of the Department: Prof. Dr. Ashraf Taha

Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn042: English Language

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic information

Title: English Language	**Code:** GENn042	**Level:** ZERO, 1st Semester	
Credit Hours: 2	**Lectures:** 2	**Tutorial: -**	**Practical: -**
	Pre-requisite: None		

C – Professional information

1 – Course Learning Objectives:

This course is designed for students of the pre-intermediate to upper-intermediate level of English. The course aims at developing students' reading, writing, speaking, and listening skills with regard to the related topics. It is also designed to consolidate and extend Students' knowledge of situations of everyday life. The course offers realistic and informative original situations introducing students to key concepts of different topics.

2 – Competencies:

c1- Identify the most frequent words, phrases, and grammar rules in everyday conversation. (C5)
c2- Communicate effectively, even at the very beginning levels. (C8)
c3- Differentiate between tenses. (C10)
c4-Enhance class interaction in terms of speaking, reading, listening, and writing. (C10)
c5-Personalize the learning experience by offering students interesting topics relevant to their interests and experiences. (C10)
c6-Employ tasks which encourage students to take an active role in learning and using new vocabulary. (C9)
c7-Use different tenses in conversation. (C8)
c 8-Write paragraphs and peer edit them using error detection. (C8)
c 9- Interact with each other and with the Prof. (C8)
c 10-Use different tenses in conversation. (C8)
c 11-Brainstorm ideas for homework writing. (C8)
c12- Work in a team and involve in group discussion. (C8)
c13- Communicate effectively and present data and results orally and in written form. (C8, C10)
c14- communicate effectively in written and oral forms. (C8)
c15- Search for information in references and in internet. (C10)
c16- Practice self-learning. (C10)

This course contributes to the following program competencies:C5, C8, C9 & C10

3– Contents

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	**Computer Hackers**	2		
2	**At the Doctor's** Reviewing tenses Reading	2		
3	**At the Doctor's** (to be continued) Grammar: perfect tenses& prefixes	2		
4	**Global Warming** Reading Speaking: English communication skills Suffixes & adj.&adv.	2		
5	**Computer Addiction** Reading: 53-55 Speaking: discussing the topic Grammar: adjectives	2		
6	**Earthquake** Reading: 59-61 Grammar: Suffixes	2		
7	**MID TEARM**	2		
8	**Words and their Stories** Reading Grammar: wh-questions and negatives	2		
9	**Revision** **7th Week Exam**	2		
10	**Describing People &Things** **Reading:** **Grammar:** adj.& adv	2		
11	**Describing People &Things (to be continued)** **Reading:** **Grammar: relative clauses**	2		
12	**Qualities and Flaws** Speak: discussing qualities and flaws of each one (pair work **Grammar:** Possession Pronouns+ Adjectives	2		
13	**Qualities and Flaws (to be continued)** **List. & Speak:** discussing the topic	2		
14	**People Idioms** **Grammar:** gerund & to infinitive & adjectives with prepositions	2		
15	**English proverbs** **Grammar: problem verbs**	2		
	Total hours	**30**	**-**	**-**

4– Course content/Course Competencies mapping matrix:

Topics	Course Competencies															
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16
Computer Hackers	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
At the Doctor's Reviewing tenses Reading	1	1	1	1	1	1	1		1	1	1		1	1	1	1
Global Warming Reading Speaking: English communication skills Suffixes & adj.&adv.	1	1	1	1	1	1	1		1	1	1		1	1	1	1
Computer Addiction Reading: 53-55 Speaking: discussing the topic Grammar: adjectives	1	1	1		1	1	1		1	1	1		1		1	1
Earthquake Reading: 59-61 Grammar: Suffixes	1	1	1	1	1		1		1	1		1		1	1	
Words and their Stories Reading Grammar: wh-questions and negatives	1	1	1	1	1	1	1		1	1		1	1		1	
Revision **7th Week Exam**	1		1			1	1			1						1
Describing People &Things **Reading** **Grammar:** adj.& adv	1	1	1	1	1		1	1		1	1	1	1	1	1	
Describing People &Things (to be continued) **Reading:** **Grammar: relative clauses**	1	1	1		1	1	1	1		1		1		1	1	
Qualities and Flaws Speak**:** discussing qualities and flaws of each one (pair work **Grammar:** Possession Pronouns+ Adjectives	1	1	1		1	1		1		1	1		1	1		1
Qualities and Flaws (to be continued) **List. & Speak:** discussing the topic	1	1	1	1	1	1		1		1		1			1	
People Idioms **Grammar:** gerund & to infinitive & adjectives with prepositions	1	1	1	1	1		1		1	1	1	1	1	1		1
Revision and sheets	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1
Topics Covering Competencies	13	12	13	9	12	10	10	6	9	13	8	8	9	9	10	8
% Topics Covering Competencies	100	92	100	69	92	77	77	62	69	100	62	62	69	69	77	62

5- Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1		1				١			1			1		1
c2	1							1							
c3	1						١			1			1	١	1
c4	1		1					١							
c5	1							1						١	1
c6	1														
c7	1		١					١		1			1	١	1
c8	1						1							1	1
c9	1						1	1						1	
c10	1		1											1	1
c11	1		١				١	1							
c12	1						1	1						١	
c13	1		1				1							1	
c14	١		١				1	1						1	
c15	1						١	1						1	
c16	1						١	١						١	
$\sum$	16	0	7	0	0	0	10	10	0	3	0	0	3	11	6
%	100	0	44	0	0	0	63	63	0	19	0	0	19	69	38

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Assignments and Reports	Bi-Weekly	20
Two Quizzes	5th and 10th Weeks	20
Mid-Term Exam	7-th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- The English Language Book by Dr. Neveen Samir , 2015

7-2 Required books

- Shelton, James, Handbook for technical writing, NTC publishing Group, Illinois, USA, 1998.

7-3 Recommended books: None

7-4 Periodicals, Web sites, etc.:

- http://www.bbc.co.uk/learningenglish
- http://www.rong-chang.com/

- http://legacy.australianetwork.com/studyenglish/

8 – Facilities required for teaching and learning:

- Library and Internet

Course coordinator: Dr. Neveen Samir
Head of the Department: Prof. Dr. Ashraf Taha
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn043: History of Engineering & Technology

A- Affiliation

Relevant program:	Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Manufacturing Engineering and Production Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Manufacturing Engineering and Production Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic information

Title: History of Science and Technology	**Code:** GENn043	**Level:** Zero, 1st Semester	
Credit Hours: 2	**Lectures:** 2 **Prerequisite:** None	**Tutorial/Exercise:** -	**Practical:** -

C – Professional information

1 – Course Learning Objectives:

مع نهاية تدريس هذا المقرر يكون الطالب قد اكتسب المهارات التى تمكنه من فهم تاريخ الهندسه و التكنولوجيا فى مختلف العصور والفرق بين كل من العلم والهندسة والتكنولوجيا – نقل التكنولوجيا – نشاطات العمل الهندسى و مسئوليات المهندس- امثلة على تطور اوجه النشاط الهندسى و التكنولوجى و أشهر علماء الهندسة كنماذج يحتذى بها

2 – Competencies:

c1- مفهوم العلم و الهندسة والتكنولوجيا و علاقتهم ببعضهم البعض و كيفية ابتكار معدات و منظومات تحقق احتياجات المجتمع طبقا لتلك المفاهيم (C7,C9)
c2- المعلومات التاريخية عن مهنه الهندسة و التكنولوجيا وكذا العلاقة بين مسمى المعهد او الكلية و بين ما يتم دراسته(C7,C8,C9).
c3- مفهوم التعليم الهندسى و مجالات العمل للمهندسين و كيفيه القيد و التسجيل بنقابة المهندسين و كذا حقوق وواجبات المهندس(C7,C8,C9)
c4-تطور اوجه النشاط الهندسى و التكنولوجى و ايضا التعرف على الطرق المختلفة لنقل التكنولوجيا (C7,C8,C9)
c5- أن يكتسب الطالب مهارات توظيف النظريات و المعارف و البيانات و الافكار لابتكار معدات و منظومات متطورة (C7,C8,C9)
c6-أن يستحدم الطالب المنهج العلمى فى التفكير وصولا لتصميم و تركيب الفروض (C7,C8,C10)
c7- أن يستطيع الطالب التفكير فى حل مشكلة ما من خلال تفهمه لموضوعات الهندسة العكسية (C7,C9)
c8- ان يستطيع الطالب اتخاذ القرار السليم و اختيار انسب الحلول من خلال دراسته لنماذج و امثلة من المشاكل الهندسيه و عرض الحلول الممكنه لها (C7,C8,C9,C10)
c9- المام الطالب بمعايير الجودة و نظم الامان فى استخدام المنظومات الهندسية(C10).
c10- تدريب الطالب على التفكير و ايجاد التصميمات اللازمة لخلق كل ما هو جديد.(C7,C8,C10).
c11- اكساب الطالب الخبرة فى ايجاد حلول عملية تخدم برامج خارج تخصصه (C7,C10).
c12-اكساب الطالب كيفية وضع المعايير اللازمة لتكوين فريق بحثى متكامل(C10)

This course contributes to the following program competencies: C7, C8, C9 & C10

3 – Contents

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	العلم و الهندسة والتكنولوجيا	2	-	-
2	الهندسة و البحث العلمى – منظومة البحث العلمى	2	-	-
3	عناصر و متطلبات البحث العلمى	2	-	-
4	الهندسة وخريطة البحث العلمى – مراحل البحث العلمى	2	-	-
5	تاريخ الهندسة و التكنولوجيا فى مختلف العصور	4	-	-
6	نقل التكنولوجيا	2	-	-
7	امتحان منتصف الفصل	2	-	-
٨	نشاطات العمل الهندسى و مسئوليات المهندس	2	-	-
٩	التعليم الهندسى	2	-	-
١٠	نقابة المهندسين المصرية – جمعية المهندسين المصرية	4	-	-
١١,12	تطور اوجه النشاط الهندسى و التكنولوجى	4	-	-
13,14,15	اشهر علماء الهندسة و التكنولوجيا	2	-	-
	Total hours	**30**	**-**	**-**

4 – Course content/Course Competencies mapping matrix

Topics	Course Competencies											
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12
العلم و الهندسة والتكنولوجيا	1							١	١	1	1	1
الهندسة و البحث العلمى – منظومة البحث العلمى						1		١	١	1	1	1
عناصر و متطلبات البحث العلمى				1				١	1	1	1	1
الهندسة وخريطة البحث العلمى – مراحل البحث العلمى		1	1			1		١	١	1	1	1
تاريخ الهندسة و التكنولوجيا فى مختلف العصور		1			١			١	١	1	1	1
نقل التكنولوجيا						١		١	١	1	1	1
نشاطات العمل الهندسى و مسئوليات المهندس								1	1	1	1	1
التعليم الهندسى	1			1				1	1	1	1	1
نقابة المهندسين المصرية – جمعية المهندسين المصرية		1				1	1	1	1	1	1	1
تطور اوجه النشاط الهندسى و التكنولوجى		1		1			1	1	1	1	1	1
اشهر علماء الهندسة و التكنولوجيا	1		1		1			1	1	1	1	1
Topics Covering Competencies	3	4	2	3	2	4	2	11	11	11	11	11
% Topics Covering Competencies	27	36	18	27	18	36	18	100	100	100	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1		١				١	١		1			1	١	١
c2	1	1	١				١	1		1			١	١	١
c3	1	1	١				١			1			١	١	١
c4	1	1	١				١	١		1			١	١	١
c5	1	1	١				١	1		١			1	١	١
c6	1	1	١				١	١		1			1		١
c7	1	1	١				١	١		1			1	١	١
c8	1	1											1	1	
c9	1	1						1		1			1	1	1
c10	1		1				1	1						1	
c11	1		1				1	1					1	1	
c12	1		1				1	1					1	1	
$\sum$	12	8	10	0	0	0	10	11	0	8	0	0	11	12	٧
%	100	67	83	0	0	0	83	92	0	67	0	0	92	100	58

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Assignments	Bi-Weekly	20
Quizzes	5th and 10th Weeks	20
Mid-Term Exam	6-th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes: -

- Ghada Maher, History of Engineering and Technology, Lecture note, Modern Academy Press, 2019.

7-2 Required books: None

7-3 Recommended books

- Wright, P. H., Introduction to engineering, second edition, John Wiley and Sons Inc., New York, 1994

7-4 Periodicals, Web sites, etc.

- مواقع الانترنت الخاصة بنقابه المهندسين المصرية

8 – Facilities required for teaching and learning:

- Computer, Data show and projector.

Course coordinator: Dr. Marwa Mohamed Fouad
Head of the Department: Prof. Dr. Ashraf Taha
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn141: Presentation skills

A- Affiliation

Relevant program:	Electronic Engineering and Communication Technology BSc Program Manufacturing Engineering and Production Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program
Department offering the program:	Electronic Engineering and Communication Technology Department Manufacturing Engineering and Production Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department
Department offering the course:	Electronic Engineering and Communication Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Presentation skills **Code:** GENn141 **Level:** 2nd Fall
Credit Hours: 2 **Lectures:** 2 **Tutorial/Exercise:** - **Practical:** -
Pre-requisite: None

C – Professional information
1 – Course Learning Objectives:

This is a public speaking course that requires the student to combine both written knowledge with oral performance criteria. The course gives practical advice on the different modes of communication, including formal writing, CV writing, body language, art of listening, leadership, speeches, negotiation, and face-to-face interactions, and examines how to design and deliver an effective presentation. Students will become more confident and less fearful, more skillful, and less clumsy, more understanding of others and less threatened by them. Students will practice different modes of communication and examine how to design and deliver an effective attractive presentation.

2 – Competencies:

c1- Practice research, select relevant topics, and allocate relevant references. (C5, C10)
c2- Summarize and write a report about the selected topic (C7, C8)
c3- Prepare a presentation, give a speak, and involve in discussion about the selected topic. (C8).

This course contributes to the following program competencies: C5, C7, C8, & C10.

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Introduction	2	-	-
2	Technical report writing + biography	2	-	-
3	C.V Writing: Preparation of an attractive C.V. containing personal data qualifications, posts, and publications. - Interview Preparations + Interview skills	2	-	-
4	Presentation skills (Fundamentals of preparing an attractive style for a short talk, techniques for using slides and projector for better interpretation. Using the power point technique for achieving and ideal short talk through a lab top and a data show / Seminar training)	2	-	-
5	Presentation skills / communications skills	2	-	-
6	To improve the student communications skills / Seminar training / Joharry's window & 7 C's	2	-	-

7	Mid Term Exam	2	-	-
8	To develop the student acquiring power of leadership	2	-	-
8	Training on active listening and negotiation.	2	-	-
10	To understand and practice what's body language / Arts	2	-	-
11	Speeches vs. presentation	2	-	-
12	Suggested topic by the students.	2	-	-
13	Revision / group presentation	2	-	-
14	Revision / group presentation	2	-	-
15	Revision / group presentation	2	-	-
Total hours		**30**	**-**	**-**

4 – Course content/Course Competencies mapping matrix.

Topics	Course Competencies												
	c1	**c2**	**c3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Topics are selected by each, or group of students	1	1	1	-	-	-	-	-	-	-	-	-	-
Topics Covering Competencies	1	1	1	-	-	-	-	-	-	-	-	-	-
% Topics covering Competencies	100	100	100										

5- Teaching, Learning and Assessment methods:

Course Competences	Teaching Methods					Learning Methods			Assessment Method					
	Lecture	Tutorials	Problem solving	Laboratory & Experiments	Discussions & seminars	Self - Learning	Research & Report	Assignments	Discussions & seminars	Oral Exam	Quizzes	Assignments	Research & Report	Mini - Project
c1	1				1	1	1		1				1	
c2	1				1	1	1		1				1	
c3	1				1	1	1		1				1	
$\sum$	3	0	0	0	3	3	3	0	3	0	0	0	3	0
%	100	0	0	0	100	100	100	0	100	0	0	0	100	0

6 – Assessment Timing and Grading:

<table>
<tr><th colspan="2">Assessment Method</th><th>Timing</th><th>Grade (Degrees)</th></tr>
<tr><td colspan="2">Mid-Term Exam</td><td>7th Week</td><td>20</td></tr>
<tr><td rowspan="4">Semester Work</td><td>Quizzes</td><td>-</td><td>-</td></tr>
<tr><td>Reports/Research/biography</td><td>A group of students make a report every Week</td><td>20</td></tr>
<tr><td>Presentation</td><td>A group of students presents every Week</td><td>12</td></tr>
<tr><td>Other (CV)</td><td>Each student makes his/her CV once</td><td>8</td></tr>
<tr><td colspan="2">Practical Exam</td><td>-</td><td>-</td></tr>
<tr><td colspan="2">Written Exam</td><td>16th Week</td><td>40</td></tr>
<tr><td colspan="3">Total</td><td>100</td></tr>
</table>

7 – List of references:

7-1 Course notes

- Presentation and Communication Skills “Theoretical part”

7-2 Required books

- Anderson, Paul, Technical Communication: A Reader-Centered Approach, 5th. Edition MacMillan Publishing., 2003.

7-3 Recommended books

- Strunck, William, Jr.; and white, E. B., The Elements of style, 3rd edition", MacMillan Co., 2000
- Gerson Sharon J. and Gerson Steven M., Technical Communication Process and Product, 7th edition, Prentice Hall, 2012.
- Riordan Daniel G. Technical Report Writing Today, 9th edition", Houghton Mifflin, 2005.
- Stephen Lucas, The Art of Public Speaking, 9th edition, McGraw Hill. 2007.
- Julius Fast, Body Language, MJF books, 1970.

8 - Facilities required for teaching and learning:

- Computer, and Data show

Course coordinator:	Dr. Lubna Fekry
Head of the Department:	Prof. Dr. Shouman S.E.I.
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn142: Technical Report Writing

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Electronic Engineering and Communication Technology BSc Program
Computer Engineering and Information Technology BSc Program
Civil Engineering and Building Technology BSc program

Department offering the program: Manufacturing Engineering and Production Technology Department
Electronic Engineering and Communication Technology Department
Computer Engineering and Information Technology Department
Civil Engineering and Building Technology Department

Department offering the course: Basic Science Department
Date of specifications approval: August 2020

B - BASIC INFORMATION

Title: Technical Report Writing **Code:** GENn142 **Level:** ZERO
Credit Hours: 2 **Lectures:** 2 **Tutorial/Exercise:** - **Practical:** -
Pre-requisite: None

C - PROFESSIONAL INFORMATION

1 – Course Learning Objectives:

The main objective of this course is to enable students to introduce the basic concepts of writing technical reports, resume's, CVs, and research papers.

2 – Competencies:

c1- Study rhetorical models of writing. (C5)
c2- Write paragraphs and peer edit them using error detection. (C8)
c3- Identify different types of technical reports. (C5)
c4- Enhance methodology of analyzing the engineering data. (C5)
c5- Practice writing lab reports. (C5)
c6- Develop clear understanding of the effects of word choice, sentence structure, organization, and document design. (C6)
c7- Recognize the elements of technical reports. (C8)
c8- Implement the methodology of technical writing. (C8)
c9- Use the correct expressions and analytical reading. (C8)
c10- Practice using the conventional style of using visuals. (C8)
c11- Interact professionally with other writers and their writings. (C8)
c12- Utilize knowledge and scientific findings with other people. (C5)
c13- Perform report and manual writing. (C5)
c14- Present findings of scientific research in seminars and workshops. (C5)
c15- Collaborate effectively with the group work and publishing strategies. (C5)
c 16- Practice the conventional style of using equations, tables, and figures. (C5)

This course contributes to the following program competencies:C5, C6 & C8

3 – Contents

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• Introduction: Paragraph writing	2	-	-
2	• Steps to a Successful Writing Assignment	2	-	-
3	• The Writing Process	2	-	-
4	• Elements of technical reports	4	-	-
5	• Research Papers and Reports	2	-	-
6	• Lab Reports	4	-	-
7	Assessment (Mid-Term Exam)	2		
8	• Resumes and Cover Letters	2	-	-
9	• Using Words Correctly	2	-	-
10	• Report and Thesis Layout	2	-	-
11	• Technical Writing Ethics	2	-	-
12	• A Structured Approach to Presenting Postgraduate Research Theses	2	-	-
13	• Publishing from the thesis	2	-	-
14,15	• Writing a research paper	2	-	-
	Total Hours	**30**	**-**	**-**

4 – Course content/Course Competencies mapping matrix

Topics	Course Competencies															
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**	**c16**
Introduction: Paragraph writing	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Steps to a Successful Writing Assignment	1	1	1	1	1	1	1		1	1	1		1	1	1	1
The Writing Process	1	1	1	1	1	1	1		1	1	1		1	1	1	1
Elements of technical reports	1	1	1		1	1	1		1	1	1		1		1	1
Research Papers and Reports	1	1	1	1	1		1		1	1		1		1	1	
Lab Reports	1	1	1	1	1	1	1		1	1		1	1		1	
Revision **7th Week Exam**	1		1			1	1			1						1
Resumes and Cover Letters	1	1	1	1	1		1	1		1	1	1	1	1	1	
Using Words Correctly	1	1	1		1	1	1	1		1		1		1	1	
Report and Thesis Layout	1	1	1		1	1		1		1	1		1	1		1
Technical Writing Ethics	1	1	1	1	1	1		1		1		1			1	
A Structured Approach to Presenting Postgraduate Research Theses	1	1	1	1	1		1		1	1	1	1	1	1		1
Writing a research paper	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1
Topics Covering Competencies	13	12	13	9	12	10	10	6	9	13	8	8	9	9	10	8
% Topics Covering Competencies	100	92	100	69	92	77	77	46	69	100	62	62	69	69	77	62

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1		1				١			1			1		1
c2	1							1							
c3	1						١			1			1	١	1
c4	1		1					١							
c5	1							1						١	1
c6	1														
c7	1		١					١		1			1	١	1
c8	1						1							1	1
c9	1						1	1						1	
c10	1		1											1	1
c11	1		١				١	1							
c12	1						1	1						١	
c13	1		1				1							1	
c14	١		١				1	1						1	
c15	1						١	1						1	
c16	1						١	١						١	
∑	16	0	7	0	0	0	10	10	0	3	0	0	3	11	6
%	100	0	44	0	0	0	63	63	0	19	0	0	19	69	38

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Assignments and Reports	Bi-Weekly	20
Two Quizzes	5th and 10th	20
Mid-Term Exam	7-th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- The Report Writing Book by Dr. Neveen Samir , 2015

7-2 Required books

- Shelton, James, Handbook for technical writing, NTC publishing Group, Illinois, USA, 1998.
- Deborah, C.A. & Margaret D. Blickle (2001) Technical Writing, Principles and Forms, 2nd Ed., MacMillan Publishing.

7-3 Recommended books:

- Douglas Godfrey, ASLE Author's Guide, Jan. ,1997

7-4 Periodicals, Web sites, etc.:

- www.technical-writing.com

8 – Facilities required for teaching and learning:

- Internet educational lab, Computer and Data show

Course coordinator: Dr. Neveen Samir
Head of the Department: Prof. Dr. Ashraf Taha
August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn341c: Project Management

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc Program
Department offering the program:	Manufacturing Engineering & Production Technology Department
Department offering the course:	Manufacturing Engineering & Production Technology Department.
Date of specifications approval:	August 2020

B - Basic Information

Title: Project Management	**Code:** GENn341c	**Level:** 4th /Fall	
Credit Hours: 2	**Lectures:** 2	**Tutorial/ Exercise: -**	**Practical: -**
	Pre-requisite: None		

C - Professional information

1 – Course Learning Objectives:

By the end of the course, Students should know the fundamental of the project management, and the basic principles of the feasibility study and manage a new project by giving them the knowledge and skills to do this. This is achieved throughout studying the management process and their implementation in regard to initiating, planning, execution, monitoring controlling and finally close out the project. It also includes studying the quality control, Stakeholder, Communications, Procurement Management, costs, risk control and time management with reasons of delay, in addition to evaluating the project management systems.

2 – Competencies:

c1- Demonstrate a good understanding of what is meant, goals, main steps of the feasibility study (C2, C3, C11).
c2- Definition of a project, project management (C4, C5, C6).
c3- Roll of the project manager (C4, C5, C7, C8, C9, C14).
c4- Process of a project, steps of managing a project (C2, C3, C7, C11, C14).
c5- Knowledge area of the project management (C1, C2, C3, C6, C7, C8, C9,C10, C12).
c6- Evaluating the project management systems (C3, C5, C9, C11, C13).
c7- Carry out the feasibility study of a new project (C4, C12, C14)
c8- Manage and evaluate a project (C1, C10, C14)
c9- Manage a project (C2, C3, C13).
c10- Solve an operational research problem using different techniques (C11)
c11- Effectively manage main tasks, time, quality, and cost (C4, C5, C6, C7).
C12- Practice self-learning and communicate effectively orally and in written form (C5, C6, C9).
c13 Work in a team and be involved in a group discussion (C7, C8, C9)
c14- Work in a stressful environment and within constraints (C6)
c15- Communicate with others; work in a team and involvement in group discussion and seminars (C8).
c16- Present data and results orally and in written form (C8).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14.

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• Introduction.	2	-	-
2	➢ What is meant and the goals of the feasibility study	2	-	-
3	➢ Common components of a Feasibility Study,	2	-	-
4	➢ Main steps of the feasibility study.	2	-	-
5	➢ Definition of a project, project management,	2	-	-
6	➢ The roll of the project manager,	2	-	-
7	Assessment (Mid-Term Exam)	2	-	-
8	➢ The roll of the project manager,	2	-	-
9	➢ Process of a project, steps of managing a project,	2	-	-
10	➢ Knowledge area of the project management.	2	-	-
11 – 15	• Assignment problems and evaluating the project management	10	-	-
	Total hours	**30**	**-**	**-**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies															
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**	**c16**
Introduction.		1	1													1
Feasibility study:																
What is meant and the goals of the feasibility study,	1						1									1
Common components of a Feasibility Study,		1	1	1		1		1	1				1		1	1
Main steps of the feasibility study.			1		1					1	1			1		1
Project management::																
Definition of a project, project management,				1	1	1								1	1	1
The roll of the project manager,	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Process of a project, steps of managing a project,	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Knowledge area of the project management.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Assignment problems and evaluating the project.	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1
Topics Covering Competencies	5	6	7	6	6	6	5	5	4	5	5	4	5	6	6	9
% Topics Covering Competencies	56	67	78	67	67	67	56	56	44	56	56	44	56	67	67	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1	1				1	1		1			1	1	1
c2	1	1	1				1	1		1			1	1	1
c3	1	1	1		1		1	1	1	1			1	1	1
c4	1	1	1		1		1	1		1			1	1	1
c5	1	1	1		1		1	1		1			1	1	1
c6	1	1	1		1		1	1		1			1	1	1
c7	1	1	1		1		1	1	1	1		1	1	1	1
c8	1	1	1		1		1	1		1		1	1	1	1
c9	1	1	1		1		1	1	1	1			1	1	1
c10	1	1	1		1		1	1		1			1	1	1
c11	1	1	1		1		1	1		1			1	1	1
c12	1	1	1		1		1	1		1			1	1	1
c13	1	1	1		1		1	1		1		1	1	1	1
c14	1	1	1		1		1	1		1		1	1	1	1
c15	1	1	1		1		1	1		1		1	1	1	1
c16			1							1			1	1	1
$\sum$	15	15	16	0	13	0	15	15	3	16	0	5	16	16	16
%	94	94	100	0	81	0	94	94	19	100	0	31	100	100	100

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: ➢ Assignments, ➢ Quizzes ➢ Reports	 Bi-Weekly 3 Quizzes per semester 2 Report per semester	 10 20 10
Mid-Term Exam	7th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Printed lecture

7-2 Required books

- Project Management Institute, (2017), “A Guide to the Project Management Body of Knowledge” (PMBOK® Guide) – 6th edition, USA.

7-3 Recommended books:

- James P. Lewis, (2007), "Fundamentals of project Management", AMACOM 3rd Edition Mc Graw-Hill, NY.

7-4 Periodicals, Web sites, etc.

- Fundamentals of project management / Joseph Heaney. —4th ed. paraphrase James P. Lewis, author of the first three publications. 9/1/2019.
- Jim Lombardi, (2018), "Project Management Guidebook 2018" Method123. 9/1/2019.
- Iowa State University Extension and Outreach, Feasibility and Business Plans. Department of Economics, agdm@iastate.edu 9/1/2019.

8 – Facilities required for teaching and learning:

- Modern Academy Library
- Lecture rooms equipped with projector and sound systems.
- Computer, Data show and Computer programs.
- Internet and communication facilities for distance learning.

Course coordinator:	Dr. Metwally Abd Elghaffar
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn351c: Technical English

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department.
Date of specifications approval:	August 2020

B - Basic Information

Title: Technical English **Code:** GENn351c **Level:** Level Three, Seventh Semester
Credit Hours: 2 **Lectures:** 2 **Tutorial/Exercise:** - **Practical:** -
Pre-requisite: GENn042

C - Professional information

1 – Course Learning Objectives:

By the end of this course the students should have good understanding and practice on the spoken and written areas of English in the manufacturing engineering and production technology field. The course also covers the core language and skills that students need to communicate successfully in this specialization. Therefore, the course is divided into three areas: 1) Revision of Grammar and Vocabulary. 2) Writing Skills: the written part consists primarily of a report on a technical subject, which is defended at the end of the semester. 3) Oral Proficiency: comprised of discussions and presentations, with consideration of correct pronunciation and manner. 4) Electronic communication: comprised of good communication skills for correspondence via email. High considerations are given to grammar and style during the whole course. Modules of this course are covered in a spiraling approach where part of the module material is covered and then the remainder is covered later in the program to review, practice, and reinforce the relevant skills.

2 – Competencies:

On successful completion of the course, the student must be able to:

- c01 - have a good knowledge of English pronunciation and grammar during the study of technical concepts using motivating texts and clear illustrations. The students should practice grammar regularly and understand a comprehensive grammar summary section. C1
- c02 - understand how reading texts can increase vocabulary and improve fluency in English while studying topics that reflect the latest developments in technology and are relevant to student's needs. C1, C2
- c03 – get familiar with core language common to the specializations of manufacturing engineering, production technology, mechanical engineering, and mechanical design. C1, C2,
- c04 – be able to discuss and apply technical issues and texts based on the set readings and show an increased vocabulary within the area of English, manufacturing engineering, and production technology while acquiring confidence in English pronunciation and conversational skills within the same areas above. C1, C2, C5
- c05 – be able to freely communicate during the assignments presented in both oral and writing tasks C1
- c06 – explore beside the language skills a sense of the workplace culture during the discussion of tasks, such as: academic and ethical codes, integrating into corporate culture, multicultural teams, and communication issues. C1, C2, C3, C14
- c07 – apply grammar, vocabulary, and pronunciation skills to both oral and written communication while incorporating various thinking skills (decision making, problem solving, etc.). C1

c08 - choose appropriate styles, forms, and vocabulary for in-class and electronic communication with fellow students and lecturer. C1
c09 - analyze different types of technical texts and appreciate their specific linguistic and stylistic features. C1, C2
c10 - analyze the evolution of a text from abstract to research, production and editing while understanding and evaluating his/her written texts and oral communications C1, C2
c11 - work autonomously and effectively as an individual as well as in teams and actively participate in group discussion, and interactive ways of teaching. C7, C8, C9, C10
c12 - communicate effectively and present data and results in both orally and in written form using best-practice methods and techniques such as: PowerPoint presentations, public speaking, MS Word, MS Excel, Google Docs, Google sheets, Google Slides, Microsoft Team, Moodle, Zoom, etc. in order to develop both technical writing, communication, and presentation skills. C4, C7, C8, C9, C10
c13 - search for information online and in libraries and asking experts in the field for their opinion then re-phrase everything in the student's words. C4, C5, C7, C8, C9, C10
c14 - practice self-learning through preparation of the pre-readings before attending the lecture, then discussing their questions during the lectures. C7, C8, C9, C10
c15 - practice life-long continuous learning through the further readings and further studies mentioned at the end of each chapter and to communicate freely with the lecturer. C7, C8, C9, C10
c16 – report immediately any problem he/she is facing or struggling with while learning the subject and ask for help during the lecture, in addition to the office hours and through the communication channels announced by Modern Academy for Engineering and Technology. C7, C8, C10

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C8, C9, C10 & C14.

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1,2	**Revision of English Grammar and Technical Vocabulary:** Applying Grammar to Published Articles in Manufacturing Engineering and Production Technology	4	-	-
3,4	**Basics of Technical English and Technical Writing:** Grammar, Spelling, Sentence Structure, Punctuation, Style & Methods, Objectivity, Synonyms, Antonyms, and Homophones.	4	-	-
5,6	**Important Skills for Technical Writing:** Letters, Emails, CVs, writing your Draft, Summarizing, Avoiding Redundancy, Clarity, Accuracy, Correctness, Descriptiveness, Language, Appropriateness, Acceptability, Conciseness and Flow	4	-	-
7	**Assessment (Mid-Term Exam)**	2	-	-
8	**Describing Technological Applications:** Materials Technology, Components and Assemblies, Engineering Design, Automated Systems, Information Technology	2	-	-
9	**Describing Technical Data:** Explaining test and experiments, describing graphs and charts, writing results, writing conclusions	2	-	-
10,11	**Presentation Strategies and Oral Communication:** Audience, Content, Introduction, Main Body, Visual Aids, Accent, Pitch, Body Language, Conversation & Dialogues, Storytelling, No Monotone Voice,	4	-	-
12	**Presenting Technical Data:** Presenting literature review, presenting experimental methodology, presenting results and discussions, presenting conclusions	2	-	-
13, 14	**Case Studies and Reports Presentations:** each student present the report he/she has been doing during the whole semester (Coaching for Students is Involved)	4	-	-

15	**Revision and Conclusions:** revising the course and concluding the most important things to remember from this course and how to further practice and develop their technical English knowledge and skills	2	-	-
	Total hours	**30**	**-**	**-**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies															
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**	**c16**
Revision of English Grammar and Technical Vocabulary	1	1	1								1	1	1	1	1	1
Basics of Technical English and Technical Writing	1	1	1							1	1	1	1	1	1	1
Important Skills for Technical Writing	1	1	1					1	1	1	1	1	1	1	1	1
Presentation Strategies and Oral Communication	1	1	1	1	1	1	1	1			1	1	1	1	1	1
Case Studies and Reports Presentations:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Revision and Conclusions:	1	1	1								1	1	1	1	1	1
Oral reading presentations	1	1	1	1	1	1		1	1		1	1	1	1	1	1
Defending individual written report by oral presentation	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Written Email assignments (written communication)	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1
Topics Covering Competencies	9	9	9	5	5	5	4	6	4	5	9	9	9	9	9	9
% Topics Covering Competencies	100	100	100	56	56	56	44	67	44	56	100	100	100	100	100	100

5 – Course Competencies / Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	**Presentations & Movies**	**Discussions & seminars**	**Tutorials**	**Problem solving**	**Laboratory & Experiments**	**Research, Reports & Assignments**	**Self-Learning**	**Modeling and Simulation**	**Written Exam**	**Tutorials**	**Practical Exam**	**Quizzes**	**Research & Presentations**	**Mini Project Report**
c1	1	1					1	1		1				1	
c2	1	1					1	1		1				1	
c3	1	1					1	1		1			1	1	
c4	1	1	1				1	1		1				1	
c5	1	1	1				1	1		1			1	1	
c6	1	1	1				1	1		1				1	
c7	1	1	1				1	1		1			1	1	
c8	1	1	1				1	1		1				1	
c9	1	1	1				1	1		1			1	1	
c10	1	1	1				1	1		1				1	
c11	1	1	1				1							1	
c12			1				1							1	
c13							1							1	
c14			1				1							1	
c15							1								

c16			1				1							1	
$\sum$	11	11	11	0	0	0	16	10	0	10	0	0	4	15	0
%	69	69	69	0	0	0	100	63	0	63	0	0	25	94	0

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Closed-Book Exam		7th Week	20
Semester Work	**Oral reading Assignments** (during the lecture)	3 oral reading presentations of a selected short topic in front of the class (at the beginning, middle and end of the semester)	6
	Online Quizzes (On Moodle)	4 Open-Book Online Quizzes (one quiz every other Week, starting from Week 3)	8
	Written report and oral presentation	One written and submitted report followed by defense of the written report (on the 11th or 12th Week)	20 (10 for written report and 10 for oral presentation)
	Written Email Assignments (Submitted using the academic email of modern academy)	3 individual communication assignments between student and lecturer via email (at the beginning, middle and end of the semester)	6
Written Open-Book Exam		16th Week	40
Total			**100**

7 – List of references

7-1 Course notes: Technical English for Manufacturing Engineers (Lecture Notes)

7-2 Required books

- Hutchinson, Tom, and Alan Waters. "*Interface: English for technical communication*." Vol. 1. Longman Group, 1984. (Available in the library of Modern Academy for Engineering and Technology, SN: 817, ID: 51)

7-3 Recommended books:

- Procter P. "Cambridge international dictionary of English", 2000. (Available in the library of Modern Academy for Engineering and Technology, SN: 270, ID: 243)
- Murphy R. "English Grammar in Use" Cambridge; 2012. (Available in the library of Modern Academy for Engineering and Technology, SN: 630, ID: 178), also available online (https://goielts.com.my/wp-content/uploads/2020/10/English-Grammar-in-use-Intermediate2019.pdf)
- Redman S. "English Vocabulary in Use: pre-intermediate and intermediate" Cambridge university press; 2003. (Available in the library of Modern Academy for Engineering and Technology, SN: 631, ID: 175), also available online (https://webzoom.freewebs.com/thmsadaqagroup/englishbook_2.pdf)
- Hamilton CM. "Communicating for success"" Routledge; 2016 Jul 22. (Available online: https://files.transtutors.com/cdn/uploadassignments/5772911_1_chapter-6-building-interpersonal-relationships.pdf)

7-4 Periodicals, Web sites, etc.

- Technical writing: https://www.coursera.org/learn/technical-writing
- Academic writing made easy: https://www.edx.org/course/academic-writing-made-easy-2?index=product&queryID=df29cf0577578cf397f345ee7459859f&position=16
- Writing Professional Email and Memos (Project-Centered Course): https://www.coursera.org/learn/professional-emails
- Communication Skills for Engineers Specialization: https://www.coursera.org/specializations/leadership-communication-engineers

8 – Facilities required for teaching and learning:

- Lecture Room
- Computer, Data show
- High speed internet for E-learning and using online meeting software and academic email.

Course coordinator:	Dr. Mahmoud Saleh Rabie
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn352: Risk Management

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Electronic Engineering and Communication Technology BSc Program
Computer Engineering and Information Technology BSc Program
Architecture Engineering and Building Technology BSc Program
Civil Engineering and Building Technology BSc program

Department offering the program: Manufacturing Engineering and Production Technology Department
Electronic Engineering and Communication Technology Department
Computer Engineering and Information Technology Department
Architecture Engineering and Building Technology Department
Civil Engineering and Building Technology Department

Department offering the course: Basic Science Department

Date of specifications approval: August 2020

B - Basic Information

Title: Risk Management **Code:** GENn352 **Level:** 3rd, Fall

Credit Hours: 2 **Lectures:** 2 **Tutorial/Exercise:** - **Practical:** -

Pre-requisite: None

C - Professional information

1 – Course Learning Objectives:

On successful completion of the course, the student will be able to synthesize and respond to the complexity of legal issues within their risk management practice and demonstrate the ability to operate effectively in complex and unpredictable situations within professional contexts.

2 – Competencies:

c1- Understanding the basic concepts of risk assessment. (C٤, C٨)
c2- Explain the basic concepts of hazards and risk factors. (C٩, C١٠)
c3 - Explain principles of rating the extent of potential harm and evaluating the likelihood that harm will occur. (C٤)
c4 - Classify and compare the principles of controlling the risks. (C١٠)
c5 - Deciding priorities for action. (C2, C3)
c6 - Analyze, strategies for managing the risks. (C2, C3)
c7 - Apply Principles of strategic approaches for dealing with risks. (C2, C3)
c8 - Relate general theory to specific contexts. (C٩)
c9 - Compare and analyze different risk situations and risk environments. (C٢, C٤)
c10 - Select and use appropriate Strategies, methods, and techniques for identifying, diagnosing and dealing with risks. (C٣, C٦, C7)
c11 - Develop problem solving approaches and controlling the risk. (C٢, C٦, C٧, C٩)
c12 - Enhance the ability to critically reflect on own and others' practice to improve own/others 'actions. (C2, C3, C7)
c13 - Search for information and engage in life-long self-learning discipline. (C5, C9)
c14 - Practice self-learning and communicate effectively orally and in written form. (C7, C8)

This course contributes to the following program competencies: C2, C3, C4, C5, C٦, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Identify risk assessment, hazards, and risk factors	2	-	-
2,3	➢ Evaluating the hazards and risks.	4	-	-
4,5	➢ Rating the extent of potential harm, and the likelihood that harm will occur.	4	-	-
6	➢ Controlling the risks, Control measures.	4	-	-
7	Assessment (Mid-Term Exam)	2		
8	➢ Systems of control, Deciding priorities for action.	2	-	-
9,10	➢ Case study 1: health services, Case study 2: call centers.	4	-	-
11	➢ Case study 3: food production and processing, Case study 4: engineering and manufacture.	3	-	-
12	➢ Strategies for managing the risks, Planning, Range of strategic approaches for dealing with risks.	3	-	-
13,14	➢ Stakeholders and spreading the risks, and Policies.	2	-	-
	Total Hours	**30**	**-**	**-**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies													
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**
Identify risk assessment, hazards, and risk factors	۱	1	1	۱				1		۱			۱	۱
Evaluating the hazards and risks.	۱	۱	۱	۱	1	1	1	۱	۱	۱	۱		۱	۱
Rating the extent of potential harm, and the likelihood that harm will occur.	۱	۱	۱	۱	1	1	1	۱	۱	۱	۱		۱	۱
Controlling the risks, Control measures.	۱	۱	1	۱	1	1	1	۱	۱	۱	۱		۱	۱
Systems of control, Deciding priorities for action.	۱	۱	1	۱	1	1	1	۱	۱	۱	۱	۱	۱	۱
Case study 1: health services, Case study 2: call centers.	۱	۱	۱	۱	1	1	1	۱	۱	۱	۱	1	۱	۱
Case study 3: food production and processing, Case study 4: engineering and manufacture.	۱	1	۱	۱	1	1	1	۱	۱	۱	۱	۱	۱	۱
Strategies for managing the risks, Planning, Range of strategic approaches for dealing with risks.	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Stakeholders and spreading the risks, and Policies.	1	1	1	1	1	1	1	1	1	1	1		1	1
Topics Covering Competencies	9	9	9	9	8	8	8	9	8	9	8	4	9	9
% Topics Covering Competencies	100	100	100	100	89	89	89	100	89	100	89	44	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Assignments
c1	1	1			1	1	1	1
c2	1	1			1	1	1	1
c3	1	1			1	1	1	1
c4	1	1			1	1	1	1
c5	1	1			1	1	1	1
c6	1	1			1	1	1	1
c7	1	1			1	1	1	1
c8	1	1			1	1	1	1
c9	١	1			1	1	1	1
c10	1	1			1			
c11	1	1			1			
c12	1	1			1			
c13		1			1			
c14	1	1			1	1	1	1
$\sum$	13	14	0	0	14	10	10	10
%	93	100	0	0	100	71	71	71

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	5th and 10th	20
	Assignments/ Reports	Bi- Weekly	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Risk Management.

7-2 Required books:

- J. Jeyras (2002), "Risk management principles", planta Tree, UK

7-3 Recommended books:

- E. J. Vaughan, T. Vaugan (2007), 9th Edition, "Fundamentals of risk and insurance", John Wiley,
- M. Keegan (2004): The orange book of risk management- Principles and concepts", HM treasury concepts, London, UK
- E. Baranoff (2012)" Enterprise and individual risk management", Harvard Business Review US

7-4 Periodicals, Web sites, etc.

- https://www.investopedia.com/terms/r/riskmanagement.asp
- http://www.freebookcentre.net/

8 – Facilities required for teaching and learning:

- **Lectures room equipped with OHP and data show facility.**
- **Library.**
- **Internet.**

Course coordinator: Dr. Nagat A. Elmahdy
Head of the Department: Associate Prof. / Ashraf Taha EL-Sayed
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn353a: Industrial Psychology

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department
Date of specifications approval: August 2020

B - Basic Information

Title: Industrial Psychology **Code:** GENn353a **Level:** Seventh Semester (Level three)
Credit Hours: 2 **Lectures:** 2 **Tutorial/Exercise:** 0 **Practical:** 0
Pre-requisite: None

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to improve the performance of the whole work system as well to reduce the stress imposed on the working human being in industry.

2 – Competencies:

c1. Identify the role of the role of industrial engineer (C4).
c2. Learn the structural system of human work (C4, C6).
c3. Learn the physical environmental impacts on human beings which can be assessed quantitatively (C4, C6)
c4. Use appropriate techniques on basics of ergonomics to instrument display, machine, control and lay out of workplace (C4, C5, C6)
c5. Consider effect of all environmental changes on equipment (C3)
c6. Diminishing the effects of physical environmental impacts on human beings (C3, C4)
c7. Utilize and make the best use of human abilities (C10)
c8. Acquire and apply new knowledge to new product design adapted to the customer. (C5, C6)
c9. Practice using ergonomic factors in domestic and industrial products (C4, C5, C6)
c10. Collaborate effectively within multidisciplinary team (C5, C7, C9).
c11. Practice self-learning and communicate effectively orally and in written form (C8, C10).

This course contributes to the following program competencies: C3, C4, C5, C7, C8, C9 & C10

3 – Contents:

Weeks	Topics	Lecture hours	Tutorial hours	Practical hours
1	Industrial Design - Design concepts	2	-	-
2	Ergonomics	2	-	-
3	Application of ergonomics - Instruments - Controls - Work place.	2	-	-
4	Aesthetic and ergonomics coordination	2	-	-
5	Working condition and Environment	2	-	-
6	Heating and Ventilation	2	-	-
7	Assessment (Mid-Term Exam)	2	-	-
8	Local Ventilation - Industrial Ventilation	2	-	-
9	Air condition systems - CFC'S - Ozone	2	-	-
10	Depletion and Global Warning	2	-	-
11	Noise - Exposure to noise - Noise control	2	-	-
12	Technique - Vibration	2	-	-
13	Lighting - Level of luminance - Factors	2	-	-
14	Affecting the quality of lighting	2	-	-

15	Human effectiveness	2	-	-
15	Revision		-	-
	Total hours	**30**	**-**	**-**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies										
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11
Industrial Design - Design concepts	1								1		1
Ergonomics	1			1		1			1	1	1
Application of ergonomics - Instruments - Controls - Work place.	1	1		1		1			1		
Aesthetic and ergonomics coordination		1		1		1		1			
Working condition and Environment		1	1	1	1	1					1
Heating and Ventilation			1	1	1	1					
Local Ventilation - Industrial Ventilation			1	1		1		1			
Air condition systems - CFC'S - Ozone			1	1	1	1					
Depletion and Global Warning			1	1		1					
Noise - Exposure to noise - Noise control			1	1		1		1			
Technique - Vibration			1	1		1					
Lighting - Level of luminance - Factors			1	1		1					
Affecting the quality of lighting			1	1		1		1			
Human effectiveness		1	1			1	1			1	1
Topics Covering Competencies	3	4	10	12	3	13	1	4	3	2	4
% Topics Covering Competencies	21	29	71	86	21	93	7	29	21	14	29

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method				
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations
c1	1	1	1							1			1	
c2	1	1	1							1			1	
c3	1		1							1			1	
c4	1	1								1			1	
c5	1									1			1	
c6	1									1			1	
c7	1									1			1	
c8	1									1			1	
c9	1									1			1	
c10			1					1						
c11			1					1						
$\sum$	9	3	5	0	0	0	0	2	0	9	0	0	9	0
%	82	27	45	0	0	0	0	18	0	82	0	0	82	0

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7^{th} Week	20
Semester Work	Quizzes	2 Quizzes per semester	10
	Reports	4 reports per semester	20
Mini-project case study research		15th Week	10
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books:

- None

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.

- None

8 – Facilities required for teaching and learning:

- **Lectures room equipped with OHP and data show facility.**
- **Library.**
- **Internet.**

Course coordinator: Prof. Mamdouh Saber
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn451: Environmental Effects of Electromagnetic Waves

A- Affiliation

Relevant program: Electronic Engineering and Communication Technology BSc Program
Computer Engineering and Information Technology BSc Program
Manufacturing Engineering and Production Technology BSc Program
Architecture Engineering and Building Technology BSc Program
Civil Engineering and Building Technology BSc Program

Department offering the program: Electronic Engineering and Communication Technology Department
Computer Engineering and Information Technology Department
Manufacturing Engineering and Production Technology Department
Architecture Engineering and Building Technology Department
Civil Engineering and Building Technology Department

Department offering the course: Basic Science Department

Date of specifications approval: August 2020

B - Basic Information

Title: Environmental Effects of Electromagnetic Waves **Code:** GENn451 **Level:** 3rd

Credit Hours: 2 **Lectures:** 2 **Tutorial/Exercise:** - **Practical:** -

Pre-requisite: None

C - Professional information

1 – Course Learning Objectives:

The Environmental Studies of electromagnetic Waves major prepares students for understanding and addressing complex environmental issues of EMW from a problem-oriented, interdisciplinary perspective.

2 – Competencies

c1- Understanding the main concepts and methods from physical sciences and their application in environmental problem solving. (C٤, C٨)
c2- Explain the basic information about electromagnetic waves. (C٩, C١٠)
c3 - Understanding the concepts and terminology for electromagnetic waves applications and uses. (C٤)
c4 - Classify the EMW environmental problems and ways of addressing them, including interactions across local to global scales. (C١٠)
c5 - Demonstrate the critical reflection about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world. (C2, C3)
c6 - Analyze, different types of environmental effects of electromagnetic fields. (C2, C3)
c7 - Develop deep understanding and analysis of EMW environmental effects design. (C2, C3)
c8 - Relate general theory to specific contexts. (C٩)
c9 - Critically analyze EMW environmental effect issues in communication as well as provide innovative solutions. (C٢, C٤)
c10 - Select and use appropriate Strategies, methods and techniques for identifying, diagnosing and dealing with environmental effects. (C٣, C٦, C7)
c11 - Develop problem solving approaches and controlling the environmental effects. (C٢, C٦, C٧, C٩)
c12 - Enhance the ability to critically reflect on own and others' practice to improve own/others 'actions. (C2, C3, C7)
c13 - Search for information and engage in life-long self-learning discipline. (C5, C9)
c14 - Practice self-learning and communicate effectively orally and in written form. (C7, C8)

This course contributes to the following program competencies: C2, C3, C4, C5, C٦, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Maxwell's equations	1	-	-
1	➢ Optical properties of electromagnetic waves	1	-	-
2	➢ Physical properties of electromagnetic waves	1	-	-
3	➢ Electromagnetic radiation	1	-	-
4	➢ Electromagnetic waves spectrum	2	-	-
5	➢ Antenna and transmission lines	2	-	-
6	Ground waves, sky waves, and space waves	2	-	-
7	➢ Assessment (Mid-Term Exam)	2	-	-
8	➢ Radio waves and fading of electromagnetic waves	2	-	-
9	➢ Applications of electromagnetic waves	1	-	-
9	➢ Absorption of electromagnetic waves	1	-	-
10	➢ Health and environmental effects of electromagnetic waves	2	-	-
10	➢ Health and environmental effects of non-ionizing radiation	2	-	-
11	➢ Radio frequency radiation	2	-	-
12	➢ Microwave oven	1	-	-
12	➢ Radar and human health	1	-	-
13	➢ Infrared radiation health effect	2	-	-
14	➢ Visible light health effect	1	-	-
14	➢ Ultraviolet radiation health effect	1	-	-
15	➢ International recommendations for radiation exposure	2	-	-
	Total Hours	**30**		

4 – Course content/Course Competencies mapping matrix

Topics	Course Competencies													
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14
Maxwell's equations	١	1	1				1	1		١	1		١	١
Optical properties of electromagnetic waves	١	١	١				1	١	١	١	١		١	١
Physical properties of electromagnetic waves	١	١	١				1	١	١	١	١		١	١
Electromagnetic radiation	١	١	1	١	1	1	1	١	١	١	١		١	١
Electromagnetic waves spectrum	١	١	1	١	1	1	1	١	١	١	١		١	١
Antenna and transmission lines	١	١	١	١	1	1	1	١	١	١	١		١	١
Ground waves, sky waves, and space waves	١	1	١	١	1	1	1	١	١	١	١		١	١
Radio waves	1	1	1	1	1	1	1	1	1	1	1		1	1
Fading of electromagnetic waves	1	1	1	1	1	1	1	1	1	1	1		1	1
Applications of electromagnetic waves	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Absorption of electromagnetic waves	1	1	1	1	1	1	1	1	1	1	1		1	1
Health and environmental effects of electromagnetic waves	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Health and environmental effects of non-ionizing radiation	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Radio frequency radiation	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Microwave oven	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Radar and human health	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Infrared radiation health effect	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Visible light health effect	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Ultraviolet radiation health effect	1	1	1	1	1	1	1	1	1	1	1	1	1	1
International recommendations for radiation exposure	1	1	1	1	1	1	1	1	1	1	1		1	1
Topics Covering Competencies	20	20	20	17	17	17	20	20	19	20	20	9	20	20
% Topics Covering Competencies	100	100	100	85	85	85	100	100	95	100	100	45	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Assignments
c1	1	1			1	1	1	1
c2	1	1			1	1	1	1
c3	1	1			1	1	1	1
c4	1	1			1	1	1	1
c5	1	1			1	1	1	1
c6	1	1			1	1	1	1
c7	1	1			1	1	1	1
c8	1	1			1	1	1	1
c9	۱	1			1	1	1	1
c10	1	1			1			
c11	1	1			1			
c12	1	1			1			
c13		1			1			
c14	1	1			1	1	1	1
$\sum$	13	14	0	0	14	10	10	10
%	93	100	0	0	100	71	71	71

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	5th and 10th	20
	Assignments/ Reports	Bi- Weekly	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- None.

7-2 Required books:

- Physics for Scientists and Engineers, Raymond A. Serway, Thomson Brooks, 2004; 6th Edition. Introduction to RF Propagation, John S. Seybold, by John Wiley& Sons, Inc: 2005.

7-3 Recommended books:

- Halliday, David, Robert Resnick, Jearl Walker.

7-4 Periodicals, Web sites, etc.

- http://www.slideshare.net/bleonacoba/history-of-electromagnetic-waves-discovery
- http://www.infocellar.com/networks/wireless/spectrum.htm
- Serway, RAYMOND Physics for scientists and engineers 6th Ed. San Francisco: (2003).
- Health Effects of Electromagnetic Fields– Department of Communications, Marine and Natural Resources. Expert Group on Health Effects of Electromagnetic Fields. 29–31 Adelaide Road, Dublin 2, Ireland. www.dcmnr.gov.ie

8 – Facilities required for teaching and learning:

- **Library.**
- **Computer, Internet, and Data Show.**

Course coordinator:	Dr. Marwa Shoeib
Head of the Department:	Associate Prof. / Ashraf Taha EL-Sayed
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn452b: Civilization and Heritage

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc. Program Electronic Engineering and Communication Technology BSc. Program Computer Engineering and Information Technology BSc. Program Architecture Engineering and Building Technology BSc. Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Architecture Engineering and Building Technology BSc Program
Date of specifications approval:	August 2020

B - Basic Information

Title: Civilization and Heritage	**Code: GENn452**	**Level** :4th., **Tenth Semester**	
Credit Hours: 2	**Lectures:** 2	**Tutorial/Exercise: -**	**Practical: -**
	Pre-requisite: None		

C - Professional information

1 – Course Learning Objectives:

By the end of this is course the student can know the background in the field of social, cultural and humanitarian studies throughout identifying the cultural environment; this includes the meaning, features, characteristics, and social interaction, in addition to its impact on the human's needs in the field of specialization. In addition, it studies the cultural and environmental forms of expressions and the social pattern in cultural heritage throughout analyzing its elements and the alternative of dealing with it. Additionally, study some case from old and modern traditional societies in the field of study.

2 – Competencies:

c1. Classify and compare between Heritage buildings and Architecture (C1)
c2. Explain, Analyze and Adapt innovative approaches in urban and architectural design considering the cultural backgrounds and realities of the local community. (C3, C5)
c3. Explain the theoretical background needed and generate and develop selective interventions that cope with the significance of Architectural Heritage (C1, C7, C13).
c4. Investigate and evaluate and criticize the outcomes of urban and Architectural projects in relation to cultural and heritage considerations (C12, C14)
c5. Practice self-learning and communicate effectively orally and in written form (C8, C10).
c6. Search for information required to develop successful approaches in design. (C14).

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This course contributes to the following program competencies: C1, C3, C5, C7, C8, C9, C10, C12 & C14

3 – Contents

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	General definitions, terms, and characteristics of culture and Architecture)	2	-	-
2	Definitions, Classification of Heritage, World Heritage sites.	2	-	-
3	The Interrelation between culture and traditional and heritage	2	-	-
4	The Interrelation between culture and Civilization (General theories, concepts and examples)	2	-	-
5	Architecture as cultural and Civilization expression - Features and characteristics (A detailed discussion of the multi-components of culture and its impacts in urban sites.	2	-	-
6	Social interaction and urban environment – perception, environment image and behavior patterns.	2	-	-
7	Assessment (Mid-Term Exam)	2	-	-
8	The role of participation and community involvement in Architectural and Urban Design (Local Case studies)	2	-	-
9	A brief discussion of the Anthropology as a tool of understanding local and indigenous cultures and its application to Architecture	2	-	-
10	Regionalism of architecture and architectural expression	2	-	-
11	Urban Heritage (A review of Values)	2	-	-
12	Urban and Architectural Conservation (A review of interventions)	2	-	-
13	Local and international case studies of urban and Architectural projects corresponding to the cultural dimension of the societies.	2	-	-
14, 15	Research project presentation and discussion	4	-	-
	Total hours	30	-	-

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies					
	c1	c2	c3	c4	c5	c6
General definitions, terms, and characteristics of culture and Architecture)	1		1			
Definitions, Classification of Heritage, World Heritage sites.	1	1	1	1	1	1
The Interrelation between culture and traditional and heritage		1	1		1	1
The Interrelation between culture and Civilization (General theories, concepts and examples)	1	1		1	1	
expression - Features and characteristics (A detailed discussion of the multi-components of culture in urban sites.	1	1	1	1	1	1
Social interaction and urban environment – perception, environment image and behavior patterns.		1	1	1	1	
General definitions, terms, and characteristics of culture and Architecture)	1	1		1	1	1
Definitions, Classification of Heritage, World Heritage sites.	1	1	1	1	1	1
The Interrelation between culture and traditional and heritage		1	1	1		1
The role of participation and community involvement in Architectural and Urban Design (Local Case studies)	1	1		1	1	1
A brief discussion of the Anthropology as a tool of understanding local and indigenous cultures and its application to Architecture	1	1	1	1	1	1
Regionalism of architecture and architectural expression	1	1		1	1	1
Urban Heritage (A review of Values)			1	1	1	1
Urban and Architectural Conservation (A review of interventions)	1	1	1		1	1
Topics Covering Competencies	10	12	11	11	11	13
% Topics Covering Competencies	71	86	79	79	79	93

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1	1				1	1		1	1		1		
c2	1	1						1		1	1			1	1
c3	1	1								1	1		1	1	
c4	1	1	١							1	1				
c5	1	1	١					1		1	1		1	١	
c6	1	1	1		1		1	1		1	1		1	١	١
∑	٦	٦	٤	0	١	٢	٢	٤	0	٦	٦	0	4	4	٢
%	100	100	67	0	17	33	33	67	0	100	100	0	67	67	33

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
	Mid-Term Exam	7th Week	20
Semester Work	Quizzes	2 Quizzes (one each 4 Weeks)	20
	Reports/Research	Two reports per semester	20
	Written Exam	16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books

- Fraser, D. (1968) "Village Planning in the Primitive World", Studio Vista, London
- Oliver, P. (1969) "Shelter and Society", Barrie & Rockliff, The Cresset Press, London
- Oliver, P. (1997) "Encyclopedia of vernacular architecture of the world", Cambridge University Press, New York
- Rapoport, A. (1969) "House, Form and Culture", Englewood Cliffs, N.J
- Silverman, H., & Waterton, E., & Watson, S., (2017), “Heritage in Action: Making the Past in the Present”, Springer International Publishing, Switzerland.
- Born, G., (2006), “Architecture, Preserving Paradise: The Architectural Heritage and History of the Florida Keys”, The History Press, USA.

7-3 Recommended books:

- أشرف كامل بطرس (١٩٩٨) "الثقافة والنتاج البنائي - منهج لرصد وتحليل واستقراء الأبعاد الثقافية وتوظيفها في عملية البناء"رسالة دكتوراه غير منشورة، كلية الهندسة، جامعة القاهرة.
- حسن المويلحى (٢٠٠٥) "العمارة بين الثقافة والتنمية نحو فهم ثقافة مجتمع المستخدمين لخدمة عملية التنمية من خلال البرمجة المعمارية"رسالة ماجستير غير منشورة، كلية الهندسة، جامعة القاهرة.
- Silverman, H., & Waterton, E., & Watson, S., (2017), “Heritage in Action: Making the Past in the Present”, Springer International Publishing, Switzerland.
- Born, G., (2006), “Architecture, Preserving Paradise: The Architectural Heritage and History of the Florida Keys”,

7-4 Periodicals, Web sites, etc.

https://www.ierek.com/news/index.php/2017/06/03/architectural-cultural-heritage
http://www.cultureindevelopment.nl/Cultural_Heritage/What_is_Cultural_Heritage
https://en.unesco.org/themes/biodiversity/culture-values

8 – Facilities required for teaching and learning:

- Lecture and Exercise rooms equipped with projection and sound systems.
- Computer, Data show
- High speed internet and communication facilities for distance learning

Course coordinator:	Prof. Nahed Omran
Head of the Department:	Dr. Asamer Zakrya
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
GENn453: Marketing

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Marketing — **Code:** GENn453 — **Level:** 3rd
Credit Hours: 2 — **Lectures:** 2 — **Tutorial/Exercise: -** — **Practical: -**
Pre-requisite: None

C - Professional information

1 – Course Learning Objectives:

مع نهاية تدريس هذا المقرر يكون الطالب قد اكتسب المهارات التي تمكنه من فهم مجال المبيعات، إدارة قوة المبيعات الاستراتيجية. عملية البيع الشخصية وتنظيم قوى المبيعات, تنميط وتوظيف البائعين, اختيار وتوظيف المتقدمين, تطوير برنامج المبيعات, تحفيز قوى المبيعات, تعويض قوة المبيعات والمصروفات والنقل, قيادة قوة المبيعات، التنبؤ بالمبيعات وتطوير الميزانيات و مناطق المبيعات الأقاليم, تحليل حجم المبيعات, تحليل تكلفة التسويق والربح ومعرفة سياسة التوزيع و استراتيجية الترويج.

2 – Competencies:

c1- ادارة المبيعات وتطوير برنامج المبيعات (C9, C1)
c2- تحليل حجم المبيعات, تحليل تكلفة التسويق والربح، تقييم الأداء (C8)
c3- تنميط وتوظيف البائعين, اختيار وتوظيف المتقدمين (C9)
c4 – ان يكتسب الطالب مهارات في مجال اساسيات ادارة المبيعات (C1, C2)
c5- ان يدرك الطالب كيفية اختيار وتوظيف المتقدمين وافضل الطرق لتحفيز فريق المبيعات (C1, C2)
c6- ان يستطيع الطالب تحليل تكلفة التسويق حسب مناطق التوزيع و الربح (C1, C2)
c7- تدريب الطالب على كيفية البحث عن المعلومات في المراجع وفى الانترنت (C7)
c8- اكساب الطالب كيفية العمل في فريق واشراكهم في مناقشات جماعية (C1, C9)
c9- تعليم الطالب على كيفية ايجاد الطرق الازمة لابتكار كل ما هو جديد (C7, C8)
c10- اكساب الطالب الخبرة في ايجاد حلول عملية تخدم برامج خارج تخصصه (C7, C10).

This course contributes to the following program competencies: C1, C2, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1,2,3	مجال المبيعات، إدارة قوة المبيعات الاستراتيجية عملية البيع الشخصية وتنظيم قوة المبيعات	6	-	-

4,5	اختيار القوى العاملة وتوظيف المتقدمين	4	-	-
6	الرقابة التسويقية	2	-	-
7	امتحان منتصف الفصل	2		
8,9	تكاليف التسويق	4	-	
10,11	تعظيم الارباح ورقابة وخفض التكلفة	4	-	-
12	استراتيجية الترويج	2		-
13	سياسة التوزيع	2	-	-
14,15	مراجعة عامة	4	-	-
	Total hours	**30**	**-**	**-**

4 – Course content/Course Competencies mapping matrix

Topics	Course Competencies									
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10
مجال المبيعات، إدارة قوة المبيعات الاستراتيجية . عملية البيع الشخصية وتنظيم قوة المبيعات	1						1	1	1	1
تنميط وتوظيف البائعين، اختيار وتوظيف المتقدمين			1				1	1	1	1
تطوير برنامج المبيعات، تحفيز قوى المبيعات تعويض قوة المبيعات والمصروفات والنقل	1						1	1	1	1
قيادة قوة المبيعات والتنبؤ بالمبيعات				1	1		1	1	1	1
تطوير الميزانيات ومناطق المبيعات الأقاليم							1	1	1	1
تحليل حجم المبيعات ,تحليل تكلفة التسويق والربح		1				1	1	1	1	1
تقييم الأداء، كتابة عطاءات المسؤوليات الأخلاقية والقانونية		1					1	1	1	1
مراجعة عامة	1	1	1	1	1	1	1	1	1	1
Topics Covering Competencies	3	3	2	2	2	2	8	8	8	8
%Topics Covering Competencies	38	38	25	25	25	25	100	100	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1					1			1			1	1	
c2	1	1						1		1			1	1	
c3	1	1	1				1			1				1	
c4	1	1	1				1	1		1			1	1	
c5	1	1					1	1					1	1	
c6	1	1	1				1			1			1		
c7	1	1	1					1					1	1	
c8	1	1					1								
c9	1	1					1	1		1					
c10	1									1					
∑	10	9	4	0	0	0	7	5	0	7	0	0	6	6	0
%	100	90	40	0	0	0	70	50	0	70	0	0	60	60	0

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	2 Quizzes (one each 4 Weeks)	10
	Assignments	3 assignments per semester	15
	report	One report per semester	15
Written Exam		16th Week	40
Total			**100**

7 – List of references:
7-1 Course notes:
- Marketing

7-2 Required books
- MARKETING PRINCIPLES AND PERSPECTIVES
- WILLIAM O. BEARDEN New York: McGraw-Hill/Irwin, ©2004

7-3 Recommended books:
- None

7-4 Periodicals, Web sites, etc.
- http://goo.gl/cH9x4G
- http://goo.gl/8mNZU1
- http://goo.gl/8txKD9

8 – Facilities required for teaching and learning:
- Computer, Data show.
- Computer programs.
- High speed internet and communication facilities for distance learning

Course coordinator: Dr. Shaymaa Sherif
Head of the Department: Prof. Dr. Ashraf Taha
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MTHn001: Mathematics -1 (Algebra and Calculus)

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Mathematics -1 (Algebra and Calculus)	**Code:** MTHn001	**Level:** Zero Fall	
Credit Hours: 3	**Lectures:** 2 **Pre-requisite:** None	**Tutorial/Exercise:**3	**Practical:** -

C - Professional information

1 – Course Learning Objectives:
By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to the main concepts of differential calculus, linear algebra, Taylor expansion and binomial expansion and polar coordinates and their applications.

2 – Competencies:

c1- Rules of limits and continuity of functions of one variable. (C1)
c2- Concepts of differentiation. (C1)
c3- Rules of applications of differential calculus used engineering. (C1)
c4- Basic concepts of Taylor expansion and Binomial expansion. (C1)
c5- Basic concepts matrices and matrices algebra. (C1, C5, C9)
c6- Solutions of systems of linear equations. (C1, C5)
c7- Basic concepts of vectors, vector spaces and vector algebra. (C1)
c8- Solve problems on limits, continuity and differentiate all continuous function. (C1, C9)
c9- Use differential calculus to solve applied Engineering Models. (C1, C7, C9)
c10- Apply infinite series, power series, Taylor and Maclaurin series to applications. (C1, C9)
c11- Apply basic concepts of different methods to discuss solutions of linear systems. (C1, C5, C9)
c12- Solve problems on vectors, vector spaces and vector algebra. (C1, C9)
c13- Apply differential calculus in mechanics and electronics. (C1, C9)
c14- Use matrices and vectors to solve engineering problems. (C1, C9)
c15- Write technical reports. (C7)
c16- Communicate effectively in written form. (C8)
c17- Search for information's in references and in internet. (C9, C7, C10)

This course contributes to the following program competencies: C1, C5, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Functions	3	4	—
2	➢ Differentiation	3	6	—
3,4	➢ Trigonometric and inverse trigonometric functions	4	6	—
5	➢ Exponential and logarithmic functions	2	4	—
6	➢ Hyperbolic and inverse hyperbolic functions	2	4	—
7	Assessment (Mid-Term Exam)	2		
8	➢ Taylor and binomial expansions	2	3	—
9,10,11	➢ Matrices with applications	6	6	—
12	➢ Vectors in the Euclidean space	2	3	—
13	➢ Real vector spaces	2	3	—
14,15	➢ Polar coordinates	2	3	—
	Total hours	**30**	**42**	**—**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17
Functions	1							1							1		1
Differentiation		1	1					1	1				1		1	1	1
Trigonometric and inverse trigonometric functions		1	1					1	1				1		1	1	1
Exponential and logarithmic functions		1	1					1	1				1		1	1	1
Hyperbolic and inverse hyperbolic functions		1	1					1	1				1		1	1	1
Taylor and binomial expansions				1						1					1	1	1
Matrices with applications					1	1					1			1	1	1	1
Vectors in the Euclidean space							1					1		1	1	1	1
Real vector spaces							1					1		1	1		1
Polar coordinates							1					1		1	1		1
Topics Covering Competencies	1	4	4	1	1	1	3	5	4	1	1	3	4	4	10	7	10
% Topics Covering Competencies	10	40	40	10	10	10	30	50	40	10	10	30	40	40	100	70	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Assignments
c1	1	1	1	1	1	1	1	1
c2	1		1	1	1	1	1	1
c3	1		1	1	1	1	1	1
c4	1		1	1	1	1	1	1
c5	1		1	1	1	1	1	1
c6	1		1		1	1		1
c7	1	1	1	1	1	1		1
c8	1		1	1		1	1	1
c9	1				1	1		
c10	1	1		1	1	1		
c11	1		1	1	1	1	1	1
c12			1	1		1	1	1
c13	1	1						
c14	1	1						
c15		1		1	1			1
c16		1	1	1	1			1
c17	1				1			1
$\sum$	14	7	11	12	13	12	8	13
%	82	41	65	71	76	71	47	76

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	Bi-Weekly	40
	Reports/Research		
	Assignments		
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Osama Elgayar and Sabry Abd El-Aziz Algebra and Calculus, Lecture Notes, Modern Academy Press.

7-2 Required books:

- Briggs (2013) Calculus for Scientists and Engineers, U.S.A: Pearson.
- Stewart, J. (2012) Calculus early transcendental, 7ed, Canada: brooks/cole.

7-3 Recommended books:

- E. Kreyszig (1999) Advanced Engineering Mathematics, 8ed, John Willey & Sons, Inc.

7-4 Periodicals, Web sites, etc.

- www.mathwords.com
- www.17calculus.com
- www.sosmath.com

8 – Facilities required for teaching and learning:

- Library.
- Internet.

Course coordinator: Dr. Sabry Abd El-Aziz
Head of the Department: Associate Prof. / Ashraf Taha EL-Sayed
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MTHn002: Mathematics -2 (Integration and Analytic Geometry)

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Mathematics-2(Integration and Analytic Geometry)	**Code:** MTHn002	**Level:** Zero, Spring	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:** 3	**Practical:** -
	Pre-requisite: MTHn001		

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to the main concepts of integral calculus and analytic geometry with their applications.

2 – Competencies:

c1. Definition of anti-derivative, indefinite integral, definite integrals. (C1, C5)
c2. Methods of integration (integration by parts, substitution). (C1, C5)
c3. Integration rules of trigonometric functions, integration of rational functions, improper integrals. (C1, C5)
c4. Basic concepts of convergence of infinite sequences and series. (C1, C5)
c5. Equations of lines, planes, and conic sections. (C1, C5)
c6. Investigate the geometric interpretation of the integration. (C1, C5, C9)
c7. Develop techniques for using basic integration formulas to obtain indefinite integrals of complicated functions. (C1, C5, C9)
c8. Explore some of the geometric applications of the definite integral by using it to compute areas between curves, volumes of solids, arc length and surface area. (C1, C5, C9)
c9. Develop several tests to determine whether a series is convergent or divergent without explicitly finding its sum. (C1, C5, C9)
c10. Estimate of the sum of the convergent series and the error using various methods. (C1, C2)
c11. Derive the equation and main geometric properties of lines, planes and conic sections. (C1, C5, C9)
C12. USE INTEGRATION TO EVALUATE AREA BETWEEN CURVES, VOLUME OF SOLIDS WITH KNOWN CROSS SECTIONS, ARC LENGTH.
(C1, C2, C5, C9)
c13. Work in a team and involve in group discussion and seminars (C7).
c14. Communicate effectively and present data and results orally and in written form (C8).
c15. Search for information's in references and in internet (C9, C7, C10).

This course contributes to the following program competencies: C1, C2, C5, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Anti-derivative, indefinite integral	2	2	—
2	➢ Definite integrals and the fundamental theorem of calculus	2	3	—
3,4	➢ Methods of integration (integration by parts, substitution)	4	6	—
5	➢ Integration of trigonometric functions	2	4	—
6	➢ Trigonometric Substitutions	2	2	—
7	➢ Assessment (Mid-Term Exam)	2		
8	➢ Integration of rational functions	2	4	—
9	➢ Miscellaneous Substitutions, improper integrals	2	4	—
10,11	➢ Application of definite integral (area, volume, arc length, surface area)	3	4	—
12,13	➢ Sequences, series	4	6	—
14	➢ Equations of lines, planes, and circles	3	4	—
15	➢ Conic sections (parabola, ellipse, hyperbola)	2	3	—
	Total hours	**30**	**42**	**—**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies														
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**
Anti-derivative, indefinite integral	1												1		1
Definite integrals and the fundamental theorem of calculus	1					1						1	1	1	1
Methods of integration (integration by parts, substitution)		1				1	1					1	1	1	1
Integration of trigonometric functions			1			1	1					1	1	1	1
Trigonometric Substitutions			1			1	1					1	1	1	1
Integration of rational functions			1			1	1					1	1	1	1
Miscellaneous Substitutions, improper integrals			1			1						1	1	1	1
Application of definite integral (area, volume, arc length, surface area)				1			1	1				1	1	1	1
Sequences, series				1					1	1			1		1
Equations of lines, planes, and circles					1						1		1		1
Conic sections (parabola, ellipse, hyperbola)					1						1	1	1	1	1
Topics Covering Competencies	2	1	4	2	2	6	5	1	1	1	2	8	11	8	11
% Topics Covering Competencies	18	9	36	18	18	55	45	9	9	9	18	73	100	73	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Assignments
c1	1	1	1		1	1	1	1
c2	1		1	1		1	1	1
c3	1		1	1		1	1	1
c4	1	1	1	1	1	1	1	1
c5	1		1	1	1	1	1	1
c6	1		1	1		1	1	1
c7	1		1	1		1	1	1
c8	1	1	1	1	1	1		1
c9	1		1	1		1		1
c10	1		1	1		1		1
c11	1	1	1	1	1	1		1
c12	1	1	1	1	1	1		1
c13		1		1	1			
c14		1			1			
c15		1			1			
$\sum$	12	8	12	12	9	12	7	12
%	80	53	80	80	60	80	47	80

6 – Assessment Timing and Grading:

<table>
<tr><th colspan="2">Assessment Method</th><th>Timing</th><th>Grade (Degrees)</th></tr>
<tr><td colspan="2">Mid-Term Exam</td><td>7th Week</td><td>20</td></tr>
<tr><td rowspan="3">Semester Work</td><td>Quizzes</td><td rowspan="3">Bi-Weekly</td><td rowspan="3">40</td></tr>
<tr><td>Reports/Research</td></tr>
<tr><td>Assignments</td></tr>
<tr><td colspan="2">Written Exam</td><td>16th Week</td><td>40</td></tr>
<tr><td colspan="3">Total</td><td>100</td></tr>
</table>

7 – List of references:

7-1 Course notes:

- S. Shenawy and S. Abd-elaziz, Integration and Analytic Geometry, Lecture Notes, 2013

7-2 Required books:

- E. W. Swokoski, Calculus, 6ed, PWS Publishing Company, Boston, 1994.
- E. W. Swokoski, Algebra & trigonometry with analytic geometry, 10ed, brooks cole, U.S.A.,2002.

7-3 Recommended books:

- E. Kreyszig (1999) Advanced Engineering Mathematics, 8ed, John Willey & Sons, Inc.

7-4 Periodicals, Web sites, etc.

- www.sosmath.com

8 – Facilities required for teaching and learning:

- Library.
- Internet.
- Data show
- Required Computer programs

Course coordinator: Dr. Sabry Abd El-Aziz
Head of the Department: Associate Prof. / Ashraf Taha EL-Sayed
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MTHn103: Mathematics -3 (Differential Equations and Transforms)

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Differential Equations and Transforms	**Code:** MTHn103	**Level:** 1st (Fall / Spring)	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:** 3	**Practical:** -
	Pre-requisite: MTHn002		

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to the basic concepts of the ordinary differential equations (O.D.E) and understanding a lot of methods to solve the different types of O.D.E. Furthermore, they should be able to study in this course the basic concepts of Laplace transform, Fourier series and Legendre and Bessel functions.

2 – Competencies:

c1- Classification of O.D.E. (C1)
c2- Solution of the O.D.E using suitable methods. (C1, C5)
c3- Rules of Laplace transform. (C1, C5)
c4- Rules of inverse Laplace transform. (C1, C5)
c5- Fourier series and its applications in applied engineering problems. (C1, C5)
c6- Basic concepts of Legendre function. (C1, C5)
c7- Basic concepts of Bessel function. (C1, C5)
c8- Choose the suitable methods for solving O.D.E. (C1, C7, C9)
c9- Apply rules of Laplace transform and its inverse to Solve O.D.E and integral equations. (C1, C5, C7, C9)
c10- Make analysis for electrical problem using Fourier series. (C1, C2)
c11- Solving problems on Legendre and Bessel functions. (C1, C9)
c12- Apply O.D.E in electrical, mechanical, and civil problems. (C1, C7, C9)
c13- Apply Laplace transform in electrical, mechanical, and civil problems. (C1, C7, C9)
c14- Apply Fourier series in electrical, mechanical, and civil problems. (C1, C7, C9)
c15- Communicate effectively. (C8)
c16- Search for information. (C9, C10)

This course contributes to the following program competencies: C1, C2, C5, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Definitions, order, degree.	1	1	—
2,3,4	➢ 1st order differential equations, 2nd order and n th order differential equations with constant coefficients.	6	10	—
5,6	➢ Nonhomogeneous D.E., undetermined coefficient method.	6	10	—
7	➢ Assessment (Mid-Term Exam)	2		
8	➢ Variation of parameters, Euler equations, practical D.E.	3	4	—
9,10	➢ Laplace transform, 1st and 2nd shifting theorem.	4	6	—
11,12	➢ Laplace transforms of derivative and integrals, inverse Laplace transforms, convolution, applications.	4	6	—
13,14	➢ Fourier series, half rang expansion, Legendre and Bessel functions.	4	5	—
	Total hours	**30**	**42**	**—**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies															
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16
Definitions, order, degree.	1															1
1st order differential equations, 2nd order and n th order differential equations with constant coefficients.		1						1				1				1
Nonhomogeneous D.E., undetermined coefficient method		1						1				1				1
Variation of parameters, Euler equations, practical D.E.		1						1				1				1
Laplace transform, 1st and 2nd shifting theorem			1						1				1		1	1
Laplace transforms of derivative and integrals, inverse Laplace transforms, convolution, applications.			1	1					1				1		1	1
Fourier series, half rang expansion, Legendre and Bessel functions.					1	1	1			1	1			1	1	1
Topics Covering Competencies	1	3	2	1	1	1	1	3	2	1	1	3	2	1	3	7
% Topics Covering Competencies	14	43	29	14	14	14	14	43	29	14	14	43	29	14	43	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Assignments
c1	1	1	1	1				1
c2	1		1	1	1	1	1	1
c3	1	1	1	1	1	1	1	1
c4	1	1	1	1	1	1	1	1
c5	1		1	1		1	1	1
c6	1	1	1	1		1	1	1
c7	1	1	1	1		1	1	1
c8	1	1		1		1	1	1
c9	1		1	1		1	1	1
c10	1	1	1	1	1	1	1	1
c11	1			1	1	1	1	1
c12	1	1			1			
c13	1	1			1			
c14	1	1		1	1			
c15		1	1		1			1
c16	1			1	1			1
$\sum$	15	11	10	13	10	10	10	13
%	94	69	63	81	63	63	63	81

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
	Mid-Term Exam	7th Week	20
Semester Work	Quizzes	Bi-Weekly	40
	Reports/Research		
	Assignments		
	Written Exam	16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Essawi, A. M. and El-Sayed, A. T. (2013) Differential Equations and Transforms. Cairo: MAM Press

7-2 Required books:

- Bronson, R. and Costa, G. (2012) Schaumas easy out lines differential equations. McGraw-Hill, U.S.A.

7-3 Recommended books:

- Kreyszig, E. (2010) Advanced Engineering Mathematics. John Wiley, New York.

7-4 Periodicals, Web sites, etc.

- www.mathwords.com.

- www.khanacademy.org/math/differential-equations
- www.sosmath.com/diffeq/diffeq.html

8 – Facilities required for teaching and learning:

- Library.
- Internet.

Course coordinator:	Associate Prof. / Ashraf Taha EL-Sayed
Head of the Department:	Associate Prof. / Ashraf Taha EL-Sayed
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MTHn105: Mathematics-5 (Numerical Analysis)

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Mathematics-5(Numerical Analysis)	**Code:** MTHn105	**Level:** (1st Spring) and (2nd Fall)	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:** 2	**Practical:** -
	Pre-requisite: MTHn103		

C - Professional information
1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to investigate and learn many numerical methods for solving many engineering mathematical problems. It aims to introduce the student to numerical techniques for solving mathematical engineering problems and explains when and why numerical methods work. It also covers solution methods for systems of linear and nonlinear equations.

2 – Competencies:

- c1- Techniques of Least square method in curve fitting (C1, C2, C5)
- c2- Methods of numerical interpolation using divided differences, Hermite and Lagrange interpolation techniques (C1, C2, C5)
- c3- Numerical integration (C1, C9)
- c4- Types and methods of numerical solution of initial value problems (C1, C9)
- c5- Methods of numerical solution of linear and non-linear equations (C1, C9)
- c6- Analyze when and why a numerical method work. (C1, C5, C9)
- c7- Choose the best method for solving different mathematical problems (C1, C5, C9, C10)
- c8- Apply different techniques of curve fitting and numerical interpolation (C1, C5, C9)
- c9- Solve integration, initial value problems, linear and non-linear algebraic equation using numerical methods. (C1, C2, C5, C9)
- c10. Apply numerical methods to solve engineering problems (C1, C2, C5, C9, C10)
- c11- Write technical reports (C7)
- c12- Communicate effectively and present data in written form (C8)
- c13- Communicate using E-mail (C8)
- c14- Search for information from internet (C7, C9, C10)

This course contributes to the following program competencies: C1, C2, C5, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1,2	➢ Curve fitting and linear Approximation of a function.	4	4	—
3	➢ Polynomial interpolation and error estimation in the interpolation formula Lagrange interpolation.	2	2	—
4	➢ Newton interpolation.	2	2	—
5	➢ Hermite interpolation.	2	2	—
6	➢ Newton-Cotes formula, composite Newton-cotes formula	2	2	—
7	➢ Assessment (Mid-Term Exam)	2		
8	➢ Romberg – steifel integration method.	2	2	—
9	➢ Numerical solution of initial value problems	2	2	—
10,11	➢ Numerical solution of first order methods Runge-Kutta methods	4	4	—
12	➢ Multistep methods.	2	2	—
13,14	➢ Numerical solution of linear and non-linear equation, Gauss-Seidel method.	4	4	—
15	➢ Numerical solution of nonlinear equations the fixed-point iteration method, Newton-Raphson method.	2	2	—
	Total hours	**30**	**28**	**—**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies													
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14
Curve fitting and linear Approximation of a function.	1					1	1	1		1	1	1	1	1
Polynomial interpolation and error estimation in the interpolation formula Lagrange interpolation.		1				1	1	1		1	1	1	1	1
Newton interpolation.		1				1	1	1		1	1	1	1	1
Hermite interpolation.		1				1	1	1		1	1	1	1	1
Newton-Cotes formula, composite Newton-cotes formula			1			1	1		1	1	1	1	1	1
Romberg – steifel integration method.			1			1	1		1	1	1	1	1	1
Numerical solution of initial value problems				1		1	1		1	1	1	1	1	1
Numerical solution of first order methods Runge- Kutta methods				1		1	1		1	1	1	1	1	1
Multistep methods.				1		1	1		1	1	1	1	1	1
Numerical solution of linear and non-linear equation, Gauss-Seidel method.					1	1	1		1	1	1	1	1	1
Numerical solution of nonlinear equations the fixed-point iteration method, Newton-Raphson method.					1	1	1		1	1	1	1	1	1
Topics Covering Competencies	1	3	2	3	2	11	11	4	7	11	11	11	11	11
%Topics Covering Competencies	9	27	18	27	18	100	100	36	64	100	100	100	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Assignments
c1	1	1	1	1	1	1	1	1
c2	1	1	1	1	1	1	1	1
c3	1		1	1	1	1	1	1
c4	1		1	1	1	1	1	1
c5	1		1	1	1	1	1	1
c6	1	1	1	1		1	1	1
c7	1		1	1	1	1	1	1
c8	1	1	1		1	1	1	1
c9	1	1	1		1	1	1	1
c10	1	1	1		1	1		
c11			1	1	1			1
c12		1	1	1	1			1
c13		1						1
c14		1						1
$\sum$	10	9	12	9	11	10	9	13
%	71	64	86	64	79	71	64	93

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	Bi-Weekly	40
	Reports/Research		
	Assignments		
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Osama El-Gayar, Numerical Methods for Engineers, Lecture Notes, Modern Academy, 2014.

7-2 Required books:

- Steven C. Chapra and Raymond P. Canale, Numerical Methods for Engineers, 7th ed., McGraw-Hill Education, New York, 2015.

7-3 Recommended books:

- E. Kreyszig, Advanced Engineering Mathematics, 8ed, John Willey & Sons, Inc., 2014
- R. L.Brude, Numerical Analysis,4th ed., McGraw Hill, 1995.

7-4 Periodicals, Web sites, etc.

- http://math.fullerton.edu/mathews/numerical.html
- http://archives.math.utk.edu/topics/numericalAnalysis.html

8 – Facilities required for teaching and learning:

- Library.
- Internet.

Course coordinator:	Associate Prof. Sameh Shenawy
Head of the Department:	Associate Prof. / Ashraf Taha EL-Sayed
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MTHn107: Mathematics-7 (Introduction to Probability and Statistics)

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Mathematics-7(Introduction to Probability and Statistics) **Code:** MTHn107 **Level:** (1st Spring) and (2nd Fall & Spring)

Credit Hours: 3 **Lectures:** 2 **Tutorial/Exercise:** 2 **Practical:** -

Pre-requisite: MTHn002

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to gain, investigate, and learn the main concepts of functions, set theory, random events, probability functions, mathematical expectation, conditional probability, Binomial distribution, normal distribution, Sampling and the central limit theorem, Estimation, hypothesis testing, regression and correlation and Chi-square analysis and analysis of variance.

2 – Competencies:

c1- Main rules and notions of functions and set theory. (C1, C5)
c2- Basics and different rules of probability theory. (C1, C2, C5)
c3- Discrete and continuous probability distributions and rules of their expectation and their standard deviation (C1, C2, C5).
c4- Notions of descriptive statistics, probability concepts, binomial, and normal distributions, as well as the notions of conditional probability and counting techniques. (C1, C2, C5)
c5- Principles of sampling and the central limit theorem, estimation, and regression. (C1, C2, C5)
c6- Basic concepts of statistics, measures of location and measures dispersion. (C1, C2)
c7- Describe discrete data graphically and compute measures of centrality and dispersion. (C1, C2)
c8- Compute probabilities by applying different probability rules and theorems of probability. (C1, C2, C9)
c9- Construct the probability distribution of a random variable, based on a real-world situation, and use it to compute expectation and variance. (C1, C2, C9)
c10- Apply basic concepts of probability functions, Mathematical expectation, variables, discrete distribution, binomial distribution, continuous distribution, and normal distribution to applications. (C1, C2)
c11- Evaluate and analyze basic concepts of statistics, sampling, the central limit theorem, estimation, correlation, and regression. (C1, C2, C5, C9)
c12- Apply probability and statistics methods to engineering problems (C1, C2, C5, C9)
c13- Write technical reports. (C7)
c14- Communicate effectively in written form. (C8).
c15- Search for information's in references and in internet (C7, C9, C10).

This course contributes to the following program competencies: C1, C2, C5, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1,2	➢ Functions, curve equation relationship.	4	4	—
3,4	➢ Set theory, Random events, and probability functions.	4	4	—
5,6	➢ Mathematical expectation, conditional probability.	4	4	—
7	➢ Assessment (Mid-Term Exam)	2		
8,9	➢ Binomial distribution, normal distribution.	4	4	—
10,11	➢ Sampling and the central limit theorem.	4	4	—
12	➢ Estimation, hypothesis testing.	2	2	—
13,14	➢ Regression and correlation.	4	4	—
15	➢ Chi-square analysis and analysis of variance.	2	2	—
	Total hours	**30**	**28**	**—**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies														
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15
Functions, curve equation relationship.	1						1						1		1
Set theory, Random events, and probability functions.	1							1	1	1		1	1	1	1
Mathematical expectation, conditional probability.		1	1	1				1	1	1		1	1	1	1
Binomial distribution, normal distribution.		1	1	1				1	1	1		1	1	1	1
Sampling and the central limit theorem.					1						1	1	1	1	1
Estimation, hypothesis testing.					1						1	1	1	1	1
Regression and correlation.					1						1	1	1	1	1
Chi-square analysis and analysis of variance.						1					1	1	1	1	1
Topics Covering Competencies	2	2	2	2	3	1	1	3	3	3	4	7	8	7	8
% Topics Covering Competencies	25	25	25	25	38	13	13	38	38	38	50	88	100	88	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods		Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Modeling and Simulation	Written Exam	Quizzes	Assignments
c1	1	1	1	1	1		1	1	1
c2	1		1	1	1		1	1	1
c3	1		1	1	1		1	1	1
c4	1	1	1	1	1	1	1	1	1
c5	1	1	1	1	1	1	1	1	1
c6	1	1	1	1	1	1	1	1	1

c7	1		1	1			1	1	1
c8	1				1	1	1		
c9	1	1		1	1		1		
c10	1		1	1	1		1	1	1
c11	1		1		1		1		
c12	1	1			1	1	1		
c13		1		1	1				1
c14	1	1	1	1	1				1
c15	1				1				1
$\sum$	14	8	10	11	14	5	12	8	11
%	93	53	67	73	93	33	80	53	73

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes Reports/Research Assignments	Bi-Weekly	40
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Sameh Shenawy, Introduction to Probability and Statistics, Lecture Notes, Modern Academy, Egypt, 2019.

7-2 Required books:

- Douglas C. Montgomery and George C. Runger, Applied Statistics and Probability for Engineers, 6th ed., John Willey & Sons, Inc., 2014
- R.E. Walpole, R.H. Myers and S.L. Meyers, Probability and Statistics for Engineers and Scientists, sixth edition. Prentice-Hall 1998

7-3 Recommended books:

- John Neter, G.A. Whitmore, William Wasserman, Applied Statistics, Fourth Edition, Needham Heights, MA: A
- Division of Simon & Schuster, Inc.,1993.

7-4 Periodicals, Web sites, etc.

- www.mathworlds.com
- www.sosmath.com

8 – Facilities required for teaching and learning:

- Library.
- Internet.

Course coordinator: Associate Prof. Sameh Shenawy
Head of the Department: Associate Prof. / Ashraf Taha EL-Sayed
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MTHn209: Mathematics -9 (Applications Advanced Calculus)

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Basic Science Department
Date of specifications approval: August 2020

B - Basic Information
Title: Mathematics-9(Applications Advanced Calculus) **Code:** MTHn209 **Level:** 2nd Spring
Credit Hours: 3 **Lectures:** 2 **Tutorial/Exercise:**2 **Practical:** -
Pre-requisite: MTHn103

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to the basic concepts in functions of many independent variables and its partial derivative with applications and to realize the basic concepts of multiple integrals.

2 – Competencies:

c1- Applications of partial derivatives to physical and Engineering problems. (C1, C5)
c2- Rule of multiple integrals. (C1, C5)
c3- Basic concepts, classification, and canonical form of PDEs (C1, C5)
c4- Basic concepts of spherical and cylindrical coordinates. (C1, C5)
c5- Method of separation of variables for heat, wave, and Laplace equations. (C1, C5)
c6- Solution of PDEs using Laplace transform. (C1, C5, C9)
c7- Apply applications of partial derivatives to Engineering problems. (C1, C5, C9)
c8- Choose the right decision by choosing the best kind of multiple Integration in applications. (C1, C5, C9)
c9- Use vector analysis to evaluate line integrals and surface integrals for a vector function. (C1, C5)
c10- Apply the method of separation of variables to solve heat, wave, and Laplace equations. (C1, C5, C9)
c11- Solve PDEs using Laplace transform. (C1, C5, C9)
c12- Apply multiple Integration in electronics. (C1, C5, C9)
c13- Apply vector analysis to find the work done by the force field in electrical problem. (C1, C5, C9)
c14- Solve partial differential equations describing real systems. (C1, C5, C9)
c15- Communicate effectively. (C8)
c16- Search for information. (C7, C9, C10)

This course contributes to the following program competencies: C1, C5, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Functions of several variables	2	2	—
2	➢ Partial derivatives	2	2	—
3	➢ Directional derivatives, Taylor polynomials	2	2	—
4	➢ Lagrange multiplier max, and min. of functions	2	2	—
5	➢ Multiple integrals (double, triple integrals)	2	2	—
6	➢ Multiple integrals (double, triple integrals)	2	2	—

7	➢ Assessment (Mid-Term Exam)	2		
8	➢ Introduction to PDEs, Basic concepts of PDEs	3	3	—
9	➢ Classifications and conical forms of 2nd order linear PDEs.	2	2	—
10	➢ Classifications and conical forms of 2nd order linear PDEs.	2	2	—
11	➢ Method of separation of variables for heat equation.	3	3	—
12	➢ Wave and Laplace equations.	2	2	—
13	➢ D'Alembert solution of wave equation.	2	2	—
14, 15	➢ Solution of PDEs using Laplace transforms.	2	2	—
	Total hours	**30**	**28**	**—**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies															
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16
Functions of several variables	1						1									1
Functions of several variables	1						1								1	1
Partial derivatives	1						1								1	1
Directional derivatives	1						1								1	1
Taylor polynomials	1						1								1	1
Lagrange multiplier max, and min. of functions	1						1								1	1
Multiple integrals (double, triple integrals)		1		1				1	1			1	1		1	1
Introduction to PDEs, Basic concepts of PDEs			1							1				1	1	1
Classifications and conical forms of 2nd order linear PDEs.			1							1				1	1	1
Method of separation of variables for heat equation.					1					1				1	1	1
Wave and Laplace equations.					1					1				1	1	1
D'Alembert solution of wave equation.					1					1				1	1	1
Solution of PDEs using Laplace transforms.						1					1			1	1	1
Topics Covering Competencies	6	1	2	1	3	1	6	1	1	5	1	1	1	6	12	13
%Topics Covering Competencies	46	8	15	8	23	8	46	8	8	38	8	8	8	46	92	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Assignments
c1	1	1	1	1				1
c2	1	1	1	1	1	1	1	1
c3	1	1	1	1	1	1	1	1
c4	1		1	1	1	1	1	1
c5	1		1	1		1	1	1

c6	1	1	1	1		1	1	1
c7	1	1		1		1	1	1
c8	1	1	1	1		1	1	1
c9	1	1	1	1	1	1	1	1
c10	1	1			1	1		
c11	1	1			1	1		
c12		1	1		1	1		1
c13	1			1	1	1		1
c14	1	1	1	1				1
c15	1	1	1	1	1	1	1	1
c16	1	1	1	1	1	1	1	1
$\sum$	15	13	12	13	10	14	10	14
%	94	81	75	81	63	88	63	88

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	Bi-Weekly	40
	Reports/Research		
	Assignments		
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Sameh Shenawy, Applications of Advanced Calculus, Lecture Notes, Modern Academy Press, Cairo, 2020.

7-2 Required books:

- Kreyszig, E. (2011) Advanced Engineering Mathematics. John Wiley, New York.

7-3 Recommended books:

- Wylie, C. R. and Barrett, L. C. (1996) Advanced Engineering Mathematics. McGraw-Hill.

7-4 Periodicals, Web sites, etc.

- www.mathwords.com.
- www.khanacademy.org/math
- www.sosmath.com

8 – Facilities required for teaching and learning:

- Library.
- Internet.

Course coordinator: Dr. Fatma Taha Albahrawy
Head of the Department: Associate Prof. / Ashraf Taha EL-Sayed
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
PHYn001: Physics 1

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Physics 1	**Code:** PHYn001	**Level:** Freshman, Fall	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:**1	**Practical:** 2
	Pre-requisite: None		

C - Professional information

1 – Course Learning Objectives:

This course will enable the student to have a clear presentation of the basic concepts and principles of fundamental topics in classical physics. Concerning properties of matter, heat, and waves.

2 – Competencies:

c1- Explain the basic principles of rotational motion, application of rotational motion. (C1, C16)
c2- Study laws of planetary motion derived from the law of gravity and driving a general expression for gravitational potential energy. (C1, C18)
c3 – Deduce mathematical relations describing the objects deform under load condition and defining of several elastic constants for different types of deformation. (C2, C16)
c4 – Apply a theoretical model with certain simplifying assumptions to describe the wave motion and fluid motion. (C1, C2)
c5 – Analyze, thermal phenomena through important terms, temperature, heat & internal energy. (C1, C18)
c6 - Use experimental facilities to explain the concept of internal energy and the process by which energy is transferred. (C15, C18)
c7- Apply the first law of thermodynamic on different systems and its applications (C1, C2)
c8 - Understanding the kinetic theory of gas, entropy, and engine efficiency. (C3, C4, C14)
c9 - Work in a team and involve in group discussion and seminars. (C2, C3, C7)
c10 - Analyze and solve a wide variety of problems of the related subjects listed above, justify the suitability and limitations of the studied equations, and select the most appropriate equations for problem solutions. (C5, C10)
c11 - Differentiate and compare the different types of heat transfer in different walls. (C8, C9, C14)
c12 - Search for information's in references and in internet. (C5, C9)
c13 - Communicate and interact effectively with other people and in a small group. (C5, C8, C14)
c14 - Practice self-learning and communicate effectively orally and in written form. (C7, C8)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C8, C9, C10 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Rotational motion, angular displacement, velocity, acceleration	2	-	-
2	• Relation between linear and angular quantities.	1	1	-
3	• Applications on rotational motion	2	1	4
4	➢ Universal gravitational law	1	1	3
5	• Kepler's laws	2	1	-
6	• Gravitational energy	1	-	-
7	Assessment (Mid-Term Exam)	2	1	1
8	• Escape speed and orbital energy	1	1	
9	➢ Elasticity: Linear, shear and Bulk deformation	3	2	4
10	➢ Characteristics of fluids and streamlines	1	1	4
11	• Fundamental laws of fluid	2	1	-
12	• Applications on Bernoulli's equation	2	1	2
13	• Viscosity and Poiseuille's law	1	1	2
14	➢ Heat transfer by convection and conduction	2	1	2
14	➢ Work and heat in thermodynamic system	1	-	-
14	• First law of thermodynamic	1	-	4
15	• Isothermal expansion of gases and Molar specific heat	2	1	-
15	➢ Mathematical representation of transverse waves	1	-	-
15	• The principle of superposition	1	-	-
15	• Standing waves and Sound waves	1	1	4
	Total Hours	**30**	**15**	**30**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies													
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14
Rotational motion, angular displacement, velocity, acceleration	1	1		1					1			1		1
Relation between linear and angular quantities.	1	1		1					1			1		1
Applications on rotational motion	1	1		1					1			1		1
Universal gravitational law	1	1		1					1			1		1
Kepler's laws	1	1		1					1	1		1	1	1
Gravitational energy	1	1		1					1	1		1	1	1
Escape speed and orbital energy	1	1		1					1	1		1	1	1
Elasticity: Linear, shear and Bulk deformation			1						1	1		1	1	1
Characteristics of fluids and streamlines				1					1	1		1	1	1
Fundamental laws of fluid				1					1	1		1	1	1
Applications on Bernoulli's equation				1					1	1		1	1	1
Viscosity and Poiseuille's law				1					1	1		1	1	1
Heat transfer by convection and conduction					1	1	1	1	1	1	1	1	1	1
Work and heat in thermodynamic system					1	1	1	1	1	1	1	1	1	1
First law of thermodynamic					1	1	1	1	1	1	1	1	1	1
Isothermal expansion of gases and Molar specific heat					1	1	1	1	1	1	1	1	1	1

Mathematical representation of transverse waves				1					1	1		1	1	1
The principle of superposition				1					1	1		1	1	1
Standing waves and Sound waves									1	1		1	1	1
Topics Covering Competencies	7	7	1	13	4	4	4	4	19	14	4	19	15	19
%Topics Covering Competencies	37	37	5	68	21	21	21	21	100	74	21	100	79	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Assignments
c1	1	1	1	1	1	1	1	1
c2	1	1	1	1	1	1	1	1
c3	1	1	1	1	1	1	1	1
c4	1	1	1	1	1	1	1	1
c5	1	1	1	1	1	1	1	1
c6	1	1	1	1	1	1	1	1
c7	1	1	1	1	1	1	1	1
c8	1	1	1	1	1	1	1	1
c9	1	1	1		1			
c10	1	1	1	1	1	1	1	1
c11	1	1	1	1	1	1	1	1
c12		1	1		1			
c13	1	1	1	1	1			
c14	1	1	1	1	1			
$\sum$	13	14	14	12	14	10	10	10
%	93	100	100	86	100	71	71	71

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	Bi-Weekly	20
	Reports/Research		
	Assignments		
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Physics I, PHYn001. Dr. El-Tawab Kamal, Dr. Abo el Yazeed B. Abo el Yazeed, Dr. Marwa Y. Shoeib and Dr. Nagat A. Elmahdy. Modern Academy Press.
- Physics Lab (1) Note

7-2 Required books:

- Serway (2003) Physics for Scientists & Engineering, USA: Sundress College Pub.
- Griffith Thomas (2008) The Physics of Everyday Phenomena, USA: Mc-Graw hill.

7-3 Recommended books:

- Halliday, David, Robert Resnick, Jearl Walker (2005). Fundamentals of Physics, 7th ed. Hoboken, N.J.: John Wiley and Sons.

7-4 Periodicals, Web sites, etc.

- http.www.saunderscollege.cpm/physics
- http://www.physicsclassroom.com/calcpad/circgrav/
- http://physicsworld.com/
- http://www.britannica.com/science/wave-motion
- http://physics.info/

8 – Facilities required for teaching and learning:

- Laboratories.
- Library.
- Internet.

Course coordinator:	Dr. Marwa Shoeib
Head of the Department:	Associate Prof. / Ashraf Taha EL-Sayed
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
PHYn002: Physics 2

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Physics 2	**Code:** PHYn002	**Level:** Freshman, Spring	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:**1	**Practical:** 2
	Pre-requisite: PHYn001		

C - Professional information
1 – Course Learning Objectives:

By the end of this course the students should be able to apply, demonstrate the knowledge and understanding of the concepts of the electricity and magnetism and learn the main laws of electromagnetism, understanding how to connect the actual phenomena with the theory, and learn the fundamentals of physical optics.

2 – Competencies:

c1- Explain the fundamental and basic law of applications in electricity, magnetism, and electromagnetism. (C1, C16)
c2- Study Gausses law in electricity for different type of charged bodies. (C1, C18)
c3 - Deduce mathematical relations describing laws of electric capacitors and effect of dielectric. (C2, C16)
c4 - Understanding direct current, resistance and solution of simple electric circuits and kerchief's laws. (C1, C2)
c5 - Analogy between magnetic field and electric field., and application of Ampere's law, Gauss's law in magnetism. (C1, C18)
c6 - Use experimental facilities to explain the Magnetic properties of matter. (C15, C18)
c7- Explain fundamental theories of Electro-magnetic waves and main physical phenomena of physical optics (interference, diffraction, and polarization) (C1, C2)
c8 - Investigate electric force and electric field (using Gauss's law) and select the proper manner to solve problem. (C3, C4, C14)
c9 - Work in a team and involve in group discussion and seminars. (C2, C3, C7)
c10 - Study of capacitors and dielectric effect, uses of capacitors, and use Kirchhoff's laws to solve simple electric circuits. (C5, C10)
c11 - Investigate and compare electric field, magnetic field, and magnetic force using Gauss law in magnetism and Ampere's law; studying the nature of each and identify magnetic properties and studying electromagnetic wave. (C8, C9, C14)
c12 - Search for information's in references and in internet. (C5, C9)
c13 - Communicate and interact effectively with other people and in a small group. (C5, C8, C14)
c14 - Practice self-learning and communicate effectively orally and in written form. (C7, C8)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C8, C9, C10 & C14.

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1,2	➢ Charge and Matter, The Electric Field, Gauss' law	2	1	2
3	➢ Gauss's law applications	2	1	2
4	➢ Electric Potential	2		2
5	➢ Capacitors and Dielectric	2	1	2
6	➢ Capacitors and Dielectric	2	1	2
7	➢ Assessment (Mid-Term Exam)			
8,9	➢ The Magnetic Field, Ampere's Law	2	1	2
10,11	➢ Ampere's law, Inductance	2	1	2
12	➢ Magnetic Properties of matter	2	1	2
12	➢ Magnetic Properties of matter, Electromagnetic Waves	2	1	2
13	➢ Electromagnetic Waves	2	1	2
13	➢ Electromagnetic Waves, Physical Optics, Polarization of light	2	1	2
14	➢ Polarization of light	2	1	2
14	➢ Interference of light	2	1	2
15	➢ Interference of light, Diffraction of light	2	1	1
15	➢ Diffraction of light, Some applications	2	1	1
	Total Hours	**30**	**15**	**30**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies													
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14
Charge and Matter, The Electric Field, Gauss' law	1	1	1	1	1		1	1	1		1	1		1
Gauss's law, Electric Potential	1	1	1	1	1		1	1	1		1	1		1
Gauss's law applications	1	1	1	1	1		1	1	1		1	1		1
Capacitors and Dielectric	1	1	1	1	1		1		1	1	1	1		1
Capacitors and Dielectric	1	1	1	1	1		1		1	1	1	1	1	1
The Magnetic Field, Ampere's Law	1		1	1	1	1	1		1	1	1	1	1	1
Ampere's law, Inductance	1		1	1	1	1	1		1	1	1	1	1	1
Magnetic Properties of matter	1			1	1	1	1		1	1	1	1	1	1
Magnetic Properties of matter, Electromagnetic Waves	1			1	1	1	1		1	1	1	1	1	1
Electromagnetic Waves	1				1	1	1		1	1	1	1	1	1
Electromagnetic Waves, Physical Optics, Polarization of light	1				1	1	1		1		1	1	1	1
Polarization of light					1	1	1		1		1	1	1	1
Interference of light						1	1	1	1		1	1	1	1
Interference of light, Diffraction of light						1	1	1	1		1	1	1	1
Diffraction of light, Some applications						1	1	1	1		1	1	1	1
Topics Covering Competencies	11	5	7	9	12	10	15	6	15	7	15	15	11	15
%Topics Covering Competencies	73	33	47	60	80	67	100	40	100	47	100	100	73	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method		
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Assignments
c1	1	1	1	1	1	1	1	1
c2	1	1	1	1	1	1	1	1
c3	1	1	1	1	1	1	1	1
c4	1	1	1	1	1	1	1	1
c5	1	1	1	1	1	1	1	1
c6	1	1	1	1	1	1	1	1
c7	1	1	1	1	1	1	1	1
c8	1	1	1	1	1	1	1	1
c9		1	1		1			
c10	1	1	1	1	1	1	1	1
c11	1	1	1	1	1	1	1	1
c12		1	1		1			
c13	1	1	1	1	1			
c14	1	1	1	1	1			
$\sum$	12	14	14	12	14	10	10	10
%	86	100	100	86	100	71	71	71

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	Bi-Weekly	20
	Reports/Research		
	Assignments		
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- PHYn002, Physics II.
- Physics Lab (2) Note

7-2 Required books:

- M. El- Tawab Kamal and Abo- Elyzeed B. Abo- Elyzeed, Marwa Shoeb, Nagat Elmahdy. Electricity, Magnetism and Optics Physics
- Serway (2003) Physics for Scientists & Engineering, USA: Sundress College Pub.
- Griffith Thomas (2008) The Physics of Everyday Phenomena, USA: Mc-Graw hill.

7-3 Recommended books:

- David Halliday, Robert Resnick, JearlWallker, Fundamentals of Physics, John Wiley, New York, 1993.

- Raymond A. Serway, Physics for Scientists and Engineers with Modern Physics, 3rd ed. Wiley, New York, 1990.

7-4 Periodicals, Web sites, etc.

- http.www.saunderscollege.cpm/physics
- http://www.physicsclassroom.com/calcpad/circgrav/
- http://physicsworld.com/
- http://www.britannica.com/science/wave-motion
- http://physics.info/

8 – Facilities required for teaching and learning:

- Laboratories.
- Library.
- Internet.

Course coordinator:	Dr. Nagat A. Elmahdy
Head of the Department:	Associate Prof. / Ashraf Taha EL-Sayed
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MECn001: Mechanics-1

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Mechanics-1 **Code:** MECn001 **Level:** Zero Fall
Credit Hours: 2 **Lectures:** 1 **Tutorial/Exercise:** 3 **Practical:** -
Pre-requisite: None

C - Professional information
1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to the basic concepts of statics in plane and space: (force resultant equilibrium analysis of structures).

2 – Competencies:

c1- Knowledge of the basic of statics in plane and space (C1, C5).
c2- Knowledge the difference between the moment of force in plane and space (C1, C5).
c3- Classification the support reaction in plane and in space (C1, C5).
c4- Understanding the structural analysis in plane (C1, C5).
c5- Analyze and classify between equilibrium in plane and equilibrium in space (C1, C5, C9).
c6- Classify and compare the different between equilibrium of a single rigid body and all forces involved were external to the rigid body (C1, C5, C9).
c7- Solve the equations of equilibrium to get three unknowns (C1, C9).
c8- Solve the trusses to get the value of the forces in the structural by joints and by section methods (C1, C9).
c9- Work in a team to solve problem as a search (C7, C8).
c10- Search for information in references and in internet (C9, C7, C10)

This course contributes to the following program competencies: C1, C5, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Basic Concepts of statics.	1	1	—
2	➢ Resultant of concurrent forces in plane	1	1	—
3	➢ Resultant of concurrent forces in space	1	3	—
4	➢ Equilibrium of a particle (in plane and in space)	1	1	—
5	➢ Different types of support in plane	1	2	—
6	➢ Distributed loads	1	2	—
7	➢ Assessment (Mid-Term Exam)	1	2	

8	➢ Equilibrium of rigid body in plane	1	2	—
9	➢ Different types of supports in space	1	3	—
10	➢ Equilibrium of rigid body in space	2	4	—
11	➢ Special cases of two, three and four force members	1	3	—
12	➢ Analysis of Trusses by the method of joints	1	3	—
13	➢ Analysis of Trusses by the method of section	1	2	—
14,15	➢ Final revision	1	1	—
	Total hours	**15**	**30**	**—**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies									
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**
Basic Concepts of statics.	1	1								1
Resultant of concurrent forces in plane		1							1	1
Resultant of concurrent forces in space		1							1	1
Equilibrium of a particle (in plane and in space)			1				1		1	1
Different types of support in plane			1				1		1	1
Distributed loads			1				1		1	1
Equilibrium of rigid body in plane			1		1		1		1	1
Different types of supports in space			1		1		1		1	1
Equilibrium of rigid body in space			1		1		1		1	1
Special cases of two, three and four force members				1		1	1		1	1
Analysis of Trusses by the method of joints				1		1	1	1	1	1
Analysis of Trusses by the method of section				1		1	1	1	1	1
Final revision	1	1	1	1	1	1	1	1	1	1
Topics Covering Competencies	2	4	7	4	4	4	10	3	12	13
% Topics Covering Competencies	15	30	54	30	30	30	77	23	92	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method			
	Lecture	**Discussions and seminars**	**Tutorials**	**Problem solving**	**Research and Reports**	**Written Exam**	**Quizzes**	**Term papers**	**Assignments**
c1	1		1	1	1	1	1	1	1
c2	1		1	1		1	1	1	1
c3	1		1	1	1	1	1	1	1
c4	1	1	1	1	1	1	1	1	1
c5	1	1	1			1	1		1
c6	1	1	1	1		1	1	1	1
c7	1	1	1	1		1	1	1	1
c8	1	1	1			1	1	1	1
c9				1	1			1	
c10					1			1	
$\sum$	8	5	8	7	5	8	٨	٩	8

%	80	50	80	70	50	80	80	90	80

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7^{th} Week	20
Semester Work	Quizzes	Bi-Weekly	40
	Reports/Research		
	Assignments		
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Shimaa Lotfy and Moamen Wafaie, Engineering Mechanics (Statics), Lecture Notes, Modern Academy Press.

7-2 Required books:

- Beer and Johnston, Vector Mechanics for Engineers- Statics, 8th Edition in SI Units, ISBN 978-007-125765-7, U.S.A., 2007)

7-3 Recommended books:

- Beer and Johnston, Vector Mechanics for Engineers- Statics, 8th Edition in SI Units, ISBN 978-007-125765-7, U.S.A., 2007.

7-4 Periodicals, Web sites, etc.

- Basic of mechanical engineering, engineering mechanics statics and dynamics, statics, and dynamics hibbeler 12th edition.

8 – Facilities required for teaching and learning:

- Library.
- Internet.
- High speed internet and communication facilities for distance learning.

Course coordinator:	Dr. Moamen Wafaie
Head of the Department:	Associate Prof. / Ashraf Taha EL-Sayed
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MECn002: Mechanics-2

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Basic Science Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Mechanics-2 **Code:** MECn002 **Level:** Zero Spring
Credit Hours: 2 **Lectures:** 1 **Tutorial/Exercise:** 3 **Practical:** -
Pre-requisite: MECn001

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to the basic concepts of the geometry of motion to relate displacement, velocity, acceleration and time without reference to the cause of the motion. The study of the relation existing between the forces acting on a body to determine the forces required to produce a given motion. The end of this course the students should demonstrate the knowledge that the equation of motion together with the principle of kinetics to obtain the two additional methods of analysis the method of the work and energy and the method of impulse and momentum.

2 – Competencies:

c1- Basic of dynamics like velocity, acceleration, total distance, average velocity, and average speed. (C1, C5).
c2- Definition of differentiation and integration (C1)
c3- Classification the particle's motion in straight line and in curved path and it's applications (C1, C5)
c4- Understanding the dynamics system and the effect of forces on the system in different coordinates (C1).
c5- Classification of two methods of kinetics, namely, the method of work and energy and method of impulse and momentum. (C1, C5, C9)
c6- Analyze and classify between the force acting on the system to get its value and the principle of work and energy to get the velocity of the particle (C1, C5, C9)
c7- Classify and compare the different between the average velocity and average speed (C1, C5, C9).
c8- Solve the equation of motion to get velocity, acceleration and total distance traveled at any time. (C1, C5, C9)
c9- Calculate the time of flight of projectile to get a target. (C1, C5, C9).
c10- Solve the equation of motion graphically. (C1, C5, C9)
c11- Work in a team to solve problem as a search. (C7, C8)
c12- Search for information in references and in internet (C7, C9, C10).

This course contributes to the following program competencies: C1, C5, C7, C8, C9 & C10

3 - Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Rectilinear Motion of particles.	1	٣	—
2	➢ Determination of the motion of a particle.	1	٣	—
3	➢ Graphical Solution of Rectilinear Motion.	1	١	—
4	➢ Curvilinear Motion of particle, Free Flight Motion.	2	٣	—
5	➢ Normal and Tangential.	1	٣	—
6	➢ Plane Curvilinear Motion.	1	٣	—
7	Assessment (Mid-Term Exam)	1	1	
8	➢ Polar Coordinates.	1	1	—
9,10	➢ Kinetics of Particles, Force and acceleration.	2	٣	—
11,12	➢ Kinetics of Particles Energy and Momentum Methods	2	٣	—
13	➢ Motion under a conservative central force.	1	٣	—
14	➢ Principle of Impulse and Momentum for particle.	1	٣	—
	Total hours	**15**	**٣٠**	**—**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies											
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**
Rectilinear Motion of particles.	1											1
Determination of the motion of a particle.	1	1	1								1	1
Graphical Solution of Rectilinear Motion.	1		1								1	1
Curvilinear Motion of particle, Free Flight Motion.		1									1	1
Normal and Tangential.		1	1								1	1
Plane Curvilinear Motion.				1							1	1
Polar Coordinates.			1	1							1	1
Kinetics of Particles, Force and acceleration.					1	1	1				1	1
Kinetics of Particles Energy and Momentum Methods				1	1	1	1				1	1
Motion under a conservative central force.				1	1		1	1		1	1	1
Principle of Impulse and Momentum for particle.					1			1	1	1	1	1
Topics Covering Competencies	3	3	4	4	4	2	3	2	1	2	10	11
% Topics Covering Competencies	27	27	63	63	63	18	27	18	9	18	91	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods				Learning Methods	Assessment Method			
	Lecture	Discussions and seminars	Tutorials	Problem solving	Research and Reports	Written Exam	Quizzes	Term papers	Assignments
c1	1		1	1	1	1	1	1	1
c2	1		1	1		1	1	1	1
c3	1		1	1	1	1	1	1	1

c4	1	1	1	1	1	1	1	1	1
c5	1	1	1			1	1	1	1
c6	1	1	1			1	1		1
c7	1	1	1	1		1	1	1	1
c8	1	1	1	1		1	1	1	1
c9	1		1			1	1	1	1
c10	1		1	1				1	1
c11				1	1			1	
c12					1			1	
$\sum$	10	5	10	8	5	9	٩	١٢	10
%	83	42	83	67	42	75	75	100	83

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	Bi-Weekly	40
	Reports/Research		
	Assignments		
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Moamen Wafaie, Engineering Mechanics (Dynamics), Lecture Notes, Modern Academy Press.

7-2 Required books:

- F. Beer and Johnston Vector mechanics for Engineers, Dynamics, McGraw-Hill.
- R.C. Hibbeler Engineering Mechanics, Dynamics.

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.

- Basic of mechanical engineering, engineering mechanics statics and dynamics, statics, and dynamics hibbeler 12th edition and there are teams link uploaded by videos concerning the course.

8 – Facilities required for teaching and learning:

- Library.
- Internet.

Course coordinator: Dr. Shimaa Lotfy
Head of the Department: Associat Prof. / Ashraf Taha EL-Sayed
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn001: Engineering Graphics 1

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Electronic Engineering and Communication Technology BSc Program
Computer Engineering and Information Technology BSc Program
Architecture Engineering and Building Technology BSc Program
Civil Engineering and Building Technology BSc program

Department offering the program: Manufacturing Engineering and Production Technology Department
Electronic Engineering and Communication Technology Department
Computer Engineering and Information Technology Department
Architecture Engineering and Building Technology Department
Civil Engineering and Building Technology Department

Department offering the course: Manufacturing Engineering and Production Technology Department.

Date of specifications approval: August 2020

B - Basic Information

Title: Engineering Graphics **Code:** MNFn001 **Level:** Freshman, first semester
Credit Hours: 2 **Lectures:** 1 **Tutorial/Exercise:** 3 **Practical:** -
Pre-requisite: None

C - Professional information

1 – Course Learning Objectives:

By the end of the course, students should know to read and draw components in different drawing kinds, namely orthogonal, perspective and/or isometric drawings. The students will be able to apply the dimensioning principles on the drawings.

2 – Competencies:

c1. Solve and communicate problems in orthographic views and isometric and oblique drawings (C2, C3, C7, C8, C9).
c3. Consider the benefits of solving problems of developments and intersections and draw different problems in sectional views. (C3, C4, C8, C9)
c5. Select the proper section for each component and draw dimensions for components from production point of view. (C1, C4, C5, C8)
c7. Produce orthographic views from 3D models. (C6, C9, C10)
c8. Read and understand orthographic drawing and prepare and interpret engineering drawing. (C1, C8, C14)
c10. Read orthographic drawing with multi views and make necessary views using multi view and isometric. (C3, C5, C6, C9, C10)
c12. Use the graphic language and communicate effectively with other discipline using the graphical language (C1, C5)
c14. Expand their creative talents and to communicate their ideas in a meaningful manner. (C8, C9, C10)
c15. Search for information and engage in life – long sell learning discipline. (C8, C10)
c16. Use graphically effectively. (C8, C9)
c17. Refer to relevant literature. (C9, C10)
c18. Search for information's in references and in internet and practice self-learning and continuous learning (C5, C8, C9, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Drawing instruments, draw sheets; Scales; Folding, Lettering.	1	3	-
2	Geometric Construction.	1	3	-
3	Alphabet of lines.	1	3	-
4	Theory of orthographic projection: Projection of point; line and plane Projection of geometric solids.	1	3	-
5	Multi view drawing (of Vertical and Horizontal Surfaces).	1	3	-
6	Multi view drawing (of inclined Surfaces).	1	3	-
7	Assessment (Mid-Term Exam)	1	1	-
8	Multi view drawing (of cylindrical Surfaces).	1	3	-
9	Practices of multi view in all cases.	1	3	-
10	Pictorial drawing (isometric), Pictorial drawing (oblique).	1	3	-
11	Isometric drawing (of Vertical, Horizontal).	١	٣	-
12	Isometric drawing (of inclined Surfaces).	١	٣	-
13	Isometric drawing (of cylindrical Surfaces).	١	٣	-
14	Practices of Isometric drawing in all cases.	١	٣	-
15	Conventional practice in ED.	١	٣	-
	Total hours	**15**	**43**	**-**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies											
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**
1- Drawing instruments, draw sheets; Scales; Folding, Lettering.	1			1		1						
2- Geometrical constrictions	1				1	1	1			1	1	
3- Alphabet of lines.		1			1	1	1	1	1	1	1	1
4- Theory of orthographic projection: Projection of point; line and plane Projection of geometric solids.	1	1			1	1	1	1	1	1	1	1
5- Multi view drawing (of Vertical and Horizontal Surfaces).	1	1			1	1	1					
6- Multi view drawing (of inclined Surfaces).		1	1			1	1			1	1	1
7- Multi view drawing (of cylindrical Surfaces).		1	1			1				1	1	1
8- Practices of multi view in all cases.	1		1			1		1	1			
9- Pictorial drawing (isometric), Pictorial drawing (oblique).		1	1			1	1	1	1	1	1	1
10- Isometric drawing (of Vertical, Horizontal).		1	1		1	1	1			1	1	1
11- Isometric drawing (of inclined Surfaces).		1	1			1	1	1	1	1	1	1
12- Isometric drawing (of cylindrical Surfaces).				1	1	1	1			1		
13- Practices of Isometric drawing in all cases.				1	1	1	1			1		
14- Conventional practice in ED.				1	1	1	1			1		
Topics Covering Competencies	5	8	6	4	8	14	11	5	5	11	8	7
% Topics Covering Competencies	36	57	43	29	57	100	79	36	36	79	57	50

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	١			١	1		١	١		١	١		١		
c2	١		١	١	١	1	١	١	1	١	١	1	١	1	
c3	١			١	١	١			١	١	١	١	١	1	
c4	١	١	١				١		١	١	١				
c5	١	١		١	١		١	١	١	1	١		١	١	١
c6			1		1	١	١		١			١			
c7						١	١		١			١			
c8	1	١	١					١					1	١	١
c9	1	١	١					١							
c10		١	١					١							
c11	1	١	١					١						١	1
c12	1										1		1	1	
∑	9	6	7	4	5	4	6	7	6	5	6	4	6	6	3
%	75	50	58	33	42	33	50	58	50	42	50	33	50	50	25

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes per semester	20
	Tutorials	3 Assignments per semester	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Engineering Graphics by Prof. Nabil Gadallah.

7-2 Required books

- James H.Earle, Graphics For Engineers, Addison Wesley Publishing Company 1991.

7-3 Recommended books

- None

7-4 Recommended Web Site

- None

8 – Facilities required for teaching and learning:

- Overhead projector and screen.
- Models and prototype as teaching aids.

Course coordinator: Dr. Metwally Abd Elghaffar
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn002: Engineering Graphics 2

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Electronic Engineering and Communication Technology BSc Program
Computer Engineering and Information Technology BSc Program
Architecture Engineering and Building Technology BSc Program
Civil Engineering and Building Technology BSc program

Department offering the program: Manufacturing Engineering and Production Technology Department
Electronic Engineering and Communication Technology Department
Computer Engineering and Information Technology Department
Architecture Engineering and Building Technology Department
Civil Engineering and Building Technology Department

Department offering the course: Manufacturing Engineering and Production Technology Department.

Date of specifications approval: August 2020

B - Basic Information

Title: Engineering Graphics **Code:** MNFn002 **Level:** Freshman, first semester
Credit Hours: 2 **Lectures:** 1 **Tutorial/Exercise:** 3 **Practical:** -
Pre-requisite: MNFn001

C - Professional information

1 – Course Learning Objectives:

The objective of this course is to enable the students to read and draw components in different drawing kinds, namely orthogonal, perspective and/or isometric drawings & missing views and sectional views as well as steel constructions. The students will be able to apply the dimensioning principles on the drawings.

2 – Competencies:

c1. Solve and communicate problems in orthographic views and isometric and oblique drawings (C2, C3, C7, C8, C9).
c3. Consider the benefits of solving problems of developments and intersections and draw different problems in sectional views. (C3, C4, C8, C9)
c5. Select the proper section for each component and draw dimensions for components from production point of view. (C1, C4, C5, C8)
c7. Produce orthographic views from 3D models. (C6, C9, C10)
c8. Read and understand orthographic drawing and prepare and interpret engineering drawing. (C1, C8, C14)
c10. Read orthographic drawing with multi views and make necessary views using multi view and isometric. (C3, C5, C6, C9, C10)
c12. Use the graphic language and communicate effectively with other discipline using the graphical language (C1, C5)
c14. Expand their creative talents and to communicate their ideas in a meaningful manner. (C8, C9, C10)
c15. Search for information and engage in life – long sell learning discipline. (C8, C10)
c16. Use graphically effectively. (C8, C9)
c17. Refer to relevant literature. (C9, C10)
c18. Search for information's in references and in internet and practice self-learning and continuous learning (C5, C8, C9, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9 & C10

3 – Contents:

Weeks	Topics	Lecture hours	Tutorial hours	Practical hours
1	Revision of theory of orthographic projection: Projection of point; line and plane Projection of geometric solids.	1	3	-
2	Missing view drawing (of Vertical and Horizontal Surfaces).	1	3	-
3	Missing view drawing (of inclined Surfaces).	1	3	-
4	Missing view drawing (of cylindrical Surfaces).	1	3	-
5	Practices of multi view in all cases.	1	3	-
6	Pictorial drawing (isometric), Pictorial drawing (oblique).	1	3	-
7	Assessment (Mid-Term Exam)	1	1	-
8	Isometric drawing (of Vertical, Horizontal & inclined Surfaces and cylindrical Surfaces).	1	3	-
9	Sectional views	1	3	-
10	Sectional views**:** Basic types of sections: Full sections: longitudinal, cross – section.	1	3	-
11	Offset; Aligned sections; Half-section; Partial S.; Revolved & Auxiliary sections.	١	٣	-
12	Steel constructions: Basic types of steel structures.	١	٣	-
13	Steel constructions**:** Projection of steel sectional.	١	٣	-
14	Steel constructions: practices of constructions steel sectional.	١	٣	-
15	Dimensioning – Arrangements of dimensions – Rules for dimensions of circles; radii ; angles ; plain holes.	١	٣	-
	Total hours	**15**	**43**	**-**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies											
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**
1- Revision of theory of orthographic projection: Projection of point; line and plane Projection of geometric solids.	1			1								
2- Missing view drawing (of Vertical and Horizontal Surfaces).	1			1								
3- Missing view drawing (of inclined Surfaces).		1			1							
4- Missing view drawing (of cylindrical Surfaces).		1			1							
5- Practices of multi view in all cases.		1	1									
6- Pictorial drawing (isometric), Pictorial drawing (oblique).		1	1		1							
7- Isometric drawing (of Vertical, Horizontal & inclined Surfaces and cylindrical Surfaces).					1							
8- Sectional views			1									
9- Sectional views**:** Basic types of sections: Full sections: longitudinal, cross – section.				1	1							
10- Offset; Aligned sections; Half-section; Partial S.; Revolved & Auxiliary sections.				١	1							
11- Steel constructions: Basic types of steel structures.					1							
12- Steel constructions**:** Projection of steel sectional.			١	1								

13- Steel constructions: practices of constructions steel sectional.			✓	1								
14- Dimensioning – Arrangements of dimensions – Rules for dimensions of circles; radii; angles; plain holes.	✓											
Topics Covering Competencies	3	4	5	6	7	0	0	0	0	0	0	0
% Topics Covering Competencies	21	29	36	43	50	0	0	0	0	0	0	0

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	✓			✓	1		✓	✓		✓	✓		✓		
c2	✓		✓	✓	✓	1	✓	✓	1	✓	✓	1	✓		
c3	✓			✓	✓	✓			✓	✓	✓	✓	✓	1	
c4	✓	✓	✓	1	1		✓	1	✓	✓	✓		✓	✓	✓
c5	✓			✓	✓	1	1		✓	✓	✓	1	✓	✓	
c6						✓	✓		✓			✓			
c7						✓	✓		✓						
c8	1	✓	✓					✓						✓	✓
c9	1	✓	✓					✓							
c10		✓	✓					✓							
c11	1	✓	✓					✓						✓	
c12	1										1		1	1	
$\sum$	9	5	6	5	5	5	6	7	6	5	6	4	6	6	2
%	75	42	50	42	42	42	50	58	50	42	50	33	50	50	17

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	20
	Tutorials	3 Assignments per semester	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Engineering Graphics by Prof. Nabil Gadallah.

7-2 Required books

- James H.Earle, Graphics For Engineering, Addison Wesley Publishing Company 1991.

7-3 Recommended books

- None

7-5 Recommended Web Site

- None

8 – Facilities required for teaching and learning:

- Overhead projector and screen.
- Models and prototype as teaching aids.

Course coordinator:	Dr. Metwally Abd Elghaffar
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn003: Principles of Production Engineering

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program Electronic Engineering and Communication Technology BSc Program Computer Engineering and Information Technology BSc Program Architecture Engineering and Building Technology BSc Program Civil Engineering and Building Technology BSc program
Department offering the program:	Manufacturing Engineering and Production Technology Department Electronic Engineering and Communication Technology Department Computer Engineering and Information Technology Department Architecture Engineering and Building Technology Department Civil Engineering and Building Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August, 2020

B - Basic Information

Title: Principles of Production Engineering	**Code:** MNFn003	**Level:** zero	
Credit Hours: 3	**Lectures:** 2 **Pre-requisite:** None	**Tutorial/Exercise:** -	**Practical:** 3

C - Professional Information

1 – Course Learning Objectives:

By the end of this course the student should have gained the planned competencies (based on the knowledge, skills, and personal attitude) related to the production system and different methods of production by cutting and non-cutting processes theoretically and practically.

2 – Competencies:

On successful completion of the course, the student should demonstrate knowledge and understanding of:
c1- Basic production methods related to casting, metal forming processes, welding, and metal cutting (C1)
c2- Design pattern, allowances in casting & solidification (C2), (C3).
c3- Fundamental of centrifugal casting process (C1)
c4- Classification of welding process (C1, C4).
c5- Basic methods of hot and cold forming (C1, C4).
c6- Applications of metal cutting processes (C1)
c7- Select the proper manufacturing process for a specific product (C3, C4)
c8- Design the pattern for sand casting (C3, C4)
c9- Choose the suitable welding method or different joining (C2, C3, C4)
c10- Use the principle of production engineering in producing good quality cheap product (C4)
c11- Solve some simple production problems related to method of production selection (C3)
c12- Use the studied manufacturing methods in producing prototypes during practical hours (C7).
c13- Collect, record and submitting data about production engineering (C10).
c14- Work in a team and involve in group discussion (C6, C7).
c15- Communicate effectively and present data and results orally (C8).
c16- Search for information's in references and in internet (C5).
c17- Practice self-learning (C10).

This course contributes to the following program competencies:C1, C2, C3, C4, C5, C6, C7, C8 & C10

3 – Contents:

Weeks	Topics	Lecture hours	Tutorial hours	Practical hours
1-3	Role of production engineering, production system objective, types of industries, classification of manufacturing processes.	4		
4-6	Sand casting, melting of metal & furnaces. Solidification, pattern allowances, sand molding & gating system. Die casting, centrifugal & investment casting.	6		8
7	Assessment (Mid-Term Exam)	2		
8-10	Types of welding, oxy- acetylene welding, electric- arc welding, submerged arc welding, MIG, TIG, resistance welding, soldering & brazing	6		8
11, 12	Hot & cold forming, rolling, extrusion, wire drawing & sheet metal forming	6		9
13-15	Metal cutting processes (Turning, milling, shaping, grinding and drilling)	6		20
	Total hours	**30**		**45**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17
1- Role of production engineering, production system objective, types of industries, classification of manufacturing processes ..	1	1	1					1									
2- Sand casting, melting of metal & furnaces. Solidification, pattern allowances, sand molding & gating system. Die casting, centrifugal & investment casting.	1	1	1					1		1	1	1	1				
3- Types of welding, oxy- acetylene welding, electric- arc welding,				1					1	1	1	1	1				

submerged arc welding, MIG, TIG, resistance welding, soldering & brazing.																	
4- Hot & cold forming, rolling, extrusion, wire drawing & sheet metal forming					1			1	1	1	1	1	1				
5-Metal cutting processes (Turning, milling, shaping, grinding, and drilling)	1					1	1		1	1	1	1	1				
Topics covering Competencies	3	2	2	1	1	1	1	3	3	4	4	4	4	0	0	0	0
% Topics covering Competencies	60	40	40	20	20	20	20	60	60	80	80	80	80	0	0	0	0

5 – Teaching, Learning, and Assessment Methods:

Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & Seminars	Tutorials	Problem solving	Laboratory Experiment	Research, Reports & Assignments	Self-learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1	1			1				1		1	1	1	
c2	1	1	1			1			1	1		1	1	1	
c3	1	1	1			1			1	1		1	1	1	
c4	1	1	1			1			1	1		1	1	1	
c5	1	1	1			1			1	1		1	1	1	
c6	1	1	1			1			1	1		1	1	1	
c7	1	1	1			1				1		1	1	1	
c8	1	1	1			1			1	1		1	1	1	
c9	1	1	1			1				1		1	1	1	
c10	1	1	1			1				1			1	1	
c11	1		1			1				1		1			
c12	1	1				1				1		1			
c13	1	1				1		1		1				1	
c14		1	1			1									
c15			1			1							1		
c16														1	
c17								1				1			
$\sum$	13	13	13	0	0	15	0	2	6	13	0	12	11	12	0

%	76	76	76	0	0	88	0	12	35	76	0	71	65	71	0

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: seminars, quizzes, assignments, and reports	Bi-Weekly	20
Mid-Term Exam	7th Week	20
Practical Exam	15th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Lecture notes & workshop training notes

7-2 Required books:

- Serope Kalpakjiam," Manufacturing Engineering and technology", prentice hall, 2010

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and learning:

- Lecture room, and workshops

Course coordinator: Dr. Maher Khalifa

Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn060: Summer Training for Level Zero

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Summer training for level zero	**Code:** MNFn060	**Level:** 1st Summer (Level zero)
Credit Hours: 0	**Lectures:** 0	**Tutorial/Exercise/ Practical:** Total of 60 hours
	Pre-requisite: None	

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to professional 2D drawing, design and drafting using AutoCAD. They should compete on:

- Use AutoCAD for daily working process.
- Navigate throughout AutoCAD using major navigating tools.
- Understand the concept and techniques to draw.
- Create multiple designs using several of tools.
- Create layers to control the objects' visibility.
- Explain drawing using annotations.
- Plot or print the drawing by scale.

2 – Competencies:

c1. Identify the basic commands in AutoCAD (keyboard, menu and tool bars) (C1).
c2. Learn how to save drawings (C1, C2).
c3. Acquire and apply new knowledge on drawing commands (circles, arcs, rectangle, ellipse, ...etc.) (C1, C2).
c4. Learn and explain editing commands (Erase, copy, move, rotate, mirror, fillet, chamfer, …etc.) (C1, C2).
c5. Practice controlling the drawing display (C2)
c6. Identify the fundamental dimensioning terms (C9, C14)
c7. Use appropriate techniques for hatching and hatching edit (C2, C9).
c8. Practice creating drawings using AutoCAD. (C5, C9)
c9. Collaborate effectively within multidisciplinary team (C5, C7, C9).
c10. Practice self-learning and communicate effectively orally and in written form (C8, C10).

This course contributes to the following program competencies: C1, C2, C5, C7, C8, C9, C10 & C14

3 – Contents:

Topics	Lecture hours	Tutorial hours	Practical hours
• AutoCAD GUI • (Mouse + Keyboard) input functions. • Tool bars. • Layers properties. • How to select objects. • Different coordinate systems (Cartesian + Polar) (Absolute/Relative) • Polar Tracking. • Starting a new drawing (Create A4 sheet) • Saving your work • Opening an existing file • Draw (Line / Circle) • Modify menu (Erase command)		3	3
• Controlling layers (On-off/Lock-Unlock) • AutoCAD Options • Object snap • Orthomode • Draw (Rectangle / Polygon / Ellipse) • Modify menu (Fillet / Offset / Trim / Extend).		2	4
• Setting units. • Limits command. • Undo / Redo / Oops • Modify menu (Copy / Mirror / Move / Rotate / Array).		2	4
• Creating and Editing Text. • Dimensioning (Styling / Adding / Editing) • Drawing and Editing Curved Polylines. • Hatching o Specifying Hatch Areas o Associating Hatches with Boundaries o Hatching the Patterns		2	4
• Organizing and formatting drawing. • Draw (Arcs) • Modify (Scale / Stretch)		2	4
• Defining Blocks • Inserting Blocks • Redefining Blocks • Editing Blocks		2	4
• Creating annotative styles and objects • Creating layouts • Adjust floating viewports • Overriding layer properties in layout viewports • Drawing on layouts		2	4
• (Show-hide) command line (ctrl + 9) • Drawing Units (UN) • Convert LINES to POLYLINE (PE) • Draw (Donut / Polyline / Divide / Revcloud) • Modify menu (Lengthen)		2	4

• Printing and Plotting. • Configuring output devices • Creating & using plot styles tables • Plotting in modelspaces & paperspace • Exporting to an electronic format • Solve plotting Arabic Text issues		2	4
• Final Evaluation		1	5
Total hours		**20**	**40**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies									
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**
Introduction	1						1	1		1
AutoCAD software GUI and options	1				1		1	1		1
Drawing commands	1	1	1		1		1	1		1
Modify commands	1	1		1	1		1	1		1
Texting and Dimensioning						1		1	1	1
Hatching		1							1	
Printing and plotting	1							1		1
Topics Covering Competencies	5	3	1	1	3	1	4	6	2	6
% Topics Covering Competencies	71	43	14	14	43	14	57	56	28	56

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	**Presentations & Movies**	**Discussions & Seminars**	**Tutorials**	**Problem Solving**	**Laboratory & Experiment**	**Research, Reports & Assignments**	**Self-Learning**	**Modeling and Simulation**	**Written Exam**	**Tutorials**	**Practical Exam**	**Quizzes**	**Research & Presentations**	**Mini Project Report**
c1		1		1					1	1	1		1		
c2		1		1					1	1	1		1		
c3		1		1					1	1	1		1		
c4		1		1					1	1	1		1		
c5		1		1					1	1	1		1		
c6		1		1					1	1	1		1		
c7		1		1					1	1	1		1		
c8		1		1					1	1	1		1		
c9									1						
c10									1						
$\sum$	0	8	0	8	0	0	0	0	10	8	8	0	8	0	0
%	0	80	0	80	0	0	0	0	100	80	80	0	80	0	0

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Quizzes and Assignments	Daily	60
Final Evaluation	Tenth Day	40
Total		**100**

7 – List of references:

7-1 Course notes

- Yahia Elattar, AutoCAD for beginners (training book notes)

7-2 Required Book:

- None.

7-3 Recommended books:

- Shumaker, Terence M., David A. Madsen, David P. Madsen, Jeffery Laurich, J. C. Malitzke, Craig P. Black, and Adam M. Ferris. AutoCAD and Its Applications: Comprehensive, 2014. Goodheart-Willcox Company, Incorporated, 2014

7-4 Periodicals, Web sites, etc.:

- https://www.autodesk.com/certification, (Last accessed August 2020)

8 – Facilities required for teaching and learning:

- Computer lab. equipped with projection and sound systems.
- Computer, Data show and computer programs.
    - AutoCAD software package.
- High speed internet and communication facilities for distance learning.

Course coordinator:	Dr. Yahia Elattar
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn111: Mechanics of Materials

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Mechanics of Materials	**Code:** MNFn111	**Year/level:** 1st Level/Semester1	
Credit Hours: 3	**Lectures:** 2	**Tutorial:** 3	**Practical:** -
	Pre-requisite: MECn001		

C - Professional Information

1 – Course Learning Objectives:

The objective of this course is to enable the students to understand the fundamental kinds of applied loads, analyze the relation between stress and strain, calculate various types of individual and combined stresses, thermal stresses and determine the deflection of beams.

2 – Competencies:

On successful completion of the course, the student must:

- c1 Know and understand the stress-strain relationship for different materials. (C12).
- c2 Know and understand the types of loads and should draw tensile, bending and torsion diagrams (C11)
- c3 Know and understand the theoretical background needed to find and calculate the center of gravity, first moment of inertia and second moment of inertia for beam cross-sections. (C3).
- c4 Know and understand the types of stresses. (Tensile, Bending, and Torsion). (C1, & C12).
- c5 Know and understand the stresses due to combined loading and should calculate their principal values. (C1 & C12).
- c6 Know and understand the thermal stresses. (C1 & C12).
- c7 Know and understand the deflections in beams. (C3, & C12).
- c8 Know and understand some selected topics in the field of mechanics of materials. (C1, C3, C8, C11 & C12).
- c9 Use the international system of units in calculations. (C11 & C14).
- c10 Analyze how the mechanical characteristics are obtained in the laboratory (C2 & C11)
- c11 Solve simple problems concerning statically determinate and indeterminate systems. (C1 & C11)
- c12 Compare between the failures of mechanical elements subjected to combined loads (C1, C2 & C11)
- c13 Carry out stress and strain analysis in tensile test, and other experimental tests. (C2)
- c14 Differentiate between different cross-sections and their properties (C1 & C12).
- c15 Evaluate shear and bending diagrams for beams (C3).
- c16 Evaluate the safety factors of loaded mechanical elements. (C4).
- c17 Write standard technical reports. (C8)
- c18 Work in a team (C7)
- c19 Communicate effectively in written reports (C8).
- c20 Refer to relevant literatures (independent work). (C14)

This course contributes to the following program competencies: C1, C2, C3, C4, C7, C8, C11, C12 & C14.

3 – Contents:

Weeks	Topics	Lecture hours	Tutorial hours
1	➢ Loads and Reactions. (Kinds of loads and types of supports)	2	3
2	➢ Tension and Compression stresses • Mechanical Properties, Hook's Law	2	3

Weeks	Topics	Lecture hours	Tutorial hours
	• Thermal Stress		
3	➢ Statically Indeterminate Force Systems. • Compatibility Equation	2	3
4,5	➢ Geometrical Characteristics of a Plane Figures. • First Moment of Area • The Centroid of an Area, Neutral Axis • Moment of Inertia of Some Geometrical Shapes	4	6
6	➢ Direct Shear Stress. • Application of direct shear stress	2	3
7	➢ Assessment (Mid-Term Exam)	2	
8	➢ Torsional Stress. • Twisting Moment, and Shear stress • Angle of Twist.	2	3
9,10	➢ Shearing Force and Bending Moment Diagrams. • Internal Shear Force and Bending Moment • Transverse Shear Stress	4	6
11	➢ Bending Stress. • Neutral Surface and Neutral Axis • Bending Stress in Beams	2	3
12,13	➢ Combined Stresses, principal Stresses. • Principal Stresses, and Principal Planes • Maximum Shearing Stress, and its Plane • Mohr's Circle	4	6
14	➢ Deflection of beams • Different approach to find the deflection of beams	2	3
15	➢ Selected Topics, (Spring, Thin walled Cylinder, ….)	2	3
Total hours		**30**	**42**

4 – Course content/Course Competencies mapping matrix:

Course Content Topics	Course Competencies																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1- Loads and Reactions.		1							1								1		1	
2- Tension and Compression stresses	1			1		1			1	1			1				1	1	1	1
3- Statically Indeterminate Force Systems.		1		1	1	1			1	1	1		1				1	1	1	1
4- Geometrical Characteristics of a Plane Figures.			1	1		1			1	1				1			1	1	1	1
5- Direct Shear Stress.	1	1	1	1					1					1	1	1	1		1	1
6- Torsional Stress.	1	1	1	1					1					1	1	1	1		1	1
7- Shearing Force and Bending Moment Diagrams	1	1	1	1					1					1	1	1	1		1	1
8- Bending Stress.	1	1	1	1					1						1		1		1	1
9- Combined Stresses, principal Stresses.	1	1	1	1	1				1			1		1	1		1		1	1
10- Deflection of beams		1	1	1	1		1	1	1					1	1	1			1	1
11- Selected Topics, (Spring, Thin walled Cylinder, ….)	1	1	1	1	1	1		1	1	1		1		1	1	1	1	1	1	1
Topics Covering each Competency	7	9	8	10	4	4	1	2	11	4	1	2	2	7	7	5	10	4	11	10

Course Content Topics	Course Competencies																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
% Topics covering each competency	35	45	40	50	20	20	5	10	55	20	5	10	10	35	35	25	50	20	55	50

5 – Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1	1		1	1				1		1		1
c2	1	1		1	1				1				1
c3	1	1		1	1				1				1
c4	1	1		1	1				1		1		1
c5	1	1		1	1				1				1
c6	1	1		1	1				1		1		1
c7	1	1	1	1			1						
c8	1	1	1	1			1				1		
c9	1	1		1	1				1				1
c10	1	1	1	1			1				1		
c11	1	1	1	1	1				1		1		1
c12	1	1	1	1	1		1				1		1
c13	1	1	1	1			1						
c14	1	1		1	1								1
c15	1	1		1	1				1		1		1
c16	1	1	1	1			1						1
c17	1	1	1	1	1								1
c18			1				1						
c19			1	1			1						1
c20			1				1						
Σ	17	17	11	18	12	0	9	0	9	0	8	0	14
%	85	85	55	90	60	0	45	0	45	0	40	0	70

6 – Assessment Timing and Grading

Assessment Method		Timing	Grade (Degrees)
Semester Work	Class Work	Bi-Weekly	20
	Assignments	At Even Weeks	10
	Quizzes	4 Times at 3rd, 6th, 9th and 12th Weeks	10
Mid-Term Exam		7-th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Printed Lectures in Mechanics of Materials, Modern Academy

7-2 Required books

- WILLIAM A. NASH, Fifth edition, Strength of Materials, McGraw-Hill, 2011

- R.K., Rajput, Engineering Material, S. Chand Company Ltd, New Delhi, India, Second Edition, 2004
- R.C. Hibbler, Mechanics of Materials, Print ice Hall-Periodicals, Singapore, 2011

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.

- None

8 – Facilities required for teaching and learning:

- Lecture room, and workshops
- Projector

Course coordinator:	Dr. Tarek Ahmed Abdou
Head of the Department:	Dr. Metwally Abdel Ghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn112: Fundamentals of Materials Science

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department.
Date of specifications approval:	August 2020

B - Basic Information

Title: Fundamentals of Materials Science	**Code:** MNFn112	**Level:** Sophomore, First Semester	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:**1	**Practical:** 2
	Pre-requisite: None		

C - Professional information

1 – Course Learning Objectives:

By the end of this course the students should have a professional knowledge and practical experience about different kinds of engineering materials used in various engineering applications, the properties generally associated with them, and how to measure it and make a calculated decision when they chose the right material for the right application. From atomic scale to microscopic and macroscopic scale, the course gives a fundamental education about atomic bonds, crystalline structures, defects in such crystalline materials, strengthening mechanisms based on understanding of the role of defects and mechanical, chemical, and heat treatments in a very simplified and basic way. The student should understand different types of atomic bonds with examples that shows how the bond type affect the properties of materials. Then the basics of the crystal structures, dislocation theory, and strengthening mechanisms give a feeling of how we can manipulate the properties of materials. Diffusion process (mechanisms, mathematics, and factors affecting it) opens the way for simple heat treatments concepts (which shall be explored in detail in the following semester). After having such basics, they should now be able to study how to test and measure various mechanical properties of the material and relative destructive tests (tensile, hardness, impact, fatigue, and creep tests) and to be able to evaluate and investigate types of fracture in metallic materials. This last part is very important for manufacturing and production engineers and has great impact on their every-day-routine in any factory. An extension to other chemical and physical properties could be added to give the student the whole spectrum of materials characterization.

2 – Competencies:

On successful completion of the course, the student must be able to:

- c01 - Have basic knowledge of various types of engineering materials and to differentiate between general characteristics of them. C1
- c02 - Have a fundamental knowledge of atomic structure and interatomic bonding with examples. C1
- c03 - Understand the crystal structure of metallic materials and how it affects the properties and solve different exercises on them and understand their applicability in real-life problems or future research topics. C1
- c04 - Have a sense of different material imperfections and their relevant effects on the properties of materials and understand the relationship between defects and various strengthening mechanisms. C1
- c05 - Digest the concept of diffusion and its physical meaning, mechanisms, mathematical laws, and effect on the characteristics and treatments of materials, solve engineering exercises on it, and understand its connection to industrial applications. C1
- c06 - Understand the mechanical properties of materials and their relevant destructive testing and how to practically measure these mechanical properties in the materials laboratory. C1, C2, C3, C13
- c07 - Investigate the difference in material properties between various kinds of engineering materials to be able to choose the suitable material for the suitable application on both theoretical and practical levels and select appropriate solutions for materials' problems based on analytical thinking, problem solving, and critical thinking. C1, C2, C3, C5, C6, C9, C10, C12, C13
- c08 - Use the principles of materials science and engineering in selecting the required materials and solve some basic production problems related to materials selection in the design, manufacturing, and processing of engineering materials. C1, C2, C3, C5, C6, C12, C13

c09 - Apply knowledge of materials in combi1nati1on with other considerations such as price and economics, environment, and availability of resources. C1, C2, C3, C5, C6, C12, C13

c10 - Use professionally the knowledge from this course to improve and develop materials properties. C1, C2, C3, C5, C6, C9, C10, C12, C13

c11 - Work autonomously and effectively as an individual as well as in teams and actively participate in group discussion and interactive ways of teaching. C7, C8, C9, C10

c12 - Communicate effectively and present data and results in both orally and in written form using best-practice methods and techniques such as: PowerPoint presentations, public speaking, MS Word, MS Excel, Google Docs, Google sheets, Google Slides, Microsoft Team, Moodle, Zoom, etc. in order to develop both technical writing, communication, and presentation skills. C4, C7, C8, C9, C10

c13 - Search for information online and in references and asking experts in the field for their opinion. C4, C7, C8, C9, C10

c14 - Practice self-learning through preparation of the lecture material before attending then discussing their questions during the lecture, tutorials, and lab. C7, C8, C9, C10

c15 - Practice life-long continuous learning through the further readings and further studies pointed at in this course and in each chapter and communicate freely with the lecturers and teaching assistants. C7, C8, C9, C10

c16 – Report immediately any problem he/she is facing in learning the subject and ask for help from the lecturer and the teaching assistants during the lecture, tutorial, or laboratory, in addition to the office hours and through the communication channels announced by Modern Academy for Engineering and Technology. C7, C8, C10

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C12 & C13.

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Introduction to Materials Science and Engineering Types and Properties of Engineering Materials	2	1	2
2	Atomic Structure and Interatomic Bonding	2	1	2
3,4	Structure of Crystalline Materials Crystallographic Directions and Planes (Miller Indices)	4	2	4
5, 6	Imperfections in Solids (point, line, surface, and volume defects) Microscopic Techniques and sample preparation	4	2	4
7	Assessment (Mid-Term Exam)	2	-	-
8, 9	Diffusion: Theory, Mechanisms, and Factors Diffusion applications: Mathematical Laws, Exercises, and industrial use	4	2	4
10, 11	Dislocation Theory Effect of Dislocations on Various Strengthening Mechanism	4	2	4
12, 13,14	Mechanical Properties: Strength, Elasticity / Stiffness, Young's Modulus, Plasticity, Ductility/Malleability, Yield Strength, Ultimate Tensile Strength, Shear Strength, Brittleness, Hardness, Wear Resistance / Durability, Toughness, Fatigue, Creep, Slip, Cleavage, and Fracture. Mechanical (Destructive) Testing: Tensile, Hardness, Impact, Fatigue, and Creep	6	3	6
15	Other properties: Chemical (Oxidation, Corrosion, Toxicity), and Physical (Density, Thermal, Electrical, Magnetic, and Optical),	2	1	2
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies															
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16
Introduction to Materials Science and Engineering	1										1	1	1	1	1	1
Types and Properties of Engineering Materials	1										1	1	1	1	1	1
Atomic Structure and Interatomic Bonding		1									1	1	1	1	1	1
Structure of Crystalline Materials			1								1	1	1	1	1	1
Crystallographic Directions and Planes (Miller Indices)			1								1	1	1	1	1	1
Imperfections in Solids (point, line, surface, and volume defects)				1							1	1	1	1	1	1
Microscopic Techniques and sample preparation				1							1	1	1	1	1	1
Diffusion: Theory, Mechanisms, and Factors					1						1	1	1	1	1	1
Diffusion applications: Mathematical Laws, Exercises, and industrial use					1						1	1	1	1	1	1
Dislocation Theory				1							1	1	1	1	1	1
Effect of Dislocations on Various Strengthening Mechanism				1							1	1	1	1	1	1
Mechanical Properties						1	1	1	1	1	1	1	1	1	1	1
Mechanical (Destructive) Testing						1	1	1	1	1	1	1	1	1	1	1
Other properties: Chemical & Physical							1	1	1	1					1	1
Exercises and research papers (integrated into tutorials)	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1
Case studies (integrated into lectures)	1	1	1	1	1	1	1	1	1	1					1	1
Mini projects (integrated into lab work)	1	1	1	1		1					1	1	1	1		1
Topics Covering Competencies	5	4	5	7	4	5	4	5	5	5	15	15	15	15	16	17
% Topics Covering Competencies	29	24	29	41	24	29	24	29	29	29	88	88	88	88	94	100

5 – Course Competencies / Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1		1	1	1	1			1	1	1	1	1	
c2	1	1		1	1	1	1			1	1	1	1	1	
c3	1	1		1	1	1	1			1	1	1	1	1	
c4	1	1		1	1	1				1	1	1	1	1	
c5	1	1		1	1	1				1	1	1	1	1	
c6	1	1		1	1	1				1	1	1	1	1	
c7	1	1		1	1	1				1	1	1	1	1	
c8	1	1		1	1	1				1	1	1	1	1	1

c9	1	1		1	1	1				1	1	1	1	1	1
c10	1	1		1	1	1	1			1	1	1	1	1	1
c11	1	1		1	1	1	1				1				1
c12	1		1	1	1	1	1				1				1
c13	1		1	1	1	1	1	1			1				1
c14	1		1	1	1	1	1	1			1				1
c15	1		1	1	1	1	1	1			1				1
c16	1		1	1	1	1	1				1				1
$\sum$	16	11	5	16	16	16	10	3	0	10	16	10	10	10	9
%	100	69	31	100	100	100	63	19	0	63	100	63	63	63	56

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester work: quizzes, assignments, term papers, and mini project	Weekly	20
Mid-term written exam.	7th Week	20
Practical exam	15th Week	20
Written exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Fundamentals of Materials Science (Lecture and Lab. Notes)

7-2 Required books

- William D. Callister, "Fundamentals of Materials Science and Engineering", Wiley, USA, 2005

7-3 Recommended books:

- David G. Rethwisch, "Fundamentals of Materials Science and Engineering", Wiley, Asia, 2013.

7-4 Periodicals, Web sites, etc.

- https://ocw.mit.edu/courses/materials-science-and-engineering/
- https://www.doitpoms.ac.uk/tlplib/index.php
- https://www.coursera.org/learn/materials-science
- https://www.edx.org/course/from-atoms-to-materials-predictive-theory-and-simu
- https://www.coursera.org/learn/nanotechnology

8 – Facilities required for teaching and learning:

- Materials Lab.
- Lecture Room
- Computer, Data show
- High speed internet with a large bandwidth and communication facilities for distant E-Learning.

Course coordinator: Dr. Mahmoud Saleh Rabie and Dr. Hanan Abd El Kader
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn113: Mechanics of Machines – 1

A- Affiliation

Relevant program/s:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Mechanics of Machines – 1 **Code:** MNFn113 **Level:** sophomore, first semester
Credit Hours: 2 **Pre-requisite:** MECn002
Contact Hours: **Lectures:** 1 **Tutorial:**3 **Laboratory:** - **Total:** 4

C - Professional Information

1 – Course Learning Objectives:

By the end of the course students have a deep understanding of all the elements of mechanics that are fundamental for industrial automation, mastering design and construction principles that play a role in modern automatic machines.

2 – Competencies:

On successful completion of the course, the student must:
c1. Apply and understand the fundamentals of the theory of kinematics and dynamics of machines (C1, C2).
c2. Explain effect of applied loads on mechanical parts (C2, C13)
c3. Explain and draw the free body diagram of mechanical bodies (C2, C3).
c4. Identify dynamic loads in equipment and explain the need for balance and how it is achieved (C11)
c5. Calculate and analyze the motions of mechanisms (C11, C12).
c6. Understand techniques for studying motion of machines and their components (C11).
c7. Identify the basic relations between distance, time, velocity, and acceleration (C1, C11).
c8. Present data and results orally and in written form (C7, C8).
c9. Practice self-learning and distance learning (C10).

This course contributes to the following program competencies: C1, C2, C3, C7, C8, C10, C11 & C12

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Introduction, Newton's second law	1	3	
2	➢ Conservation of linear momentum for a system of particles	1	3	
3	➢ Coefficient of restitution and collision	1	3	
4	➢ Angular momentum for a system of particles	1	3	
5	➢ Motion of mass center of a system of particles	1	3	
6	➢ The Principle of Impulse and momentum	1	3	
7	➢ Assessment (Mid-Term Exam)	1	1	
8	➢ Conservation of energy	1	3	
9	➢ The principle of work and energy	1	3	
10	➢ Absolute and relative velocity in plane motion	1	3	
11	➢ Instantaneous center of rotation in plane motion	1	3	
12	➢ Equations of motion for a rigid body	1	3	
13	➢ Plane motion of a rigid body (D'alembert's principle)	1	3	
14	➢ Principle of work and energy for a rigid body	1	2	
	➢ Plane motion of rigid bodies: force & acceleration		1	
15	➢ Plane motion of rigid bodies: Energy & momentum	1	3	
	Total hours	**15**	**43**	**0**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies								
	c1	c2	c3	c4	c5	c6	c7	c8	c9
Introduction and basic definitions	1								1
Newton's second law	1	1	1	1	1		1	1	1
Conservation of linear momentum for a system of particles	1		1	1		1		1	1
Coefficient of restitution and collision	1			1				1	1
Angular momentum for a system of particles	1			1		1		1	1
Motion of mass center of a system of particles	1		1	1	1			1	1
The Principle of Impulse and momentum	1	1	1	1				1	1
Kinetic and potential energy	1		1	1		1	1	1	1
Conservation of energy	1	1	1	1		1		1	1
The principle of work and energy	1	1	1	1		1	1	1	1
Power and efficiency	1					1		1	1
Types of rigid body motion	1							1	1
Absolute and relative velocity in plane motion	1				1			1	1
Instantaneous center of rotation in plane motion	1				1				1
Equations of motion for a rigid body	1		1	1	1	1	1	1	1
Plane motion of a rigid body (D'alembert's principle)	1	1	1	1		1		1	1
Principle of work and energy for a rigid body	1	1		1		1		1	1
Topics Covering Competencies	17	6	9	12	5	9	4	15	17
% Topics Covering Competencies	100	35	53	71	29	53	24	88	100

5- Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research & Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1			1	1				1		1		1
c2	1		1	1	1				1		1		1
c3	1		1	1	1				1		1		1
c4	1		1	1	1				1		1		1
c5	1		1	1	1				1		1		1
c6	1		1	1	1				1		1		1
c7	1			1	1				1		1		1
c8	1				1				1		1		1
c9	1			1									1
$\sum$	9	0	5	8	8	0	0	0	8	0	8	0	9
%	100	0	56	89	89	0	0	0	89	0	89	0	100

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
	Mid-Term Exam	7^{th} Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	20
	Tutorials	3 Assignments per semester	20
	Written Exam	16th Week	40
Total			100

7 – List of references:

7-1 Course notes:

- None

7-2 Required books:

- Mechanics of Machines – 1 lecture notebook, by Dr. rehab Ibrahim.

7-3 Recommended books:

- Ferdinand P.B. and Russell E. Johnston, Vector Machines for Engineers- Dynamics. NY: McGraw-Hill, 9th Ed.
- Khurmi R. S. and Gupta J. K., Theory of Machines. New Dehli, 14th Ed.

8 – Facilities required for teaching and learning:

- Lecture and Exercise rooms equipped with projection and sound systems.
- Computer and Data show

Course coordinator: Dr. Rehab Ibrahim
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn114: Machine Drawing – 1

A- Affiliation
Relevant program: Manufacturing Eng. and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department
Date of specifications approval: August 2020

B - Basic Information
Title: Machine Drawing – 1 **Code:** MNFn114 **Level**: Sophomore, First Semester
Credit Hours: 3 **Lectures:** 2 **Tutorial/Exercise:** 3 **Practical: -**
Pre-requisite: MNFn002, MNFn060

C - Professional Information

1 – Course Learning Objectives:

A study of this course will enable the student to draw assembly drawings, have the knowledge about machine constructions and have knowledge about the machine constructions documents.

2 – Competencies:

On successful completion of the course, the student must:
c1. Know and understand the necessary data for production (drawing of detail drawing). (C4, C10 & C12).
c2. Know and understand the dismountable joints used in assembly drawings (C1, C4 & C12)
c3. Know and understand the permanent joints used in assembly drawings. (C1, C4 & C12).
c4. Know and understand the construction of machines. (C4, C11 & C12).
c5. Know and understand the design documents. (C1 & C4).
c6. Make assembly drawings from detail drawings. (C10, C13)
c7. Determine the function of the assembled unit. (C10, C12 & C13).
c8. Develop the sequence of assembling detail parts (C11)
c9. Create new design / constructions based on his knowledge on the topic of Machine Drawing. (C12 & C13)
c10. Read and understand assembly drawings (C11)
c11. Draw detail drawing from assembly. (C1 & C8)
c12. Draw part detail drawing and specify constrains for proper part production (C8 & C11)
c13. Choose the suitable standard joint (C1, C4 & C10)
c14. Collaborate effectively within multidisciplinary team. (C7).
c15. Work in stressful environment and within constraints. (C8)
c16. Communicate graphically using the standard graphic language (C8).
c17. Refer to relevant mechanical standard. (C14)

This course contributes to the following program competencies: C1, C4, C7, C8, C10, C11, C12, C13 & C14.

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours
	CHAPTER I: Data necessary for production		
1	1. Shape Description	2	4
2	2. Size Description	2	4
3, 4	3. Tolerances & Fits and Geometrical Accuracy	4	6
5	4. Surface Finish	4	6
6	5. Material Description	2	4

Week	Topics	Lecture hours	Tutorial hours
7	Assessment (Mid-Term Exam)	2	
	CHAPTER II: Graphical representation of principal machine elements and joints		
8, 9	1. Introduction	4	2
	2. Standardization of Machine Parts		
	3. Joints of Machine Parts		
	4. Dismountable Joints		
10	4.1 Threaded Joints	2	6
11	4.2 Keyed Joints	2	8
	4.3 Splines & Serrations		
12	4.4 Pin Joints	2	4
13	5. Non Dismountable Joints	2	6
	5.1 Welded Joints		
14, 15	5.2 Riveted Joints	2	6
	Total hours	**30**	**56**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
CHAPTER I: Data necessary for production																	
1. Shape Description	1				1						1	1				1	
2. Size Description	1				1						1	1				1	
3. Tolerances & Fits and Geometrical Accuracy	1				1						1	1			1	1	1
4. Surface Finish	1				1						1	1			1	1	1
5. Material Description	1				1												1
CHAPTER II: Graphical representation of principal machine elements and joints																	
1. Introduction	1			1				1		1			1			1	
2. Standardization of Machine Parts		1		1		1		1					1	1	1	1	1
3. Joints of Machine Parts		1	1	1		1	1	1		1			1	1	1	1	1
4. Dismountable Joints		1	1		1	1	1	1		1			1	1	1	1	1
4.1 Threaded Joints		1		1		1	1	1	1	1			1	1	1	1	1
4.2 Keyed Joints		1		1		1	1	1	1	1			1	1	1	1	1
4.3 Splines & Serrations		1		1		1	1	1	1	1			1	1	1	1	1
4.4 Pin Joints		1		1		1	1	1	1	1			1	1	1	1	1
5. Non-Dismountable Joints			1	1		1	1	1	1	1			1	1	1	1	1
5.1 Welded Joints			1	1		1	1	1	1	1			1	1	1	1	1
Topics Covering Competencies	6	7	4	9	6	9	8	10	6	9	4	4	10	9	11	14	12
% Topics Covering Competencies	40	47	27	60	40	60	53	67	40	60	27	27	67	60	73	93	80

5 – Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1	1		1					1		1		1
c2	1	1		1									1
c3	1	1		1									1
c4	1	1	1	1					1		1		1
c5	1	1	1	1									1
c6	1	1		1			1		1		1		1
c7	1	1	1	1			1				1		1
c8	1	1	1	1			1		1		1		1
c9	1	1	1	1			1						1
c10	1	1	1	1			1		1		1		1
c11	1	1		1	1		1		1		1		1
c12	1	1		1	1		1		1		1		1
c13	1	1	1	1	1		1				1		1
c14				1									1
c15				1					1		1		1
c16			1	1			1		1		1		1
c17	1	1	1	1	1		1		1		1		1
Σ	14	14	9	17	4	0	10	0	10	0	12	0	17
%	82	82	53	100	24	0	59	0	59	0	71	0	100

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Assignments	Weekly	20
Mid-Term Exam	7th Week	20
Quizzes	4- Quizzes	20
Written Exam	16th Week	40
Total		**100**

7 – List of references

7-1 Course notes:

- Machine Drawing (1) by : Prof. Nabil Gadallah

7-2 Required books:

- Engineering Drawing and Graphic Technology Mc-Graw Hill,2009

7-3 Recommended books:

- None

7-4 Periodicals, Web sites … etc.:

- Standardized parts

8 – Facilities required for teaching and Learning

- OHP and screen
- Model wood, Al., steel, and foam prototypes as teaching aids

Course Coordinator:	Dr. Tarek Ahmed Abdou
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn115: Mechanics of Machines – 2

A- Affiliation

Relevant program/s:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Mechanics of Machines – 2 **Code:** MNFn115 **Level:** sophomore 1, first semester
Credit Hours: 2 **Pre-requisite:** MNFn113
Contact Hours: **Lectures:** 1 **Tutorial:**3 **Laboratory:** - **Total:** 4

C - Professional Information

1 – Course Learning Objectives:

By the end of the course students understand the basic concepts and notations of mechanisms, gears and gear trains, gyroscopes and gyroscopic effects, inertia forces and couples in machine parts, speed governors and flywheels. The student should be able to analyze the forces and couples acting on the moving parts and implement the necessary modifications to achieve the required performance of linkages and mechanisms as well as the controlling of rotating speeds of shafts.

2 - Competencies

On successful completion of the course, the student must:
c1. Kinematics of motion of particles, the basic equations governing particles motions. Ways of plotting displacement, velocity, and acceleration time diagrams (C1, C2).
c2. The sort of motions of members of any mechanism (rotating, translating, plain motions) (C2, C13)
c3. Analyze the motions of mechanisms and their links members. (C2, C3).
c4. Apply the principles of mathematics, science and technology to solve problems of gear trains, mechanisms, and machine moving parts. (C11)
c5. Select appropriate mathematical and computer-based methods for analyzing problems related to mechanisms, gear trains, and flywheels. (C11, C12).
c6. Evaluate designs of mechanisms, gear trains, flywheels and propose improvements. (C3, C11).
c7. Design, assemble, operate, inspect, and maintain mechanisms, gear trains, and moving parts (C1, C11).
c8. Apply knowledge of mathematics, science, and engineering practice integrally to solve problems related to gears, mechanisms, and machine moving parts. (C2, C3).
c9. Use computer software to design, calculate, simulate, or animate different mechanisms and moving parts (C5, C14).
c10. Solve operational problems related to mechanisms and their members as well as gear trains (C2, C11)
c11. Search for information from diverse references and internet (C10).

This course contributes to the following program competencies: C1, C2, C3, C5, C7, C10, C11& C12

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Kinematics of motion: Different types of motions of particles, the basic equations governing motion.	1	3	-
2	Graphical representation of displacement, velocity, and acceleration versus time.	1	3	-
3	➢ Relation between linear angular quantities of motion.	1	3	-
4	➢ Velocity in Mechanism: Space and body centroid, Methods for determining the velocity of a point on a link, velocity of point on a link by instantaneous center method	1	3	-

5	Gear trains: types of gear trains: simple, compound.	1	3	-
6	Gear trains: reverted and epicyclic gear trains.	1	3	-
7	➢ Assessment (Mid-Term Exam)	1	1	-
8	➢ Transmission ratios of different gear trains	1	3	
9	➢ Gyroscopes: Definition of gyroscope, processional angular motion, gyroscopic couple, effect of gyroscopic couple in different applications (motor vehicles, marines, aircrafts, production machines, …….).	1	3	-
10	➢ Inertia forces in reciprocating parts: D-Alembert's principle velocity and acceleration of reciprocating parts in engines, approximate analytical method for velocity and acceleration of the piston and connecting rod, forces on the reciprocating parts of an engine	1	3	-
11	➢ Turning moment diagrams and flywheel.	1	3	-
12	➢ Turning moment diagrams for single-cylinder and multi-cylinder engines.	1	3	-
13	➢ Fluctuations of energy and speed, flywheel design calculations.	1	3	-
14	➢ Speed governors, mechanism of action of the basic types of governors	1	3	-
15	➢ Speed governors: the basic equations for controlling the rotating speeds.	1	3	-
	Total hours	**15**	**43**	**-**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies										
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11
Kinematics of motion: Different types of motions of particles, the basic equations governing motion.	1	1	1	1	1			1		1	
Graphical representation of displacement, velocity, and acceleration versus time.	1	1	1								
Relation between linear and angular quantities of motion.	1	1	1	1							
Velocity in Mechanism: Space and body centroid, Methods for determining the velocity of a point on a link, velocity of point on a link by instantaneous center method	1		1	1			1				1
Gear trains: types of gear trains: simple, compound.	1			1	1	1	1	1	1	1	1
Gear trains: reverted and epicyclic gear trains.	1			1	1	1	1	1	1	1	1
Transmission ratios of different gear trains	1	1	1					1	1		
Gyroscopes: Definition of gyroscope, processional angular motion, gyroscopic couple, effect of gyroscopic couple in different applications (motor vehicles, marines, aircrafts, production machines.	1		1	1		1	1	1	1		
Inertia forces in reciprocating parts: D-Alembert's principle velocity and acceleration of reciprocating parts in engines, approximate analytical method for velocity and acceleration of the piston and connecting rod, forces on the reciprocating parts of an engine	1	1		1		1		1		1	1
Turning moment diagrams and flywheel.	1		1	1		1	1	1	1		
Turning moment diagrams for single-cylinder and multi-cylinder engines.	1		1	1		1	1	1	1		
Fluctuations of energy and speed, flywheel design calculations.	1		1	1	1			1	1		1
Speed governors, mechanism of action of the basic types of governors	1	1	1	1	1			1	1		1
Speed governors: the basic equations for controlling the rotating speeds.	1	1	1	1	1				1		
Topics Covering Competencies	14	7	11	12	6	6	6	10	9	4	6
% Topics Covering Competencies	100	50	79	86	43	43	43	71	64	29	43

The course content insures a balanced coverage of the course competencies.

5 – Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1			1	1				1		1		1
c2	1		1	1	1				1		1		1
c3	1		1	1	1				1		1		1
c4	1		1	1	1				1		1		1
c5	1		1	1	1				1		1		1
c6	1		1	1	1				1		1		1
c7	1				1				1				
c8	1			1	1				1		1		1
c9	1												
c10	1			1									
c11			1										
∑	10	0	6	8	8	0	0	0	8	0	7	0	7
%	91	0	56	73	73	0	0	0	73	0	64	0	64

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Class Work	Bi-Weekly	20
	Quizzes	2 Quizzes	10
	Tutorials	Every two Weeks	10
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Gaafar A.H. "Mechanics of Machines-II", Printed lectures, Modern Academy of Engineering and Technology.

7-2 Required books:

- Khurmi R.S. and Gupta J.K. "Theory of Machines", S. Chand & Company Ltd, 2000, ISBN 81-219-0132-4.

7-3 Recommended books:

- None

7-4 Periodicals, Web sites:

- http://www.codecogs.com/library/engineering/theory_of_machines/mechanisms.php (Last accessed December 20, 2019)
- https://en.wikisource.org/wiki/The_Kinematics_of_Machinery (Last accessed March 15, 2020)

8 – Facilities required for teaching and learning:

- Computer, Data show and Computer programs.

Course coordinator:	Assoc. Prof. Gaafar Ahmed Hussein
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn116: Machine Drawing – 2

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department
Date of specifications approval: August 2020

B - Basic Information

Title: Machine Drawing – 2 | **Code:** MNFn116 | **Year/level:** 1st Level / 2nd Semester
Credit Hours: 3 | **Lectures:** 2 | **Tutorial:** 3 | **Practical:** -
Pre-requisite: MNFn114 | **Total:** 5

C - Professional Information

1 – Course Learning Objectives:

The objective of this course is to enable the students to understand how to draw an assembly drawing of a Machine or Mechanism then draw the detail working drawing of any needed part to be manufactured in Production Workshop. Also, how to use documents and International Standard.

2 – Competencies:

On successful completion of the course, the student must:
c1- Know and understand the kinds of technical drawings. (C4 & C10).
c2- Know and understand the permanent joints used in assembly (welded and riveted joints) (C1, C4 & C12)
c3- Know and understand sliding and rolling bearings. (C1, C4 & C12).
c4- Know and understand gear transmissions. (C1, C4 & C12).
c5- Know and understand springs. (C1, C4 & C12).
c6- Use the International Standard Organization (Standard) in assembly drawing. (C14).
c7- Read and determine the function of the assembled drawing. (C10, C12 & C13).
c8- Know the function of each part of the assembly (C1 & C11).
c9- Draw the detail / working drawing of each part in the assembly. (C1 & C8)
c10- Choose the suitable standardized parts (C1, C3 & C4)
c11- Develop the construction of the assembly drawing (C12).
c12- Do the assembly and disassembly. (C11).
c13- Work under severe conditions. (C7)
c14- Work individually (C9).
c15- Communicate graphically using the standard graphic language (C8 & C14)
c16- Refer to relevant mechanical standard. (C14)

This course contributes to the following program competencies: C1, C4, C3, C7, C8, C9, C10, C11, C12, C13 & C14.

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours
1	**CHAPTER 1: BEARINGS** 1. Classification of bearings 2. Advantages of plain bearings 3. Advantages of rolling-contact bearings 4. Types of bearing loadings	2	4
2, 3	**CHAPTER 2: Sliding Bearings** 1. Radial Sliding Bearing (Journal bearings)	4	8

	2. Thrust Sliding Bearing **3.** Combined Loaded Sliding Bearing		
4, 5	**CHAPTER 3: Rolling Bearings** 1. Radial Rolling Bearing (Ball bearings) 2. Thrust Rolling Bearing 3. Combined Loaded Rolling Bearing 4. Mounting of Rolling Bearings	4	8
6	**CHAPTER 4: POWER TRANSMISSION** 1. General: - Direct (in contact) drives - Indirect drives 2. General kinematics 3. Efficiency of power Transmission	2	4
7	**Assessment (Mid-Term Exam)**	2	
8 - 12	**CHAPTER 5: Gear Drive**		
	1. Spur gears	4	8
	2. Helical gears.	2	4
	3. Bevel gears	2	4
	4. Worm gears	2	4
13	**CHAPTER 6: GEAR REDUCERS** 1. Gear Reducers Fundamentals 2. Single Stage Spur Gear Reducer 3. Single Stage Worm Gear Reducer	2	4
14, 15	**CHAPTER 7: SPRINGS** 1. Kind of Springs 2. Applications	2	4
Total hours		**30**	**56**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies															
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**	**c16**
CHAPTER 1: BEARINGS																
1. Classification of bearings	1		1			1		1								
2. Advantages of plain bearings			1													
3. Advantages of rolling-contact bearings			1													
4. Types of bearing loadings	1		1			1	1	1	1	1	1	1	1	1	1	1
CHAPTER 2: Sliding Bearings																
5. Radial Sliding Bearing (Journal bearings)	1		1			1	1	1	1	1	1	1	1	1	1	1
6. Thrust Sliding Bearing	1		1			1	1	1	1	1	1	1	1	1	1	1
7. Combined Loaded Sliding Bearing	1		1			1	1	1	1	1	1	1	1	1	1	1
CHAPTER 3: Rolling Bearings																
8. Radial Rolling Bearing (Ball bearings)	1		1			1	1	1	1	1	1	1	1	1	1	1
9. Thrust Rolling Bearing	1		1			1	1	1	1	1	1	1	1	1	1	1
10. Combined Loaded Rolling Bearing	1		1			1	1	1	1	1	1	1	1	1	1	1
11. Mounting of Rolling Bearings	1	1	1			1	1	1	1	1	1	1	1	1	1	1
CHAPTER 4: POWER TRANSMISSION																
12. General: - Direct (in contact) drives - Indirect drives	1			1		1	1	1	1	1	1	1	1	1	1	1
13. General kinematics				1									1	1	1	
14. Efficiency of power Transmission				1												
CHAPTER 5: Gear Drive																
15. Spur gears	1			1		1	1		1	1	1	1	1	1	1	1
16. Helical gears.	1			1		1	1		1	1	1	1	1	1	1	1
17. Bevel gears	1			1		1	1		1	1	1	1	1	1	1	1

Topics	Course Competencies															
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16
18. Worm gears	1			1		1	1		1	1	1	1	1	1	1	1
CHAPTER 6: GEAR REDUCERS																
19. Gear Reducers Fundamentals	1			1		1		1								
20. Single Stage Spur Gear Reducer	1			1		1	1	1	1	1	1	1	1	1	1	1
21. Single Stage Worm Gear Reducer	1			1		1	1	1	1	1	1	1	1	1	1	1
CHAPTER 7: SPRINGS																
22. Kind of Springs	1				1	1	1	1	1	1	1	1	1	1	1	1
23. Applications		1			1		1						1	1		1
Topics covering competencies	18	2	11	10	2	18	17	14	16	16	16	16	18	18	17	17
% Topics covering competencies	78	9	48	43	9	78	74	61	70	70	70	70	78	78	74	74

5- Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1	1		1					1		1		1
c2	1	1		1							1		1
c3	1	1		1					1		1		1
c4	1	1		1					1		1		1
c5	1	1		1			1				1		1
c6	1	1		1			1		1		1		1
c7	1	1	1	1							1		1
c8	1	1	1	1							1		1
c9	1	1		1					1		1		1
c10	1	1	1	1	1				1		1		1
c11	1	1		1	1				1		1		1
c12	1	1		1	1				1		1		1
c13				1							1		1
c14				1					1		1		1
c15	1	1		1					1		1		1
c16	1		1	1			1		1		1		1
Σ	14	13	4	16	3	0	3	0	11	0	16	0	16
%	88	81	25	100	19	0	19	0	69	0	100	0	100

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Semester Work	Class Work	Bi-Weekly	20
	Assignments (H.W)	Bi-Weekly	10
	Quizzes	2 Times at 5th and 10th Weeks	10
Mid-Term Exam		7-th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Machine and Construction Drawing, Printed lecture Modern Academy.

7-2 Required books

- W. ABOTT, Technical Drawing, Fourth Edition, Printed in Great Britain, 1976, ISBN 0216 90210x (Blackie Edition).
- K.L.Narayana, P.Kannaiah, K.Venkata Reddy, Production Drawing, second edition, New AGE, International Publishers, 2009, ISBN 978-81-224-2288-7
- James H-Earle, Graphics for Engineers, Printed in Adison-Wesley Publishing Company, 2001, ISBN 0-201-11430-5

7-3 Recommended books:

- None

8 – Facilities required for teaching and learning:

- Lecture and Exercise rooms equipped with projection and sound systems.
- Computer and Data show

Course coordinator:	Dr. Mohamed Raafat
Head of the Department:	Dr. Metwally Abdel Ghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn121: Metal Cutting Processes

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Metal Cutting Processes	**Code:** MNFn121	**Level:** 1st spring	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:**1	**Practical:** 2
	Pre-requisite: MNFn003		

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to the principles of different metal cutting processes and their basic elements. They should compete on the selection of traditional machines, cutting tools and construct process sheet.

2 – Competencies:

c1. Classification and specifications of traditional machine tools (C13).
c2. Characteristics of solid materials related to the metal cutting processes (C13).
c3. Current classical production technologies as related to the production processes (C5).
c4. Construction, operation, and characteristics of the basic components of traditional machines (C4, C13).
c5. Prepare and present technical reports required when solving problems and executing experiments (, C13).
c6. Comparison of theoretical and practical metals cutting conditions (C2,).
c7. Calculate the obtained accuracy of different cutting processes (C1, C5).
c8. Think in a creative and innovative way in determining the suitable cutting process (C2, C9).
c9. Consider the economy of different cutting processes (C3, C9).
c10. Use measuring instruments, workshop facilities, and processing equipment to design experiments for analyzing, collect, analyze, and interpret results of experiments (C1, C2, C9, C11).
c11.Use different types of tools, techniques and equipment pertaining to the production process (C2, C3, C7, C13).
c12. Prepare and present technological report for manufacturing of certain product (C4, C10).
c13. Analyze suitable operating parameters for manufacturing of different materials with required quality (C2, C4, C5).
c14. Use basic workshop equipment for equipment safety (C2, C3, C4, C9).
c15. Communicate effectively and present data and results orally and in written form (C7, C8).
c16. Search for information's in references and in internet (C4, C5, C10).
c17. Work in a team and involve in group discussion and seminars (C7, C8).
c18. Use ICT facilities in presentations (C4).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C8, C9, C10, C11& C13

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Introduction; Definition of technology, production system, manufacturing processes and elements of machining system	2	1	2
2	In Accuracy of Machining, Deviations; reasons, types, dimensional deviation, denotations of geometric deviations, surface roughness.	2	1	2
3	Cutting Tool Materials and Basic Geometry	2	1	2
4	Turning Operation: Basic concept, Main parts of the center lathe, Clamping of tools , and clamping of workpiece.	2	1	2
5	Turning operations, External turning, Internal turning, Calculation of machining time, Types of lathes, Attainable accuracy and surface roughness	2	1	2
6	Drilling Operation: Basic concept, Calculation of drilling time, Drilling operations Drilling of accurate holes, Reaming, Boring operations	2	1	2
7	Assessment (Mid-Term Exam)	2		
8	Milling Operation: Basic concept, milling machines, Workpiece clamping on milling machines,	2	1	2
9	Classification of milling cutters, Attainable surfaces, accuracy and surface roughness when milling	2	1	2
10	Shaping, Planning, and Slotting Operations	2	1	2
11	Grinding Operations: Basic concepts of grinding operation, Marking of grinding wheel, Methods of grinding, cylindrical external grinding,	2	1	2
12	Cylindrical internal grinding, Surface grinding, attainable accuracy and surface roughness for grinding	2	1	2
13	Technological Procedure	2	1	2
14	Technological Procedure	2	1	2
15	Revision	2	1	2
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																	
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
Introduction	1	1																
In Accuracy of Machining		1			1	1	1											
Cutting Tool Materials and Basic Geometry		1	1		1					1	1			1	1	1		
Turning Operation			1	1	1	1			1	1	1		1	1	1	1		
Drilling Operation			1	1	1	1			1	1	1		1	1	1	1		
Milling Operation			1	1	1	1			1	1	1		1	1	1	1		
Shaping, Planning, and Slotting Operations			1	1	1	1				1	1		1	1	1	1		
Grinding Operations			1	1	1	1				1	1		1	1	1	1		
Technological Procedure					1			1		1	1	1		1	1		1	1
Topics Covering Competencies	1	3	6	5	8	6	1	1	3	7	7	1	6	7	7	7	1	1
% Topics Covering Competencies	11	33	66	55	88	66	11	11	33	77	77	11	66	77	77	77	11	11

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Report
c1	1	1		1		1				1	1	1	1		
c2	1			1		1				1	1	1			1
c3	1	1					1	1						1	1
c4	1	1		1		1				1	1	1	1		
c5			1	1	1	1		1				1			1
c6	1			1	1					1	1		1		1
c7	1			1	1	1				1	1		1		1
c8	1			1		1				1	1		1		1
c9	1			1	1	1			1	1	1	1			1
c10				1		1						1			1
c11	1			1		1	1					1		1	1
c12	1	1				1	1			1	1			1	1
c13	1		1	1	1			1		1	1		1		1
c14						1		1				1			
c15			1		1		1	1				1		1	1
c16			1		1			1		1					1
c17			1			1						1		1	1
c18			1	1				1						1	
$\sum$	11	4	6	12	7	12	4	7	1	10	9	10	6	6	14
%	61	22	33	66	39	66	22	39	6	56	50	56	33	33	78

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	2 Quizzes (one each 6 Weeks)	6
	Reports/Research	one reports per semester	4
	Tutorials	3 Assignments per semester	6
	Mini project	One mini project per semester	4
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books

- Metal cutting processes, Lecture, and exercise parts, by M. Merdan, Ph., D.

7-3 Recommended books:

- M. P. Groover, 920070" Fundamentals of Modern Manufacturing Materials, Processes, and Systems ", John Wiley &Sons Inc.
- S. Kalpakjian, (1993), "Manufacturing Engineering and Technology ", 3rd Edition, Addison-Wesley Publishing Company.
- S. D. El Wakil, (1998), " Processes and Design for Manufacturing", 2nd Edition, PWS Publishing Company.

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and learning:

- Traditional metal cutting workshop, Metrology lab.
- Different materials as cutting samples.
- Lecture and Exercise rooms equipped with Computer, Data show, and sound systems.
- High speed internet and communication facilities for distance learning.

Course coordinator:	Dr. Ahmed Elwardany
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn122: Materials Technology and Testing

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Materials Technology and Testing	**Code:** MNFn122	**Level:** 1st Spring	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:** 1	**Practical:** 2
	Pre-requisite: MNFn111, MNFn112		

C - Professional information

1 – Course Learning Objectives:

By the end of this course the students should demonstrate the knowledge and understanding of alloys; construct a simple isomorphous and eutectic phase diagrams. For a binary phase diagram, they should be able to locate the temperatures and compositions of eutectic, eutectoid, peritectic, and congruent phase transformations. The students should be able to construct the iron-carbon diagram, develop TTT and CCT diagrams. They also should be able to investigate defects inside pipes and in service products by non-destructive tests.

2 – Competencies:

On successful completion of the course, the student must be able to:

- c1. Identify the different types of alloys and effect of different compositions on the properties of it. (C11)
- c2. Identify different techniques of fabrication of any alloy (C6)
- c3. Choose the appropriate forming technique according to requested properties (C9)
- c4. Construct a simple isomorphous and eutectic phase diagrams (C11)
- c5. Construct some simple phase diagrams and label the various phase regions (C1)
- c6. Solve limited operational problems related to phase diagrams of alloys (C3).
- c7. Select suitable alloy from the phase diagram according to the application to be used (C5)
- c8. Surface preparation of materials (C10)
- c9. Investigate the microstructure of alloys by optical microscope (C10, C13)
- c10. Use the iron carbon diagram to choose the suitable phase for any application (C12)
- c11. Develop TTT and CCT diagrams (C13)
- c12. Use different heat treatments processes to obtain appropriate properties (C3)
- c13. Use experimental facilities to visualize and investigate different defects by non-destructive tests (C13, C9, C15)
- c14. Measure some mechanical properties (C1).
- c15. Professionally merge the engineering knowledge to improve material properties (C2, C15)
- c16. Practice self-learning and communicate effectively orally and in written form (C8, C10).

This course contributes to the following program competencies: C1, C2, C3, C5, C6, C8, C9, C10, C11, C12, C13 & C15

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Engineering materials, alloys, and different types of fabrication Investigation of chemical composition and microstructure of alloys	2	1	2
2	Cooling curves & solidification.	2	1	2
3,4	Phase diagrams ➢ Classification, Eutectic, Peritectic, and basic Eutectoid	4	2	4
5, 6	➢ Iron carbon diagram with all phases and phase transformations. ➢ TTT and CCT diagrams	6	3	6
7	Assessment (Mid-Term Exam)	2	-	-
8. 9, 10	Heat treatments of ferrous alloys ➢ Annealing, Normalizing, and Hardening ➢ Case hardening	6	3	6
11, 12	➢ Non-Destructive Testing (NDT) ➢ Visual inspection, penetration, magnetic, and ultrasonic.	4	2	4
13, 14, 15	➢ Case studies & mini project	4	2	4
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies															
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**	**c16**
Engineering materials, alloys, Different types of fabrication	1	1	1												1	
Investigation of chemical composition and microstructure of alloys								1	1						1	
Cooling curves & solidification.				1	1	1										
Phase diagrams				1	1	1	1									
Classification, Eutectic, Peritectic, and basic Eutectoid						1	1			1					1	
Iron carbon diagram with all phases										1	1	1			1	
Heat treatments of ferrous alloys										1	1	1			1	1
Annealing, Normalizing, and Hardening Case Hardening										1	1	1		1	1	
Non-Destructive Testing (NDT)													1	1	1	
Visual inspection, penetration, magnetic, and ultrasonic tests													1	1	1	1
Case studies							1	1	1		1	1		1		
Mini project							1	1						1	1	1
Topics Covering Competencies	1	1	1	2	2	3	4	3	2	4	4	4	2	5	9	3
% Topics Covering Competencies	8	8	8	16	16	24	32	24	16	32	32	32	16	40	72	24

5 – Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1	1	1		1					1				
c2	1	1						1			1				
c3	1	1		1	1						1		1		
c4	1	1		1	1		1			1	1		1		
c5	1	1	1	1	1						1		1		
c6	1	1		1	1					1	1		1		
c7	1	1		1			1				1		1		
c8				1		1					1	1			1
c9				1		1					1	1			1
c10	1	1	1	1	1					1	1		1		
c11	1	1	1	1	1					1	1	1	1		
c12	1			1	1		1	1			1		1		1
c13	1	1									1	1		1	1
c14	1			1				1					1	1	
c15	1	1					1	1			1			1	1
c16						1						1			1
∑	13	11	4	12	7	4	4	4	0	4	14	5	9	3	6
%	81	69	25	75	44	25	25	25	0	25	88	31	56	19	38

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	7
	Tutorials	5 Assignments per semester	10
	Mini project	Once per semester	3
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Materials Technology and Testing (Lecture - Lab. Notes)

7-2 Required books

- David G. Rethwisch, “Fundamentals of Materials Science and Engineering”, Wiley, Asia,2013

7-3 Recommended books:

- William D. Callister, “Fundamentals of Materials Science and Engineering”, Wiley, USA, 2005

7-4 Periodicals, Web sites, etc.

- http://simple.wikipedia.org/wiki/Materials_science

- http://www.matsci.com/
- http://www.homework-help-secrets.com/atomic-structure.html
- https://www.coursera.org/learn/ferrous-technology-2

8 – Facilities required for teaching and learning:

- Materials Lab.
- Lecture Room
- Computer and data show
- High speed internet and communication facilities for distance learning.

Course coordinator:	Dr. Hanan Abd El Kader and Dr. Mahmoud Saleh Rabie
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn160: Summer Training for Level One

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department
Date of specifications approval: August 2020

B - Basic Information

Title: Summer training for level one **Code:** MNFn160 **Level:** 2nd Summer (Level one)
Credit Hours: 0 **Lectures:** 0 **Tutorial/Exercise/ Practical:** Total of 60 Hours
Pre-requisite: MNFn060

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to the use of the Solid Works package (essential level).

2 – Competencies:

c1. Identify the basic commands in basic features and commands of SolidWorks (C1).
c2. Learn how to save drawings (C1, C2).
c3. Acquire and apply new knowledge on sketching (C1, C2).
c4. Learn and explain editing commands (C1, C2).
c5. Practice controlling the drawing display (C2)
c6. Identify the fundamental dimensioning terms (C9, C14)
c7. Use appropriate techniques for assembly constraints, features, and animation (C2, C9).
c8. Practice creating a detailed drawing and isometric. (C5, C9)
c9. Collaborate effectively within multidisciplinary team (C5, C7, C9).
c10 Practice self-learning and communicate effectively orally and in written form (C8, C10).

This course contributes to the following program competencies: C1, C2, C5, C7, C8, C9, C10 & C14

3 – Contents:

Topics	Lecture hours	Tutorial hours	Practical hours
SolidWorks Basics and the User Interface • SolidWorks GUI, Introduction • Design Intent. • File References. • Opening Files. • Using the Command Manager.	-	2	4
Introduction to Sketching • 2D Sketching • Sketching Guidelines and Relations • Design Intent • Dimensions • Extrude • Saving Files	-	2	4
Basic Part Modeling • Basic Modeling and Terminology • Choosing the Sketch Plane • Details of the Part • Revolved Features	-	2	4

• Cut Feature • View Selector • Filleting • Editing Tools • Drawing Views • Dimensioning • Changing Parameters	-	2	4
• Sweep Features • Lofting Features • Introduction to Curves	-	2	4
• Using the Hole Wizard	-	2	4
Using Assemblies • Analyzing the Assembly • Checking for Clearances • Changing the Values of Dimensions • Exploded Assemblies • Explode Line Sketch • Bill of Materials	-	2	4
• Assemblies and tool box • Assembly features • Introduction to animation.	-	2	4
Symmetry and Draft • Boss Feature with Draft • Symmetry in the Sketch • Sketching Inside the Model • View Options • Using Model Edges in a Sketch • Creating Views of Assemblies • SolidWorks SimulationXpress • Using SolidWorks SimulationXpress • The SimulationXpress Interface • Photo View360 (Introduction)	-	2	4
• Final Evaluation	-	2	4
Total hours	**-**	**20**	**40**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies									
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**
SolidWorks Basics and the User Interface	1						1	1		1
Introduction to Sketching	1				1		1	1		1
Basic Part Modeling	1	1	1		1		1	1		1
Using Assemblies	1	1		1	1		1	1		1
Symmetry and Draft						1		1	1	1
Topics Covering Competencies	4	2	1	1	3	1	4	5	1	5
% Topics Covering Competencies	80	40	20	20	60	20	80	100	20	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method				
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations
c1		1		1					1	1	1		1	
c2		1		1					1	1	1		1	
c3		1		1					1	1	1		1	
c4		1		1					1	1	1		1	
c5		1		1					1	1	1		1	
c6		1		1					1	1	1		1	
c7		1		1					1	1	1		1	
c8		1		1					1	1	1		1	
c9									1					
c10									1					
$\sum$	0	8	0	8	0	0	0	0	10	8	8	0	8	0
%	0	80	0	80	0	0	0	0	100	80	80	0	80	0

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Quizzes and Assignments	Daily	60
Final Evaluation	Tenth Day	40
Total		**100**

7 – List of references:

7-1 Course notes

- None

7-2 Required Book:

- Lombard, Matt. SolidWorks 2013 bible. John Wiley & Sons, 2013.

7-3 Periodicals, Web sites, etc.:

- https://www.solidworks.com/sw/support/1495_enu_html.htm, (Last accessed July 2020)

8 – Facilities required for teaching and learning:

- Computer lab. equipped with projection and sound systems.
- Computer, Data show and computer programs.
    - SolidWorks software package.
- High speed internet and communication facilities for distance learning.

Course coordinator: Dr. Yahia Elattar
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn211: Fluid Mechanics

A- Affiliation

Relevant program: Manufacturing Engineering & Production Technology BSc Program
Department offering the program: Manufacturing Engineering & Production Technology Department
Department offering the course: Manufacturing Engineering & Production Technology Department.
Date of specifications approval: August 2020

B - Basic Information

Title: Fluid Mechanics **Code:** MNFn211 **Level:** 2^{nd} /Fall
Credit Hours: 3 **Lectures:** 2 **Tutorial/Exercise:** 2 **Practical:** 1
Pre-requisite: MTHn002

C - Professional information

1 – Course Learning Objectives:

By the end of the course, students should know what is meant by fluid substances, fluid properties and their effect on fluid behavior, pressure at a point in a fluid, pressure measurement, and hydrostatic forces acting on plane or curved surfaces. Gain better understanding of fluid kinematics (velocity and acceleration fields), physical laws and some of their applications. In addition to use of similitude and dimensional analysis and show competency for better model design. All the above will be applied on viscous flow in pipes. The student will perform some experiments concerning fluid and flow characteristics.

2 – Competencies:

c1- Demonstrate a good understanding of systems of units, dimensional homogeneity and basic concepts and definitions used in fluid mechanics (C1, C10)
c2- Estimate the effects of fluid properties on fluid behavior (C13)
c3- Solve fluid static and dynamic problems (C1, C3)
c4- Investigate the effects of buoyancy on stability and floatation of bodies (C3, C10, C11)
c5- Discriminate among streamlines, path lines, and streak lines (C13)
c6- Shows a good understanding of conservation laws (mass, momentum, energy), and their applications (C10, C12,)
c7- Use of dimensional analysis, similitude, design of models, and planning of experiments required to test the model (C2, C10, C11)
c8- Analyze the behavior of viscous fluids in pipes and ducts (C3, C11, C14)
c9- Calculate forces affecting the fully and partially immersed bodies (C1, C3, C12)
c10- Apply physical laws (mass, momentum, energy conservation laws in addition to ideal gas law) on fluid flow problems (C3, C10, C13)
c11- Integrate knowledge from different courses to solve fluid mechanics problems (C2, C3, C4, C10)
c12- Design, plan, and perform experiments to study fluid problems (C2, C10)
c13- Use experimental facilities and related computer software to investigate and analyze some phenomena related to fluid mechanics (C2, C4)
c14-Carry out some experiments concerning hydrostatic force acting on a plane surfaces, hydraulic losses in bends, Bernoulli's equation, flow over weirs, Reynolds's experiment, and free jet flow (C2, C4, C11, C13)
c15- Analyze experimental results and determine their accuracy and validity (C2, C11)
c16- Practice self-learning and communicate effectively orally and in written form (C5, C6, C9).
C17- Work in a team and be involved in a group discussion (C7)
C18- Work in a stressful environment and within constraints (C6)
C19- Present the results and conclusions of work orally or in a written form (C8)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• Introduction: ➢ Definition of fluids, ➢ Dimensions and units,	1	2	-
1	**6-** Fluid properties.	2	2	2
2	• Fluid statics: ➢ Pressure at a point, ➢ Pressure field,	2	-	-
3	➢ Pressure measurement,	1	2	1
3	➢ Hydrostatic forces acting on plane and curved surfaces,	2	2	2
4	➢ Buoyancy, floatation, and stability.	1	-	-
4	• Fluid kinematics: ➢ Velocity field,	2	2	2
5	➢ Acceleration field,	2	2	1
5	➢ Reynolds's transport theorem.	1	1	-
6	• Conservation laws: ➢ Conservation of mass- continuity equation,	2	2	-
7	Assessment (Mid-Term Exam)	2	-	-
8	➢ Conservation of linear and angular momentum,	2	2	-
8	➢ Conservation of energy	1	1	2
9	• Similitude, dimensional analysis, and modeling: ➢ Dimensional analysis, ➢ Buckingham Pi theorem, determination of Pi terms by inspection,	2	2	-
10	➢ Common dimensionless groups in fluid mechanics, ➢ Correlation of experimental data,	2	2	-
11	➢ Modeling and similitude, some typical model studies.	2	2	2
12	• Viscous Flow in Pipes: ➢ General characteristics of pipe flow, ➢ Fully developed laminar flow,	1	2	-
13	➢ Fully developed turbulent flow, ➢ Dimensional analysis of pipe flow,	1	-	-
14, 15	➢ Pipe flow examples, ➢ Pipe flow rate measurement.	1	2	2
	Total hours	**30**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																		
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
Introduction: Definition of fluids, Dimensions, and units	1	1					1				1								
Fluid properties.	1	1						1			1	1				1	1		
Fluid statics: Pressure at a point, Pressure field,		1	1	1						1	1	1	1	1	1	1	1	1	1
Pressure measurement				1					1		1	1	1	1	1	1	1	1	1
Hydrostatic forces acting on plane and curved surfaces,		1	1						1		1	1	1	1	1	1	1	1	1
Buoyancy, floatation, and stability		1	1	1					1		1		1						
Fluid kinematics: Velocity field			1		1						1	1	1			1	1	1	1
Acceleration field,			1		1						1					1	1	1	1
Reynolds's transport theorem.		1				1				1				1	1				
Conservation laws: Conservation of mass- continuity equation,			1			1				1	1	1	1	1	1	1	1	1	1
Conservation of linear and angular momentum,			1			1		1		1	1		1			1	1	1	1
Conservation of energy			1			1				1	1	1	1	1	1	1	1	1	1
Similitude, dimensional analysis, and modeling: Dimensional analysis, Buckingham Pi theorem, determination of Pi terms by inspection,							1	1			1	1				1			
Common dimensionless groups in fluid mechanics, Correlation of experimental data.							1	1			1	1	1			1			
Modeling and similitude, some typical model studies.							1	1			1	1				1			
Viscous Flow in Pipes: General characteristics of pipe flow. Fully developed laminar flow.		1	1			1		1		1	1	1	1	1	1		1	1	1
Fully developed turbulent flow, Dimensional analysis of pipe flow.		1	1			1	1	1		1	1	1	1		1		1	1	1
Pipe flow examples, Pipe flow rate measurement.		1	1			1	1	1		1	1	1	1	1	1	1	1	1	1
Topics Covering Competencies	2	9	11	3	2	7	6	8	3	8	17	13	12	8	9	13	12	11	11
% Topics Covering Competencies	11	50	61	17	11	39	33	44	17	44	94	72	66	44	50	72	66	61	61

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1			1	1			1		1	1		1	1	
c2	1	1		1	1	1		1		1	1	1	1		
c3	1			1	1					1	1		1	1	
c4	1	1	1	1	1	1	1	1		1	1	1	1	1	
c5	1		1	1	1		1	1		1	1		1	1	
c6	1			1	1	1	1			1	1	1	1	1	1
c7	1	1		1	1	1	1			1	1	1	1	1	1
c8	1			1	1			1		1	1		1		
c9	1			1	1	1	1		1	1	1	1	1		
c10	1			1	1		1			1	1		1		
c11	1	1	1	1		1	1	1	1	1	1	1	1	1	1
c12	1	1				1		1	1			1		1	1
c13		1				1	1	1	1			1		1	
c14						1	1		1			1		1	
c15		1				1	1		1			1		1	
c16		1	1				1	1						1	1
c17		1	1			1	1	1	1					1	1
c18		1	1			1	1	1	1					1	1
c19			1	1	1	1	1		1	1	1	1	1	1	1
$\sum$	12	10	7	12	11	13	14	11	9	12	12	11	12	15	8
%	63	53	37	63	58	68	74	58	47	63	63	58	63	79	42

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: ➢ Assignments, ➢ Quizzes ➢ Reports	 Bi-Weekly 3 Quizzes per semester 1 Report per semester	 10 6 4
Mid-Term Exam	7th Week	20
Experimental Part: ➢ During the semester ➢ Practical Exam.	 Weekly 15th Week	 10 10
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Selected topics

7-2 Required books:

- Fundamentals of Fluid Mechanics, B.R. Munson, D.F. Young, & T.H., Okiishi, John Wiley & Sons, Inc., 7th. ed., 2013.

7-3 Recommended books:

- Fluid Mechanics, F.M. White, McGraw-Hill, 4th ed., 1999.

7-4 Periodicals, Web sites, etc.

- Web sites interested in fluid mechanics

8 – Facilities required for teaching and learning:

- Fluid Mechanics laboratory.
- Modern Academy Library
- Lecture and Exercise rooms equipped with projector and sound systems.
- Computer, Data show and Computer programs.
- High speed internet and communication facilities for distance learning.

Course coordinator:	Dr. Mohamed Riad
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn213: Computer Applications

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Computer Applications **Code:** MNFn213 **Level:** Level 2, Second Semester
Credit Hours: 2 **Lectures:** 1 **Tutorial/Exercise:** - **Practical:** 3
Pre-requisite: ENGn213a

C - Professional Information

1 – Course Learning Objectives:

A study of this course will enable the student to:
- Understand the difference between CN and CNC machines.
- Know the different types of G-Codes
- Write program in G-Code (Funoc)
- Implement some command in Turning and in Milling

2 – Competencies:

c1- History of CNC machines and its development from NC to CNC machines. (C1, C4, C5)
c2- The main definition for NC and CNC machines and the important features of CNC machines. (C1, C4, C5, C13, C14)
c3- The different methods for program entry and the methods for verifying and proving program. (C1, C2)
c4- Utilize computer software (winnc32) that uses fanuc21 control. (C9, C10, C11)
c5- Write program using G-code (Funoc) for milling operations. (C3, C4, C5, C6)
c6- Write program using G-code (Funoc) for turning operations. (C3, C4, C5, C6)
c7- Implement a simulation in milling and turning operations. (C8, C9, C11, C13, C14, C15, C16)
c8- Adjust the CNC machine for the zero point. (C10, C12)
c9- Clamp the semi-product on the CNC machine. (C3, C4, C5, C6, C15, C16)
c10- Enter the written program of the G-code on the CNC machine. (C3, C4, C5, C6, C15, C16)
c11- Work in a team and be involved in a group discussion. (C6, C7)
c12- Demonstrate efficient IT capabilities. (C10, C13, C14, C15, C15)
c13-Practice self-learning and communicate effectively orally and in written form. (C8, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15 & C16

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Introduction to NC and CNC Machines. • History of CNC machines. • Definitions of NC and CNC. • CNC Versus Conventional Machining. • Industrial Application of CNC. • Advantages and disadvantages of Computer Numerical Control.	1	-	3
2	CNC axes, datum and coordinate system.	1	-	3

	• CNC axes definitions. • Linear axes movement. • Rotary axes movement. • Datum. • Coordinate system.			
3, 4	CNC data input and documentations. • data input to CNC machines. • CNC Documentation.	1	-	3
5, 6	CNC part programming. • Basic Definitions of G-Codes. • Different Types of G-Codes. • Basic Terminology of G-Code (FUNOC)	1	-	3
7	Assessment (Mid-Term Exam)	1	-	1
8 - 13	Milling programming. • Work piece Installation. • Determination of Zero Position. • Definition and Applications of G58 , G52. • Definition and Applications of G00. • Definition and Applications of G01. • Definition and Applications of G02 , G03.	6	-	18
14	Turning programming • Definition and Applications of G58 , G52. • Definition and Applications of G00. • Definition and Applications of G01. • Definition and Applications of G02 , G03.	3	-	9
15	Revisions	1	-	3
	Total hours	**15**	**-**	**43**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies												
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13
History of CNC machines.	1												
Definitions of NC and CNC.		1											
CNC Versus Conventional Machining.		1											
Industrial Application of CNC.		1											
Advantages and disadvantages of Computer Numerical Control.		1											
CNC axes, datum and coordinate system.	1	1											
CNC data input and documentations.			1										
CNC part programming.				1	1	1	1	1	1	1			
Basic Definitions of G-Codes.				1	1	1							
Different Types of G-Codes.				1	1	1							
Basic Terminology of G-Code (FUNOC)				1	1	1							
Milling programming.				1	1	1	1	1	1	1	1	1	1
Turning programming				1	1	1	1	1	1	1	1	1	1
Topics Covering Competencies	2	5	1	6	6	6	3	3	3	3	2	2	2
% Topics Covering Competencies	15	38	8	46	46	46	23	23	23	23	15	15	15

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method				
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations
c1	1		1			1	1	1		1		1	1	1
c2	1		1			1	1	1		1		1	1	1
c3	1		1			1	1	1		1		1	1	1
c4	1		1			1	1	1		1		1	1	1
c5	1		1			1	1			1		1	1	1
c6	1		1			1	1			1		1	1	1
c7	1		1			1	1			1		1	1	1
c8	1		1			1	1			1		1	1	1
c9	1		1			1	1			1		1	1	1
c10	1		1			1	1			1		1	1	1
c11														1
c12														1
c13														1
$\sum$	10	0	10	0	0	10	10	4	0	10	0	10	10	13
%	77	0	77	0	0	77	77	31	0	77	0	77	77	100

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	4 Quizzes (every 3 Weeks) 2 degrees for each one	8
	Reports	One report per semester	4
	Assignment	Bi-Weekly	8
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references

7-1 Course notes

- Lecture notes

7-2 Required books:

- Software manuals.

7-3 Recommended books:

- James V. Valentino, Ed V. Goldenberg and AAA Predator, 2012,Introduction to Computer Numerical Control, 5th Edition.

7-4 Periodicals, Web sites, etc.

- None

8 – Facilities required for teaching and Learning

- Computer lab. equipped with suitable computers and software packages
- Lecture room
- Data show

Course Coordinator: Dr. Eatemad Hosny
Head of the Department: Dr. Metwally Abd Elghaffar

Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn214: Thermodynamics

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc Program
Department offering the program:	Manufacturing Engineering & Production Technology Department
Department offering the course:	Manufacturing Engineering & Production Technology Department.
Date of specifications approval:	August 2020

B - Basic Information

Title: Thermodynamics **Code:** MNFn214 **Level:** 2nd /Spring
Credit Hours: 3 **Lectures:** 2 **Tutorial/Exercise:** 2 **Practical:** 1
Pre-requisite: PHYn002

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the student should be acquainted with wide applications of thermodynamics, types of systems, energy, work, and heat. Understand thermodynamic equilibrium, state, process, and cycle. Understand properties of pure substances, phase diagrams, and use of tables to determine the state of a system. Get acquainted with thermodynamics laws in different forms for control mass & control volume, enthalpy, and entropy. Analysis of SSSF and USUF processes. Concept of heat engine and heat pump. Analysis of Carnot cycle, reversible and irreversible processes. Performing some experiments concerning heat and energy.

2 – Competencies

c1- Gain additional knowledge concerning thermodynamic system, surroundings, energy, and its different forms (C10)
c2- Analyze different types of thermodynamic systems and describe their behavior. (C1)
c3- Determine the properties of different phases of a pure substance, and use of thermodynamic tables to determine their properties (C13)
c4- Apply basic laws governing thermodynamic processes (zeroth, first, and second laws. (C1, C3)
c5- Solve problems related to entropy, Carnot cycle, thermodynamic temperature scale and the analysis of heat engines and heat pumps. (C1)
c6- Analyze Carnot cycle, its efficiency and clarify its importance. (C1, C11)
c7- Solve thermodynamics problems (C1, C4)
c8- Design a process, or system applying appropriate knowledge, principles, and techniques. (C3, C5, C12)
c9- Adopt creative and innovative thinking in solving thermodynamic problems. (C3, C4, C5, C9)
c10- Analyze simple thermodynamic problems using basic laws. (C1, C11)
c11- Integrate knowledge from different courses to solve thermodynamic problems (C1, C3, C4, C10, C14)
c12- Plan, design and execute some experiments concerning heat and energy (C2, C3, C5, C6, C12)
c13-Employ laboratory facilities to design experiments and collect, analyze, and interpret results (C2, C8, C10)
c14- Use experimental facilities and related computer software to investigate and analyze some phenomena related to thermodynamics (C2, C4, C13)
c15- Analyze experimental results and determine their accuracy and validity (C1, C2, C11)
c16- Practice self-learning and communicate effectively orally and in written form (C5, C6, C8, C9).
C17- Work in a team and be involved in a group discussion (C6, C7)
C18- Work in a stressful environment and within constraints (C6, C7)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• Introduction: ➢ Importance of thermodynamics, ➢ Some applications	1	2	-
1	Mechanisms of heat transfer	1	2	2
2	• Concepts and definitions: System, boundary, surroundings, closed, open, and isolated systems.	1	-	-
2	➢ Kinetic, potential, and internal energy,	1	2	1
3	➢ State of a system, process, cycle	1	2	1
3	➢ Reversible, and irreversible processes, and work.	2	1	-
4	• Properties of a pure substance: ➢ Definition, phase diagram of water (p-v), (T-v).	2	2	2
5	➢ Tables of steam	3	2	1
6	➢ Equation of state, and compressibility factor, specific heats (C_P & C_V)	1	2	-
6	• First law of thermodynamics: ➢ Statement of the first law for cycle & process.	2	2	-
7	Assessment (Mid-Term Exam)	2	-	-
8	➢ Different forms for a control mass & control volume	2	2	2
9	➢ Special cases (SSSF, USUF). Enthalpy	1	1	2
10	• Second law of thermodynamics: ➢ Heat engine and heat pump. ➢ Kelvin–Plank and Clausius statements.	2	2	3
11	➢ Reversibility and factors affecting it. ➢ Carnot cycle and its efficiency	2	2	-
12	➢ Thermodynamic temperature scales.	1	1	-
13	• Entropy: ➢ Definition, Clausius inequality. ➢ Entropy of a pure substance. ➢ Entropy changes in a process.	2	2	-
14	➢ Entropy relation. ➢ Entropy generation and principle of increase of it,	2	-	-
15	➢ Entropy changes of a solid, liquid, and ideal gas. ➢ Second law for a control volume, for SSSF, and USUF processes	1	1	-
	Total hours	**30**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																	
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
• Introduction: Importance of thermodynamics, Some applications	1																	
Mechanisms of heat transfer.	1						1		1	1	1	1	1	1	1	1	1	1
• Concepts and definitions: System, boundary, surroundings, closed, open, and isolated systems.	1	1					1				1						1	1
Kinetic, potential, and internal energy,	1						1			1	1	1	1	1	1	1		

State of a system, process, cycle	1						1			1						1		
Reversible, and irreversible processes, and work.	1						1		1		1					1		
• Properties of a pure substance: Definition, phase diagram of water (p-v), (T-v).			1				1			1	1					1	1	1
Tables of steam			1				1		1	1	1					1	1	1
Equation of state, and compressibility factor, specific heats (C_P & C_V)				1			1			1	1	1				1		
• First law of thermodynamics: Statement of the first law for cycle & process.				1			1				1					1	1	1
Different forms for a control mass & control volume		1		1			1		1	1						1	1	1
Special cases (SSSF, USUF). Enthalpy		1		1			1	1	1	1	1					1	1	1
• Second law of thermodynamics: Heat engine and heat pump. Kelvin–Plank and Clausius statements.				1	1		1	1	1	1	1	1	1	1	1	1	1	1
Reversibility and factors affecting it. Carnot cycle and its efficiency					1	1	1	1			1					1	1	1
Thermodynamic temperature scales.				1	1		1									1		
• Entropy: Definition, Clausius inequality. Entropy of a pure substance. Entropy changes in a process.					1		1	1		1	1					1	1	1
Entropy relation. Entropy generation and principle of increase of it,					1		1	1		1	1					1	1	1
Entropy changes of a solid, liquid, and ideal gas. Second law for a control volume, for SSSF, and USUF processes		1		1	1	1	1	1	1	1	1					1	1	1
Topics Covering Competencies	6	4	2	7	6	2	17	6	7	12	14	4	3	3	3	16	12	12
% Topics Covering Competencies	33	22	11	39	33	11	94	33	39	66	78	22	17	17	17	89	66	66

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1		1	1			1	1		1	1				
c2	1	1		1	1		1		1	1	1		1		1
c3	1			1	1			1	1	1	1		1		
c4	1			1	1		1			1	1		1		
c5	1	1		1	1	1		1		1	1	1	1		1

c6	1	1	1	1	1	1			1	1	1	1	1		1
c7	1			1	1	1			1	1	1	1	1		
c8	1	1	1	1	1		1	1		1	1	1	1	1	1
c9		1	1		1	1	1	1		1	1	1		1	1
c10	1			1	1	1			1	1	1	1	1		1
c11	1			1	1	1	1		1	1	1	1	1		1
c12	1	1	1	1	1	1	1	1		1	1	1	1	1	1
c13						1	1					1	1		
c14						1	1					1	1		
c15						1	1					1	1		
c16							1	1						1	1
c17		1	1			1	1	1	1					1	1
c18		1	1			1	1	1	1					1	1
∑	11	8	6	11	11	12	13	9	8	12	12	11	13	6	11
%	61	44	33	61	61	66	72	50	44	66	66	61	72	33	61

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: ➢ Assignments, ➢ Quizzes ➢ Reports	 Bi-Weekly 3 Quizzes per semester 1 Report per semester	 10 6 4
Mid-Term Exam	7th Week	20
Experimental Part: ➢ During the semester ➢ Practical Exam.	 Weekly 15th Week	 10 10
Final Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Lecture notes, Lab. Notes, and handouts for assigned problems.

7-2 Required books

- Fundamentals of Engineering Thermodynamics, 7th edition, by M.J. Moran and H.N. Shapiro, John Wiley & Sons, 2010

7-3 Recommended books:

- Thermodynamics: An Engineering Approach, 3rd edition, by Y.A Cengel and M.A.Boyes, WCB McGraw-Hill, 1998.
- Thermodynamics, 4th edition, by J.P. Holman, McGraw-Hill, 1998.

7-4 Periodicals, Web sites, etc.

- Available web sites concerned with thermodynamics courses and experiments

8 – Facilities required for teaching and learning:

- Thermodynamics laboratory.
- Modern Academy Library
- Lecture and Exercise rooms equipped with projector and sound systems.
- Computer, Data show and Computer programs.
- High speed internet and communication facilities for distance learning.

Course coordinator: Dr. Mohamed Riad
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn221: Metals Cutting Theory

A- Affiliation

Relevant program: Manufacturing Engineering & Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department.
Date of specifications approval: August 2020

B - Basic Information

Title: Metals Cutting Theory **Code:** MNFn221 **Level:** Freshman, first semester
Credit Hours: 3 **Lectures:** 2 **Tutorial/Exercise:** 1 **Practical:** 2
Pre-requisite: MNFn121

C - Professional information

1 – Course Learning Objectives:

By the end of the course, students should know is to learn the concept of machining, production systems and methods of production as well as main reasons of machining deviations, cutting tool materials, basic geometry and technological angles and chip formation process, and cutting forces, heat generated and cutting temperature, tool wear and cutting-edge durability and cutting conditions and machinability as well as production costs and productivity.

2 – Competencies:

c1. Solve and communicate problems in production systems (C2, C7, C8).
c2. Solve and communicate problems in methods of production (C3, C9).
c3. Consider the benefits of solving problems of machining deviations. (C3, C9)
c4. Draw different problems in cutting tool. (C3, C4, C8, C11)
c5. Select the proper section for each component. (C1, C4, C5)
c6. Draw proper dimensions of tool geometry. (C4, C5, C8, C12)
c7. Produce cutting tool material. (C6, C9 C10)
c8. Read and understand chip formation and cutting forces (C1, C8)
c9. Prepare tool materials and production costs and productivity. (C1, C8)
c10. Read heat generation (C3, C6, C9, C10)
c11. Read cutting temperature, tool wear. (C5, C9, C13)
c12. Use cutting conditions and machinability. (C1, C5)
c13. Communicate effectively with other discipline using the cutting-edge durability. (C1, C5, C14)
c14. Expand their creative talents and to communicate their ideas in a meaningful manner. (C8, C9, C10)
c15. Search for information and engage in life – long sell learning discipline. (C8, C10)
c16. Use graphically effectively. (C8, C9)
c17. Refer to relevant literature. (C9, C10)
c18. Search for information's in references and in internet (C8, C9)
c19. Practice self-learning (C5, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Introduction of metal cutting theories, production system, technology, concept of machining, basic methods of production.	2	1	2
2	Inaccuracy of machining.	2	1	2
3	Measurements and inspection.	2	1	2
4	Cutting tool materials, basic geometry and technological angles.	2	1	2
5	Dimension chain.	2	1	2
6	Chip formation process, basic concept of chip formation, criteria of chip formation.	2	1	2
7	Assessment (Mid-Term Exam)	2	-	-
8	Cutting forces, cutting forces components in turning, milling, and drilling as well as shaping.	2	1	2
9	Heat generation and cutting temperature.	2	1	2
10	Tool wear and cutting-edge durability.	2	1	2
11	Cutting conditions and machinability.	٢	١	٢
12	Production costs, economic of metal cutting and productivity.	٢	١	
13	Broaching operation.	٢	١	٢
14	Gear manufacturing.	٢	١	٢
15	ISO fitting system.	٢	١	٢
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																		
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
1- Introduction of metal cutting theories, production system, technology, concept of machining, basic methods of production.	1	1					1				1								
2- Inaccuracy of machining.	1	1						1			1	1				1	1		
3- Measurements and inspection.				1					1		1	1	1	1	1	1	1	1	1
4- Cutting tool materials, basic geometry and technological angles.		1	1						1		1	1	1	1	1	1	1	1	1
5- Dimension chain.		1	1	1					1		1		1						
6- Chip formation process, basic concept of chip formation, criteria of chip formation.			1		1						1	1	1			1	1	1	1
7- Cutting forces, cutting forces components in turning, milling and drilling as well as shaping.			1		1						1					1	1	1	1
8- Heat generation and cutting temperature.		1				1				1				1	1				
9-Tool wear and cutting edge durability.			1			1				1	1	1	1	1	1	1	1	1	1
10- Cutting conditions and machinability.			1			1		1		1	1		1			1	1	1	1
11- Production costs, economic of metal cutting and productivity.			1			1				1	1	1	1	1	1	1	1	1	1

12- Broaching operation.							1	1			1	1				1			
13- Gear manufacturing.							1	1			1	1	1			1			
14- ISO fitting system.							1	1			1	1				1			
Topics Covering Competencies	2	5	7	2	2	4	4	5	3	4	13	9	8	5	5	11	8	7	7
% Topics Covering Competencies	14	39	50	14	14	28	28	39	21	28	93	64	57	39	39	76	57	50	50

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	١			١			١	١		١	١		١		
c2	١			١	١		١	١		١	١		١		
c3	١		١	١	١		١	١		١	١		١		
c4	١			١	١	١			١	١	١	١	١		
c5	١			١	١	١			١	١	١	١	١		
c6	١			١	١	١			١	١	١	١	١	١	
c7	١	١	١				١		١	١	١				
c8	١	١		١	١		١	١	١		١		١	١	١
c9	١			١	١				١	١	١		١	١	
c10						١	١		١			١			
c11						١	١		١			١			
c12						١	١		١			١			
c13						١	١		١						
c14	1	١	١					١						١	١
c15	1	١	١					١							
c16		١	١					١							
c17	1	١	١					١						١	
c18	1										1		1	1	
c19	1										1		1		
∑	14	6	6	8	7	7	9	8	9	8	11	6	9	6	2
%	74	32	32	42	37	37	47	42	47	42	58	32	47	32	11

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7^{th} Week	20
Semester Work	Quizzes	3 Quizzes per semester	١٠
	Tutorials	3 Assignments per semester	١٠
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Metal cutting theories by Dr. Merdan.

7-2 Required books

- A text of Manufacturing Technology, Volume1, P. N. Rao, second Edition, 2014.
- D. A. Stephenson. (2016), "Metal Cutting Theory and Practice", Taylor & Francis Gr.

7-3 Recommended books

- P. C. Sharma, A Textbook of Production Engineering, S. Chand and Co. Ltd., New Delhi, India, 2003

7-4 Recommended Web Site

- None

8 – Facilities required for teaching and learning:

- Overhead projector and screen.
- Models and prototypes as teaching aids.

Course coordinator:	Dr. Mohamed Abu-Okail
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn222: Machine Design – 1

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department
Date of specifications approval: August 2020

B – Basic Information

Title: Machine Design – 1 **Code:** MNFn222 **Level:** Level 2, First Semester
Credit Hours: 3 **Lectures:** 2 **Tutorial/Exercise:** 3 **Practical: -**
Pre-requisite: MNFn116

C – Professional information

1 – Course Learning Objectives:

By the end of this course the students should demonstrate the knowledge and understanding of the Design the dismountable & permanent joints, power screws, the loaded shafts, and the springs applications, for the static and dynamic designs, based on the different static and dynamic failure theories.

2 – Competencies:

c1- Stress state at a point, principal stresses, failure theories under static and/or dynamic loading. (C1, C2)
c2- Characteristics of ductile and brittle materials under static or dynamic loading (C1, C4, C9).
c3- Principle of design of machine parts; shafts, power screws, dismountable joints, and helical springs under static or dynamic loading. (C3, C5, C6)
c4- Application of failure theories on design shafts, dismountable and permanent joints, and helical springs. (C7, C10)
c5- Apply knowledge of mathematics, science, and design to solve engineering problems concerns machines and devices of mechanical nature. (C1, C14)
c6- Apply the principles of mathematics to determine the principal stresses at critical points. (C11, C12, C13)
c7- Determine the safety factor of machine parts under static and/or dynamic loading. (C6, C7)
c8- Evaluate the characteristics of machine elements under dynamic loading. (C5, C6)
c9- Practice self-learning through assignments and allocations self-reading. (C8, C10)
c10- Present data and results orally and in written form. (C8, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours
1	• Introduction; definitions, design phases and design considerations, mechanical properties of metals	2	3
2	• Analysis of stresses at a point	2	3
3, 4	• Determination of principal stresses for a stress element	4	6
5	• Design for static strength	2	3
6	• Design for Dynamic strength	2	3
7	Assessment (Mid-Term Exam)	2	-
8	• Design of Shafts	2	3
9	• Design of Keys, Feathers & splines	2	3
10 – 12	• Design of Threaded Joints, Fasteners and Connections	6	9
13	• Design of Welded Joints	2	3
14, 15	• Design of Helical Springs	4	6
	Total hours	**30**	**42**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies									
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10
Introduction; definitions, design phases and design considerations, mechanical properties of metals	1									
Analysis of stresses at a point			1	1	1	1				
Determination of principal stresses for a stress element		1		1	1	1				
Design for static strength	1	1					1			
Design for Dynamic strength		1					1			
Design of Shafts	1	1					1			
Design of Keys, Feathers & splines			1					1		
Design of Threaded Joints, Fasteners and Connections				1	1		1	1		
Design of Welded Joints	1	1		1	1	1			1	
Design of Helical Springs				1	1	1				1
Topics Covering Competencies	4	5	2	5	5	4	4	2	1	1
% Topics Covering Competencies	40	50	20	50	50	40	40	20	10	10

5 – Teaching, Learning and Assessment methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method				
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations
c1	1			1	1			1		1	1			1
c2	1			1	1					1	1		1	1
c3	1		1	1	1			1		1	1		1	
c4	1		1		1			1		1	1		1	
c5	1		1	1	1					1	1			
c6	1			1	1					1	1			
c7	1			1	1					1	1			
c8	1		1	1	1			1		1	1			
c9			1											
c10			1											
$\sum$	8	0	6	7	8	0	0	4	0	8	8	0	3	2
%	80	0	60	70	80	0	0	40	0	80	80	0	30	20

6 – Assessment Timing and Grading:

<table>
<tr><th colspan="2">Assessment Method</th><th>Timing</th><th>Grade (Degrees)</th></tr>
<tr><td colspan="2">Mid-Term Exam</td><td>7th Week</td><td>20</td></tr>
<tr><td rowspan="3">Semester Work</td><td>Quizzes</td><td>4 Quizzes (every 3 Weeks)
4 degrees for each one</td><td>16</td></tr>
<tr><td>Reports</td><td>One report per semester</td><td>8</td></tr>
<tr><td>Assignment</td><td>Bi-Weekly</td><td>16</td></tr>
<tr><td colspan="2">Written Exam</td><td>16th Week</td><td>40</td></tr>
<tr><td colspan="3">Total</td><td>100</td></tr>
</table>

7 – List of references:

7-1 Course notes:

- None

7-2 Required books

- Serage E. Khalifa, Machine Design I, Modern Academy, Cairo, 2012.

7-3 Recommended books

- Shigley J.E., Mechanical Engineering Design, first metric edition, McGraw- Hill,1986.
- R.S.KHURMI,J.K.GUPTA, A text book of Machine Design, EURASIA Publishing house (Pvt.) LTD,2003
- Peter R.N. Childs, Mechanical Design, John Wiley & Sons Inc,1998
- Jack A. Collins, Henry R. Busby & George H. Staab, Mechanical Design of Machine elements and Machines, John Wiley & Sons Inc,2010

7-4 Periodicals, Web sites, etc.

- http://www.onesmartclick/engineering/machine-design.html
- http://www.scribed.com/doc/100573482/Design-of-Machine-Element.html
- http://www.Learnerstv.com/Frec-Engineering-video-lectures-Ltvo77-Page1.html

8 – Facilities required for teaching and learning:

- Lecture and tutorial rooms,
- Drawing hall,
- Computer laboratory

Course coordinator: Prof. Dr. Serage El-din Khalifa
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn223: Foundry Technology

A- Affiliation

Relevant program: Manufacturing Engineering & Production Technology BSc Program
Department offering the program: Manufacturing Engineering & Production Technology Department
Department offering the course: Manufacturing Engineering & Production Technology Department.
Date of specifications approval: August 2020

B – Basic Information

Title: Foundry Technology **Code:** MNFn223 **Level:** Junior, Second Semester
Credit Hours: 3 **Lectures:** 2 **Tutorial/Exercise:**1 **Practical:** 2
Pre-requisite: MNFn112

C – Professional information

1 – Course Learning Objectives:

By the end of this course the students should demonstrate the knowledge and understanding foundry technology, patterns and pattern making, molding, casting processes, melting, pouring, and testing, and modernization and mechanization in foundry shop.

2 – Competencies

c1- Introduction to foundry (C1)
c2- Steps involved in casting advantages, limitations, and implications of casting process. (C1).
c3- Pattern types, allowances for pattern, pattern materials, color coding and storing of patterns. (C4).
c4- Molding methods and processes, materials, equipment, molding sand ingredients, essential requirements, sand preparation and control, testing, cores and cores making. (C4, C13)
c5- Design considerations in casting, gating and risers, and directional solidification in casting (C4, C13, C14).
c6- Sand castings, pressure die casting, permanent mold casting, centrifugal casting, precision investment, casting shell molding, CO2 molding, continuous casting, squeeze casting, electro slag casting. (C7)
c7- feting, finishing, and casting defects. (C13, C14)
c8- Foundry remolding furnaces, selection of furnace, crucibles oil fired furnaces, electric furnaces cupola, calculation of cupola charges, hot blast cupola, degasification, inoculation, pouring equipment, and inspection of casting (C8, C12)
c9- Need- Areas for mechanization, typical layout, sand reclamation techniques, and material handling (C12)
c10- Pollution control in foundry (C11)
c11- Computers in casting process (C14)
c12- Investigate the required properties to choose the casting method (C1, C13)
c13- Select appropriate solutions for gating system, pattern, risers, and cores problems based of analytical thinking (C2, C3)
c14- Investigate the favor of component, systems, and processes (C6)
c15- Use computer software to design and calculate the advanced casting components (C5, C6, C14).
C16- Classify and compare the different casting methods (C2, C5, C12)
c17- Design, assemble, operate, and test the casting component (C1, C3)
c18- Calculate the characteristics of casting components (C1, C5)
c19- Use computer software to design and calculate the casting components. (C5, C6, C11)
c20- Use experimental facilities to investigate the defects and evaluate the characteristics of the casting component (C12, C13, C16)
c21-Work in a team and involve in good discussions and seminars (C1, C3)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• Introduction to foundry	2	-	-
2	• Steps involved in casting advantages, limitations, and implications of casting process	2	1	-
3	• Pattern types, allowances for pattern, pattern materials, color coding and storing of patterns.	3	2	4
4	• Molding methods and processes, materials, equipment, molding sand ingredients, essential requirements	2	2	2
5	• Sand preparation and control, testing, cores and cores making	2	1	2
6	• Design considerations in casting, gating and risers, and directional solidification in casting	3	2	4
7	Assessment (Mid-Term Exam)	2	-	-
8, 9	• Sand castings, pressure die casting, permanent mold casting, centrifugal casting, precision investment, casting shell molding, CO2 molding, continuous casting, squeeze casting, electro slag casting	3	2	5
10	• Feting, finishing, and casting defects	2	1	2
11, 12	• Foundry remolding furnaces, selection of furnace, crucibles oil fired furnaces, electric furnaces cupola, calculation of cupola charges, hot blast cupola, degasification, inoculation, pouring equipment, and inspection of casting	3	1	5
13	• Need- Areas for mechanization, typical layout, sand reclamation techniques, and material handling	2	1	2
14	• Pollution control in foundry	2	-	-
15	• Computers in casting process	2	1	2
	Total hours	**30**	**14**	**28**

4 – Course contents and Course Competencies mapping matrix:

Topics	Course Competencies																				
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19	c20	c21
Introduction to foundry	1		1		1	1		1	1	1	1		1	1	1	1		1	1		
Steps involved in casting advantages, limitations, and implications of casting process		1	1	1		1	1	1		1	1	1	1	1		1	1	1	1	1	1
Pattern types, allowances for pattern, pattern materials, color coding and storing of patterns.	1	1		1	1	1	1	1		1		1	1	1		1			1	1	1
Molding methods and processes, materials, equipment, molding sand ingredients, essential requirements	1	1	1	1			1	1		1		1	1	1		1	1	1	1	1	1

Sand preparation and control, testing, cores, and cores making	1	1			1	1	1	1		1	1		1	1		1	1	1			1
Design considerations in casting, gating and risers, and directional solidification in casting	1		1	1			1	1	1		1	1	1	1	1		1		1	1	1
Sand castings, pressure die casting, permanent mold casting, centrifugal casting, precision investment, casting shell molding, CO2 molding, continuous casting, squeeze casting, electro slag casting	1	1	1	1	1	1	1	1		1	1		1	1	1	1		1	1	1	1
Feting, finishing, and casting defects	1	1		1		1	1	1		1		1	1	1		1		1	1	1	1
Foundry remolding furnaces, selection of furnace, crucibles oil fired furnaces, electric furnaces cupola, calculation of cupola charges, hot blast cupola, degasification, inoculation, pouring equipment, and inspection of casting	1		1		1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	
Need- Areas for mechanization, typical layout, sand reclamation techniques, and material handling		1	1	1	1	1	1	1	1	1	1		1	1			1			1	1
Pollution control in foundry	1	1	1	1	1	1	1	1		1		1	1	1	1	1	1	1	1	1	1
Computers in casting process	1		1	1	1	1		1		1	1		1	1		1	1	1	1		1
Topics Covering Competencies	10	9	9	9	9	10	10	12	4	11	8	6	12	12	5	10	8	9	10	9	11
% Topics Covering Competencies	83	75	75	75	75	83	83	100	33	92	67	50	100	100	42	83	67	75	83	75	92

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
c2	1	1	1	1	1	1	1	1	1	1	1	1	1		
c3	1	1	1	1	1	1	1		1	1	1	1	1	1	
c4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
c5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
c6	1	1	1	1		1	1		1	1	1	1	1	1	1
c7	1	1	1	1		1	1		1	1	1	1	1	1	1
c8	1	1	1	1		1	1	1	1	1	1	1	1		
c9	1	1	1	1		1	1		1	1	1		1		
c10	1	1	1	1		1	1		1	1	1	1	1		
c11	1	1	1	1		1	1	1	1	1	1	1	1	1	1
c12	1	1	1	1		1	1	1	1	1		1	1	1	1
c13	1	1	1	1		1	1	1	1	1		1	1	1	
c14	1	1	1	1	1	1	1		1	1		1	1	1	
c15	1			1			1		1			1	1	1	
c16	1	1	1	1		1	1	1	1	1		1	1	1	1
c17			1		1	1	1	1		1		1	1	1	1
c18		1	1				1	1		1		1	1	1	1
c19			1				1			1	1	1	1	1	1
c20		1	1		1	1	1		1	1		1	1		
c21	1		1			1			1			1		1	1
$\sum$	17	17	20	16	8	18	20	11	18	19	12	20	20	16	9
%	81	81	95	76	38	86	95	52	86	90	57	95	95	76	43

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: Seminars, quizzes, assignments, and reports	Bi-Weekly	20
Mid-Term Exam	7th Week	20
Practical Exam	13th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Foundry Technology (Lecture notes).

7-2 Required books

- Jain P.L. "Principles of Foundry Technology", Tata McGraw Hill Publishing Company Ltd., 1995.
- Lindberg R.A. "Process and Materials of Manufacture", Prentice Hall of India (p) Ltd., ASM, Metals Handbook on Casting, 1992.

- Taylor H. F. Flemings M. C. & Wulff J. "Foundry Engineering", Wiley Eastern Ltd., 1993.

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and learning:

- Lecture room
- Computer, Data show.

Course coordinator:	Dr. Mohammed Raafat
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn224: Machine Design – 2

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department.
Date of specifications approval:	August 2020

B – Basic Information

Title: Machine Design – 2	**Code:** MNFn224	**Level:** Freshman, first semester	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:**3	**Practical:** -
	Pre-requisite: MNFn222		

C – Professional information

1 – Course Learning Objectives:

By the end of this course the students should demonstrate the knowledge and understanding of the Design the sliding and anti-friction bearings, the spur, helical and worm gearings, for the static and dynamic loadings, based on the different static and dynamic failure theories.

2 – Competencies

c1. Determine kinds of lubrication, lubrication of sliding bearings and hydrodynamic theory (C2, C7, C8).
c2. Determine lubricant characteristics in sliding bearings during operation (C3, C9).
c3. Understand principle of design of rolling, control bearings, spur gears, helical gears bevel gears and worm gearing (C3, C9).
c4. Determine application of failure theories on design of spur, helical, bevel and worm gearing (C3, C4, C8, C11)
c5. Determine the load carrying capacity of sliding, rolling contact bearings and gears (C1, C4, C5)
c6. Evaluate the characteristics of lubricant in sliding bearings (C4, C5, C8, C12)
c7. Investigate the failures of bearings, and gears during operation (C6, C9 C10)
c8. Apply the principles of mathematics and science to check gears against fatigue and surface fatigue failures (C1, C8)
c9. Apply knowledge of mathematics, science, information technology, and design to solve engineering problems concerns bearings and gearboxes (C1, C8)
c10. Create and re-design mechanical systems as gearboxes (C3, C6, C9, C10)
c11. Prepare and present technical reports (C5, C9, C13)
c12. Prepare engineering drawing and computer graphics for assembly drawing concern mechanical machines (C1, C5)
c13. Practice self-learning through assignments and allocations self-reading. (C1, C5, C14)
c14. Present data and results orally and in written form. (C8, C9, C10)
c15. Search for information and engage in life – long sell learning discipline. (C8, C10)
c16. Use graphically effectively. (C8, C9)
c17. Refer to relevant literature. (C9, C10)
c18. Search for information's in references and in internet (C8, C9)
c19. Practice self-learning (C5, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1, 2	Hydrodynamic bearings theory	4	3	-
3	Hydrodynamic bearings design	2	6	-
	Rolling contact bearings:			
4	1. Kinds and Fundamentals	2	3	-
5, 6	2. Selection of Bearings	2	3	-
7	Mid-Term Exam	2	-	-
	Spur gears:			
8	1. Force Analysis	2	3	-
9	2. Bending Fatigue	2	3	-
10	3. Surface Fatigue (Surface Durability)	2	٣	-
	Helical gears:			
11	1. Force Analysis	2	3	-
11	2. Bending Fatigue and Surface Fatigue (Surface Durability)	2	3	-
	Bevel gears:			
12	1. Force Analysis	2	3	-
13	2. Bending Fatigue and Surface Fatigue (Surface Durability)	2	3	-
	Worm gears:			
14	1. Force Analysis	2	3	-
15	2. Bending, Fatigue and Surface Fatigue (Surface Durability)	2	3	-
	Total hours	**30**	**42**	**-**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																		
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
1- Hydrodynamic bearings theory	1	1					1			1	1								
2- Hydrodynamic bearings design	1	1						1			1	1				1	1		
3- Rolling contact bearings: - Kinds and Fundamentals - Selection of Bearings				1					1		1	1	1	1	1	1	1	1	1
4- Spur gears: - Force Analysis - Bending Fatigue Surface Fatigue (Surface Durability)		1	1						1		1	1	1	1	1	1	1	1	1
5- Helical gears - Force Analysis - Bending Fatigue and Surface Fatigue (Surface Durability)		1	1	1		1			1	1	1		1						
٦- Bevel gears - Force Analysis			1		1						1	1	1	1		1	1	1	1

- Bending Fatigue and Surface Fatigue (Surface Durability)																			
7- Worm gears: - Force Analysis - Bending Fatigue and Surface Fatigue (Surface Durability)			1		1	1					1				1	1	1	1	1
Topics Covering Competencies	2	4	4	2	2	2	1	1	3	2	7	4	4	3	3	5	5	4	4
% Topics Covering Competencies	29	58	58	29	29	29	14	14	43	29	100	58	58	43	43	71	71	58	58

5- Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	١			١			١	١		١	١		١		
c2	١			١	١		١	١		١	١		١		
c3	١		١	١	١		١	١		١	١		١		
c4	١			١	١	١			١	١	١	١	١		
c5	١			١	١	١			١	١	١	١	١		
c6	١			١	١	١			١	١	١	١	١	١	
c7	١	١	١				١		١	١	١				
c8	١	١		١	١		١	١	١		١		١	١	١
c9	١			١	١				١	١	١		١	١	
c10						١	١		١			١			
c11						١	١		١			١			
c12						١	١		١			١			
c13						١	١		١						
c14	1	١	١					١						١	١
c15	1	١	١					١							
c16		١	١					١							
c17	1	١	١					١						١	
c18	1										1		1	1	
c19	1										1		1		
∑	14	6	6	8	7	7	9	8	9	8	11	6	9	6	2
%	74	32	32	42	37	37	47	42	47	42	58	32	47	32	11

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes per semester	١٠
	Tutorials	3 Assignments per semester	١٠

Practical Exam	15th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Serage E. Khalifa, Machine Design II, Modern Academy, Cairo, 2012, printed notes

7-2 Required books

- Shigley J.E. (1986). Mechanical Engineering Design. Tenth edition. McGraw- Hill.
- R.S.KHURMI, J.K.GUPTA. (2003). A textbook of Machine Design. EURASIA Publishing house (Pvt.) LTD.

7-3 Recommended books:

- None

7-4 Recommended Web Site:

- None

8 – Facilities required for teaching and learning:

- Overhead projector and screen.
- Models and prototype as teaching aids.

Course coordinator: Dr. Tarek Ahmed Abdou
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn22٥: Engineering Metrology

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc. Program
Department offering the program:	Manufacturing Engineering & Production Technology Department.
Department offering the course:	Manufacturing Engineering & Production Technology Department
Date of specifications approval:	August 2020

B – Basic Information

Title: Engineering Metrology **Code:** MNFn225 **Year/level:** Junior, 6th Semester
Credit Hours: 2 **Lectures:** 1 **Tutorial:** 1 **Practical:** 2
Pre-requisite: MNFn121

C – Professional Information
1 – Course Learning Objectives

By the end of this course the student should have gained the planned competencies (based on the knowledge, skills, and personal attitude) related to the basic concepts and theory of measurements of lengths and used tools.

2 – Competencies:

c1- The metrological system's elements, units & characteristics. (C1, C2, C11)
c2- The metrological standards (of length, tolerances, shape, and positional tolerances & surface roughness. (C1, C2,)
c3- The different metrological sensors used for different metrological parameter (length, angles, thread, surface roughness, out of roundness). (C4, C9, C11)
c4- 3-D measuring machines and a computer software for engineering metrology. (C4, C11)
c5- Identify the metrological instrument's characteristics. (C1, C3, C4, C11, C12)
c6- choose the instrument, suitable for the specified metrological phenomenon. (C1, C3, C4, C11, C13)
c7- design, prepare and elaborate a simple metrological experiment (C11)
c8- Statistically treat the metrological measurements. (C1, C3, C4, C11)
c9- Build up metrological measuring systems, based on the used metrological instrumentation's characteristics, in addition to the measured metrological phenomenon (C1, C3, C4, C11)
c10- Build up metrological transducers utilizing different sensors convenient for the corresponding measurements. (C5, C14)
c11- Measure the metrological quantities by the previously mentioned devices. (C5, C14)
c12- Evaluate the measured metrological data, treat them statistically and to analyze the obtained results. (C5, C9)
c13- Work in stressful environment and within constraints (C9, C10, C14)
c14- Present finding of scientific research in seminars and workshops. (C5, C7, C9)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture Hours	Tutorial hours	Practical hours
1	Errors in measurements.	1	1	2
2, 3	Light waves as standard of length.	2	2	4
4	Standard for dimensional tolerances.	1	1	2
5	Linear measurements. -Angular measurements and circular divisions.	1	1	2
6	Limits and limit gauge design. -Machine tool metrology.	1	1	2
7, 8	Assessment (Mid-Term Exam)	2	-	-
9	Gear measurements. -Thread measurements	1	1	2
10	Surface roughness measurements	1	1	2
11	Standard for shape and positional deviations	1	1	2
12, 13	3-D measuring machines	2	2	4
14	Computer software for engineering metrology	1	2	4
15	Revision	1	1	2
	Total hours	**15**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies													
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14
• Errors in measurements.	1	1	1	1		1								
• Light waves as standard of length.		1	1	1		1	1	1	1	1		1		
• Standard for dimensional tolerances.	1	1		1		1	1	1	1	1	1	1	1	
• Linear measurements. -Angular measurements and circular divisions.	1	1	1	1		1	1	1	1	1	1	1	1	1
• Limits and limit gauge design. -Machine tool metrology.	1	1	1	1	1	1		1		1	1	1	1	1
• Gear measurements. -Thread measurements	1	1	1	1		1				1	1	1	1	1
• Surface roughness measurements	1	1	1		1	1	1	1		1	1	1	1	
• Standard for shape and positional deviations	1	1	1		1	1	1	1		1	1	1	1	
• 3-D measuring machines	1	1	1		1	1		1	1			1		
Topics Covering Competencies	8	9	8	6	4	9	5	7	4	7	6	8	6	3
% Topics Covering Competencies	89	100	89	67	44	100	56	78	44	78	67	89	67	33

5- Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods				Assessment Method					
	Lecture	Presentations & Movies	Discussions & Seminars	Tutorials	Problem solving	Laboratory	Modeling and Simulation	Self-learning	Experimental	Research, Reports & Assignments	Tutorials	Quizzes	Reports	Mid-Term Exam	Practical Exam	Written Exam
c1	1			1		1			1		1	1		1	1	1
c2	1			1							1	1		1		1
c3	1			1		1			1		1	1		1	1	1
c4	1			1		1			1		1	1			1	1
c5	1			1							1	1		1		1
c6	1			1							1	1		1		1
c7	1			1		1			1		1	1			1	1
c8	1			1		1			1		1	1			1	1
c9	1			1		1			1					1	1	
c10	1			1		1			1					1	1	
c11	1			1		1			1						1	
c12	1			1								1				1
c13	1			1								1				1
c14	1			1				1			1			1		
$\sum$	14	0	0	14	0	8	0	1	8	0	9	10	0	8	8	10
%	100	0	0	100	0	57	0	7	57	0	64	71	0	57	57	71

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Assignments	Weekly	20
Mid-term exam	7th Week	20
Practical Exam	15th Week	20
Final exam	16th Week	40
Total		**100**

7 – List of references

7-1 Course notes

- Lecture notes and handouts

7-2 Required books:

- None

7-3 Recommended books:

- J.F.W. Galyer, "Metrology for Engineers", ELBS, 1998

7-4 Periodicals, Web sites, etc.:

- www.HBM.com

8 – Facilities required for teaching and Learning

- Classroom and Workshop
- Modern Academy Library
- Lecture and Exercise rooms equipped with projector and sound systems.
- Computer, Data show and Computer programs.
- High speed internet and communication facilities for distance learning

Course Coordinator:	Dr. Nasr Aref
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn260: Industrial Training (1)

A- Affiliation

Relevant program: Manufacturing Engineering &Production Technology BSc Program
Department offering the program: Manufacturing Engineering &Production Technology Department
Department offering the course: Manufacturing Engineering &Production Technology Department.
Date of specifications approval: August 2020

B – Basic Information

Title: Industrial Training (1) **Code:** MNFn260 **Level:** Senior 1,7th Semester
Credit Hours: 0 **Lectures:** 0 **Tutorial:** 0 **Practical:** 60 hours
Pre-requisite: 65 credit hours, MNFn160

C – Professional information

1 – Course Learning Objectives:

Providing real world working environment perspective and real experience of working in industry.

2– Competencies:

c1- Applicability of theoretical knowledge gained during academic sessions (C1, C2, C10)
c2- Actual needs of business of the domain of specialization (C14)
c3- Develop the personal attitudes to serve the society (C3, C6
c4- Develop personal contacts in the field (C7)
c5- Practicing the actual production cycle (C12, C13, C14)
c6- Presenting a report that includes all information about the training (C11)
c7- Presenting personal qualities. (C4, C9, C7)
c8- Communicate effectively by diverse ways (C8)
c9- Practice self-learning (C5, C9, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Topics	Lecture hours	Tutorial hours	Practical hours
• Practical industrial training for two Weeks- during the summer vacation at the end of the 6th semester- in a recognized industrial establishment.	10		50
• At the end of the training, student should submit a report with the following information: ▯ Profile of the industry ▯ Organization structure. ▯ Product range ▯ Processes ▯ Machines, equipment, devices. ▯ Personnel welfare scheme ▯ Details of the training undergo ▯ Projects undertaken during the training. (if any)			
Total hours	**10**		**50**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies								
	c1	c2	c3	c4	c5	c6	c7	c8	c9
Practical industrial training for two Weeks- during the summer vacation at the end of the 6th semester- in a recognized industrial establishment.	1	1	1	1	1		1	1	1
At the end of the training, student should submit a report with the following information: Profile of the industry, Organization structure, Product range, Processes, Machines, equipment, devices, Personnel welfare scheme, Details of the training undergo, Projects undertaken during the training.(if any)						1			
Topics Covering Competencies	1	1	1	1	1	1	1	1	1
% Topics Covering Competencies	50	50	50	50	50	50	50	50	50

5- Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods							Learning Methods				Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Site Visits	Projects	Modeling & Simulation	Self-Learning	Cooperative	Research & Reports	Seminars	Quizzes	Reports	Mid-Term Exam	Practical Exam	Written Exam
c1						1	1	1	1		1						
c2						1			1		1						
c3		1	1			1			1	1							
c4						1				1							
c5						1	1				1						
c6											1			1			
c7			1			1				1							
c8						1	1				1						
c9							1		1								
$\sum$	0	1	2	0	0	7	4	1	4	3	5	0	0	1	0	0	0
%	0	11	22	0	0	77	44	11	44	33	55	0	0	11	0	0	0

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Evaluation of the foundation	Daily during the training	60
Report from student of the training	By the end of the training period	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Provided by external training organizations

7-2 Required books:

- None

7-3 Recommended books:

- Geary, Don, and Rex Miller. Welding. McGraw Hill Professional, 2011.

7-4 Periodicals, Web sites, etc.:

- https://www.edx.org/course/fundamentals-of-non-destructive-testing?index=product&queryID=e3841857eedf996d4f5915b2b95e12de&position=1

8 – Facilities required for teaching and learning:

- Provided by external training organizations/companies.

Course coordinator:	Dr. Nasr Aref
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn261: Seminar-1

A- Affiliation

Relevant program:	Manufacturing Engineering &Production Technology BSc Program
Department offering the program:	Manufacturing Engineering &Production Technology Department
Department offering the course:	Manufacturing Engineering &Production Technology Department.
Date of specifications approval:	August 2020

B – Basic Information

Title: Seminar-1 **Code:** MNFn261 **Level:** Junior ,5th semester
Credit Hours: 1 **Lectures:** - **Tutorial:** 2 **Practical:** -
Pre-requisite: 66 Credit Hours +GENn141+ GENn142

C – Professional information

1 – Course Learning Objectives:

Providing a concept on the exploitation of technology for the advancement of humankind and an introduction to the engineering discipline.

2 – Competencies:

c1- The definition and evolution of technology. (C4, C10)
c2- Human and social consideration in engineering design and social problems. (C3, C9)
c3- Solve engineering problems (C9)
c4- Decide the technology selection and consider its social impacts (C2, C4, C13)
c5- Apply knowledge of different engineering disciplines in technological applications (C3, C6, C12, C14)
c6- Present a report that includes all information about the seminar. (C2, C8, C11)
c7- Present personal qualities. (C1, C5).
C8- Communicate effectively by diverse ways. (C7, C9).
C9- Practice self-learning (C4, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Topics	Lecture hours	Tutorial hours	Practical hours
• The course consists of several seminars concerned with the development of technology and its impact to society, it covers the following areas: ➢ The definition and evolution of technology. ➢ Technology and society ➢ Technology and Innovation. ➢ Technology selection decision and social considerations ➢ Engineering design. ➢ Engineering problem solving. ➢ Human and social considerations in engineering design, and social problems. ➢ Concepts of the exploitation of technology for the advancement of humankind.		28	
Total hours		**28**	

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies								
	c1	c2	c3	c4	c5	c6	c7	c8	c9
The course consists of a number of seminars concerned with the development of technology and its impact to society, It covers the following areas: The definition and evolution of technology, Technology and society, Technology and Innovation, Technology selection decision and social considerations, Engineering design, Engineering problem solving, Human and social considerations in engineering design, and social problems, Concepts of the exploitation of technology for the advancement of human kind.	1	1	1	1	1	1	1	1	1
Topics Covering Competencies	1	1	1	1	1	1	1	1	1
% Topics Covering Competencies	100	100	100	100	100	100	100	100	100

5- Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods							Learning Methods				Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Site Visits	Projects	Modeling and Simulation	Self-Learning	Cooperative	Research & Reports	Seminars	Quizzes	Reports	Mid-Term Exam	Practical Exam	Written Exam
c1			1	1		1		1			1	1		1			
c2			1	1		1		1			1	1		1			
c3		1	1	1		1		1			1	1		1			
c4		1	1	1		1		1			1	1		1			
c5		1		1	1	1	1	1			1	1					
c6		1	1				1				1	1		1			
c7		1	1				1				1	1		1			
c8		1	1				1				1	1		1			
c9		1	1				1				1	1		1			
$\sum$	0	7	8	5	1	5	5	5	0	0	9	9	0	8	0	0	0
%	0	78	89	56	11	56	56	56	0	0	100	100	0	89	0	0	0

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Semester Work	Reports	During the semester	30
	Presentations		30
Oral Exam		By the end of each seminar	40
Total			**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books:

- Tentative, depending on the topic of each seminar

7-3 Recommended books:

- Black, Bruce. Workshop processes, practices and materials. Routledge, 2015.
- Sharma, P. C. A Textbook of Production Technology (Manufacturing Processes): Manufacturing Processes. S. Chand Publishing, 2007.
- Robert, J. Pond, and L. Rankinen Jeffrey. *Introduction to engineering technology*. Pearson, 2013.

7-4 Periodicals, Web sites, etc.:

- https://www.coursera.org/learn/research-methods
- https://www.coursera.org/learn/how-to-write-a-scientific-paper
- https://www.coursera.org/specializations/english-for-research-publication-purposes
- https://www.coursera.org/learn/sciwrite
- https://www.edx.org/course/quantitative-and-qualitative-research-for-beginners?index=product&queryID=79bd4428e749621506e769504f52487c&position=1
- https://www.edx.org/course/scientific-methods-and-research?index=product&queryID=142f71d2e7003f7450b4d7baca17cf88&position=4
- https://www.edx.org/course/research-methods-an-engineering-approach?index=product&queryID=142f71d2e7003f7450b4d7baca17cf88&position=5

8 – Facilities required for teaching and learning:

- Lecture room
- Projector
- Computer

Course coordinator:	Prof. Nabil Gadallah
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn262: Seminar-2

A- Affiliation

Relevant program: Manufacturing Engineering &Production Technology BSc Program
Department offering the program: Manufacturing Engineering &Production Technology Department
Department offering the course: Manufacturing Engineering &Production Technology Department.
Date of specifications approval: August 2020

B – Basic Information

Title: Seminar-2 **Code:** MNFn262 **Level:** Junior ,6th Semester
Credit Hours: 1 **Lectures:** - **Tutorial:** 2 **Practical:** -
Pre-requisite: MNFn261

C – Professional information

1 – Course Learning Objectives:

Providing a concept on the exploitation of technology for the advancement of humankind and an introduction to the engineering discipline.

2 – Competencies:

c1- The definition and evolution of technology. (C4, C10)
c2- Human and social consideration in engineering design and social problems. (C3, C9)
c3- Solve engineering problems (C9)
c4- Decide the technology selection and consider its social impacts (C2, C4, C13)
c5- Apply knowledge of different engineering disciplines in technological applications (C3, C6, C12, C14)
c6- Present a report that includes all information about the seminar. (C2, C8, C11)
c7- Present personal qualities. (C1, C5).
c8- Communicate effectively by diverse ways. (C7, C9).
c9- Practice self-learning (C4, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Topics	Lecture hours	Tutorial hours	Practical hours
• The course consists of a number of seminars concerned with the development of technology and its impact to society, It covers the following areas: ➢ The definition and evolution of technology. ➢ Technology and society ➢ Technology and Innovation. ➢ Technology selection decision and social considerations ➢ Engineering design. ➢ Engineering problem solving. ➢ Human and social considerations in engineering design, and social problems. ➢ Concepts of the exploitation of technology for the advancement of humankind.	-	28	-
Total hours	**-**	**28**	**-**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies								
	c1	c2	c3	c4	c5	c6	c7	c8	c9
The course consists of a number of seminars concerned with the development of technology and its impact to society, It covers the following areas: The definition and evolution of technology, Technology and society, Technology and Innovation, Technology selection decision and social considerations, Engineering design, Engineering problem solving, Human and social considerations in engineering design, and social problems, Concepts of the exploitation of technology for the advancement of human kind.	1	1	1	1	1	1	1	1	1
Topics Covering Competencies	1	1	1	1	1	1	1	1	1
% Topics Covering Competencies	100	100	100	100	100	100	100	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods							Learning Methods				Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Site Visits	Projects	Modeling and Simulation	Self-Learning	Cooperative	Research & Reports	Seminars	Quizzes	Reports	Mid-Term Exam	Practical Exam	Written Exam
c1			1	1		1		1			1	1		1			
c2			1	1		1		1			1	1		1			
c3		1	1	1		1		1			1	1		1			
c4		1	1	1		1		1			1	1		1			
c5		1		1	1	1	1	1			1	1					
c6		1	1				1				1	1		1			
c7		1	1				1				1	1		1			
c8		1	1				1				1	1		1			
c9		1	1				1				1	1		1			
$\sum$	0	7	8	5	1	5	5	5	0	0	9	9	0	8	0	0	0
%	0	78	89	56	11	56	56	56	0	0	100	100	0	89	0	0	0

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Semester Work	Reports	During the semester	30
	Presentations		30
Oral Exam		By the end of each seminar	40
Total			**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books:

- Tentative, depending on the topic of each seminar.

7-3 Recommended books:

- Black, Bruce. Workshop processes, practices and materials. Routledge, 2015.
- Sharma, P. C. A Textbook of Production Technology (Manufacturing Processes): Manufacturing Processes. S. Chand Publishing, 2007.
- Robert, J. Pond, and L. Rankinen Jeffrey. *Introduction to engineering technology*. Pearson, 2013.

7-4 Periodicals, Web sites, etc.:

- https://www.coursera.org/learn/research-methods
- https://www.coursera.org/learn/how-to-write-a-scientific-paper
- https://www.coursera.org/specializations/english-for-research-publication-purposes
- https://www.coursera.org/learn/sciwrite
- https://www.edx.org/course/quantitative-and-qualitative-research-for-beginners?index=product&queryID=79bd4428e749621506e769504f52487c&position=1
- https://www.edx.org/course/scientific-methods-and-research?index=product&queryID=142f71d2e7003f7450b4d7baca17cf88&position=4
- https://www.edx.org/course/research-methods-an-engineering-approach?index=product&queryID=142f71d2e7003f7450b4d7baca17cf88&position=5

8 – Facilities required for teaching and learning:

- Lecture room
- Projector
- Computer

Course coordinator:	Dr. Metwally Hussein Metwally
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn3١١: Mechanical Measurements

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc. Program
Department offering the program:	Manufacturing Engineering & Production Technology Department.
Department offering the course:	Manufacturing Engineering & Production Technology Department
Date of specifications approval:	August 2020

B – Basic Information

Title: Mechanical Measurements	**Code:** MNFn311	**Year/level:** 4-th year / 2-nd Term	
Credit Hours: 3	**Lectures:** 2	**Tutorial:** 1	**Practical:** 2
	Pre-requisite: MNFn1١١		

C – Professional Information
1 – Course Learning Objectives

By the end of this course the student should have gained the planned competencies Identify the instrument's & measuring system characteristics. The students will also be able to choose the suitable instrument for the specified measured phenomenon. In addition, the student will be able to elaborate an experiment, take results, analyze these results, treat them statistically, plot them and write a report for this experiment.

2 – Competencies:

c1- The measuring system's elements. (C1, C2, C11)
c2- The measuring units & characteristics) C1, C2,)
c3- The different measuring sensors used for different mechanical phenomenon (strain, stress, force, torque, power, pressure, temperature, viscosity, and fluid flow (C4, C9, C11)
c4- identify the instrument's characteristics. (C4, C11)
c5- choose the instrument, suitable for the specified measured phenomenon (C1, C3, C4, C11, C12)
c6- design, prepare and elaborate a simple experiment. (C1, C3, C4, C11, C13)
c7- Design a measuring system (C11)
c8- Statistically treat the measurements. (C1, C3, C4, C11)
c9- Build up measuring systems, based on the used instrumentation's static and dynamic characteristics, in addition to the measured phenomenon (C1, C3, C4, C11)
c10- Build up measuring transducers utilizing different sensors convenient for the corresponding measurements (C5, C14)
c11- Measure the physical quantities by the previously mentioned devices. (C5, C14)
c12- identify novel and/or original perspectives on the subject. (C5, C9)
c13- - Evaluate the measured data, to treat them statistically and to analyze the obtained results. (C9, C10, C14)
c14- Work in stressful environment and within constraints. (C5, C7, C9)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• Measuring system characteristics	2	1	2
2	• Traceability, uncertainty & calibration	2	1	2
3	Strain measurements: Wire strain gauges	2	1	2
4, 5	• Strain measurements: Extensometers	4	2	4
6	• Stress measurements: Photoelasticity	2	1	2
7	Assessment (Mid-Term Exam)	2	-	-
8, 9	• Time and speed measurements	4	2	4
10, 11	• Acceleration and frequency measurements	4	2	4
12, 13	• Force and torque measurements	4	2	4
14, 15	• Manufacturing techniques	4	2	4
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies													
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**
• Measuring system characteristics	1	1	1	1		1								
• Traceability, uncertainty & calibration		1	1	1		1	1	1	1	1		1		
• Strain measurements: Wire strain gauges	1	1		1		1	1	1	1	1	1	1	1	
• Strain measurements: Extensometers	1	1	1	1		1	1	1	1	1	1	1	1	1
• Stress measurements: Photo-elasticity	1	1	1	1	1	1		1		1	1	1	1	1
• Time and speed measurements	1	1	1	1		1				1	1	1	1	1
• Acceleration and frequency measurements	1	1	1		1	1	1	1		1	1	1	1	
• Force and torque measurements	1	1	1		1	1	1	1		1	1	1	1	
• Power measurements	1	1	1		1	1		1	1			1		
Topics Covering Competencies	8	9	8	6	4	9	5	7	4	7	6	8	6	3
% Topics Covering Competencies	89	100	89	67	44	100	56	78	44	78	67	89	67	33

5- Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & Seminars	Tutorials	Problem solving	Laboratory	Modeling	Self-learning	Experimental	Tutorials	Quizzes	Reports	Mid-Term Exam	Practical Exam	Written Exam
c1	1			1		1			1	1	1		1	1	1
c2	1			1						1	1		1		1
c3	1			1		1			1	1	1		1	1	1
c4	1			1		1			1	1	1			1	1
c5	1			1						1	1		1		1
c6	1			1						1	1		1		1
c7	1			1		1			1	1	1			1	1
c8	1			1		1			1	1	1			1	1
c9	1			1		1			1				1	1	
c10	1			1		1			1				1	1	
c11	1			1		1			1					1	
c12	1			1							1				1
c13	1			1							1				1
c14	1			1				1		1			1		
∑	14	0	0	14	0	8	0	1	8	9	10	0	8	8	10
%	100	0	0	100	0	57	0	7	57	64	71	0	57	57	71

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Assignments	Weekly	20
Mid-term exam	7th Week	20
Practical Exam	15th Week	20
Final exam	16th Week	40
Total		100

7 – List of references

7-1 Course notes:

- Lecture notes and handouts

7-2 Required books:

- C.V. COLLETTE & A.D. HOPE, Engineering Measurements, the English Language Book Society & Pitman, 2nd. Ed., 1983;
- L.F. ADAMS, Engineering Measurements & Instrumentation, the English Universities Press Ltd., 1986;
- Ernest O. DOEBELIN, Measurements Systems, McGraw-Hill Kogakusha, LTD International Student Ed., 1976.

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and Learning

- Classroom and Workshop
- Modern Academy Library
- Lecture and Exercise rooms equipped with projector and sound systems.
- Computer, Data show and Computer programs.
- High speed internet and communication facilities for distance learning

Course Coordinator:	Dr. Nasr Aref
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specifications
MNFn312: Industrial Operations Research

A – Affiliation

Relevant program: Manufacturing Engineering & Production Technology BSc. Program
Department offering the program: Manufacturing Engineering & Production Technology Department.
Department offering the course: Manufacturing Engineering & Production Technology Department.
Date of specifications approval: August 2020

B – Basic information

Title: Industrial Operations Research **Code:** MNFn312 **Level:** 4th, Seventh semester
Credit Hours: 3 **Lectures:** 2 **Tutorial/Exercise:** 3 **Practical:** 0
Pre-requisite: None

C – Professional Information

1 – Course Learning Objectives:

By the end of this course, the student should have gained the planned competencies (based on the knowledge, skills and personnel attitudes) related to the basic concepts, methodologies and theories of industrial operations research. He must formulate and solve the problems which are raised when running production systems.

2 – Competencies:

On successful completion of the course, the student must:
c1 Understands the concepts of mathematics and sciences, appropriate to operations research (C1).
c2 Understands the basics of linear programming related to operations research problems solving (C7, C9).
c3 Solve transportation model and its application (C2, C3)
c4 Construction of project scheduling PERT & CPM (C2).
c5 Analyze & take decisions of waiting line models (C2, C6).
c6 Select appropriate mathematical and computer-programming methods for modeling and analyzing problems arising when running production systems (C1, C5).
c7 Solve manufacturing problems, often based on limited resources (C3, C4, C7, C9).
c8 Analyze results of waiting line models and take decision analysis (C2, C7).
c9 Apply network models for production line (C2, C8).
c10 Use related computer software to solve manufacturing problems (C9, C10).

This course contributes to the following program competencies: C1, C2, C3, C5, C6, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	An Introduction to Linear Programming.	2	2	-
2	Linear Programming – graphical solution	2	2	-
3, 4	Linear Programming Simplex method	4	4	-
5	Sensitivity and duality	2	2	-
6	Integer linear programming applications	2	2	-
7	Assessment (Mid-Term Exam)	2	-	-
8	Assignment problem, applications in production lines	2	2	-
9, 10	Transportation model solution and applications	4	4	-
11, 12	Project scheduling: PERT, CPM	4	4	-
13	Waiting line models	2	2	-
14	Decision analysis	2	2	-
15	Computer applications	2	2	-
	Total Hours	**30**	**28**	**-**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies									
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10
1. An Introduction to Linear Programming.	1	1								
2. Linear Programming – graphical solution	1	1					1			
3. Linear Programming Simplex method	1	1					1			
4. sensitivity and duality	1	1					1			
5. Integer linear programming applications	1	1					1			
6. Assignment problem, applications in production lines	1	1					1			
7. Transportation model solution and applications	1	1	1				1			
8. Project scheduling: PERT, CPM				1			1		1	
9. Waiting line models					1			1		
10. Decision analysis					1		1	1		
11. Computer applications						1				1
Topics covering competencies	7	7	1	1	2	1	8	2	1	1
% Topics covering competencies	70	70	10	10	20	10	80	20	10	10

5- Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1			1					1		1		1
c2	1			1					1		1		1
c3	1			1					1		1		1
c4	1			1					1		1		1
c5	1			1					1		1		1
c6	1			1		1			1		1		1
c7	1			1					1		1		1
c8	1			1					1		1		1
c9	1			1					1		1		1
c10						1					1		1
$\sum$	9	0	0	9	0	2	0	0	9	0	10	0	10
%	90	0	0	90	0	20	0	0	90	0	100	0	100

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: Seminars, Quizzes & Reports	Bi-Weekly	40
Mid-Term Exam	7th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Lecture notes

7-2 Required books:

- None

7-3 Recommended books:

- Anderson and Sweeney, "An introduction to Management Science, Quantitative approach", Thomson South-western, 2008

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and learning:

- Lecture and exercise rooms, and computer lab
- Computer application (POM-QM ver.5.Taylor)

Course coordinator:	Dr. Mohamed Saad Abdelkarim
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn313: Automatic Control

A- Affiliation

Relevant program/s:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B – Basic Information

Title: Automatic Control	**Code:** MNFn313		**Level:** 3rd (Senior 1), Second Semester	
Credit Hours: 3	**Pre-requisite:** MTHn103			
Contact Hours:	**Lectures:** 2	**Tutorial:** 2	**Laboratory:** 1	**Total:** 5

C – Professional Information
1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (based on the knowledge, skills, and personnel attitudes) related to the basic concepts and theories of automatic control. He must analyze the systems stability and precision and implement the necessary classical controllers including the P, PI and PID controllers. The controlled system should be precise with the required degree of precision and stable with the required degree of stability.

2 – Competencies:

On successful completion of the course, the student must:

c1. Apply engineering fundamentals, basic science, and mathematics to deduce the mathematical relations describing the dynamic behavior of simple systems and their transfer function (C1, C2).
c2. Apply the block diagram algebra and signal flow graphs to deduce the system Transfer function (C1, C2)
c3. Calculate, plot and analyze the transient and frequency responses of control systems (C11).
c4. Identify systems based their step response and frequency response (using Bode and Nyquest diagrams) (C12).
c5. Explain effect of roots of characteristic equation on the transient response and system stability (C11).
c6. Define, describe mathematically, and calculate the steady state error and evaluation of the precision of closed loop system (C1, C12)
c7. Apply the Routh-Herwitz and Nyquist stability criteria to evaluate the closed loop system stability (C1, C11, C12).
c8. Interpret the root locus (C12)
c9. Design, implement and tune the parameters of P, PI and PID controllers to improve the closed loop system stability and precision (C3)
c10. Describe the characteristics of typical instruments, sensors, and controllers (C11, C14)
c11. Construct, test and investigate the performance of typical control systems, pressure control, flow control and speed control. (C11, C14)
c12 Use the suitable software to carry out the system analysis and calculate the system response and improve its stability and precision. (e.g., MATLAB, Simulink, codas) (C5)
c13. Use experimental facilities to investigate the system performance (C2).
c14. Search for information's from diverse references and internet, write technical reports and prepare convenient presentations (C5, C8)
c15. Practice self-learning and distance learning (C10).

This course contributes to the following program competencies: C1, C2, C3, C5, C8, C10, C11, C12 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Introduction, basic definitions, and terminology	2	-	-
	➢ Mathematical topics	-	2	-
2	➢ Transfer functions, definition, and case studies	2	2	-
3	➢ Block diagrams; conventions, block diagram algebra and reduction of block diagrams.	2	2	-
4	➢ Signal flow graphs; definition, conventions and Mason's formula	1	-	-
	Time domain analysis			
	➢ Transient response of proportional, integrating and first order elements.	1	2	-
5,6	➢ Transient response of proportional, integrating and first order elements.	1	-	-
	➢ Transient response of second order elements. Effect of location of roots of characteristic equation on the transient response	3	4	-
7	Assessment (Mid-Term Exam)	2	-	-
8	➢ System identification based of the transient response.	2	2	-
	Frequency response			
9, 10	➢ Frequency response; Polar plot and Bode plots.	4	4	-
11	➢ System identification based of the transient and frequency responses.	2	2	-
12	➢ Accuracy of feedback systems; steady state error.	2	1	-
13,14	➢ Stability of feedback systems; Routh-Herwitz and Nyquest stability criteria.	3	4	-
	➢ Root locus analysis	1	-	-
15	➢ Mini Project; design and tuning of P, PI and PID controllers	2	3	-
Over the 15 Weeks	**Laboratory Work**			
	➢ Instruments, sensors and controllers	-	-	2
	➢ Level control	-	-	2
	➢ Flow control	-	-	2
	➢ Speed control	-	-	1
	➢ Temperature control	-	-	2
	➢ Robotic arm control	-	-	1
	➢ Design and tuning of P, PI and PID controllers	-	-	4
	Total hours	**30**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Introduction, basic definitions and terminology	1														1
Mathematical topics	1	1	1	1	1	1	1								1
Transfer functions, definition and case studies	1	1	1	1	1	1									1
Block diagrams; conventions, block diagram algebra and reduction of block diagrams.		1													1
Signal flow graphs; definition, conventions, and Mason's formula		1													1
Transient response of proportional, integrating and first order elements.	1		1	1											1
Transient response of second order elements. Effect of location of roots of characteristic equation on the transient response	1		1	1	5			5							1
System identification based of the transient response.				1											1
Frequency response: Polar plot and Bode plots.			1												1
System identification based of the transient and frequency responses.				1											1

Topics	Course Competencies														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Accuracy of feedback systems; steady state error.						1									1
Stability of feedback systems; Routh-Herwitz and Nyquest stability criteria.							1								1
Root locus analysis								1							1
Mini Project; design and tuning of P, PI and PID controllers	1	1	1						1						1
Instruments, sensors and controllers										1	1	1			1
Level control										1	1	1	1	1	1
Flow control										1	1	1	1	1	1
Speed control										1	1	1	1	1	1
Temperature control										1	1	1	1	1	1
Robotic arm control										1	1	1	1	1	1
Design and tuning of P, PI and PID controllers									1			1	1	1	1
Number of Topics Covering each Competency	6	5	6	6	7	3	2	6	2	6	6	7	6	6	21
Percentage of topics covering each competency	29	24	29	29	33	14	10	29	10	29	29	33	29	29	100

The course content insures a balanced coverage of the course competencies

5- Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1	1		1	1				1		1		1
c2	1	1		1					1		1		1
c3	1	1		1	1			1	1		1		1
c4	1	1		1	1			1	1		1		1
c5	1	1							1				
c6	1	1		1	1			1	1		1		1
c7	1	1		1	1		1	1	1		1		1
c8	1	1											
c9	1	1	1	1	1		1	1	1			1	1
c10						1				1		1	
c11						1				1		1	
c12	1	1	1	1	1	1	1	1		1		1	
c13						1	1			1			
c14							1					1	1
c15			1		1		1	1				1	
$\sum$	10	10	3	8	8	4	6	7	8	4	6	6	8
%	67	67	20	53	53	27	40	47	53	27	40	40	53

6- Assessment, Timing, and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	6
	Reports/Research	Two reports per semester	4
	Tutorials	3 Assignments per semester	6
	Mini project	Once per semester	4
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Laboratory work printed notes

7-2 Required books

- RABIE M. G. (2010) Automatic Control for Mechanical Engineers, Cairo: Published by the author, ISBN 977179869-3

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.

- https://mnourgwad.github.io/CSE302/ (Last accessed March 26, 2020).
- http://www.williamsonic.com/BodeNyquist/index.html (Last accessed March 26, 2020).
- https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-06-principles-of-automatic-control-fall-2012/lecture-notes/ (Last accessed March 26, 2020).

8 – Facilities required for teaching and learning:

- Automatic Control Lab.
- Lecture and Exercise rooms equipped with projection and sound systems.
- Computer, Data show and Computer programs; Automation studio, Marex, Rexroth hydraulic trainer, Rexroth hydraulic element animation and TK-Solver.
- High speed internet and communication facilities for distance learning.

Course coordinator: Prof. M Galal Rabie
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn321: Joining Processes

A- Affiliation

Relevant program:	Mechanical Engineering & Production Technology, BSc Program
Department offering the program:	Mechanical Engineering & Production Technology Dept.
Department offering the course:	Mechanical Engineering & Production Technology Dept.
Date of specifications approval:	August 2020

B – Basic Information

Title: Joining processes	**Code:** MNFn321	**Year/level:** 2nd, first semester	
Credit Hours: 3	**Lectures:** 2	**Tutorial:** 1	**Practical:** 2
	Pre-requisite: MNFn112		

C – Professional Information

1 – Course Learning Objectives:

By the end of this course the students should demonstrate the knowledge and understanding of joining processes and its different types, economic importance, and typical industrial applications.

2 – Competencies:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

c1 – Introduction, classification of joining, basic concepts, economic importance of joining, typical industrial applications, and welding symbols.
c2 – Soldering and brazing, practice of soldering, joint types and preparation, fluxes, heat sources and heat transfer. Practice of brazing, filter materials, heat sources, different types of brazing, and braze welding.
c3 – Welding, oxy-acetylene welding, arc welding, resistance welding, spot welding, electron beam welding, thermite welding, MIG, TIG, MAG, etc. practice joint design and preparation. Filter material.
c4 – Basic science of joining processes, sources of heat energy, the flame, the electric arc, chemical reactions during welding, oxidation reaction, and protection of weld pool with fluxes or gases. Theory of distortion.
c5 – Metallurgy of welding, microstructure changes during welding, the effect of heat on melts, pretreatment and post treatment of welds, behavior of ferrous and non-ferrous metals, fracture of welds
c6 – Inspection and testing of welds and joints, mechanical testing, non-destructive testing, and weld defects.
c7 – Adhesives, contact adhesives, polyester, polyamide and polyurethane melt adhesives, toughed acrylic and epoxy adhesives, silicone adhesives, mechanical properties and fracture mechanics, and joint design.
c8 – Joining ceramics, metal/ceramic joining and ceramic/ceramic joining, thermo-chemical considerations.
c9 – Diffusion bonding, brazing methods, joint design
c10- Investigate required properties to choose the joining method.
c11 – Select appropriate solution for joint design and preparation based on analytical thinking
c12 – Investigate the failure of joint
c13- Classify and compare different joining methods.
c14 – Design, assemble, operate, and test the joining components.
c15 – Calculate the characteristics of joining components.
c16 – Use computer software to design and calculate the joining design.
c17- Work in a team and involve in group discussion and seminars
c18- Communicate effectively and present data and results orally and in written form
c19- Search for information's in references and in the internet, while practicing self-learning.

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C12, C١٣ & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1, 2	• Introduction. Classification of joining. Basic concepts. Economic importance of joining. Typical industrial applications, and welding symbols, Types of joining processes	4	1	2
3	• Soldering and brazing. Practice of soldering. Joint types and preparation. Fluxes. Heat sources and heat transfer. Different types of brazing. Braze welding, types of fixture welding.	2	2	4
4, 5	• Welding. Oxy-acetylene welding, Oxyfuel Gas Cutting and Plasma Arc Cutting, arc welding, resistance welding, spot welding, electron beam welding, thermite welding, MIG< TIG, and MAG etc. Practice, joint design and preparation. Filler materials	4	3	4
6	• Basic science of joining processes. Sources of heat energy, the flame, the electric arc, chemical reactions during welding, oxidation reaction, and protection of weld pool with fluxes or gases. Theory of distortion.	2	2	3
7	Assessment (Mid-Term Exam)	2	-	-
8	• Metallurgy of welding. Microstructure changes during welding, the effect of heat on metals. Pre-treatment and post-treatment of welds. Behavior of ferrous and nonferrous metals. Fracture of welds, Design of welding joining	3	2	3
9	• Inspections and tests of welds and joints. Mechanical testing. Non-destructive testing. Weld defects.	2	1	3
10, 11	• Adhesives. Contact adhesives. Polyester, polyamide, and polyurethane melt adhesives. Toughened acrylic and epoxy adhesives. Silicone adhesives. Mechanical properties and fracture mechanics. Joint design.	4	1	4
12, 13	• Joining of ceramics. Metal/ceramic joining and ceramic/ceramic joining. Thermo-chemical considerations.	4	1	4
14, 15	• Diffusion bonding. Brazing methods. Joint design	3	1	1
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																		
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
Introduction Classification of joining and welding symbols, Types of joining processes	1	1					1				1								
Soldering and brazing.	1			1			1	1	1	1		1	1				1		
Oxy-acetylene welding, Oxyfuel Gas Cutting and Plasma Arc Cutting	1	1	1	1						1		1		1			1	1	
FCAW											1	1		1			1	1	
MIG, TIG, and MAG			1								1	1		1			1	1	
Welding Underwater		1	1			1					1				1				
joint design and preparation. Filler materials			1			1					1	1					1	1	1
Resistance welding			1		1			1	1	1	1	1	1			1	1	1	
Types of resistance welding			1		1	1				1	1	1		1	1		1		
Protection of weld pool with fluxes or gases					1	1				1		1		1	1		1	1	
Metallurgy of welding.			1		1	1				1	1						1	1	

Introduction of Inspections and tests of welds and joints.			1		1			1		1	1	1		1	1		1	1	
Types of NDT and DT			1		1	1	1			1		1				1	1	1	1
Mechanical testing. Non-destructive testing			1		1		1			1	1	1				1		1	
Weld defects.			1		1	1	1			1		1			1			1	
Joining of ceramics					1	1				1	1	1		1			1	1	
Contact adhesives.			1			1	1		1	1		1		1	1	1		1	1
Diffusion bonding.			1				1		1	1		1	1	1	1	1	1	1	1
Topics Covering Competencies	3	3	12	2	8	7	6	3	4	13	11	16	3	9	7	5	13	14	4
% Topics Covering Competencies	17	17	67	11	44	39	33	17	22	72	61	89	17	50	39	28	72	78	22

5- Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	١			١			١	١		١	١		١		
c2	١	1		١	١		١	١		١	١		١		
c3	١		١	١	١		١	١		١	١		١		
c4	١	1	1	١	١	١			١	١	١	١	١		
c5	١			١	١	١			١	١	١	١	١		
c6	١			١	١	١			١	١	١	١	١	١	
c7	١	١	١				١		١	١	١				
c8	١	١	1	١	١		١	١	١		١		١	١	١
c9	١			١	١				١	١	١		١	١	
c10	1					١	١		١			١			
c11	1		1			١	١		١			١			
c12	1	1				١	١		١			١			
c13	1					١	١		١						
c14	1	١	١					١						١	١
c15															
c16															
c17															
c18															
c19															
∑	14	6	6	8	7	7	9	8	9	8	11	6	9	6	2
%	74	32	32	42	37	37	47	42	47	42	58	32	47	32	11

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	4 Quizzes (every 3 Weeks) (each /2)	8
	Reports	Two reports per semester (each /2)	4
	Assignments	Bi-Weekly	8
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Lecture notes and handouts

7-2 Required books

- De Gamo E. P., Black J.T. & Rosher R. A., (2004) "Material and Processes in Manufacturing", MacMillan Publisher Co. .
- Smith F. J.," Fundamental of Fabrication and Welding Engineering", 2002.
- Milner D. R., & Apps R. L. "Introduction to Welding and Brazing", Pergamon Press 2001.

7-3 Recommended books:

- Modern Welding Technology, Howard, Scott Helzer, November 10, 2004

7-4 Periodicals, Web sites, etc.:

- http://www. Matsci.com (last access November 30,2018)
- http://www. Homework- help- secrets.com/atomic-structure.html (last access November 30,2018)
- http://www.totalmateria.com/Article12.htm (last access November 30,2018)
- https://waterwelders.com/smoothest-path-to-an-underwater-welding-career/ (last access November 30,2018)

8 – Facilities required for teaching and learning:

- Lecture room
- Computer, data show
- Welding workshop.
- Mechanical testing lab.

Course coordinator: Dr. Ibrahim Sabry
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn322: Computer Numerical Control (CNC)

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Computer Numerical Control (CNC)	**Code:** MNFn322	**Year/level:** Senior 1, first Semester	
Credit Hours: 3	**Lectures:** 2	**Tutorial:** 1	**Practical:** 2
	Pre-requisite:	MNFn213, MNFn121	

C - Professional Information

1 – Course Learning Objectives:

The aim of this course is to introduce the students to Computer Numerically Control (CNC) using advanced cycles; thus it is important to have previous knowledge of CNC programming using basic codes before taking this course. The course aims to provide the ability of using CNC-machines (MILLING and TURNING machines) starting from writing of the part program up to the simulation of the program using special software and production of the part using CNC machines.

2 – Competencies:

c1- Review the basic codes of CNC programming. (C1)
c2- Operate CNC machines (MILLING and TURNING machines) using different modes like edit, automatic, reference, jog......etc.). (C2, C4)
c3- Create part programs using cycles and codes. Select the suitable tool for each manufacturing feature. (C1, C4, C6, C10, C12)
c4- Recognize the difference between using the basic G&M codes and the using of CNC programming cycles. (C1, C4, C6)
c5- Select the correct and optimal tool path for each manufacturing feature. (C3, C4, C5, C6, C12, C13)
c6- Choose the recommended cutting conditions for each manufacturing step according to the accuracy and surface finish of the machined part. (C3, C4, C5, C6)
c7- Recognize the optimization concept in part programming to reduce the manufacturing time. Recognize the optimal application of each cycle and code in the programming process. (C3, C4, C5, C15, C16)
c8- Practice the measuring of tool length offset and zero offset. (C4, C9, C10, C14)
c9- Write a G-code on the software, test and debug it of errors. (C1, C4, C11, C15, C16)
c10-Simulate the program on the 3-D view and check if it matches the required workpiece. (C2, C4, C11)
c11-Practice programming the machine with the G-code. (C1, C2, C3, C4, C6, C8, C15, C16)
c12-Recognize the different components of milling and turning CNC machines. (C1, C2, C4)
c13-Effectively manage tasks, time and resources. (C5, C7, C8, C9, C10)
c14-Develop teamwork skills to help achieve more than what could ever be achieved individually. (C5, C7, C8, C9, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15 & C16

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	- Definition and applications of Computer Numerical Control (CNC). - Review on Basic codes of G&M code.	2	1	2
2	- Rectangular and circular pocket programming. - Definition of local coordinate system - Subprogram.	2	1	2
3	- Centering and Deep hole drilling cycles and manufacturing of row of holes.	2	1	2
4, 5	- Definition of different strategies of external and internal turning.	4	2	4
6	- Grooving cycle in turning.	2	1	2
7	Assessment (Mid-Term Exam)	2	-	-
8	- Reaming and Tapping cycles.	2	1	2
9 - 11	- Scale, Mirror and polar techniques.	6	3	6
12	- Threading cycle in turning.	2	1	2
13	- Axis rotation techniques.	2	1	2
14, 15	- Revisions.	4	2	4
	Total Hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies													
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14
Definition and applications of Computer Numerical Control (CNC).	1													
Review on Basic codes of G&M code.	1	1		1										
Rectangular and circular pocket programming. Definition of local coordinate system Subprogram.	1			1		1				1		1		
Centering and Deep hole drilling cycles and manufacturing of row of holes.				1		1				1		1		1
Definition of different strategies of external and internal turning.	1		1	1	1	1	1	1	1	1	1	1		
Grooving cycle in turning.				1	1	1	1	1	1	1	1	1		
Reaming and Tapping cycles.				1	1		1				1	1		
Scale, Mirror and polar techniques.				1	1					1				
Threading cycle in turning.			1	1										
Axis rotation techniques.				1										
Topics Covering Competencies	4	1	2	9	4	4	3	2	2	5	3	5	0	1
% Topics Covering Competencies	40	10	20	90	40	40	30	20	20	50	30	50	0	10

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method				
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations
c1	1		1			1	1	1		1		1	1	1
c2	1		1			1	1	1		1		1	1	1
c3	1		1			1	1			1		1	1	1
c4	1		1			1	1			1		1	1	1
c5	1		1			1	1			1		1	1	1
c6	1		1			1	1			1		1	1	1
c7	1		1			1	1			1		1	1	1
c8	1		1			1	1			1		1	1	1
c9	1		1			1	1			1		1	1	1
c10	1		1			1	1			1		1	1	1
c11	1		1			1	1			1		1	1	1
c12	1		1			1	1			1		1	1	1
c13							1							1
c14							1							1
$\sum$	12	0	12	0	0	12	14	2	0	12	0	12	12	14
%	86	0	86	0	0	86	100	14	0	86	0	86	86	100

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	4 Quizzes(every 3 Weeks) 2 degree for each one	8
	Reports	One report per semester	4
	Assignment	Bi-Weekly	8
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Lecture notes.

7-2 Required books:

- Software manuals.

7-3 Recommended books:

- James V. Valentino, Ed V. Goldenberg and AAA Predator, 2012, Introduction to Computer Numerical Control, 5th Edition.

7-4 Periodicals, Web sites, etc.

- http://www.cncci.com/resources/articles/what%20is%20cnc.htm (Last accessed November 15, 2018)
- http://www.ehow.com/how-does_5007907_cnc-machines-work.html (Last accessed November 15, 2018)
- http://www.cnccookbook.com/CCCNCGCodeCourse.htm (Last accessed November 15, 2018)

8 – Facilities required for teaching and learning:

- Laboratory equipped with computer, data show, and white board.
- Laboratory equipped with CNC turning and milling machines
- Laboratory equipped with simulation software.

Course coordinator: Dr. Eatemad Hosny
Head of the Department: Dr. Metwally Abd Elghaffar

Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn323: Computer Aided Design

A- Affiliation

Relevant program/s: Manufacturing Engineering and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department
Date of specifications approval: August 2020

B - Basic Information

Title: Computer Aided Design **Code:** MNFn323 **Level:** 3rd Level, Second Semester
Credit Hours: 3 **Pre-requisite:** MNFn224
Contact Hours: **Lectures:** 2 **Tutorial:**1 **Laboratory:** 2 **Total:** 5

C - Professional Information

1 – Course Learning Objectives:

By the end of the course students understand the capabilities of computer aided design, the Principles of Computer Graphics and its transformation, Stress Analysis by using by Finite Element Method, Design Optimization and General Procedure for Engineering Design and Engineering Analysis.

2 - Competencies

On successful completion of the course, the student must:

c1 Understand CAD and the CIMS, CAD and traditional design (C1, C12).
c2 Use Numerical techniques for CAD (C1, C2).
c3 Apply Principles of computer graphics: mathematical formulations for graphics, basic curve-fitting techniques, two and three-dimensional transformation (C2, C3, C4, C15, C16).
c4 Master the Design Databases: Database Management Systems, Data Models and Design Databases (C3, C11).
c5 Use the Finite Element Method: The Concept of Discretization and Application of the Finite Element Method in Engineering Analysis (C11, C12, C15, C16).
c6 Apply the Stress Analysis by the Finite Element Method: Review of Basic Formulations in Linear Elasticity Theory, finite Element Formulation, One and Two-Dimensional Stress Analysis of Solids (C11, C12, C15, C16).
c7 Develop simple and effective computer programs to optimize the Design project (C11, C12, C15, C16).
c8 Present data and results orally and in written form (C3, C9).
c9 Search for information and engage in life-long self-learning discipline (C10).

This course contributes to the following program competencies: C1, C2, C3, C4, C9, C10, C11, C12, C15 & C16

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ An overview of computer-aided design and analysis	2	-	-
2	➢ Matrices and determinants and solution of simultaneous linear equations	2	1	-
3	➢ Numerical differentiation and integration	2	2	2
4	➢ Mathematical formulations for graphics	2	2	2
5	➢ Two-dimensional transformations: homogeneous coordinates	2	1	2
6	➢ Three-dimensional transformations	2	1	2
7	Assessment (Mid-Term Exam)	2	-	-
8, 9	➢ Basic curve-fitting techniques	4	3	-
10	➢ The concept of discretization	2	-	2
11	➢ Steps in the finite element method	2	-	2
12	➢ Finite element formulation and one-dimensional stress analysis of solids	2	1	4
13	➢ Two-dimensional stress analysis of solids (plane stress case)	2	-	4

14	➢ Review of basic formulations in linear elasticity theory and one-dimensional stress analysis of solids	2	1	4
	➢ Two-dimensional stress analysis of solids		1	4
15	➢ Design optimization: indirect and direct method	2	1	-
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course competencies								
	c1	c2	c3	c4	c5	c6	c7	c8	c9
An overview of computer-aided design and analysis	1								
Matrices and determinants and solution of simultaneous linear equations		1						1	
Numerical differentiation and integration		1						1	
Mathematical formulations for graphics		1	1					1	
Two-dimensional transformations: homogeneous coordinates				1				1	
Three-dimensional transformations				1				1	
Basic curve-fitting techniques		1	1					1	
The concept of discretization			1	1	1	1		1	1
Steps in the finite element method	1			1	1	1		1	
Finite element formulation and one-dimensional stress analysis of solids	1			1	1	1		1	
Two-dimensional stress analysis of solids (plane stress case)	1			1	1	1		1	
Review of basic formulations in linear elasticity theory and one-dimensional stress analysis of solids	1			1	1	1		1	
Two-dimensional stress analysis of solids	1			1	1	1		1	
Design optimization: indirect and direct method	1			1			1	1	1
Topics Covering Competencies	7	4	3	9	6	6	1	13	2
% Topics Covering Competencies	50	29	21	64	43	43	7	93	14

The course content insures a balanced coverage of the course competencies

5 – Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Researches and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1								1		1		
c2	1			1	1				1		1		1
c3	1			1	1				1		1		1
c4	1		1			1							
c5	1			1	1	1			1		1		1
c6	1			1	1	1			1		1		1
c7	1		1			1							
c8	1		1	1	1	1			1		1		1
c9	1		1			1							
$\sum$	9	0	4	5	5	6	0	0	6	0	6	0	5
%	100	0	44	56	56	67	0	0	67	0	67	0	56

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7^{th} Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	10
	Tutorials	3 Assignments per semester	10
Practical Exam		15^{th} Week	20
Written Exam		16^{th} Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books:

- Computer Aided Design lecture and practical notebooks, by Dr. Nabil Gadallah.

7-3 Recommended books:

- Tai-Ran Hsu, and Dipendra K. Sinha, Computer Aided Design: An integrated Approach, New York: West Publishing Company, 1992.
- Risler J. J. (1992). Mathematical Methods for CAD. Cambridge: Cambridge University Press. Rockwoad A. and Chambers P. (1996). Interactive Curves and Surfaces. San Francisco: hforgan Kaufman (includes a computer disk with a multimedia tutorial).

7-4 Periodicals, Web sites, etc.

- None

8 – Facilities required for teaching and learning:

- Lecture and Exercise rooms equipped with projection and sound systems.
- Computer, Data show and Computer programs; SolidWorks.
- Computer Lab.
- High speed internet and communication facilities for distance learning.

Course coordinator: Dr. Rehab Ibrahim
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn324: Advanced Composite Materials

A- Affiliation
Relevant program: Manufacturing Engineering & Production Technology BSc. Program
Department offering the program: Manufacturing Engineering & Production Technology Department.
Department offering the course: Manufacturing Engineering & Production Technology Department
Date of specifications approval: August 2020

B - Basic Information
Title: Advanced Composite Materials **Code:** MNFn324 **Year/level:** 4-th year / 2-nd Term
Credit Hours: 3 **Lectures:** 2 **Tutorial:** 1 **Practical:** 2
Pre-requisite: MNFn122

C - Professional Information
1 – Course Learning Objectives

By the end of this course the student should have gained the planned competencies (based on the knowledge, skills and personal attitude) related to the basic concepts and theory of advanced materials technology. He should be able to deal with the material selections, composite materials features and drawbacks and composite processing and fabrications

2 – Competencies:

On successful completion of the course, the student should demonstrate knowledge and understanding of:
c1- Engineering materials and composite materials. (C1,C2, C11)
c2- Material selections for different applications. (C1, C2)
c3- New methods for composite processing and fabrication. (C4, C9, C11)
c4- Polymer matrix composite constituents for low temperature applications. (C4,C11)
c5- Design for manufacturing and product development. (C1, C3, C4, C11, C12)
c6- Design simple composite architecture MMC, CMC, and PMC. (C1, C3, C4, C11, C13)
c7- Use the principles of composite architecture to analyze different material properties. (C11)
c8- Manufacture different laminated composite related wood, polymer, or metal. (C1,C3, C4,C11)
c9- Manufacture different particulate and fiber reinforced composite (C1, C3, C4, C11)
c10- Collect and record data and information related to composite manufacturing. (C5, C14)
c11- Collect and categorize ideas and information in a predictable and standard format. (C5, C14,)
c12- identify novel and/or original perspectives on the subject. (C5, C9)
c13- summarize key points from taken from a variety of standard sources. (C9, C10, C14)
c14- Present finding of scientific research in seminars and workshops. (C5, C7, C9)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• Engineering materials (structure, properties, behavior, classifications)	2	1	2
2	• Introduction to composite materials (structure, properties, behavior, classifications, composite design guide and architectural)	2	1	2
3	• Particulate reinforcing composites (raw materials for part fabrications, composite design guide and architectural, large–particle composites, dispersion-strengthened composites	2	1	2

4, 5	• Fibrous reinforced composites materials (structure, properties, behavior, classifications, composite design guide and architectural, influence of fiber length, influence of fiber orientation and concentration)	4	2	4
6	• Structural composites (laminar composites, sandwich panels)	2	1	2
7	Assessment (Mid-Term Exam)	2	-	-
8, 9	• Polymeric matrix composite materials (structure, properties, behavior, classifications, composite design guide and architectural, composites processing, composites fabrication processing of fiber-reinforced composites)	4	2	4
10, 11	• Ceramic matrix composite materials (fracture toughness property, properties of ceramic matrix composites, manufacturing processes of ceramic matrix composites, carbon – carbon composites)	4	2	4
12, 13	• Metal matrix composite materials (metal matrix composites systems, manufacturing and forming methods, properties of MMCs, applications)	4	2	4
14, 15	• Manufacturing techniques	4	2	4
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies													
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**
• Engineering materials (structure, properties, behavior, classifications)	1	1	1	1		1								
• Introduction to composite materials (structure, properties, behavior, classifications, composite design guide and architectural)		1	1	1		1	1	1	1	1		1		
• Particulate reinforcing composites (raw materials for part fabrications, composite design guide and architectural)	1	1		1		1	1	1	1	1	1	1	1	
• Fibrous reinforced composites	1	1	1	1		1	1	1	1	1	1	1	1	1
• Structural composites	1	1	1	1	1	1		1		1	1	1	1	1
• Polymeric matrix composite materials	1	1	1	1		1				1	1	1	1	1
• Ceramic matrix composite materials	1	1	1		1	1	1	1		1	1	1	1	
• Metal matrix composite materials	1	1	1		1	1	1	1		1	1	1	1	
• Manufacturing techniques	1	1	1		1	1		1	1			1		
Topics Covering Competencies	8	9	8	6	4	9	5	7	4	7	6	8	6	3
% Topics Covering Competencies	89	100	89	67	44	100	56	78	44	78	67	89	67	33

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & Seminars	Tutorials	Problem solving	Laboratory	Modeling	Self-learning	Experimental	Class Works	Quizzes	Reports	Mid-Term Exam	Practical Exam	Written Exam
c1	1			1		1			1	1	1		1	1	1
c2	1			1						1	1		1		1
c3	1			1		1			1	1	1		1	1	1
c4	1			1		1			1	1	1			1	1
c5	1			1						1	1		1		1
c6	1			1						1	1		1		1
c7	1			1		1			1	1	1			1	1
c8	1			1		1			1	1	1			1	1
c9	1			1		1			1				1	1	
c10	1			1		1			1				1	1	
c11	1			1		1			1					1	
c12	1			1							1				1
c13	1			1							1				1
c14	1			1				1		1			1		
$\sum$	14	0	0	14	0	8	0	1	8	9	10	0	8	8	10
%	100	0	0	100	0	57	0	7	57	64	71	0	57	57	71

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Assignments	Weekly	20
Mid-term Exam	7th Week	20
Practical Exam	15th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references

7-1 Course notes:

- Lecture notes and handouts

7-2 Required book

- Mazumdar, Sanjay. Composites manufacturing: materials, product, and process engineering. CrC press, 2001.
- William D. Callister, Fundamentals of Materials Science and Engineering, Wiley, USA, 2005.

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and Learning

- Classroom and Workshop
- Modern Academy Library
- Lecture and Exercise rooms equipped with projector and sound systems.
- Computer, Data show and Computer programs.
- High speed internet and communication facilities for distance learning

Course Coordinator:	Dr. Maher Khalifa
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn325: Modern Manufacturing Methods

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Modern Manufacturing Methods	**Code:** MNFn325	**Level:** 3rd spring	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:**1	**Practical:** 2
	Pre-requisite: MNFn221		

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to the construction and operation of non-traditional manufacturing and their basic elements. They should compete on the operation, design, maintain, calculate, and analyze the performance of machines and their basic components.

2 – Competencies:

On successful completion of the course, the student should demonstrate knowledge and understanding of:

c1. Classification and specifications of nontraditional manufacturing (C13)
c2. Concepts and theories of thermal, chemical, and mechanical methods (C1).
c3. Constrains within which the selection of suitable method is judged (C2, C9, C13).
c4. Construction, operation, and characteristics of the basic components of nontraditional machines (C13).
c5. Specifications and applications of each process (C4, C5)
c6. Computer programming related to CNC nontraditional methods (C2)
c7. Calculate the performance and accuracy of modern manufacturing (C1, C5).
c8. Select the suitable modern method for production of specified product (C2)
c9. Consider the economy of different non-traditional methods (C3)
c10. Assess engineering judgment considering safety, quality, reliability, and environmental impact of different processes (C4)
c11. Employ and maintain selected modern manufacturing methods (EDM, WEDM, LBM, WJM) (C2, C5, C13, C15, C16).
c12. Prepare and present technical reports about performance on nontraditional methods (C4, C10)
c13. Analyze suitable operating parameters for manufacturing of different materials with required quality (C2, C4, C5).
c14. Use basic workshop equipment for equipment safety (C3, C9).
c15. Communicate effectively and present data and results orally and in written form (C7, C8).
c16. Search for information's in references and in internet (C4, C5).
c17. Work in a team and involve in group discussion and seminars (C7, C8).
c18. Use ICT facilities in presentations (C4).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C8, C9, C10, C13, C15 & C16

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	The need for non-traditional methods Electrical Discharge Machining (EDM), Theory and concepts	2	1	2
2	EDM machines, construction, dielectric fishing systems	2	1	4
3	EDM control parameters and main applications	2	1	8
4	Wire EDM and applications	2	1	2
5	Laser Beam machining, and welding applications	2	1	2
6	Electron Beam machining, and welding applications	2	1	-
7	Assessment (Mid-Term Exam)	2	-	-
8	Plasma Arc machining and welding application	2	1	-
9	Electro-chemical machining (ECM), theory, concept, machines	2	1	2
10	ECM applications	2	1	2
11	Electro-chemical Turning (ECT) and applications	2	1	2
12	Electro-chemical boring and Electro-chemical griming applications	2	1	-
12 13	Ultrasonic machining (USM) and its applications Abrasive Jet Machining (AJM) and its applications	2	1	2
14	Water-Jet machining (WJM) and Abrasive Water-Jet machining (AWJM)	2	1	2
15	Hybrid-Nontraditional methods and its applications	2	1	-
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course competencies																	
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
The need for non-traditional methods								1			1		1					
Electrical Discharge Machining (EDM), Theory and concepts	1	1	1		1			1	1	1	1	1	1			1		
EDM machines, construction, dielectric fishing systems		1		1	1	1		1			1	1	1			1		
EDM control parameters and main applications	1	1	1		1	1	1	1	1		1	1	1	1	1	1	1	
Wire EDM and applications								1	1		1	1	1	1				
Laser Beam machining, and welding applications				1	1		1	1	1		1	1	1		1	1		
Electron Beam machining, and welding applications				1	1		1	1	1		1	1	1			1		
Plasma Arc machining and welding application				1	1		1	1	1		1	1	1			1		
Electro-chemical machining (ECM), theory, concept, machines	1			1	1		1	1	1	1	1	1	1			1		
ECM applications								1			1	1	1					
Electro-chemical Turning (ECT) and applications					1		1	1	1		1	1	1					
Electro-chemical boring and Electro-chemical griming applications					1		1	1	1		1	1	1					
Ultrasonic machining (USM) and its applications	1			1	1		1	1	1		1	1	1			1		
Abrasive Jet Machining (AJM) and its applications				1	1		1	1	1	1	1	1	1			1		

Water-Jet machining (WJM) and Abrasive Water-Jet machining (AWJM)				1	1		1	1	1	1	1	1	1			1		
Hybrid-Nontraditional methods and its applications	1				1			1			1	1	1		1	1	1	1
Topics Covering Competencies	5	3	2	8	13	2	10	16	12	4	16	15	16	2	3	11	2	1
% Topics Covering Competencies	31	19	13	50	81	13	63	100	75	25	100	94	100	13	19	69	13	6

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Report
c1	1	1		1						1			1		
c2	1	1		1		1				1	1				
c3	1	1		1	1					1		1	1		
c4	1	1		1		1	1			1	1		1		
c5	1	1		1		1	1			1	1	1		1	1
c6	1	1		1					1			1			1
c7	1			1	1	1				1	1		1		
c8	1			1			1	1				1	1	1	1
c9	1			1							1		1		
c10	1	1					1	1			1			1	1
c11	1	1		1			1			1	1		1		
c12	1					1				1		1	1		1
c13	1			1	1	1	1			1	1	1	1		1
c14			1	1							1	1			
c15			1	1										1	1
c16		1	1				1	1						1	1
c17			1				1	1						1	1
c18			1				1	1						1	1
$\sum$	13	9	5	13	3	6	9	5	1	9	9	7	8	7	10
%	72	50	28	72	17	33	50	28	6	50	50	39	44	39	56

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	2 Quizzes (one each 6 Weeks)	6
	Reports/Research	Two reports per semester	6
	Tutorials	4 Assignments per semester	8
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books:

- A M Kohail, “Advanced Manufacturing Processes”, 2013.

7-3 Recommended books: None

- H. El- Hofy, (2005), "Advanced Machining Processes “, Mc Graw – Hill.

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and learning:

- EDM Metal cutting lab.
- Different electrically conductive materials as cutting samples, and traditional machining workshop for samples and tools preparations.
- Periodical visits to Egyptians industrial plants.
- Lecture and Exercise rooms equipped with Computer, Data show, and sound systems.
- High speed internet and communication facilities for distance learning.

Course coordinator:	Prof. Ahmed Kohail
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn331: Heat Transfer

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc Program
Department offering the program:	Manufacturing Engineering & Production Technology Department
Department offering the course:	Manufacturing Engineering & Production Technology Department.
Date of specifications approval:	August 2020

B - Basic Information

Title: Heat Transfer	**Code:** MNFn331	**Level:** 3rd /Fall	
Credit Hours: 2	**Lectures:** 1	**Tutorial/Exercise:**2	**Practical:** 1
	Pre-requisite: MNFn214		

C - Professional information

1– Course Learning Objectives:

By the end of the course, students should have a theoretical and conceptual understanding of modes of heat transfer processes. In addition, gaining better understanding to how these disciplines applied to the analysis of typical practical problems of interest in heat transfer. Finally, the students should gain the planned competencies in applying these typical practical disciplines to develop methodologies for sizing, designing of such thermal systems behavior.

2 – Competencies

On successful completion of the course, the student must be able to:

c1. Genesis of the heat transfer phenomenon (C1, C7)
c2. Explain the key parameters of design procedure of the heat transfer devices at different modes of operation (C3, C11).
c3. Develop theoretical basics needed for calculation and analyze of the physical mechanisms and conditions for steady simple and composite (slabs, cylinders and spheres) (C1, C7, C11).
c4. Deduce the principles and fundamentals necessary for unsteady heat transfer by conduction (C1, C11).
c5. Use heat and mass transfer analysis for evaluation of real power, heating and cooling systems performance (C12, C15)
c6. Analyze, mathematically, heat and mass transfer analysis for evaluation of real power, heating and cooling systems performance (C1, C16)
c7. Investigate ways for improving basic heat transfer devices efficiency (C3, C16).
c8. Use appropriate techniques, skills, and tools to identify, formulate, analyze, and solve engineering heat transfer problems (C2, C8, C12, C13)
c9. Deduce mathematical relations describing the steady and unsteady heat transfer situations for different configurations and select the proper methods for their solution (C1, C18)
c10. Communicate results of the modeling process to management and other non-specialist users of engineering analyses (C16, C19)
c11. Develop the mathematical analysis of different heat transfer devices and their operational problems (C11).
c12. Evaluate the performance of real power, heating and cooling systems and deduce their characteristic parameters (C12, C13)
c13. Use computer software, Excel and other available programs to design, and calculate heat transfer systems size and their components (C2, C14).
c14. - Analyze experimental results and determine their accuracy and validity (C15, C17).
c15. Use experimental facilities to monitor and test the performance of basic and real heat transfer situations (C12, C16).
c16. Design, and build software tools for systems analysis (C2, C3, C12).
c17. Collaborate effectively within multidisciplinary team (C5, C7, C9).
c18. Consider the impact of designs on the environmental protection (C3, C9).
c19. Practice self-learning and communicate effectively orally and in written form (C8, C10).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1, 2	Introduction to heat transfer Fundamentals	2	2	-
3	Heat transfer by conduction	1	4	1
	Steady heat transfer situation for:			
4	Simple and composite surfaces	2	4	2
5	Cylindrical surfaces	2	2	2
6	Spherical surfaces	1	2	2
7	Assessment (Mid-Term Exam)	1	-	-
8, 9	Heat transfer through fines and extended surfaces	2	2	2
10, 11	Unsteady heat transfer problems analysis	1	2	2
	Heat transfer by convection			
12	Natural convection	1	2	1
13	Forced convection	1	4	1
14, 15	Heat transfer by radiation	1	4	1
	Total hours	**15**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																		
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
Introduction to heat transfer Fundamentals	1	1					1				1								
Heat transfer by conduction	1	1						1			1	1		1			1	1	
Steady heat transfer situation for:																			
Simple and composite surfaces	1	1	1	1	1			1					1						
Cylindrical surfaces	1	1	1	1	1	1		1		1	1	1	1			1		1	1
Spherical surfaces	1	1	1	1	1			1					1						
Heat transfer through fines and extended surfaces				1			1		1		1	1	1		1		1		
Unsteady heat transfer problems analysis		1	1			1			1		1	1	1	1					
Heat transfer by convection, natural convection, and forced convection		1	1	1			1		1	1	1		1			1	1		1
Heat transfer by radiation	1		1		1						1	1	1		1			1	
Topics Covering Competencies	6	7	6	5	4	2	2	4	3	2	7	5	7	2	2	2	3	3	2
% Topics Covering Competencies	67	78	67	56	44	22	22	44	33	22	78	56	78	22	22	22	33	33	22

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1			1	1			1		1	1		1	1	
c2	1	1		1	1	1		1		1	1	1	1		
c3	1			1	1					1	1		1	1	
c4	1	1	1	1	1	1	1	1		1	1	1	1	1	
c5	1		1	1	1		1	1		1	1		1	1	
c6	1			1	1	1	1			1	1	1	1	1	1
c7	1	1		1	1	1	1			1	1	1	1	1	1
c8	1			1	1			1		1	1		1		
c9	1			1	1	1	1		1	1	1	1	1		
c10	1			1	1		1			1	1		1		
c11	1	1	1	1		1	1	1	1	1	1	1	1	1	1
c12	1	1				1		1	1			1		1	1
c13		1				1	1	1	1			1		1	
c14						1	1		1			1		1	
c15		1				1	1		1			1		1	
c16		1	1				1	1						1	1
c17		1	1			1	1	1	1					1	1
c18		1	1			1	1	1	1					1	1
c19			1	1	1	1	1		1	1	1	1	1	1	1
$\sum$	12	10	7	12	11	13	14	11	9	12	12	11	12	15	8
%	63	53	37	63	58	68	74	58	47	63	63	58	63	79	42

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work:		
Assignments,	Bi-Weekly	10
Quizzes	3 Quizzes per semester	6
Reports	1 Report per semester	4
Mid-Term Exam	7th Week	20
Experimental Part:		
During the semester	Weekly	10
Practical Exam.	15th Week	10
Final Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Selected topics

7-2 Required books:

- Heat Transfer, J. P. Holman, McGraw Hill, New York, 9th Ed, 2002.

- Principle of Heat Transfer, F.C. Krieth, Engage learning, USA, 2011.

7-3 Recommended books:

- Fund. of Heat and Mass Transfer, F. P. Incropera, F. P. and D. P. Dewitt, John Wiley and Sons, New York, 7th Ed, 2007
- Heat Transfer Textbook, J. H. Lienhard, Phlogiston press, Cambridge, 5th Ed, 2006.
- A Textbook on Heat and Mass Transfer, S. P. Sukhatme, Universities Press, India, 4th Ed, 2005

7-4 Periodicals, Web sites, etc.

- http://hyperphysics.phy-astr.gsu.edu/hbase/thermo/heatra.html
- http://www.efunda.com/formulae/heat_transfer/home/overview.cfm
- http://www.wisc-online.com/Objects/heattransfer/default.aspx

8 – Facilities required for teaching and learning:

- Heat transfer Laboratory
- Modern Academy Library
- Computer, Data show and Computer programs
- High speed internet and communication facilities for distance learning

Course coordinator:	Dr. Metwally Hussein Metwally
Head of the Department:	Dr. Metwally Abd Elghaffar
Date	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn332: Mechanical Vibrations

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department
Date of specifications approval: August 2020

B - Basic Information

Title: Mechanical Vibrations **Code:** MNFn332 **Level:** 3rd spring
Credit Hours: 2 **Lectures:** 1 **Tutorial/Exercise:**2 **Practical:** 1
Pre-requisite: MNFn115

C - Professional information

1 – Course Learning Objectives:

The objective of this course is to enable the students to understand the basic concepts and theories of mechanical vibrations. The student should be able to derive mathematical models for mechanical systems with reasonable simplicity in the form of differential equations. Also, he should be able to determine the transient response and frequency response of such systems and will be able to obtain computer solutions of system responses with MATLAB. The student should be able to evaluate the technical states of machines by monitoring their conditions through vibration analysis – the most effective technique in implementing the predictive maintenance policy.

2 - Competencies

On successful completion of the course, the student must be able to:

c1- Understand the basic concepts of mechanical vibrations (C1)
c2- Gain knowledge about the basic classifications and specifications of vibrating systems (C1, C9, C10, C13)
c3- Recognize response in time and frequency domains in single and multiple degree of freedom systems (C9, C11, C13)
c4- Understand the basics of vibration control techniques (C1, C10, C14)
c5- Deduce the equations of motion of a vibrating system, select proper assumptions. (C11, C12, C14)
c6- Investigate the effects of different parameters on system response, function, and performance. (C5, C11, C12)
c7- Identify natural frequencies of systems at hand, study resonance phenomenon, and suggest solutions (C3, C11, C12, C14)
c8- Analyze and interpret data, and design experiments to detect the technical states of machines (C11, C12, C13)
c9- Apply knowledge of mathematics, science, design, and engineering practice to specify the motion of dynamic system and get its response (C1, C3, C5, C11)
c10- Study the effect of different parameters on dynamic system performance. (C11, C13, C14)
c11- Suggest several possible solutions to improve system performance and clarify which solutions are feasible. (C9, C10, C11, C12)
c12- Use computational facilities and techniques, measurements, and laboratory equipment to design experiments, collect, analyze, and interpret results. (C3, C9, C13)
c13- Search for information from diverse references and internet. (C9, C10)
c14- Write technical reports and perform the given arrangements. (C9, C10)
c15- Effectively manage tasks, time, and resources (C12, C14)

This course contributes to the following program competencies: C1, C3, C5, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Introduction to Mechanical vibrations and their fields of application. Basic terms and definitions.	1	2	1
2, 3	Classifications of the mechanical vibrating systems (free and forced vibrations, damped and undamped systems, single and multiple degrees of freedom, linear and nonlinear vibrations).	2	4	2
4 - 6	Response of undamped and damped free vibrations of single degree of freedom systems.	3	6	3
7	Assessment (Mid-Term Exam)	1	-	-
8	Response of single and multiple degree of freedom systems undergoing different forcing functions.	1	2	1
9	MATLAB simulation (single degree of freedom systems).	1	2	1
10	Mechanical-electrical analogies of vibrating systems.	1	2	1
11, 12	Vibration absorbing techniques.	1	2	1
13	Vibration measurements.	2	4	2
14	Machine monitoring conditions using mechanical vibration measuring techniques.	1	2	1
15	MATLAB simulation (multiple degree of freedom systems)	1	2	1
	Total hours	**15**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies														
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15
Introduction to Mechanical vibrations and their fields of application. Basic terms and definitions.	1	1			1										
Classifications of the mechanical vibrating systems (free and forced vibrations, damped and undamped systems, single and multiple degrees of freedom, linear and nonlinear vibrations).	1	1	1	1				1							
Response of undamped and damped free vibrations of single degree of freedom systems.							1		1	1					
Response of single and multiple degree of freedom systems undergoing different forcing functions.		1	1			1	1				1	1	1		
MATLAB simulation (single degree of freedom systems).										1		1			
Mechanical-electrical analogies of vibrating systems.								1	1	1	1	1			
Vibration absorbing techniques.					1		1	1	1						
Vibration measurements.							1	1	1			1		1	1
Machine monitoring conditions using mechanical vibration measuring techniques.								1	1		1	1			
MATLAB simulation (multiple degree of freedom systems)												1	1	1	1
Topics Covering Competencies	2	3	2	1	2	1	4	5	5	3	3	6	2	2	2
% Topics Covering Competencies	20	30	20	10	20	10	40	50	50	30	30	60	20	20	20

5 – Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1	1	1							1		1		
c2	1	1		1	1	1				1	1	1	1		
c3	1	1		1	1	1				1	1	1	1		
c4	1	1		1						1	1				
c5	1	1		1	1						1				
c6	1	1		1				1			1		1		
c7	1	1		1	1			1	1		1		1		
c8	1	1		1	1		1	1		1	1		1	1	
c9	1	1		1	1		1	1	1	1	1		1	1	
c10	1			1	1						1				
c11				1	1		1	1	1		1			1	
c12				1	1	1	1	1				1		1	1
c13			1				1	1						1	1
c14	1			1			1	1						1	
c15					1									1	1
$\sum$	11	9	2	13	10	3	6	8	3	5	11	3	7	7	3
%	73	60	13	87	67	20	40	53	20	33	73	20	47	47	20

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	10
	Class work	Bi-Weekly	5
	Tutorials	3 Assignments per semester	5
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Gaafar A. H. "Mechanical Vibrations", Printed lectures, Modern Academy of Engineering and Technology

7-2 Required books

- Rao S. "Mechanical Vibrations", Third Edition, Addison-Wesley Publishing Company, 1995, ISBN 0-201-52686-7

7-3 Recommended books:

- Ogata K. "System Dynamics", Third Edition, Prentice Hall, 1998, ISBN 0-1-950537-7

7-4 Periodicals, Web sites, etc.

- https://www.pearsonhighered.com/educator
- https://aerocastle.files.wordpress.com/2012/10/mechanical_vibrations_5th-edition_s-s-rao.pdf

- https://books.google.com.eg/books?id=I0kmBgAAQBAJ&pg
- https://en.wikipedia.org/wiki/Vibration

8 – Facilities required for teaching and learning:

- Computer with MATLAB Software
- Data show
- High speed internet and communication facilities for distance learning.

Course coordinator:	Assoc. Prof. Gaafar Ahmed Hussein
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specifications
MNFn333: Production and Operations Management

A- Affiliation

Relevant programs: Manufacturing Engineering & Production Technology BSc Program
Departments offering the programs: Manufacturing Engineering & Production Technology Department
Department offering the course: Manufacturing Engineering & Production Technology Department
Date of specifications approval: August 2020

B - Basic Information

Title: Production and Operation Management **Code:** MNFn333 **level:** 4, Eighth Semester
Credit Hours: 2 **Lectures:** 1 **Tutorial:** 2 **Practical:** 1
Pre- requisite: None

C - Professional Information

1 – Course Learning Objectives

By the end of this course, the students should have gained the planned competencies (based on the knowledge, skills and personnel attitudes) related to production system, Break-even- analysis, forecasting methods, aggregate planning, materials requirement plan (MRP) and inventory planning.

2 - Competencies

On successful completion of the course, the student must have knowledge and skills about
c1- Have knowledge and skills about production systems (C3).
c2- Have knowledge and skills about concept and evaluation of Productivity, competitiveness of business organizations (C1).
c3- Have knowledge and skills about concept and use of Break-even–analysis (C1, C8, C9)
c4- Have knowledge and skills about concept and use of forecasting techniques (C1)
c5- Have knowledge and skills about aggregate planning and capacity planning (C6)
c6- materials requirement planning (MRP) (C1, C2).
c7- Inventory management principles and evaluation of inventory models (C1, C7).
c8- Scheduling and dispatching (C5, C6)
c9- Have knowledge and skills about production and service design (C10)

This course contributes to the following program competencies: C1, C2, C3, C5, C6, C8 & C10

3 – Contents:

Week	Topics	Lecture hours	Practical hours	Tutorial hours
1, 2	Introduction	2	4	2
3	Production system	1	2	1
4, 5	Break-even-analysis	2	4	1
6	Capacity planning and aggregate planning	1	2	1
7	Assessment (Mid-Term Exam)	1	-	-
8, 9	Forecasting methods	2	4	2
10	Production and service design	1	2	2
11, 12	Inventory management	2	4	2
13, 14	Material requirement planning	2	4	2
15	Scheduling and dispatching	1	2	1
	Total hours	**15**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies								
	c1	c2	c3	c4	c5	c6	c7	c8	c9
Introduction	1	1							
Production system	1								
Break-even –analysis			1						
Capacity planning and Aggregate planning					1				
Forecasting methods				1					
Production and service design									1
Inventory management							1		
Material requirement planning						1			
Scheduling and dispatching								1	
Topics covering competencies	2	1	1	1	1	1	1	1	1
% Topics covering competencies	22	11	11	11	11	11	11	11	11

5 – Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1			1					1		1		1
c2	1			1					1		1		1
c3	1			1		1			1	1	1		1
c4	1			1		1			1	1	1		1
c5	1			1		1			1	1	1		1
c6	1			1		1			1	1	1		1
c7	1			1		1			1	1	1		1
c8	1			1					1		1		1
c9						1				1	1		
$\sum$	8	0	0	8	0	6	0	0	8	6	9	0	8
%	89	0	0	89	0	67	0	0	89	67	100	0	89

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: seminars, quizzes assignments and reports	Bi-Weekly	20
Mid-Term Exam	7th Week	20
Practical Exam	15th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references

7-1 Course notes:

- Lecture notes & workshop training notes

7-2 Required books:

- William j. Stevenson, "Operations managements", Prentice Hall, Eighth Edition,2001.

7-3 Recommended books:

- None

7-4 Periodicals, Web sites etc.:

- None

8 – Facilities required for teaching and Learning

- Lecture & exercise rooms
- Computer lab
- Computer application (POM-QM ver.5.Taylor)

Course coordinator:	Dr. Mohamed Saad Abdelkarim
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn360: Industrial Training (2)

A- Affiliation

Relevant program:	Manufacturing Engineering &Production Technology BSc Program
Department offering the program:	Manufacturing Engineering &Production Technology Department
Department offering the course:	Manufacturing Engineering &Production Technology Department.
Date of specifications approval:	August 2020

B - Basic Information

Title: Industrial Training (2) **Code:** MNFn360 **Level:** Senior 2, 9th semester
Credit Hours: 0 **Lectures:** 0 **Tutorial:** 0 **Practical:** 60 hours
Pre-requisite: 99 Credit+ MNFn260

C - Professional information

1 – Course Learning Objectives:

Providing real world working environment perspective and real experience of working in industry.

2 –Competencies:

c1- Applicability of theoretical knowledge gained during academic sessions (C1, C2, C10)
c2- Actual needs of business of the domain of specialization (C14)
c3- Develop the personal attitudes to serve the society (C3, C6)
c4- Develop personal contacts in the field (C7)
c5- Practicing the actual production cycle (C12, C13, C14)
c6- Presenting a report that includes all information about the training (C11)
c7- Presenting personal qualities. (C4, C9, C7)
c8- Communicate effectively by diverse ways (C8)
c9- Practice self-learning (C5, C9, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Topics	Lecture hours	Tutorial hours	Practical hours
• Practical industrial training for two Weeks- during the summer vacation at the end of the 6th semester- in a recognized industrial establishment.	10		50
• At the end of the training, student should submit a report with the following information: - Profile of the industry - Organization structure. - Product range - Processes - Machines, equipment, devices. - Personnel welfare scheme - Details of the training undergo - Projects undertaken during the training. (if any)			
Total hours	**10**		**50**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies								
	c1	c2	c3	c4	c5	c6	c7	c8	c9
Practical industrial training for two Weeks- during the summer vacation at the end of the 6th semester- in a recognized industrial establishment.	1	1	1	1	1		1	1	1
At the end of the training, student should submit a report with the following information: Profile of the industry, Organization structure, Product range, Processes, Machines, equipment, devices, Personnel welfare scheme, Details of the training undergo, Projects undertaken during the training.(if any)						1			
Topics Covering Competencies	1	1	1	1	1	1	1	1	1
% Topics Covering Competencies	50	50	50	50	50	50	50	50	50

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods							Learning Methods				Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Site Visits	Projects	Modeling & Simulation	Self-Learning	Cooperative	Research & Reports	Seminars	Quizzes	Reports	Mid-Term Exam	Practical Exam	Written Exam
c1						1	1	1	1		1						
c2						1			1		1						
c3		1	1			1			1	1							
c4						1				1							
c5						1	1				1						
c6											1			1			
c7			1			1				1							
c8						1	1				1						
c9							1		1								
$\sum$	0	1	2	0	0	7	4	1	4	3	5	0	0	1	0	0	0
%	0	11	22	0	0	78	44	11	44	33	56	0	0	11	0	0	0

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Evaluation of the foundation	Daily during the training	60
Report from student of the training	By the end of the training period	40
Total		100

7 – List of references:

7-1 Course notes:

- Provided by the external training organization/company.

7-2 Required books:

- None

7-3 Recommended books:

- Kumar, Mahesh. "Fluid mechanics and hydraulic machines." Intia: Pearson India Education Services Pvt. Ltd (2019).

7-4 Periodicals, Web sites, etc.:

- https://www.coursera.org/learn/fluid-power
- https://www.edx.org/course/advanced-fluid-mechanics-1?index=product&queryID=cfe1c496bc76da86481ba2106223821f&position=1

8 – Facilities required for teaching and learning:

- Provided by external training organization/company.

Course coordinator:	Dr. Nasr Aref
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn361: Project-1

A- Affiliation

Relevant program:	Manufacturing Engineering &Production Technology BSc Program
Department offering the program:	Manufacturing Engineering &Production Technology Department
Department offering the course:	Manufacturing Engineering &Production Technology Department.
Date of specifications approval:	August 2020

B - Basic Information

Title: Project-1 **Code:** MNFn361 **Level:** Senior 1 ,8th Semester
Credit Hours: 2 **Lectures:** - **Tutorial:** 2 **Practical:** 4
Pre-requisite: MNFn262

C - Professional information

1 – Course Learning Objectives:

The project is a conclusion work. Its aim is to show the ability of student to integrate the knowledge and skills acquired during program study to perform the assigned task, identify, and formulate the problem, and choose of a suitable technique to solve the problem.

2 – Competencies:

c1- Time management to carry out the assigned task. (C12)
c2- Use of knowledge and basics of mathematics and sciences appropriate to the project. (C1, C3)
c3- Compare of different techniques of solving problems and choosing the proper one to perform the task (C4, C9).
c4- Apply of the appropriate technological means (C9).
c5- List of the assembly, disassembly, and calibration procedures (C13)
c6- Apply knowledge of different engineering disciplines in technological applications (C3, C10)
c7- Test the function of the equipment (project) according to codes and standards and evaluate its performance (C2, C4, C14)
c8- Prepare the report of the project and a power point presentation (C8, C11)
c9- Prepare all the technical documents and the user manual of the project (C12)
c10- Present a report that includes all information about the project. (C8, C11)
c11- Determine technical specifications of different items of the project. (C6).
c12- Management of manpower of the teamwork, assigning different tasks for each member to be fulfilled according to the time schedule, and different resources. (C7, C9).
c13- Practice self-learning (C5, C10).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Topics	Lecture hours	Tutorial hours	Practical hours
• The project requires the following steps to be carried out: ➢ The literature surveys. ➢ Choice of the project construction based on some existing variants. ➢ Preparation of the constructional drawings of parts. ➢ Design of the most dangerous parts. ➢ Preparation of the process sheets to manufacture the parts. ➢ Assembly and testing of the project. ➢ Calibration of some parameters (if any). ➢ Preparation of the report ➢ Preparation of the presentation.	-	28	42
Total hours	**-**	**28**	**42**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies												
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	12	c13
The project requires the following steps to be carried out: The literature survey, Choice of the project construction based on some existing variants, Preparation of the constructional drawings of parts, Design of the most dangerous parts, Preparation of the process sheets to manufacture the parts, Assembly and testing of the project, Calibration of some parameters (if any), Preparation of the report, Preparation of the presentation.	1	1	1	1	1	1	1	1	1	1	1	1	1
Topics Covering Competencies	1	1	1	1	1	1	1	1	1	1	1	1	1
% Topics Covering Competencies	100	100	100	100	100	100	100	100	100	100	100	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods							Learning Methods				Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Site Visits	Projects	Modeling and Simulation	Self-Learning	Cooperative	Research & Reports	Seminars	Quizzes	Reports	Mid Term Exam	Practical Exam	Written Exam
c1			1	1							1						
c2		1	1	1		1		1			1			1			
c3		1	1	1		1		1			1			1			
c4		1	1	1		1		1			1			1			
c5		1	1	1		1		1			1			1			
c6		1		1		1	1	1			1	1					
c7		1		1		1	1	1			1	1					
c8		1		1		1	1	1			1	1					
c9		1		1		1	1	1			1	1					
c10		1	1				1				1	1		1			
c11		1	1				1				1	1		1			
c12		1	1				1				1	1		1			
c13		1	1			1	1				1	1		1			
$\sum$	0	13	9	9	0	9	8	8	0	0	13	8	0	8	0	0	0
%	0	100	69	69	0	69	62	62	0	0	100	62	0	62	0	0	0

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Year Work	During the semester	40
Evaluation of the Project	End of the semester	60
Total		**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books:

- Tentative, depending on the topic of each project.

7-3 Recommended books:

- Black, Bruce. Workshop processes, practices and materials. Routledge, 2015.
- Sharma, P. C. A Textbook of Production Technology (Manufacturing Processes): Manufacturing Processes. S. Chand Publishing, 2007.
- Robert, J. Pond, and L. Rankinen Jeffrey. Introduction to engineering technology. Pearson, 2013.

7-4 Periodicals, Web sites, etc.:

- https://www.coursera.org/learn/research-methods
- https://www.coursera.org/learn/how-to-write-a-scientific-paper
- https://www.coursera.org/specializations/english-for-research-publication-purposes
- https://www.coursera.org/learn/sciwrite
- https://www.edx.org/course/quantitative-and-qualitative-research-for-beginners?index=product&queryID=79bd4428e749621506e769504f52487c&position=1
- https://www.edx.org/course/scientific-methods-and-research?index=product&queryID=142f71d2e7003f7450b4d7baca17cf88&position=4
- https://www.edx.org/course/research-methods-an-engineering-approach?index=product&queryID=142f71d2e7003f7450b4d7baca17cf88&position=5

8 – Facilities required for teaching and learning:

- None

Course coordinator: Dr. Metwally Hussein Metwally
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn411: Quality Control and Quality Management

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc program
Department offering the program:	Manufacturing Engineering & Production Technology Department
Department offering the course:	Manufacturing Engineering & Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Quality Control and Quality Management | **Code:** MNFn411 | **Level:** 3, Nineth semester

Credit Hours: 3 | **Lectures:** 2 | **Tutorial:** 1 | **Practical:** 2

Pre-requisite: MTHn107

C - Professional Information
1 – Course Learning Objectives

By the end of this course the students, should have gained the planned competencies (based on the knowledge, skills and personnel attitudes) related to statistical quality control, acceptance sampling techniques, quality improvement methods and total quality management in addition to quality management systems.

2 – Competencies:

On successful completion of the course, the student must

c1 – Have knowledge and skills about the fundamentals of statistical quality control. (C1)
c2 - Have knowledge and skills about the methods, and plans used for acceptance sampling. (C4)
c3 - Have knowledge about the concept of quality improvement (C4, C7).
c4 - Have knowledge about the Total quality management implementation (C4, C9).
c5 - Analyze quality control charts (C2).
c6 - Select appropriate sampling plans and sampling system for production line (C4).
c7 - Apply the principles of statistics and probability for quality analysis (C1).
c8 - Apply ISO quality systems. (C4, C9)
c9 - Employ computer statistical packages for quality control (C10).
c10 - Present data and results in written and graphical form (C8).

This course covers the following competencies: C1, C2, C4, C7, C8, C9 & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Introduction to quality	2	1	-
2, 3	Fundamentals of statistics and quality	4	2	4
4	Applications of probability distributions for Q. C.	2	1	4
5, 6	Control charts for variables	4	2	4
7	Assessment (Mid-Term Exam)	2	-	-
8	Control charts for attributes	2	1	4
9	Lot-by-lot acceptance sampling	2	1	4
10	Acceptance sampling plans	2	1	4
11	Reliability and quality	2	1	-
12	Quality cost	2	1	-
13	Quality improvement techniques	2	1	4

14	ISO quality systems	2	1	-
15	Total quality management TQM	2	1	-
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	`Course Competencies									
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10
Introduction to quality	1		1	1						
Fundamentals of statistics and quality	1									1
Applications of probability distributions for Q. C.							1		1	
Control charts for variables						1				1
Control charts for attributes						1				1
Lot-by-lot acceptance sampling		1				1				1
Acceptance sampling plans		1				1				1
Reliability and quality							1			
Quality cost							1			
Quality improvement techniques			1							1
ISO quality systems					1				1	
Total quality management TQM				1						
Topics Covering Competencies	2	2	2	2	1	4	3	0	2	6
% Topics Covering Competencies	20	20	20	20	10	40	30	0	20	60

5 – Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1								1		1		
c2	1			1					1		1		1
c3	1			1					1		1		1
c4	1								1		1		1
c5	1			1		1			1	1	1		1
c6	1			1					1		1		1
c7	1			1		1			1	1	1		1
c8	1								1		1		1
c9	1					1			1	1	1		1
c10						1				1			
$\sum$	9	0	0	5	0	4	0	0	9	4	9	0	8
%	90	0	0	50	0	40	0	0	90	40	90	0	80

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: seminars, quizzes assignments and reports	Bi-Weekly	20
Mid-Term Exam	7th Week	20
Practical Exam	15th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references

7-1 Course notes:

- Lecture Notes and practical book.

7-2 Required books:

- None

7-3 Recommended books:

- Dale Bester field, “Quality Control”, Prentice Hall, 1998.

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and Learning

- Lecture and exercise rooms, and computer lab
- Computer application (Minitab)

Course coordinator: Dr. Mohamed Saad Abdelkarim
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn421: Computer Aided Manufacturing

A- Affiliation

Relevant program	Manufacturing Eng. and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Computer Aided Manufacturing	**Code:** MNFn421	**Level:** Senior 2, First Semester	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise: -**	**Practical:** 3
	Pre-requisite: MNFn322		

C - Professional Information

1 – Course Learning Objectives:

By the end of this course the students should demonstrate the knowledge and understanding of the basics of computer aided manufacturing and computer numerical control, the advanced techniques of part programming in terms of various steps needed to be taken for completing a successful CNC part program, use of special computer packages in computer aided manufacturing (wincts and wincam), Illustrating the potential applications of computer aided manufacturing in a variety of production engineering applications, and recognition of the need of using computers as a tool in the manufacture engineering.

2- competencies

c1- Identification the basics of computer aided manufacturing. (C1)
c2- The use of parameters in part programs and write parametric programing using software (Sinumeric 840-D). (C2, C7, C8)
c3- Develop programs using looping such as IF and DO. (C1, C7, C8)
c4- The advanced techniques of computer numerical control using software (Sinumeric 840-D). (C2)
c5- Use subroutines and special canned cycles that can utilize the part geometry information directly to create complex part programs. (C3, C4, C5, C6)
c6- Use the various tool path generation modules within CAMworks software through which the CNC part programs can be generated. (C2, C3, C4, C5, C15, C16)
c7- Develop advanced part programs to manufacture different mechanical parts. (C2, C3, C4, C5)
c8- Use the available simulation software to verify the developed part programs. (C3, C4, C5)
c9- Appreciate the need for group technology (GT) as a mean of bringing the benefits of mass production to the relatively smaller production that is required in a majority of the mass production to the relatively smaller production that is required in a majority of the present-day manufacturing industries. (C1, C15, C16)
c10-The concept of computer aided process planning. (C1)
c11-The different approaches used in computer aided process planning CAPP application. (C1, C15, C16)
c12-The concept of computer aided part programming using the available computer package. (C1, C7)
c13-The techniques utilized in developing CAPP systems. (C1, C9, C13, C15, C16)
c14-Practice self-learning and communicate effectively orally and in written form. (C14, C8, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15 & C16

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1 – 3	• Identification the basics of computer aided manufacturing. • The use of parameters in part programs and write parametric programing using software (Sinumeric 840-D). • Develop programs using looping such as IF and DO.	6	-	9
4, 5	• The advanced techniques of computer numerical control using software (Sinumeric840-D). • Use subroutines and special canned cycles in milling that can utilize the part geometry information directly to create complex part programs.	4	-	6
6	• Use subroutines and special canned cycles in turning that can utilize the part geometry information directly to create complex part programs.	4	-	6
7	Assessment (Mid-Term Exam)	2	-	
8, 9	• The need for group technology (GT). • The concept of computer aided process planning.	4	-	6
10, 11	• The techniques utilized in developing CAPP systems.	4	-	6
12, 13	• Use the available CNC machines for the manufacturing of turned and milled parts.	4	-	6
14, 15	• Revisions	2	-	3
	Total hours	**30**	**-**	**42**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies													
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14
Identification the basics of computer aided manufacturing.	1													
Write parametric programing using software (Sinumeric 840-D).		1					1	1						
Develop programs using looping such as IF and DO.		1					1	1						
The advanced techniques of computer numerical control using software (Sinumeric840-D).		1							1					
Use subroutines and special canned cycles in milling .			1	1	1	1								
Use subroutines and special canned cycles in.			1	1	1	1								
The need for group technology (GT).	1		1											
The concept of computer aided process planning.	1									1		1		
The techniques utilized in developing CAPP systems.	1			1	1	1							1	1
Use the available CNC machines for the manufacturing of turned and milled parts.				1	1	1					1			1
Topics Covering Competencies	4	3	3	4	4	4	2	2	1	1	1	1	1	2
% Topics Covering Competencies	40	30	30	40	40	40	20	20	10	10	10	10	10	20

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method				
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations
c1	1		1			1	1	1		1		1	1	1
c2	1		1			1	1	1		1		1	1	1
c3	1		1			1	1	1		1		1	1	1
c4	1		1			1	1	1		1		1	1	1
c5	1		1			1	1			1		1	1	1
c6	1		1			1	1			1		1	1	1
c7	1		1			1	1			1		1	1	1
c8	1		1			1	1			1		1	1	1
c9	1		1			1	1			1		1	1	1
c10	1		1			1	1			1		1	1	1
c11	1		1			1	1			1			1	1
c12	1		1			1	1			1			1	1
c13								1		1			1	1
c14								1		1				1
$\sum$	12	0	12	0	0	12	12	6	0	14	0	10	13	14
%	86	0	86	0	0	86	86	43	0	100	0	71	93	100

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	4 Quizzes (every 3 Weeks) 2 degree for each one	8
	Reports	One report per semester	4
	Assignment	Bi-Weekly	8
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references

7-1 Course notes:

- Lecture notes & Laboratory notes

7-2 Required books:

- Nanfara, F, Uccello, T and Murphy , D., The CNC workshop (A multimedia introduction to computer numerical control), Addison-Wesley Longman Inc. , 1999
- Radhakrishnan, p and subramanyan, S, CAD/CAM/CIM, New age international Ltd. Publishers, 1994
- RAO,P.N,CAD/CAM principles and applications, Tata McGraw-Hill publishing Company limited, 2004

7-3 Recommended books:

- Lynch, M, 1993, Computer Numerical Control (Advanced techniques), McGraw-Hill Inc.

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and Learning

- Lecture room
- CNC laboratory
- Software and local computer network

Course Coordinator:	Dr. Eatemad Hosny
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn422: Hydraulic Power Systems

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Hydraulic Power System	**Code:** MNFn422	**Level:** 3rd Fall	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:** 2	**Practical:** 1
	Pre-requisite: MNFn211		

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (based on the knowledge, skills and personnel attitudes) related to the construction and operation of hydraulic power systems and their basic elements. They should compete on the design, calculate, operate, maintain, and analyze the performance of hydraulic power systems and their basic components.

2 - Competencies

On successful completion of the course, the student must be able to:

c1. Classify and compare power systems (C3, C7)
c2. Explain the construction, operation, and specification of the basic components of hydraulic power systems; pumps, valves, actuators, transmission lines and accessories (C3, C7).
c3. Explain the theoretical background needed to calculate and analyze the characteristics of the hydraulic systems and their components (C1, C7, C11).
c4. Classify and compare the hydraulic fluids (C1).
c5. Investigate the effect of hydraulic fluid properties on the function of hydraulic power systems (C1)
c6. Analyze, mathematically, the effect of the Basic properties of hydraulic fluids on the system performance (C1)
c7. Read the standard symbols of hydraulic power systems and apply them in the design of hydraulic circuits (C3).
c8. Design the hydraulic circuit for simple applications, then carry out the necessary calculations, specify and select the system components. Assemble and operate the system (C2, C8, C12, C13)
c9. Deduce mathematical relations describing the steady state performance of hydraulic power systems and their elements and select the proper methods/software for their solution (C1, C11)
c10. Calculate and analyze the steady state performance of hydraulic power systems and their components (C1, C11)
c11. Classify and compare the different ways of hydraulic elements connection (C11).
c12. Design, assemble and operate simple hydraulic system (C2, C3)
c13. Use computer software; Automation Studio, Marex and other available programs to design, calculate, simulate, or animate hydraulic power systems and their components (C2, C11).
c14. Solve limited operational problems related to the hydraulic power systems and their basic elements (C3).
c15. Use experimental facilities to visualize and investigate the cavitation phenomenon and evaluate the characteristics of typical roto-dynamic and displacement pumps (2).
c16. Use experimental facilities to assemble and operate diverse hydraulic circuits (C2, C3, C12).
c17. Collaborate effectively within multidisciplinary team (C5, C7, C9).
c18. Consider the impact of designs on the environmental protection (C3).
c19. Practice self-learning and communicate effectively orally and in written form (C8, C10).

This course contributes to the following program competencies: C1, C2, C3, C5, C7, C8, C9, C10, C11, C12 & C13

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Power systems, classification, operation, and comparison. Introduction to hydraulic power systems and standard symbols	2	2	1
2	Hydraulic fluids; properties and their effect on the system performance.	2	2	1
3	Hydraulic transmission lines and connectors	2	2	1
4	Hydraulic pumps: ➢ Classification, operation, flow pulsation, cavitation and basic mathematical relations	2	2	1
5	➢ Gear pumps, vane pumps and piston pumps	2	2	1
6	➢ Fixed and variable displacement pumps and pump control	2	2	1
7	Assessment (Mid-Term Exam)	2		
8	Control valves ➢ Classification and basic design	2	2	1
9	➢ Pressure control valves (direct/pilot operated); relief valves, pressure reducers, sequence valves and accumulator charging valves	2	2	1
10	➢ Directional control valves	2	2	1
11	➢ Flow control valves	2	2	1
12	➢ Check valves	2	2	1
13	Hydraulic actuators; cylinders, motors and rotary actuators	2	2	1
14	Accessories; accumulators, filters, reservoirs, pressure switches, etc.	2	2	1
15	Mini project; design and analysis of the hydraulic system for an industrial application. Analysis of the possible operational problems...	2	2	1
	Total hours	**30**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																		
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
Power systems, classification, operation, and comparison.	1	1																	
Introduction to hydraulic power systems and standard symbols	1						1	1			1		1			1			
Hydraulic fluids; properties and their effect on the system performance.			1	1		1		1		1				1	1			1	
Hydraulic transmission lines and connectors			1	1	1	1		1	1	1		1			1	1			
Pumps classification and basic mathematical relations		1			1			1	1	1		1	1		1		1		1
Gear pumps, vane pumps and piston pumps		1						1	1			1	1		1	1			
Fixed and variable displacement pumps and pump control																			
Valve's classification and basic design								1	1		1	1		1					
Pressure control Valves; relief, pressure reducers, sequence & accumulator charging						1		1	1	1		1	1			1			

Directional control valves						1		1	1	1		1	1			1			
Flow control valves						1		1	1	1		1	1			1			
Check valves						1		1		1			1			1			
Hydraulic actuators; cylinders, motors and rotary actuators								1		1		1	1			1			
Accessories; accumulators, filters, reservoirs, pressure switches, etc.						1		1	1	1	1	1	1						
Mini project						1	1	1	1		1	1	1	1		1	1	1	1
Topics Covering Competencies	2	3	2	2	2	8	2	13	9	9	4	10	10	3	4	9	2	2	2
% Topics Covering Competencies	13	20	13	13	13	53	13	87	60	60	27	67	67	20	27	60	13	13	13

5 – Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1	1	1		1		1		1	1	1	1		
c2	1	1				1		1		1	1			1	1
c3	1	1		1						1	1		1		
c4	1	1		1						1	1				
c5	1	1		1				1		1	1		1		
c6	1	1		1	1					1	1		1		
c7	1	1		1		1				1	1		1		
c8	1	1		1		1	1			1	1		1	1	1
c9	1	1		1			1	1	1	1	1		1	1	1
c10	1	1		1	1					1	1		1		
c11	1	1				1		1		1	1		1		
c12	1					1	1	1							1
c13	1	1	1				1		1					1	1
c14					1		1	1						1	
c15						1		1				1		1	
c16						1						1			
c17		1		1			1								1
c18								1						1	
c19			1					1						1	
$\sum$	13	12	2	9	3	7	5	8	2	11	11	2	9	6	5
%	68	63	11	47	16	37	26	42	11	58	58	11	47	32	26

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	6
	Reports/Research	Two reports per semester	4
	Tutorials	3 Assignments per semester	6
	Mini project	Once per semester	4
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books:

- Rabie, M. G. (2009) Fluid Power Engineering, NY: McGraw-Hill Professional.

7-3 Recommended books:

- Saleh, I. and Rabie, M. G. (2011) Fluid Mechanics for Engineers, Cairo: Published by the authors for free distribution, ISBN 978-977-5092-00-7

7-4 Periodicals, Web sites, etc.

- http://www.moog.com/, (Last accessed January 2020)
- http://www.boschrexroth.com/en/xc/, (Last accessed January 2020)
- https://www.mgacontrols.com/products/pneumatics/, (Last accessed January 2020)
- http://www.eaton.com/Eaton/index.htm, (Last accessed January 2020)
- http://www.nfpa.com (Last accessed January 2020)

8 – Facilities required for teaching and learning:

- Fluid Power Lab.
- Lecture and Exercise rooms equipped with projection and sound systems.
- Computer, Data show and Computer programs; Automation studio, Marex, Rexroth hydraulic trainer, Rexroth hydraulic element animation and TK-Solver.
- High speed internet and communication facilities for distance learning.

Course coordinator: Prof. M. Galal Rabie
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
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Course Specification
MNFn423: Production Aids Design

A - Affiliation

Relevant program: Manufacturing Engineering & Production Technology BSc. Program
Department offering the program: Manufacturing Engineering & Production Technology Department.
Department offering the course: Manufacturing Engineering & Production Technology Department.
Date of specifications approval: August 2020

B - Basic information

Title: Production Aids Design **Code:** MNFn423 **level:** 4th, Seniors 2, First semester
Credit hours: 2 **Lectures:** 1 **Tutorial:** 2 **Practical:** 1
Pre-requisite: MNFn221

C - Professional Information

1 – Course Learning Objectives:

The main objectives of this course are to teach the students how to design different production aids including cutting tools, jigs and fixtures, plastic molds, and sheet metals, forging, and drawing dies.

2 – Competencies:

c1- Definition, classification, and properties of plastic materials (C1, C2).
c2- Design considerations of plastic products (C11).
c3- Plastics molding processes and its types (C8).
c4- Design Plastic injection molds and dies of forging, deep drawing, and sheet metal (C11).
c5- Programming of CNC lathes, milling machines (C5).
c6- Using the available software packages, in design and manufacture of molds and dies (C4).
c7- Evaluate plastic products and introduce the proper design molds for their molding (C9)
c8- Select sheet metal products and introduce the proper design dies needed their cutting and/or forming (C7).
c9- Choose metal products and introduce the proper designs of dies needed for their manufacturing by forging or deep drawing (C3, C11).
c10- Design the molds or dies and writing programs of for CNC milling or turning of their geometrically complicated parts (C11).
c11- Design and manufacture of different dies for sheet metal, deep drawing, forging and different plastics injection molds (C14, C12).
c12- Solve some production problems by writing programs for CNC milling and turning (C9).
c13- Work in a team and involve in group discussion (C10, C3).
c14- Communicate effectively and present data and results orally (C6).
c15- Search for information’s in references and internet (C13).
c16- Work in a team and involve in group discussion and seminars (C7).
c17- Communicate effectively and present data and results orally and in written form (C5).
c18- Search for information's in references and in interne (C13).
c19- Practice self-learning (C14).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9 , C10, C11, C12 ,C١٣ & C14.

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1, 2	Cutting tools design	2	4	2
3	Jigs and fixtures design	1	2	1
4	Locating and clamping elements for jigs and fixtures.	1	2	1
5	Guide elements for jigs	1	2	1
6	Milling, turning and grinding fixtures	2	4	2
7	Assessment (Mid-Term Exam)	1	-	-
8	Press tool design	1	2	1
9, 10	Bending, forming and drawing dies	2	4	2
11	Forging die design	1	2	1
12	Plastic molds design	1	2	1
13	Materials for dies	1	2	1
14, 15	Process planning and estimation for production aids	1	2	1
	Total	**15**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																		
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
Introduction to cutting tools	1	1					1				1								
Cutting tools design	1			1				1	1	1		1	1				1		
Jigs and fixtures design	1	1	1	1						1		1		1			1	1	
Locating and clamping elements for jigs and fixtures.	1					1					1	1		1	1		1	1	
Guide elements for jigs						1					1			1				1	
Milling, turning, welding, and grinding fixtures			1			1		1			1				1				
Types of clamping elements for jigs and fixtures.			1		1	1					1	1						1	1
Press tool design	1		1		1			1	1	1	1	1	1			1	1	1	
Types of die			1		1					1	1	1		1			1		
Bending, forming and drawing dies										1		1		1	1		1	1	
Blanking die			1		1					1	1						1	1	
Progressive die			1		1					1	1	1		1	1		1	1	
Shear die			1		1	1	1			1							1	1	
Line die			1			1	1				1			1			1		
Transferee die			1		1	1	1												
npanied die			1		1	1					1		1	1				1	
Forging die design						1				1		1			1	1	1	1	1
Plastic molds design			1				1		1	1	1	1	1	1	1	1	1	1	1
Topics Covering Competencies	5	2	10	2	7	9	6	3	3	10	12	10	4	9	6	2	12	12	3
% Topics Covering Competencies	28	11	56	11	39	50	33	17	17	56	67	56	22	50	33	11	67	67	17

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	√			√			√	√		√	√		√		
c2	√			√	√		√	√		√	√		√		
c3	√		√	√	√		√	√		√	√		√		
c4	√			√	√	√			√	√	√	√	√		
c5	√			√	√	√			√	√	√	√	√		
c6	√			√	√	√			√	√	√	√	√	√	
c7	√	√	√				√		√	√	√				
c8	√	√		√	√		√	√	√		√		√	√	√
c9	√			√	√				√	√	√		√	√	
c10						√	√		√			√			
c11						√	√		√			√			
c12						√	√		√			√			
c13						√	√		√						
c14	1		1	1				1	1	1		1	1		1
c15	1		1	1	1			1		1				1	
c16	1	1	1	1	1	1		1	1	1				1	
c17		√	√				1	√						√	
c18	1		1	1				1	1	1		1	1		1
c19	1		1	1	1			1		1				1	1
∑	14	4	8	13	10	8	10	11	13	13	9	8	10	7	4
%	74	21	42	68	53	42	53	58	68	68	47	42	53	37	21

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: seminars, quizzes assignments and reports	Bi-Weekly	20
Mid-Term Exam	7th Week	20
Practical Exam	15th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Lecture notes: Manufacturing Technology (3), by M. Merdan, Ph. D., 2010
- Lecture notes: CNC part programming, by A. Afifi, Ph. D., 2010

7-2 Required books:

- None

7-3 Recommended books:

- G.R. NAGPAL, " Tool Engineering & Design", Khanna publisher, 2005.

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and learning:

- Lecture Room
- CNC Lab

Course coordinator:	Dr. Ibrahim Sabry
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn424: Industrial Thermal Systems

A- Affiliation

Relevant program: Manufacturing Engineering & Production Technology BSc Program
Department offering the program: Manufacturing Engineering & Production Technology Department
Department offering the course: Manufacturing Engineering & Production Technology Department
Date of specifications approval: August 2020

B - Basic Information

Title: Industrial Thermal Systems **Code:** MNFn424 **Level:** 4th/Spring
Credit Hours: 2 **Lectures:** 1 **Tutorial/Exercise:** 2 **Practical:** 1
Pre-requisite: MNFn214

C - Professional information

1 – Course Learning Objectives:

The objective of this course is to enable the students to understand the basic concepts, notations, and specifications of: furnaces, heating, refrigeration, and air conditioning systems. The students should be able to choose the appropriate furnaces, refrigeration and air conditioning systems in different industrial applications. They should also be able to modify the components of these systems. Besides, operating and maintaining them properly.

2 – Competencies:

c1- Demonstrate knowledge about construction and principles of operation of different melting furnaces, heat treatment bathes, heating boilers, and refrigeration and air conditioning systems. (C3, C11, C13)
c2- Understand basic notations and characteristics of furnaces, boilers, refrigeration and air conditioning systems and steam power plants. (C2, C5, C13)
c3- Gain knowledge concerning engineering design principles and maintenance operations of furnaces, boilers, refrigeration and air conditioning systems and steam power plants. (C1, C2, C11)
c4- Select appropriate solutions for engineering problems related to melting furnaces, boilers, refrigeration and air conditioning systems. (C1, C3, C4, C5, C11, C13)
c5- Investigate the effects of different parameters on the function and performance of the studied industrial thermal systems. (C1, C3, C4, C6, C7)
c6- Investigate and analyze the failure of components of the studied industrial thermal systems and suggest solutions. (C1, C3, C5, C11)
c7- Apply thermodynamic and heat transfer relations to specify and solve the engineering problems related to the studied industrial thermal systems. (C1, C2, C3, C9)
c8- Evaluate and analyze the basic parts and components of the studied industrial thermal systems. (C1, C2, C3, C11).
c9- Suggest possible solutions to improve the performance of items of the studied industrial thermal systems. (C2, C3, C11)
c10- Search for information from diverse references and internet. (C10)
c11- Write technical reports and perform the given arrangements. (C3, C4, C7, C8)
c12- Effectively manage tasks, time, and resources. (C7)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11 & C13

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• Refrigeration (definition, heat pumps and criteria of its evaluation, classifications of refrigerating systems)	1	2	-
2, 3	• Vapor compression and gas compression refrigerating systems and their operating cycles and basic components and control.	2	4	3
4	• Operating cycles of vapor absorption refrigerating cycles and their basic components and control.	1	4	1
5, 6	• Air conditioning (definition and basic concepts, Psychrometry of air conditioning systems)	2	6	2
7	Assessment (Mid-Term Exam)	1	-	-
8	• Classification of air conditioning systems, basic components, and characteristics of different types.	1	-	2
9, 10	• Steam Power plant (basic components, Rankine cycle and efficiency)	2	4	1
11	• Methods to improve steam plant efficiency, reheat cycle, regenerative cycle.	1	4	2
12, 13	• Heating boilers: operating principles, types, working pressures and temperatures, main components, safety issues, best practices for efficient operation, boiler control, boiler performance evaluation.	2	-	2
14, 15	• Industrial furnaces (Classifications, types of fuel used and their combustion systems) and their evaluations.	2	4	1
	Total hours	**15**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies											
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12
Refrigeration (definition, heat pumps and criteria of its evaluation, classifications of refrigerating systems)	1	1					1			1		1
Vapor compression and gas compression refrigerating systems and their operating cycles and basic components and control.		1	1	1	1	1	1	1	1	1	1	1
Operating cycles of vapor absorption refrigerating cycles and their basic components and control.	1		1							1		1
Air conditioning (definition and basic concepts, Psychrometry of air conditioning systems)		1					1			1	1	1
Classification of air conditioning systems, basic components and characteristics of different types.	1	1	1	1	1	1	1	1	1	1		1
Steam Power plant (basic components, Rankine cycle and efficiency)	1	1	1				1	1		1	1	1
Methods to improve steam plant efficiency, reheat cycle, regenerative cycle.		1		1	1	1	1		1	1	1	1
Heating boilers: operating principles, types, working pressures and temperatures, main components, safety issues, best practices for efficient operation, boiler control, boiler performance evaluation.	1	1	1		1		1	1	1	1	1	1
Industrial furnaces (Classifications, types of fuel used and their combustion systems) and their evaluations.	1	1			1		1		1	1		1
Topics Covering Competencies	6	8	5	3	5	3	8	4	5	9	5	9
% Topics Covering Competencies	67	89	56	33	56	33	89	44	56	100	56	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1		1	1	1		1		1	1	1	1		
c2	1	1		1	1				1	1	1		1		1
c3	1	1		1	1	1	1	1	1	1	1	1	1		1
c4	1	1		1	1		1			1	1		1		1
c5	1	1		1	1		1		1	1	1		1		1
c6	1	1	1	1	1	1	1			1	1	1	1		
c7	1	1		1	1					1	1		1		
c8	1	1	1	1	1		1			1	1		1		1
c9				1	1		1	1		1	1		1		1
c10				1			1	1						1	1
c11				1			1	1						1	1
c12				1			1	1							1
∑	8	8	2	12	9	3	9	6	3	9	9	3	9	2	9
%	67	67	17	100	75	25	75	50	25	75	75	25	75	17	75

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: Assignments, Quizzes Reports	 Bi-Weekly 3 Quizzes per semester 1 Report per semester	 10 6 4
Mid-Term Exam	7th Week	20
Experimental Part: During the semester Practical Exam.	 Weekly 15th Week	 10 10
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Lecture notes: Gaafar A.H. "Industrial Thermal Systems", Printed lectures, Modern Academy of Engineering and Technology

7-2 Required books

- Philip F., Jairo M. "Manufacturing processes and Systems (9th Edition)", John Willey & Sons, 1997, ISBN 978-0-471-04741-4.

7-3 Recommended books:

- None.

7-4 Periodicals, Web sites, etc.

- Available web sites concerned with industrial thermal systems.

8 – Facilities required for teaching and learning:

- Industrial thermal systems laboratory.
- Modern Academy Library
- Lecture and exercise rooms equipped with projector and sound systems.
- Computer, Data show and Computer programs.
- High speed internet and communication facilities for distance learning.

Course coordinator:	Assoc. Prof. Gaafar Ahmed Hussein
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn430: Advanced Forming Techniques

A- Affiliation

Relevant program:	Mechanical Design and Production Technology BSc Program
Department offering the program:	Mechanical Design and Production Technology Department
Department offering the course:	Mechanical Design and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Advanced Forming Techniques	**Code:** MNFn430	**Year/level:** Senior 2, Second Semester	
Credit Hours: 3	**Lectures:** 2	**Tutorial:**1	**Practical:** 2
	Pre-requisite: MNFn122		

C - Professional Information

1 – Course Learning Objectives:

By the end of this course the students should demonstrate the knowledge and understanding of conventional and advanced metal forming processes and machines. The student should be able to select or design the process suitable to the material of the product and its configuration. The course covers a review of conventional forming processes such as rolling, forging, drawing and extrusion as well as advanced metal forming processes like superplastic forming, thermoforming, vacuum forming, high energy and high rate forming, hydroforming and explosive forming.

2 – Competencies:

c1- Classification of different types of metal forming processes and machines (C1).
c2- The strong relationships between material properties and metal forming process (C2, C3).
c3- The concepts of conventional and advanced metal forming processes (C4).
c4- The applications and limitations of different metal forming processes (C1, C5).
c5- Advantages and disadvantages and the differences between metal forming processes and machines (C8).
c6- The measure of success or failure of processes, machines, or systems (C6, C7).
c7- Analyze problems in the behavior of materials under conditions of compressive flow and ductile or brittle fracture (C12).
c8- Formulate a forming process related problem for simulation and analysis (C12).
c9- Evaluate the results of a forming related simulation and analysis (C8).
c10- Identify defects associated with each metal forming process (C1, C9).
c11- Apply the process design considerations for metal forming processes such as rolling, forging, extrusion, thermoforming, high energy, and rate forming and superplastic forming (C10).
c12- Evaluate results according to the theoretical aspects of these processes (C12).
c13- Calculate and practice the working methods of each forming process (C12).
c14- Solve operational problems related to the forming processes (C12).
c15- Use experimental facilities to visualize and investigate the different aspects of conventional and advanced forming processes and to determine the required load or power (C11).
c16- Work in a team and involve in group discussion and seminars (C14).
c17- Communicate effectively and present data and results orally and in written form (C14)
c18- Search for information's in references and in interne (C13).
c19- Practice self-learning (C14).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11. C12, C13 & C14.

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Introduction to metal forming processes and machines.	2	-	2
	➢ Conventional metal forming:			
2	• Classification and basics	2	-	2
3	• Rolling & forging	2	2	2
4	• Drawing & Extrusion	2	2	2
	➢ Advanced Metal forming techniques:			
5	➢ High energy forming- process and machines	2	-	2
6	• High energy forming- theoretical aspects	2	-	2
7	Assessment (Mid-Term Exam)	2	-	-
8	➢ High rate forming- process and machines	2	2	2
9	• High rate forming- theoretical aspects	2	-	2
10	➢ Stretch Forming- process and machines	2	2	2
11	• Stretch Forming- theoretical aspects	2	-	2
12	➢ Explosive forming- process and machines	2	2	2
13	• Explosive forming- theoretical aspects	2	2	2
14	➢ Super plastic forming- theory, process, and machines	2	2	2
15	➢ Hydroforming- theory, process, and machines	1	1	1
15	➢ Special rolling Techniques- theory, process and machines	1	1	1
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																		
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
Introduction to metal forming processes	1	1					1				1								
Conventional metal forming:	1			1			1	1	1	1		1	1				1		
Classification and basics forming	1	1	1	1						1		1		1			1	1	
Rolling process											1	1		1			1	1	
Extrusion process			1								1	1		1			1	1	
Drawing process		1	1								1				1				
deep drawing process			1								1	1					1	1	1
High energy forming- process and machines			1		1			1	1	1	1	1	1			1	1	1	
Stretch Forming- theoretical aspects			1		1	1				1	1	1		1			1		
Rubber forming and			1		1	1				1		1		1	1		1	1	
Special rolling Techniques- theory			1		1	1				1	1						1	1	
Explosive forming- theoretical aspects			1		1	1				1	1	1		1	1		1	1	
Super plastic forming- process			1		1	1	1			1		1				1	1	1	
Hydroforming- theory, process and machines			1		1	1	1			1	1	1				1	1	1	
Stretch Forming- theoretical aspects			1		1	1	1			1		1							
Vacuum forming			1		1	1				1	1	1		1			1	1	
Spanning forming- theoretical aspects			1			1	1			1		1					1	1	1
Plastic forming- theory, process and machines			1				1			1		1	1	1	1	1	1	1	
Topics Covering Competencies	3	3	15	2	9	9	6	2	2	13	11	15	3	8	4	4	15	13	2
% Topics Covering Competencies	17	17	83	11	50	50	33	11	11	72	61	83	17	44	22	22	83	72	11

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	√	1		√			√	√		√	√		√		
c2	√	1		√	√		√	√		√	√		√		
c3	√		√	√	√		√	√		√	√		√		
c4	√	1		√	√	√			√	√	√	√	√		
c5	√			√	√	√			√	√	√	√	√		
c6	√			√	√	√			√	√	√	√	√	√	
c7	√	√	√				√		√	√	√				
c8	√	√		√	√		√	√	√		√		√	√	√
c9	√			√	√				√	√	√		√	√	
c10						√	√		√			√			
c11	√	1				√	√		√			√			
c12	√					√	√		√		1	√		1	
c13						√	√		√	1					
c14	1	√	√					√						√	√
c15				1					1				1		
c16	√	1				√	√	√		√	√	√			
c17	√		1						1					1	1
c18						√	√	√		1	1				
c19					1							1	1		
∑	18	8	4	9	8	9	11	7	12	11	12	8	11	6	3
%	95	42	21	47	42	47	58	37	63	58	63	42	58	32	16

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: seminars, quizzes, assignments, and reports	Bi-Weekly	20
Mid-Term Exam	7th Week	20
Practical Exam	15th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books

- Klpakjian, Serope and Steven R. Schmidt "Manufacturing Engineering and Technology". Prentice –Hall Inc., 2001.

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and learning:

- Metal forming lab. (Some of these machine could be products of good BSc. Projects)
- Rolling mill
- Thread rolling and surface rolling machine
- Hydraulic press (100 tons)
- Draw benches for tubes and rods
- Extrusion machine
- Hydraulic pump
- Dies for bulk and sheet metal forming
- Computer, Data show and Computer programs

Course coordinator:	Dr. Ibrahim Sabry
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn431: Modeling and Simulation

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department
Date of specifications approval: August 2020

B - Basic Information

Title: Modeling and Simulation **Code:** MNFn431 **Level:** 4th Spring (Senior2 / 2nd Term)
Credit Hours: 3 **Lectures:** 2 **Tutorial/Exercise:** 1 **Practical:** 2
Pre-requisite: MNFn213

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills and attitudes) related to building mathematical models for real systems. Learning the proper simulation process steps. Gaining knowledge about queuing theory and different queuing models. They should compete on analyzing manufacturing systems performance. Developing computer-based simulation programs to evaluate the system performance.

2 – Competencies:

c1. Compare the differences between modeling process and simulation activity (C2).
c2. Explain the basic elements of a simulation model (C1, C6).
c3. Identify the purpose and advantages of simulation activity (C10).
c4. Classify and compare the different types of models (C3).
c5. Learn and explain the basic procedures of modeling a system (C10).
c6. Deduce mathematical relations describing the steady state performance of mechanical systems and their elements and select the proper methods/software for their solution (C1, C11, C12).
c7. Practice building a model of a given problem according to appropriate methodology (C5, C10).
c8. Explain the effect of model accuracy in representing the real system on quality of the resulting solution (C10).
c9. Analyze, mathematically, the system efficiency and improve the productivity (C1).
c10. Solve problems related to assembly line balancing (C1, C3, C9)
c11. Assess the formulation of a real problem into a simulation model (C1, C4)
c12. Use appropriate techniques for the verification and validation of the simulation model (C9)
c13. Gain the engineering knowledge and understanding of queuing theory (C1, C2, C5).
c14. Identify the role of artificial intelligence techniques in simulation process (C4, C10, C15, C16).
c15. Utilize computer software; MATLAB Simulink, Arena, and other available programs to design, calculate, simulate or animate mechanical systems and manufacturing problems. (C2, C11, C15, C16).
c16. Collaborate effectively within multidisciplinary team (C5, C7, C9).
c17. Practice self-learning and communicate effectively orally and in written form (C8, C10).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C15 & C16

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1, 2	• Introduction • Modeling, simulation, system definitions. • Basic elements of a simulation model. • Purpose of simulation. • Applications of simulation. • Advantages and limitations of simulation.	4	1	2
3 - 6	• Modeling • Types of models. • Basic principle rules of modeling. • Mechanical problems modeling. • Manufacturing system modeling basics. • Manual simulation. • Assembly line balancing.	6	2	6
7	Assessment (Mid-Term Exam)	2	-	-
8, 9	• Simulation process steps • Problem formulation. • Plan the simulation study. • System definition. • Data collection. • Model translation. • Verification. • Validation. • Analysis. • Documentation and reporting.	6	2	4
10 – 12	• Queueing theory • Basic structure of queueing models. • Queue characteristics. • Terminology and notations. • Examples on different queuing systems models.	6	4	8
13, 14	• Examples on simulation • Cost analysis. • Pure pursuit problem. • Role of artificial intelligence in simulation	4	4	6
15	• Revision	2	1	2
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17
Modeling, simulation, system definitions.		1															
Basic elements of a simulation model.	1					1											
Purpose of simulation.	1									1							
Applications of simulation.										1							
Advantages and limitations of simulation										1							
Types of models.			1														
Basic principle rules of modeling.					1												
Mechanical problems modeling							1				1	1					1
Manufacturing system modeling basics.			1		1		1		1	1	1	1					
Manual simulation.	1						1		1		1	1					
Assembly line balancing.			1				1		1								
Problem formulation.		1		1													
Plan the simulation study.		1														1	
System definition.	1	1															
Data collection.		1															
Model translation.		1													1		1
Verification.									1								
Validation.									1								
Analysis.	1																
Documentation and reporting.								1		1							
Basic structure of queueing models.	1	1			1								1				
Queue characteristics.	1												1				
Terminology and notations.	1																
Examples on different queuing systems models.		1			1		1						1				
Cost analysis.			1				1										
Pure pursuit problem.							1				1	1					
Role of artificial intelligence in simulation				1						1				1			
Topics Covering Competencies	9	8	4	2	4	1	7	1	5	6	4	4	3	1	1	1	2
% Topics Covering Competencies	33	30	15	7	15	4	26	4	19	22	15	15	11	4	4	4	7

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method				
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations
c1	1	1								1			1	1
c2	1	1								1			1	
c3	1	1	1							1			1	
c4	1	1				1		1		1			1	1
c5	1	1		1	1					1	1		1	
c6	1	1		1	1	1	1			1	1			1
c7	1	1	1	1	1				1	1	1	1		
c8	1	1		1	1	1	1					1		
c9	1	1		1	1	1	1		1	1	1			
c10	1	1	1	1	1	1				1	1			
c11	1	1							1					
c12	1	1				1								
c13	1	1		1		1	1			1	1		1	
c14	1	1				1		1	1			1		
c15						1						1		
c16					1	1								
c17					1	1	1	1						
∑	14	14	3	7	8	11	5	3	4	10	6	4	6	3
%	82	82	18	41	47	65	29	18	24	56	35	24	35	18

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	6
	Reports/Research	3 Reports per semester	6
	Tutorials	4 Assignments per semester	8
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes

- Lecture Notes and Handouts

7-2 Required Book:

- Chung, C.A. ed., 2003. Simulation modeling handbook: a practical approach. CRC press.
- Bender, E.A., 2012. An introduction to mathematical modeling. Courier Corporation.
- Bossel, H., 1994. Modeling and simulation. AK Peters/CRC Press.
- Altiok, T. and Melamed, B., 2010. Simulation modeling and analysis with Arena. Elsevier.

7-3 Recommended Books:

- None

7-4 Periodicals, Web sites, etc.:

- https://www.springer.com/, (Last accessed January 2020)
- https://www.elsevier.com/, (Last accessed January 2020)
- https://www.ekb.eg/, (Last accessed January 2020)
- https://www.proquest.com/, (Last accessed January 2020)

8 – Facilities required for teaching and learning:

- Computer lab.
- Lecture and Exercise rooms equipped with projection and sound systems.
- Computer, Data show and Computer programs.
  - MATLAB software package.
  - AREAN software package.
- High speed internet and communication facilities for distance learning.

Course coordinator: Dr. Yahia Elattar
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn432: Failure Analysis & Fracture

A- Affiliation

Relevant program: Manufacturing Engineering and Production Technology BSc Program
Department offering the program: Manufacturing Engineering and Production Technology Department
Department offering the course: Manufacturing Engineering and Production Technology Department
Date of specifications approval: August 2020

B - Basic Information

Title: Failure Analysis & Fracture **Code:** MNFn432 **Level:** 4th Spring
Credit Hours: 2 **Lectures:** 1 **Tutorial/Exercise:**2 **Practical:** 1
Pre-requisite: MNFn111

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (based on the knowledge, skills and personnel attitudes) related to the basics & fundamentals of fracture and failure analysis to any system. They should compete on failure analysis and failure stresses, ductile & brittle fracture, stress concentration, fracture toughness, fatigue & creep mechanisms, and fracture criteria in design.

2 - Competencies

On successful completion of the course, the student must be able to:
c1. Introduce and identify different types of fracture (C1).
c2. Explain different reasons of failure and how crack initiate and propagate (C1, C2).
c3. Compare and classify elastic and plastic zones (C3, C11)
c4. Use Griffith theory and mention critical size of crack (C1, C3, C7)
c5. Define fracture toughness (C1).
c6. Solve problems and general practice in failure analysis (C3, C12).
c7. Analyze mechanisms of crack initiation (C1, C3).
c8. Investigate the effect of crystal structure and density of dislocation on crack propagation (C3, C5).
c9. Define plain strain fracture toughness (C1).
c10. Use impact test to identify ductile-brittle transition temperature (C2, C13).
c11. Explain differences between DBT and CAT and role of each one (C1, C5, C10).
c12. Explain creep, fatigue tests and their mechanisms (C1, C8, C13).
c13. Explain creep and fatigue fractures (C3, C11).
c14. Use experimental facilities to explain impact, creep tests (C10, C13).
c15. Analyze case studies (C3, C5, C9, C10).
c16. Practice self-learning and communicate effectively orally and in written form (C8, C10).

This course contributes to the following program competencies: C1, C2, C3, C5, C7, C8, C9, C10, C11, C12 & C13

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	. Introduction	1	2	1
2	Fundamentals of fracture	1	2	1
3	Types of failure and stresses	1	2	1
4	General practice in failure analysis	1	2	1
5	Ductile and brittle fracture	1	2	1
6	Ductile brittle transition	1	2	1
7	Assessment (Mid-Term Exam)	1	-	-
8	Fracture mechanics	1	2	1

9	Stress concentration	1	2	1
10	Fracture toughness	1	2	1
11	Fatigue mechanism	1	2	1
12	Crack initiation and crack propagation	1	2	1
13	Creep mechanism	1	2	1
14	Crack initiation criteria in design	1	2	1
15	Case studies	1	2	1
	Total hours	**15**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies															
	c1	**c2**	**c3**	**c4**	**c5**	**c6**	**c7**	**c8**	**c9**	**c10**	**c11**	**c12**	**c13**	**c14**	**c15**	**c16**
Introduction	1															
Fundamentals of fracture	1	1	1													
Types of failure and stresses		1	1	1												
General practice in failure analysis	1	1		1		1	1									
Ductile and brittle fracture				1	1			1	1							
Ductile brittle transition	1							1		1				1		
Fracture mechanics									1	1	1	1				
Stress concentration				1					1	1	1	1	1			
Fracture toughness					1				1	1		1				
Fatigue mechanism							1					1	1			
Crack initiation and crack propagation			1	1	1		1	1	1							
Creep mechanism												1	1	1		
Crack initiation criteria in design				1	1		1								1	1
Case studies							1								1	1
Topics Covering Competencies	4	3	3	6	4	1	5	3	5	4	2	5	3	2	2	2
% Topics Covering Competencies	29	21	21	43	29	7	36	21	36	29	14	36	21	14	14	14

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	**Presentations & Movies**	**Discussions & seminars**	**Tutorials**	**Problem solving**	**Laboratory & Experiments**	**Research, Reports & Assignments**	**Self-Learning**	**Modeling and Simulation**	**Written Exam**	**Tutorials**	**Practical Exam**	**Quizzes**	**Research & Presentations**	**Mini Project Report**
c1	1			1				1			1				
c2	1	1		1						1	1		1		
c3	1	1	1	1						1	1		1		
c4	1	1		1	1					1	1		1		
c5	1	1		1	1	1				1	1	1	1		
c6				1	1					1	1		1		
c7	1			1	1					1	1		1		
c8	1			1						1	1				
c9	1			1	1					1	1	1	1		
c10	1	1		1		1					1	1			
c11	1			1		1				1	1		1		
c12	1	1		1		1		1			1	1			

c13	1	1		1		1			1			1			
c14						1						1		1	
c15	1				1		1	1						1	1
c16				1						1					1
∑	13	7	1	14	6	6	1	3	1	10	12	6	8	2	2
%	81	44	6	88	38	38	6	19	6	63	75	38	50	12	12

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	12
	Tutorials	3 Assignments per semester	5
	Mini project	Once per semester	3
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- Failure Analysis and Fracture (lecture & lab notes)

7-2 Required books

- McEvily, AJ, and M. Walter. Metal Failures: Mechanisms, Analysis, Prevention, 2013.

7-3 Recommended books: None

- Anderson, Ted L., and Ted L. Anderson. Fracture Mechanics: Fundamentals and Applications. CRC press, 2005.

7-4 Periodicals, Web sites, etc.

- None

8 – Facilities required for teaching and learning:

- Material Lab.
- Lecture Room
- Computer, Data show
- High speed internet and communication facilities for distance learning.

Course coordinator: Dr. Hanan Abd El-Kader
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn434: Automation in Production and Computer Integrated Manufacturing

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Automation in Production and Computer Integrated Manufacturing	**Code:** MNFn434	**Level:** 4th fall	
Credit Hours: 3	**Lectures:** 2	**Tutorial/Exercise:** 1	**Practical:** 2
	Pre-requisite: MNFn421		

C - Professional information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (knowledge, skills, and attitudes) related to the construction and operation of automated production lines and their basic elements. They should compete on the operation, design, maintain, calculate, and analyze the performance of automated production lines and their basic components.

2 – Competencies:

c1. Basic requirements of automated flow lines (C13)
c2. Line balancing, assembly systems and line balancing (C1).
c3. Line balancing, assembly systems and line balancing (C2, C9, C13).
c4. Flexible manufacturing system and group technology (C13, C15, C16).
c5. Sequential control, sensors, and PLC (C4, C5, C15, C16)
c6. Apply computer numerical control for automated lines (C2, C15, C16)
c7. Evaluate the economic considerations when selecting automated lines (C1, C5).
c8. Use cost analysis for evaluation of automated flow lines (C2)
c9. Consider the economy of different material handling methods (C3)
c10. Assess engineering judgment considering safety, quality, reliability, and environmental impact of different processes (C4)
c11. Imply the techniques for line balancing (C2, C5, C13).
c12. Prepare and present technical reports about performance automated flow lines (C4, C10)
c13. Analyze the performance of automated flow lines (C2, C4, C5).
c14. Use laboratory equipment for equipment safety (C3, C9).
c15. Communicate effectively and present data and results orally and in written form (C7, C8).
c16. Search for information's in references and in internet (C4, C5).
c17. Work in a team and involve in group discussion and seminars (C7, C8).
c18. Use ICT facilities in presentations (C4).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C7, C8, C9, C10, C13, C15, & C16

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Production process and automated strategy	1	-	-
2	Economics of automated production lines	3	2	-
3	Analysis of automated production lines	2	2	-
4	Assembly systems and balancing of production lines	2	2	-
5	Flexible manufacturing systems	2	-	-
6	CNC applications in automated manufacturing systems	2	-	4
7	Assessment (Mid-Term Exam)	2	-	-
8	Robots Technology	2	-	-
9	Robots Programming and applications in automated lines	2	2	2
10	Automated material handling and storing system	2	-	4
11	Group Technology, concepts, standard and applications	2	2	-
12	Sequential and programmable controllers 2 2 8	2	2	8
13	PLC Technology and applications	1	2	8
13	Control systems	1	-	-
14	Sensors applications in automation	2	-	2
15	Production planning system	2	-	-
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																	
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18
Production process and automated strategy								1			1		1					
Economics of automated production lines	1	1	1		1			1	1	1	1	1	1			1		
Analysis of automated production lines		1		1	1	1		1			1	1	1			1		
Assembly systems and balancing of production lines	1	1	1		1	1	1	1	1		1	1	1	1	1	1	1	
Flexible manufacturing systems								1	1		1	1	1	1				
CNC applications in automated manufacturing systems				1	1		1	1	1		1	1	1		1	1		
Robots Technology				1	1		1	1	1		1	1	1			1		
Robots Programming and applications in automated lines				1	1		1	1	1		1	1	1			1		
Automated material handling and storing system	1			1	1		1	1	1	1	1	1	1			1		
Group Technology, concepts, standard and applications								1			1	1	1					
Sequential and programmable controllers 2 2 8					1		1	1	1		1	1	1					
PLC Technology and applications					1		1	1	1		1	1	1					
Control systems	1			1	1		1	1	1		1	1	1			1		
Sensors applications in automation				1	1		1	1	1	1	1	1	1			1		
Production planning system				1	1		1	1	1	1	1	1	1			1		1
Topics Covering Competencies	5	3	2	8	13	2	10	15	12	4	15	14	15	2	3	11	2	1
% Topics Covering Competencies	33	20	13	53	87	13	67	100	80	26	100	93	100	13	20	73	13	7

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Report
c1	1	1		1						1			1		
c2	1	1		1		1				1	1				
c3	1	1		1	1					1		1	1		
c4	1	1		1		1	1			1	1		1		
c5	1	1		1		1	1			1	1	1		1	1
c6	1	1		1					1			1			1
c7	1			1	1	1				1	1		1		
c8	1			1			1	1				1	1	1	1
c9	1			1							1		1		
c10	1	1					1	1			1			1	1
c11	1	1		1			1			1	1		1		
c12	1					1				1		1	1		1
c13	1			1	1	1	1			1	1	1	1		1
c14			1	1							1	1			
c15			1	1										1	1
c16		1	1				1	1						1	1
c17			1				1	1						1	1
c18			1				1	1						1	1
∑	13	9	5	13	3	6	9	5	1	9	9	7	8	7	10
%	72	50	28	72	17	33	50	28	6	50	50	39	44	39	56

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	2 Quizzes (one each 6 Weeks)	6
	Reports/Research	Two reports per semester	6
	Tutorials	4 Assignments per semester	8
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- A M Kohail, industrial automation, 2013.

7-2 Required books:

- None

7-3 Recommended books:

- Jack W. Caplin, (2004), "Instrumentation and Automation for Manufacturing", Demlar publish.
- K. C. Jain, (2004), "Principles of automation and advanced manufacturing systems", KHANNA Publisher.
- Mikell P. Groover, (1998) "Automation of Production Systems", NJ: NJ: Prentice Hall.

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and learning:

- Automation lab.
- Periodical visits to Egyptians industrial plants.
- Lecture and Exercise rooms equipped with Computer, Data show, and sound systems.
- High speed internet and communication facilities for distance learning.

Course coordinator: Prof. Ahmed Kohail
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn435: Advanced Facility Planning

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc program
Department offering the program:	Manufacturing Engineering & Production Technology Department
Department offering the course:	Manufacturing Engineering & Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Advanced Facility Planning **Code:** MNFn435 **Level:** 3, Tenth semester
Credit Hours: 3 **Lectures:** 2 **Tutorial:** 1 **Practical:** 2
Pre-requisite: MNFn312

C - Professional Information

1 – Course Learning Objectives

By the end of this course the students, should have gained the planned competencies (based on the knowledge, skills and personnel attitudes) related to the different techniques for facilities planning to include facilities location, design of facilities systems, layout and handling system for producing a product or a service with lowest cost, highest quality, and minimum resources.

2 - Competencies

On successful completion of the course, the student must
c1- be aware of the importance of facility planning. (C5)
c2- Solve facilities location problems. (C1, C7)
c3- Develop facility design and capacity (C3, C8)
c4- Develop facility layouts. (C2, C7)
c5- Analyze layout models. (C2, C4)
c6- Solve problems by qualitative factor analysis (C6, C8)
c7- Design and analyze product, process, and schedule. (C2, C3, C4, C5)
c8- Consider political, economic & social aspects. (C3)
c9- Acquire and apply new knowledge about facility planning. (C10)
c10- Use creative, innovative, and flexible thinking of facility planning for intelligent manufacturing systems. (C9)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, & C10

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	Introduction to the facilities planning	2	1	-
2, 3	Facilities location problems	4	2	4
4	Facility design and capacity	2	1	4
5, 6	Facility layouts	4	2	4
7	Assessment (Mid-Term Exam)	2		
8	Layout planning models	2	1	4
9	Qualitative factor analysis	2	1	4
10, 11	Product, process, and schedule design	4	2	4
12	Political, economic& social aspects	2	1	-
13	Knowledge based facility planning	2	1	-
14, 15	Facility planning for intelligent manufacturing systems.	4	2	4
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies									
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10
Introduction to the facilities planning	1									
Facilities location problems		1								
Facility design and capacity			1							
Facility layouts				1						
Layout planning models					1					
Qualitative factor analysis						1				
Product, process, and schedule design							1			
Political, economic& social aspects								1		
Knowledge based facility planning									1	
Facility planning for intelligent manufacturing systems.										1
Topics Covering Competencies	1	1	1	1	1	1	1	1	1	1
% Topics Covering Competencies	10	10	10	10	10	10	10	10	10	10

5 – Course Competencies/Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1			1					1		1		1
c2	1			1				1	1		1		1
c3	1			1				1	1		1		1
c4	1			1				1	1		1		1
c5	1			1					1		1		1
c6	1			1					1		1		1
c7	1			1				1	1		1		1
c8	1			1					1		1		1
c9	1			1					1		1		1
c10	1			1				1	1		1		1
$\sum$	10	0	0	10	0	0	0	5	10	0	10	0	10
%	100	0	0	100	0	0	0	50	100	0	100	0	100

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: seminars, quizzes, assignments, and reports	Bi-Weekly	20
Mid-Term Exam	7th Week	20
Practical Exam	15th Week	20
Written Exam	16th Week	40
Total		**100**

7 – List of references

7-1 Course notes

- Lecture Notes and practical book.

7-2 Required books:

- James A. Tompkins, Facilities planning,4th Ed., McGraw-Hill, 2010.

7-3 Recommended books:

- None.

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and Learning:

- None

Course coordinator:	Dr. Mohamed Saad Abdelkarim
Head of the Department:	Dr. Metwally Abd Elghaffar
Date	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn436: Industrial Robotics

A- Affiliation

Relevant program: Manufacturing Engineering & Production Technology BSc Program
Department offering the program: Manufacturing Engineering & Production Technology Department
Department offering the course: Manufacturing Engineering & Production Technology Department.
Date of specifications approval: August 2020

B - Basic Information

Title: Industrial Robotics **Code:** MNFn436 **Level:** 3rd /spring
Credit Hours: 2 **Lectures:** 1 **Tutorial/Exercise:** 2 **Practical:** 1
Pre-requisite: MNFn115, MNFn313

C - Professional information

1– Course Learning Objectives:

By the end of the course, students should gain a consolidate competencies based on theoretical and conceptual understanding of mathematical models that represent robotic systems in many different ways. In addition, they have to gain a detailed understanding on kinematics and dynamics that are essential in controlling design and built of robotic machines. The students should also gain the planned competencies in applying the typical practical disciplines to develop methodologies for actuating the robotic system with a controlled motion by planning motions that should be safe and smooth. Adding to that, students have to have a moderate understanding on how these disciplines applied to the analysis of typical human system motion.

2 – Competencies

On successful completion of the course, the student must be able to:

c1- Demonstrate a good understanding of Robotic systems genesis and development. (C1, C10)
c2- Analyze mathematical models based on kinematic and dynamic foundation. (C13)
c3- Distinguish the principles and fundamentals necessary for motion and force control. (C1, C3)
c4- Investigate the key parameters of robot control in a free and in a contact space as the robot interact with the wall to establish the working area. (C3, C10, C11, C15, C16)
c5- Design the Robotic system for simple applications, then carry out the necessary calculations, specify and select the system components. (C13)
c6- Use appropriate techniques, skills, and tools to identify, formulate, analyze, and solve engineering robotic system problems. (C10, C12)
c7- Analyze a locomotion performance and perform a planning of a robotic system performance. (C2, C10, C11)
c8- Design, assemble and operate simple Robotic system. (C3, C11, C14)
c9- Deduce mathematical relations describing the kinematics and dynamics for different safe motion and select the proper methods for designing the robotic systems. (C1, C3, C12, C15, C16)
c10- Use experimental facilities to visualize and investigate the simulation of human motion with analysis and performance evaluation study for creating perfect Robotic controllers. (C3, C10, C13)
c11- Analyze and test the performance of a manipulator. (C2, C3, C4, C10)
c12- Use experimental facilities to assemble and operate diverse Robotic systems. (C2, C4)
c13- Consider the impact of designs on the environmental protection. (C2, C10)
c14- Use computer software to design, calculate, simulate, or animate Robotic systems and their components. (C2, C4, C11, C13, C15, C16)
c15- Communicate results of the modeling process to management and other non-specialist users of engineering analyses. (C2, C7, C11)
c16- Consider the impact of designs on the environmental protection. (C5, C6, C9).
c17- Collaborate effectively within multidisciplinary team. (C7)
c18- Practice self-learning and search for information in references and internet. (C6)
c19- Present the results and conclusions of work orally or in a written form. (C8)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15 & C16

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	• Introduction to Robotics Fundamentals.	1	-	-
2	• Rigid transformation.	1	4	1
3, 4	• Robot anatomy.	2	4	2
5, 6	• Kinematics.	2	4	2
7	Assessment (Mid-Term Exam)	1	-	-
8, 9	• Inverse kinematics.	2	4	2
10, 11	• Jacobins.	2	2	2
12	• Trajectory following	1	4	2
13, 14	• Statics	2	2	2
15	• Dynamics	1	4	1
	Total hours	**15**	**28**	**14**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																		
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19
Introduction to Robotics Fundamentals.	1	1					1				1								
Rigid transformation.	1	1						1			1	1				1	1		
Robot anatomy.		1	1	1						1	1	1	1	1	1	1	1	1	1
Kinematics.				1					1		1	1	1	1	1	1	1	1	1
Inverse kinematics.		1	1						1		1	1	1	1	1	1	1	1	1
Jacobins.		1	1	1			1		1		1		1						
Trajectory following			1		1	1		1			1	1	1			1	1	1	1
Statics			1		1			1			1					1	1	1	1
Dynamics		1				1				1				1	1				
Topics Covering Competencies	2	6	5	3	2	2	2	3	3	2	8	5	5	4	4	6	6	5	5
% Topics Covering Competencies	22	67	56	33	22	22	22	33	33	22	89	56	56	44	44	67	67	56	56

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1			1	1			1		1	1		1	1	
c2	1	1		1	1	1		1		1	1	1	1		
c3	1			1	1					1	1		1	1	
c4	1	1	1	1	1	1	1	1		1	1	1	1	1	
c5	1		1	1	1		1	1		1	1		1	1	
c6	1			1	1	1	1			1	1	1	1	1	1
c7	1	1		1	1	1	1			1	1	1	1	1	1

c8	1			1	1			1		1	1		1		
c9	1			1	1	1	1		1	1	1	1	1		
c10	1			1	1		1			1	1		1		
c11	1	1	1	1		1	1	1	1	1	1	1	1	1	1
c12	1	1				1		1	1			1		1	1
c13		1				1	1	1	1			1		1	
c14						1	1		1			1		1	
c15		1				1	1		1			1		1	
c16		1	1				1	1						1	1
c17		1	1			1	1	1	1					1	1
c18		1	1			1	1	1	1					1	1
c19			1	1	1	1	1		1	1	1	1	1	1	1
$\sum$	12	10	7	12	11	13	14	11	9	12	12	11	12	15	8
%	63	52	37	63	58	68	74	58	47	63	63	58	63	79	42

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester Work: ➢ Assignments, ➢ Quizzes ➢ Reports	 Bi-Weekly 3 Quizzes per semester 1 Report per semester	 10 6 4
Mid-Term Exam	7th Week	20
Experimental Part: ➢ During the semester ➢ Practical Exam.	 Weekly 15th Week	 10 10
Written Exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Selected topics

7-2 Required books

- Selig, Jon M. Introductory robotics. Vol. 5. London: Prentice Hall, 1992.

7-3 Recommended books:

- Williams, Geoff. CNC Robotics: Build Your Own Shop Bot. McGraw-Hill Education TAB, 2003.
- Cook, David. Robot building for beginners. Apress, 2010.
- Kurfess, Thomas R., ed. Robotics and automation handbook. CRC press, 2018.

7-4 Periodicals, Web sites, etc.

- http://www.cimtecautomation.com/parts/c-538 -denso-robotics.aspx? gclid=CPKnjfu3xbsCFdLItAodyXEAKQ
- http://www.learnaboutrobots.com/industrial.htm
- http://www.ifr.org/industrial-robots/
- https://www.coursera.org/specializations/modernrobotics
- https://www.edx.org/course/robotics-foundations-i-robot-modeling?index=product&queryID=b207eb1274714614605f614674d52226&position=1
- https://www.edx.org/course/robotics-foundation-ii-robot-control?index=product&queryID=c36e7afe26c6717b421ef1e0e37d8a8f&position=2
- https://www.edx.org/course/hello-real-world-with-ros-robot-operating-system?index=product&queryID=c36e7afe26c6717b421ef1e0e37d8a8f&position=3

8 – Facilities required for teaching and learning:

- Industrial Robotics laboratory.
- Modern Academy Library
- Lecture and Exercise rooms equipped with projector and sound systems.
- Computer, Data show and Computer programs.
- High speed internet and communication facilities for distance learning.

Course coordinator:	Dr. Metwally Hussein Metwally
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn437: Electro-Hydraulic and Pneumatic Systems

A- Affiliation

Relevant program:	Manufacturing Engineering and Production Technology BSc Program
Department offering the program:	Manufacturing Engineering and Production Technology Department
Department offering the course:	Manufacturing Engineering and Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Electro-Hydraulic and Pneumatic Systems	**Code:** MNFn437	**Level:** 4th (Senior 2), Second Semester	
Credit Hours: 3	**Lectures:** 2	**Tutorial:** 1	**Practical:** 2
	Pre-requisite:	MNFn313 & MNFn422	

C - Professional Information

1 – Course Learning Objectives:

By the end of this course, the students should have gained the planned competencies (based on the knowledge, skills and personnel attitudes) related to the construction and operation of hydraulic servo systems, Electrohydraulic servo systems and electrohydraulic proportional systems. They must operate, design, calculate and analyze the steady state and dynamic performance of the hydraulic and electrohydraulic servo systems and their basic components. Moreover, they must classify, compare, operate and maintain pneumatic systems and their basic elements.

2 – Course Competencies

On successful completion of the course, the student must be able to:

- c1 Classify and compare electrohydraulic proportional and servo systems technology and applications (C1).
- c2 Explain the basic construction hydraulic systems and deduce the mathematical models describing the dynamic behavior of hydraulic systems (C1, C11).
- c3 Deduce the mathematical relations describing the basics of electromagnetics (C1, C11)
- c4 Deduce mathematical relations describing the performance of the hydraulic and electrohydraulic servosystems (C1, C11).
- c5 Analyze the steady state and dynamic performance of hydraulic and electrohydraulic servosystems (C11)
- c6 Use the principles of control engineering to solve the precision and stability problems in electrohydraulic servosystems and judge the effect of implementation of PID controller on performance of the electrohydraulic systems (C12).
- c7 Build, operate and analyze the function of basic industrial pneumatic systems (C2)
- c8 Use computer software; Norgren pneumatic trainer, MATLAB, TK solver and other available software calculate, simulate, and animate pneumatic and hydraulic servosystems and their components (C2).
- c9 Use experimental facilities to assemble and operate Basic pneumatic systems (C11).
- c10 Analysis of the effects of air properties; air compressibility, air density and air viscosity, on the pneumatic system performance (C1)
- c11 Discuss the construction and operation of basic pneumatic circuit and their basic elements, air compressors, valves, actuators, air filters, coolers and lubricators. (C2)
- c12 Present and discuss the results of design and calculation and prepare technical reports (C8).
- c13 Work in a team and involve in group discussion and seminars (C7).
- c14 Communicate effectively and present data and results orally and in written form (C7).
- c15 Search for information's in references and in internet and practice self-learning (C10).

This course contributes to the following program competencies: C1, C2, C7, C8, C10, C11 & C12

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	**Dynamics of Hydraulic Pipe Flow**			
	➢ Fluid power systems fundamentals and basic equations	1	-	-
	➢ Modeling and dynamic performance of hydraulic transmission lines	1	1	2
2,3	**Hydraulic Servo-Actuators:**			
	➢ Construction	1	-	-
	➢ Operation	1	-	-
	➢ Applications	1	-	-
	➢ Modeling, simulation and investigation of transient behavior	1	2	4
4,5	➢ Flow and Power characteristics- Case studies	1	1	-
	Electro-Hydraulic Proportional-Valves Technology			
	➢ Construction, operation, and characteristics	3	1	-
6	**Electro-Hydraulic Servo-Valve Technology:**			
	➢ Construction, operation, and classification:	1	-	-
	➢ Hydraulic amplifiers; flapper valve, Jet nozzle and jet deflector	1	1	-
7	Assessment (Mid-Term Exam)	2	-	-
8	➢ Feedback: Mechanical, electric, and barometric	1	-	-
	➢ Transient and frequency response	1	1	-
9	**Modelling and Simulation of Electro-hydraulic Servo Actuator**			
	➢ Basics of electro-magnetics and Electromagnetic torque motor characteristics	1	-	2
	➢ Torque motor and Flapper valve, modelling and simulation	1	1	-
10	➢ First stage modelling and simulation	1	1	2
11	➢ Servo- valve modelling and simulation	2	1	2
12	➢ Integrated EHSA modelling and simulation	1	1	2
	➢ PID controller for EHSA	1	-	2
	➢ Mini project; investigate the transient performance of a small industrial hydraulic system.	1	-	4
13	**Pneumatic systems:**			
	➢ Fundamentals and theoretical background	2	1	2
14	➢ Components of pneumatic power systems; compressors, valves; pressure control valves, directional control valves, flow control valves and actuators.	2	1	2
15	➢ Case studies: Basic industrial pneumatic systems.	2	1	4
Total		**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Course Topics	Course Competencies														
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15
Fluid power systems fundamentals and basic equations	1	1					1								
Modeling and dynamic performance of hydraulic transmission lines		1										1			
Hydraulic servo system construction; operation, applications, modeling, simulation and investigation of transient behavior and flow and Power characteristics- Case studies				1	1										

Course Topics	Course Competencies														
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15
Electro-hydraulic proportional valves; construction, operation and characteristics	1	1	1												
EHSV; hydraulic amplifiers; flapper valve, Jet nozzle and jet deflector, construction, and operation	1			1											
EHSV feedback: Mechanical, electric, and barometric	1														
EHSV transient and frequency response			1		1	1		1				1			
Basics of electro-magnetics and Electromagnetic torque motor characteristics				1	1			1							
Torque motor and Flapper valve, modelling, and simulation				1	1			1							
EHSV first stage modelling and simulation				1	1			1							
Servo- valve modelling and simulation				1	1			1							
Integrated EHSA modelling and simulation				1	1			1							
PID controller for EHSA						1						1			
Mini project; investigate the transient performance of a small industrial hydraulic system.	1			1	1	1		1			1	1	1	1	1
Pneumatic systems, fundamentals, and theoretical background							1		1	1					
Components of pneumatic power systems; compressors, valves; pressure control valves, directional control valves, flow control valves and actuators.							1		1		1				
Case studies: Basic industrial pneumatic systems.							1				1		1	1	1
Topics Covering Competencies	4	1	2	7	7	3	3	7	2	1	3	3	2	2	2
% Topics Covering Competencies	29	7	14	50	50	21	21	50	14	7	21	21	14	14	14

5 – Teaching, Learning and Assessment methods:

Course Competencies	Teaching Methods						Learning Methods		Assessment Method				
	Lecture	Presentations and Movies	Discussions and seminars	Tutorials	Problem solving	Laboratory & Experiments	Research and Reports	Modeling and Simulation	Written Exam	Practical Exam	Quizzes	Term papers	Assignments
c1	1	1					1		1			1	
c2	1	1		1	1								
c3	1	1		1				1	1				
c4	1	1							1				
c5	1	1		1	1		1	1	1	1			1
c6	1	1		1		1	1	1	1	1			1
c7	1	1				1			1		1		
c8	1	1		1		1		1		1			
c9						1				1			
c10	1	1		1					1		1		
c11	1	1					1			1			
c12			1				1	1	1				1

c13			1				1					1	1
c14							1						1
c15			1				1						1
$\sum$	10	10	3	6	2	4	8	5	8	5	2	2	6
%	67	67	20	40	13	27	53	33	53	33	13	13	40

6 – Assessment Timing and Grading:

Assessment Method		Timing	Grade (Degrees)
Mid-Term Exam		7th Week	20
Semester Work	Quizzes	3 Quizzes (one each 4 Weeks)	6
	Reports/Research	Two reports per semester	4
	Tutorials	3 Assignments per semester	6
	Mini project	Once per semester	4
Practical Exam		15th Week	20
Written Exam		16th Week	40
Total			**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books

- Rabie, M. G. (2009) Fluid Power Engineering, NY: McGraw-Hill Professional.

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.:

- http://www.moog.com/, (Last accessed January 2020)
- http://www.boschrexroth.com/en/xc/, (Last accessed January 2020)
- https://www.mgacontrols.com/products/pneumatics/, (Last accessed January 2020)
- http://www.eaton.com/Eaton/index.htm, (Last accessed January 2020)
- http://www.nfpa.com/, (Last accessed January 2020)

8 – Facilities required for teaching and learning:

- Fluid Power Lab.
- Lecture and Exercise rooms equipped with projection and sound systems.
- Computer, Data show and Computer programs; Automation studio, Marex, Rexroth hydraulic trainer, Rexroth hydraulic element animation and TK-Solver.
- High speed internet and communication facilities for distance learning.

Course coordinator: Prof. M Galal Rabie
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn438: Advanced Casting Techniques

A- Affiliation

Relevant program:	Manufacturing Engineering & Production Technology BSc Program
Department offering the program:	Manufacturing Engineering & Production Technology Department
Department offering the course:	Manufacturing Engineering & Production Technology Department
Date of specifications approval:	August 2020

B - Basic Information

Title: Advanced Casting Techniques	**Code:** MNFn438	**Level:** Senior 2, First Semester	
Credit Hours: 3	**Lectures:** 2	**Tutorial:** 1	**Practical:** 2
	Pre-requisite: MNFn223		

C - Professional information

1 – Course Learning Objectives:

By the end of this course the students should demonstrate the knowledge and understanding of the advanced casting techniques and processes. Advanced casting methods of different materials and alloys.

2 – Competencies:

c1- Near Net Shape. (C1, C3, C4, C8).
c2- High-rate pressure die casting. (C1, C3, C4, C8, C13)
c3- Aluminum casting alloys for automotive. (C1, C3, C4, C12, C14)
c4- Aluminum casting alloys for aircrafts. (C1, C3, C4, C8, C14)
c5- Copper alloys for valves and machine parts (C1, C3, C5, C10, C11).
c6- Vacuum melting and vacuum pouring techniques (C1, C3, C4, C10, C14).
c7- Slag metal refining of steels (C1, C5, C6, C10, C13)
c8- Single crystal castings (C1, C3)
c9- Choosing and differentiating between the methods of advanced casting techniques. (C1, C8, C12)
c10- Designing the method needed for the advanced casting components (C3, C4, C14).
c11- Analyze the characteristics of advanced casting components (C5, C9, C14)
c12- Investigate the failure of components, systems, and processes (C6)
c13- Design, assemble, operate, and test the advanced casting components (C1, C3, C14)
c14- Calculate the characteristics of advanced casting components (C1, C5).
c15- Use computer software to design and calculate the advanced casting components (C5, C6, C14).
c16- Use experimental facilities to investigate the defects and evaluate the characteristics of the advanced casting component (C12, C13, C14).
c17- Work in a team and involve in group discussion and seminars (C1, C3).
c18- Communicate effectively and present data and results orally and in written form (C3).
c19- Search for information in references and internet (C7).
c20- Practice self-learning (C7, C9).

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Week	Topics	Lecture hours	Tutorial hours	Practical hours
1	➢ Near Net Shape	2	1	2
2	➢ High rate pressure die casting	1	-	1
2	➢ Aluminum casting alloys for automotive	1	1	1
3	➢ Aluminum casting alloys for aircrafts	2	-	2
4	➢ Copper alloys for valves and machine parts	1	1	1
4	➢ Vacuum melting and vacuum pouring techniques.	1	2	2
5	➢ Slag metal refining of steels	1	-	1
5	➢ Single crystal castings	1	1	1
6	➢ Choosing and differentiating between the methods of advanced casting techniques	1	-	1
7	Assessment (Mid-Term Exam)	2	-	-
8	➢ Designing the method needed for the advanced casting components	2	2	3
9	➢ Analyze the characteristics of advanced casting components	1	-	1
9	➢ Investigate the failure of components, systems and processes	1	-	1
10	➢ Design, assemble, operate, and test the advanced casting components	2	2	1
11	➢ Calculate the characteristics of advanced casting components	2	-	3
12	➢ Use computer software to design and calculate the advanced casting components	1	1	1
12	➢ Use experimental facilities to investigate the defects and evaluate the characteristics of the advanced casting component	1	2	2
13	➢ Work in a team and involve in group discussion and seminars	1	-	1
13	➢ Communicate effectively and present data and results orally and in written form	1	1	1
14	➢ Search for information in references and internet	1	-	1
15	➢ Practice self-learning	2	-	1
	Total hours	**30**	**14**	**28**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies																			
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13	c14	c15	c16	c17	c18	c19	c20
Near Net Shape	1		1		1	1				1			1	1		1		1	1	
High-rate pressure die casting		1	1	1		1	1			1	1	1	1	1		1		1	1	1
Aluminum casting alloys for automotive	1	1		1		1	1			1		1	1	1		1				1
Aluminum casting alloys for aircrafts	1	1	1	1			1	1		1		1	1	1		1	1	1	1	1
Copper alloys for valves and machine parts	1	1			1	1	1	1		1	1		1	1			1	1		
Vacuum melting and vacuum pouring techniques.			1				1	1					1	1	1		1		1	1
Slag metal refining of steels			1	1	1	1	1	1		1	1		1	1		1			1	
Single crystal castings	1	1					1	1		1		1	1	1				1	1	1
Choosing and differentiating between the methods of advanced casting techniques	1		1			1		1		1				1		1	1	1	1	1
Designing the method needed for the advanced casting components		1		1	1	1	1			1	1		1	1			1			1

Analyze the characteristics of advanced casting components	1	1	1			1	1			1		1	1	1	1	1	1	1	1	1
Investigate the failure of components, systems and processes	1		1		1	1		1					1	1		1	1	1	1	
Design, assemble, operate, and test the advanced casting components	1	1		1			1			1	1		1	1			1	1	1	1
Calculate the characteristics of advanced casting components		1	1		1	1	1	1		1	1	1	1	1	1	1	1	1	1	
Use computer software to design and calculate the advanced casting components			1	1	1	1	1	1		1		1	1	1	1	1	1	1		
Use experimental facilities to investigate the defects and evaluate the characteristics of the advanced casting component	1	1				1		1		1	1		1	1		1	1		1	1
Work in a team and involve in group discussion and seminars		1	1	1	1	1	1	1		1		1	1	1	1	1	1	1	1	
Communicate effectively and present data and results orally and in written form	1		1			1		1		1	1		1	1		1	1		1	
Topics Covering Competencies	10	11	12	8	8	14	14	12	3	16	8	8	17	18	5	13	13	12	14	10
% Topics Covering Competencies	56	61	67	44	44	78	78	67	17	89	44	44	94	100	28	72	72	67	78	56

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods						Learning Methods			Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Laboratory & Experiments	Research, Reports & Assignments	Self-Learning	Modeling and Simulation	Written Exam	Tutorials	Practical Exam	Quizzes	Research & Presentations	Mini Project Report
c1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
c2	1	1	1	1	1	1	1	1	1	1	1	1	1		
c3	1	1	1	1	1	1	1		1	1	1	1	1	1	
c4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
c5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
c6	1	1	1	1		1	1		1	1	1	1	1	1	1
c7	1	1	1	1		1	1		1	1	1	1	1	1	1
c8	1	1	1	1		1	1	1	1	1	1	1	1		
c9	1	1	1	1		1	1		1	1	1		1		
c10	1	1	1	1		1	1		1	1	1	1	1		
c11	1	1	1	1		1	1	1	1	1	1	1	1	1	1

c12	1	1	1	1		1	1	1	1	1		1	1	1	1
c13	1	1	1	1		1	1	1	1	1		1	1	1	
c14	1	1	1	1	1	1	1		1	1		1	1	1	
c15	1			1			1		1			1	1	1	
c16	1	1	1	1		1	1	1	1	1		1	1	1	1
c17			1		1	1	1	1		1		1	1	1	1
c18		1	1				1	1		1		1	1	1	1
c19			1				1			1	1	1	1	1	1
c20		1	1		1	1	1		1	1		1	1		
∑	16	17	19	16	8	17	20	11	17	19	12	19	20	15	8
%	80	85	95	80	40	85	100	55	85	95	60	95	100	75	40

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Semester work: seminars, quizzes, assignments, and term papers	Bi-Weekly	20
Mid-term written exam.	7th Week	20
Practical exam	15th Week	20
Written exam	16th Week	40
Total		**100**

7 – List of references:

7-1 Course notes:

- Advanced Casting Techniques (Lecture Notes)

7-2 Required books:

- Pond, Roberts, " J. Introduction to Engineering Technology", Prentice Hall, 2002 (ISBN)780135 154304)
- Dejarms, ETAL, "Materials and Processes in Manufacture" Mc Milan, 2004 (G780 470-55120).

7-3 Recommended books:

- None

7-4 Periodicals, Web sites, etc.:

- None

8 – Facilities required for teaching and learning:

- Lecture room
- Computer, Data show.

Course coordinator:	Dr. Mohammed Raafat
Head of the Department:	Dr. Metwally Abd Elghaffar
Date:	August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn461: Project-2a

A- Affiliation

Relevant program: Manufacturing Engineering &Production Technology BSc Program
Department offering the program: Manufacturing Engineering &Production Technology Department
Department offering the course: Manufacturing Engineering &Production Technology Department.
Date of specifications approval: August 2020

B - Basic Information

Title: Project-2a **Code:** MNFn461 **Level:** Level 4, First term
Credit Hours: 2 **Lectures:** 0 **Tutorial:** 2 **Practical:** 4
Pre-requisite: MNFn361 + 132 credit

C - Professional information

1 – Course Learning Objectives:

The graduation project is a conclusion work. Its aim is to show the ability of student to integrate the knowledge and skills acquired during program study to perform the assigned task. The project ideas may be initiated from the following:

- Projects that involve further investigation of a subject area discussed in a prior course.
- Project that involves a technical area in which the student has no prior course work or experience.
- Projects that involve a real local problem in the student's home or place of employment.
- Projects proposed by department faculty members.

2 –Competencies:

c1- Time management to carry out the assigned task. (C1, C2)
c2- Use of knowledge and basics of mathematics and sciences appropriate to the project (C1)
c3- Compare different techniques of solving problems and choosing the proper one to perform the task (C4).
c4- Apply of the appropriate technological means (C3).
c5- List of the assembly, disassembly, and calibration procedures (C1, C3)
c6- Apply knowledge of different engineering disciplines in technological applications (C6)
c7- Test the function of the equipment (project) according to codes and standards and evaluate its performance (C13, C14)
c8- Prepare the report of the project and a power point presentation (C8, C11)
c9- Prepare all the technical documents and the user manual of the project (C14)
c10- Present a report that includes all information about the project. (C11)
c11- Determine technical specifications of different items of the project. (C4, C12).
c12- Management of manpower of the teamwork, assigning different tasks for each member to be fulfilled according to the time schedule, and different resources. (C7, C9).
c13- Practice self-learning (C5, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Topics	Lecture hours	Tutorial hours	Practical hours
• The project requires the following steps to be carried out: - The literature surveys. - Choice of the project construction based on some existing variants. - Preparation of the constructional drawings of parts. - Design of the most dangerous parts. - Preparation of the process sheets to manufacture the parts. - Assembly and testing of the project. - Calibration of some parameters (if any). - Preparation of the report - Preparation of the presentation.	-	28	56
Total hours	**-**	**28**	**56**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies												
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13
The project requires the following steps to be carried out: The literature survey, Choice of the project construction based on some existing variants, Preparation of the constructional drawings of parts, Design of the most dangerous parts, Preparation of the process sheets to manufacture the parts, Assembly and testing of the project, Calibration of some parameters (if any), Preparation of the report, Preparation of the presentation.	1	1	1	1	1	1	1	1	1	1	1	1	1
Topics Covering Competencies	1	1	1	1	1	1	1	1	1	1	1	1	1
% Topics Covering Competencies	100	100	100	100	100	100	100	100	100	100	100	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods							Learning Methods				Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Site Visits	Projects	Modeling and Simulation	Self-Learning	Cooperative	Research & Reports	Seminars	Quizzes	Reports	Mid Term Exam	Practical Exam	Written Exam
c1			1	1							1						
c2		1	1	1		1		1			1			1			
c3		1	1	1		1		1			1			1			
c4		1	1	1		1		1			1			1			
c5		1	1	1		1		1			1			1			
c6		1		1		1	1	1			1	1					
c7		1		1		1	1	1			1	1					
c8		1		1		1	1	1			1	1					

c9		1		1		1	1	1			1	1					
c10		1	1				1				1	1		1			
c11		1	1				1				1	1		1			
c12		1	1				1				1	1		1			
c13		1	1			1	1				1	1		1			
Σ	0	13	9	9	0	9	8	8	0	0	13	8	0	8	0	0	0
%	0	100	69	69	0	69	62	62	0	0	100	62	0	62	0	0	0

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Year Work	14^{th} Week	60
Final Oral Exam	Before Written Exams	40
Total		**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books:

- Tentative, depending on the topic of each project.

7-3 Recommended books:

- Black, Bruce. Workshop processes, practices and materials. Routledge, 2015.
- Sharma, P. C. A Textbook of Production Technology (Manufacturing Processes): Manufacturing Processes. S. Chand Publishing, 2007.
- Robert, J. Pond, and L. Rankinen Jeffrey. *Introduction to engineering technology*. Pearson, 2013.

7-4 Periodicals, Web sites, etc.:

- https://www.coursera.org/learn/research-methods
- https://www.coursera.org/learn/how-to-write-a-scientific-paper
- https://www.coursera.org/specializations/english-for-research-publication-purposes
- https://www.coursera.org/learn/sciwrite
- https://www.edx.org/course/quantitative-and-qualitative-research-for-beginners?index=product&queryID=79bd4428e749621506e769504f52487c&position=1
- https://www.edx.org/course/scientific-methods-and-research?index=product&queryID=142f71d2e7003f7450b4d7baca17cf88&position=4
- https://www.edx.org/course/research-methods-an-engineering-approach?index=product&queryID=142f71d2e7003f7450b4d7baca17cf88&position=5

8 – Facilities required for teaching and learning:

- Lecture room
- Computer, Data show.

Course coordinator: Dr. Maher Khalifa
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Modern Academy
for Engineering and Technology in Maadi

Course Specification
MNFn462: Project-2b

A- Affiliation

Relevant program: Manufacturing Engineering &Production Technology BSc Program
Department offering the program: Manufacturing Engineering &Production Technology Department
Department offering the course: Manufacturing Engineering &Production Technology Department.
Date of specifications approval: August 2020

B - Basic Information

Title: Project-2b **Code:** MNFn462 **Level:** Level 4 ,10th semester
Credit Hours: 2 **Lectures:** - **Tutorial:** 2 **Practical:** 4
Pre-requisite: MNFn461

C - Professional information

1 – Course Learning Objectives:

The graduation project is a conclusion work. Its aim is to show the ability of student to integrate the knowledge and skills acquired during program study to perform the assigned task. The project ideas may be initiated from the following:

- Projects that involve further investigation of a subject area discussed in a prior course.
- Project that involves a technical area in which the student has no prior course work or experience.
- Projects that involve a real local problem in the students' home or place of employment.
- Projects proposed by department faculty members.

2 – Competencies:

c1- Time management to carry out the assigned task. (C1, C2)
c2- Use of knowledge and basics of mathematics and sciences appropriate to the project (C1)
c3- Compare different techniques of solving problems and choosing the proper one to perform the task (C4).
c4- Apply of the appropriate technological means (C3).
c5- List of the assembly, disassembly, and calibration procedures (C1, C3)
c6- Apply knowledge of different engineering disciplines in technological applications (C6)
c7- Test the function of the equipment (project) according to codes and standards and evaluate its performance (C13, C14)
c8- Prepare the report of the project and a power point presentation (C8, C11)
c9- Prepare all the technical documents and the user manual of the project (C14)
c10- Present a report that includes all information about the project. (C11)
c11- Determine technical specifications of different items of the project. (C4, C12).
c12- Management of manpower of the teamwork, assigning different tasks for each member to be fulfilled according to the time schedule, and different resources. (C7, C9).
c13- Practice self-learning (C5, C10)

This course contributes to the following program competencies: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13 & C14

3 – Contents:

Topics	Lecture hours	Tutorial hours	Practical hours
● The project requires the following steps to be carried out: - The literature surveys. - Choice of the project construction based on some existing variants. - Preparation of the constructional drawings of parts. - Design of the most dangerous parts. - Preparation of the process sheets to manufacture the parts. - Assembly and testing of the project. - Calibration of some parameters (if any). - Preparation of the report - Preparation of the presentation.	-	28	84
Total hours	**-**	**28**	**56**

4 – Course content/Course Competencies mapping matrix:

Topics	Course Competencies												
	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	12	c13
The project requires the following steps to be carried out: The literature survey, Choice of the project construction based on some existing variants, Preparation of the constructional drawings of parts, Design of the most dangerous parts, Preparation of the process sheets to manufacture the parts, Assembly and testing of the project, Calibration of some parameters (if any), Preparation of the report, Preparation of the presentation.	1	1	1	1	1	1	1	1	1	1	1	1	1
Topics Covering Competencies	1	1	1	1	1	1	1	1	1	1	1	1	1
% Topics Covering Competencies	100	100	100	100	100	100	100	100	100	100	100	100	100

5 – Teaching, Learning, and Assessment Methods:

Course Competencies	Teaching Methods							Learning Methods				Assessment Method					
	Lecture	Presentations & Movies	Discussions & seminars	Tutorials	Problem solving	Site Visits	Projects	Modeling and Simulation	Self-Learning	Cooperative	Research & Reports	Seminars	Quizzes	Reports	Mid-Term Exam	Practical Exam	Written Exam
c1			1	1							1						
c2		1	1	1		1		1			1			1			
c3		1	1	1		1		1			1			1			
c4		1	1	1		1		1			1			1			
c5		1	1	1		1		1			1			1			
c6		1		1		1	1	1			1	1					
c7		1		1		1	1	1			1	1					
c8		1		1		1	1	1			1	1					

c9		1		1		1	1	1			1	1					
c10		1	1				1				1	1		1			
c11		1	1				1				1	1		1			
c12		1	1				1				1	1		1			
c13		1	1			1	1				1	1		1			
Σ	0	13	9	9	0	9	8	8	0	0	13	8	0	8	0	0	0
%	0	100	69	69	0	69	62	62	0	0	100	62	0	62	0	0	0

6 – Assessment Timing and Grading:

Assessment Method	Timing	Grade (Degrees)
Year Work	14th Week	60
Oral Exam	3 Weeks after final exams	40
Total		**100**

7 – List of references:

7-1 Course notes:

- None

7-2 Required books:

- Tentative, depending on the topic of each project.

7-3 Recommended books:

- Black, Bruce. Workshop processes, practices and materials. Routledge, 2015.
- Sharma, P. C. A Textbook of Production Technology (Manufacturing Processes): Manufacturing Processes. S. Chand Publishing, 2007.
- Robert, J. Pond, and L. Rankinen Jeffrey. *Introduction to engineering technology*. Pearson, 2013.

7-4 Periodicals, Web sites, etc.:

- https://www.coursera.org/learn/research-methods
- https://www.coursera.org/learn/how-to-write-a-scientific-paper
- https://www.coursera.org/specializations/english-for-research-publication-purposes
- https://www.coursera.org/learn/sciwrite
- https://www.edx.org/course/quantitative-and-qualitative-research-for-beginners?index=product&queryID=79bd4428e749621506e769504f52487c&position=1
- https://www.edx.org/course/scientific-methods-and-research?index=product&queryID=142f71d2e7003f7450b4d7baca17cf88&position=4
- https://www.edx.org/course/research-methods-an-engineering-approach?index=product&queryID=142f71d2e7003f7450b4d7baca17cf88&position=5

8 – Facilities required for teaching and learning:

- Lecture room
- Computer, Data show.

Course coordinator: Dr. Maher Khalifa
Head of the Department: Dr. Metwally Abd Elghaffar
Date: August 2020

Appendix 2

شروط النجاح والتخرج وقواعد حساب التقدير

الآتي يعد مستخرج من الشق القانوني لائحة الأكاديمية الحديثة للهندسة والتكنولوجيا بالمعادي للدراسة بالساعات المعتمدة (لائحة ٢٠٣٠)

مادة [٣]
تسري أحكام هذه اللائحة على الطلاب الجدد الذين يلتحقون بالأكاديمية بعد تاريخ التصديق عليها (مايو ٢٠٢٠)

مادة [٥]
مدة الدراسة لنيل درجة البكالوريوس خمس سنوات موزعة على ١٠ فصول دراسية رئيسية ويمكن للطالب إنهاء متطلبات الحصول على درجة البكالوريوس المذكورة في المادة (٢٩) قبل ذلك بفصل دراسي واحد على الأكثر.

مادة [٦]: مشروع التخرج
يكون المشروع مقسماً على فصلين دراسيين متتاليين ليس منهما الفصل الصيفي لجميع البرامج عدا برنامج هندسة العمارة فيتم تسجيل المشروع في الفصل الدراسي الاخير قبل التخرج.

مادة [١٨]
إذا انقطع الطالب عن الدراسة لمدة أقصاها ثلاثة فصول دراسية رئيسية بعذر مسبق يقبله مجلس إدارة الاكاديمية فيمكن له ان يواصل دراسته على ان تحسب له المقررات السابق له النجاح فيها ويخضع تخرجه لأية متطلبات جديدة في الفصل الذي اعيد قيده فيه.

مادة [٢٦]: مواعيد الدراسة والقيد
يقسم العام الدراسي بالأكاديمية إلى ثلاثة فصول دراسية على النحو التالي:

أ) الفصل الدراسي الرئيسي الأول (الخريف): يبدأ في بداية العام الدراسي في شهر سبتمبر ولمدة لا تقل عن ١٤ أسبوع.
ب) الفصل الدراسي الرئيسي الثاني (الربيع): يبدأ عقب إجازة منتصف العام في شهر فبراير ولمدة لا تقل عن ١٤ أسبوع.
ج) الفصـل الصيفـي: يبدأ أواخر شهر يونيو بعد انتهاء الفصل الدراسي الثاني ولمدة لا تقل عن ٧ أسابيع.

مادة [٢٧]
شروط التسجيل للدراسة بنظام الساعات المعتمدة:

أ) حتى ١٨ ساعة معتمدة في الفصل الدراسي الرئيسي للطالب الحاصل على معدل تراكمي ≥٢.
ب) حتى ١٤ ساعة معتمدة في الفصل الدراسي الرئيسي للطالب الحاصل على معدل تراكمي < ٢.
ج) حتى ٢١ ساعة معتمدة في الفصل الدراسي الرئيسي للطالب الحاصل على معدل تراكمي ≥ ٣.
د) حتى ٦ ساعات معتمدة لأي طالب في الفصل الصيفي ويمكن التسجيل حتى ٩ ساعات بموافقة المرشد الأكاديمي إذا استدعت متطلبات التخرج ذلك.

ويتم إعداد خريطة للمقررات مع تقسيم المقررات على المستويات الدراسية التصاعدية المحددة بالمادة [٢٨]. ويتم التسجيل طبقا لخريطة المقررات مع الالتزام بتسجيل مقررات المستويات الأدنى واستكمال التسجيل من المستويات الأعلى.
كما يتم تحصيل رسوم الخدمة التعليمية كل فصل دراسي ويكون حسابها طبقاً لعدد الساعات المعتمدة التي يسجل فيها الطالب في كل فصل دراسـي، وبحد أدنى ما يقابل رسـوم خدمة تعليمية لعدد ١٢ سـاعة معتمدة، إلا إذا كان عدد السـاعات المعتمدة المتبقية للطالب للحصـول على درجة البكالوريوس أقل من ذلك فتتم محاسـبته على السـاعات المعتمدة المتبقية فقط للدراسـة. وتكون رسـوم الخدمة التعليمية للفصـل الصـيفي طبقاً لعدد الساعات المعتمدة التي يسجل فيها الطالب.

مادة [٢٨]: مستويات الدراسة
يوضح الجدول التالي موقع الطالب ومستويات الدراسة معتمداً على عدد الساعات المعتمدة التي ينتهي الطالب من دراستها.

جدول رقم (1)

المستوى الدراسي	تعريف موقع الطالب بنظام الدراسة	نسبة عدد الساعات المعتمدة التي اجتازها الطالب
صفر	Freshman	من٠% حتى ٢٠%
الأول	Sophomore	أكثر من٢٠% حتى ٤٠%
الثاني	Junior	أكثر من٤٠% حتى ٦٠%
الثالث	Senior 1	أكثر من٦٠% حتى ٨٠%
الرابع	Senior 2	أكثر من٨٠% حتى ١٠٠%

مادة [٢٩]
متطلبات الحصول على درجة البكالوريوس:

أ) الاجتياز بنجاح لمقررات مكافئة لعدد (١٦٥) ساعة معتمدة وبمعدل تراكمي لا يقل عن (٢).
ب) النجاح في مشروع التخرج.
ج) اجتياز المقررات التي يكون التقييم فيها ناجح / راسب (Pass/Fail) ولا تحتسب ضمن المعدل التراكمي مثل مقررات التدريب الصيفي للمستوي صفر والمستوي الأول ، ومقررات التدريب الصناعي للمستوى الثاني والثالث.

مادة [٣١]
شروط التعديل والإلغاء والانسحاب وإيقاف القيد:

أ) يحق للطالب تغيير مقررات سجل فيها، بأخرى خلال أسبوعين من بدء الدراسة، ويحق له سحب المقرر خلال أسبوعين من بدء الدراسة مع استرداد الرسوم ولا يسري ذلك على الفصل الصيفي.
ب) يحق للطالب الانسحاب من المقرر خلال ثمانية أسابيع على الأكثر من بداية الدراسة بالفصلين الأول والثاني وثلاثة أسابيع على الأكثر في الفصل الصيفي وفي هذه الحالة لا ترد له الرسوم.
ج) الطالب الذي يرغب في الانسحاب من فصل دراسي، لظروف المرض أو بعذر تقبله الأكاديمية، عليه التقدم بطلب لشئون الطلاب، ويحصل على موافقة مجلس الأكاديمية على الانسحاب، دون استرداد ما سبق سداده من رسوم، ويكون هذا الانسحاب قبل انعقاد

الامتحان النهائي لهذا الفصل. ويقوم بإعادة المقررات التي سجل فيها، في فصل دراسي لاحق دراسة وامتحاناً بعد سداد رسوم الخدمة التعليمية المقررة، ولا تحتسب عليه مرة رسوب.

مـادة [٣٢]

تقديــرات المقــررات الدراسيـــة:

أ) تقدر نقاط كل مقرر على النحو الموضح بالجدول رقم (٢):

جدول رقم (٢)

التقدير	عدد النقاط	النسبة المئوية المناظرة
A+	4.0	٩٧% وأعلى
A	4.0	٩٣% حتى أقل من ٩٧%
A-	3.7	٨٩% حتى أقل من ٩٣%
B+	3.3	٨٤% حتى أقل من ٨٩%
B	3.0	٨٠% حتى أقل من ٨٤%
B-	2.7	٧٦% حتى أقل من ٨٠%
C+	2.3	٧٣% حتى أقل من ٧٦%
C	2.0	٧٠% حتى أقل من ٧٣%
C-	1.7	٦٧% حتى أقل من ٧٠%
D+	1.3	٦٤% حتى أقل من ٦٧%
D	1.0	٦٠% حتى أقل من ٦٤%
F	صفر	أقل من ٦٠%

مـادة [٣٣]

حساب متوسط النقاط: (GPA)

أ) عند إعادة الطالب دراسة مقرر سبق أن حصل فيه على تقدير (F)يحتسب له التقدير الذي حصل عليه في الإعادة بحد أقصى (B+)وعند حساب المعدل التراكمي يحتسب له التقدير الأخير فقط على أن يذكر كلا التقديرين في سجل الطالب الأكاديمي.

ب) تحسب النقاط التي حصل عليها الطالب في كل مقرر على إنها عدد الساعات المعتمدة للمقرر مضروبة في النقاط التي حصل عليها الطالب حسب جدول التقديرات المذكور بالمادة رقم **[٣٢]**.

ت) يحسب متوسط نقاط أي فصل دراسي (Semester GPA)، على أنه ناتج قسمة مجموع النقاط التي حصل عليها الطالب في هذا الفصل، مقسوماً على مجموع الساعات المعتمدة لهذه المقررات.

ث) يحسب متوسط النقاط التراكمي (Cumulative GPA) عند نهاية كل فصل دراسي على أنه ناتج قسمة مجموع كل نقاط المقررات التي درسها الطالب على مجموع الساعات المعتمدة لهذه المقررات.

ج) متوسط النقاط التراكمي (Cumulative GPA) عند نهاية الفصل الدراسي الأخير للطالب هو الأساس في تحديد تقدير التخرج والنسبة المئوية.

مـادة [٣٤]

مراتب الشرف ومنح التفوق:

أ) تمنح مرتبة الشرف للطالب الذي لا يقل المعدل التراكمي عن ٣,٣ مع تحقيق مثل هذا المعدل على الأقل خلال جميع فصول الدراسة ببرامج الساعات المعتمدة أو عند التحاقه بالدراسة من البرامج ذات الفصلين الدراسيين وذلك بعد عمل مقاصة ويشترط لمنح مرتبة الشرف ألا يكون الطالب قد حصل على تقدير (F) في أي مقرر خلال دراسته الجامعية.

مـادة [٣٥]

الإنذار الأكاديمي - الفصل من الدراسة - آليات رفع المعدل التراكمي:

أ) إذا انخفض المعدل التراكمي للطالب إلى أقل من (٢) في أي فصل دراسي يوجه له إنذار أكاديمي يقضي بضرورة رفع الطالب لمعدله التراكمي إلى (٢) على الأقل.

ب) يُفصل الطالب المنذر أكاديمياً من الدراسة ببرامج الساعات المعتمدة إذا تكرر انخفاض معدله التراكمي عن (٢) **لمدة** ستة فصول دراسية رئيسية متتابعة.

ت) إذا لم يحقق الطالب شروط التخرج خلال الحد الأقصى للدراسة وهو عشر سنوات يتم فصله.

ث) يجوز لمجلس الأكاديمية أن ينظر في إمكانية منح الطالب المعرض للفصل نتيجة عدم تمكنه من رفع معدله التراكمي إلى (٢) على الأقل فرصة واحده وأخيره مدتها فصلين دراسيين رئيسيين لرفع معدله التراكمي إلى (٢) وتحقيق متطلبات التخرج إذا كان قد أتم بنجاح دراسة ٨٠% من الساعات المعتمدة المطلوبة للتخرج على الأقل.

ج) يجوز للطالب إعادة دراسة المقررات التي سبق نجاحه فيها بغرض تحسين المعدل التراكمي وتكون الإعادة دراسة وامتحانا ويُحتسب له التقدير الأعلى وذلك بحد أقصى ٥ مقررات إلا إذا كان التحسين لغرض رفع الإنذار الأكاديمي أو تحقيق متطلبات التخرج وفي جميع الأحوال يُذكر كلا التقديرين في سجله الأكاديمي.

مـادة [٣٧]

أسلوب تقييم الطالب:

أ) يعقد لكل مقرر امتحان تحريري في منتصف الفصل الدراسي لا تقل درجته عن ٢٠% من مجموع درجات المقرر.

ب) يعقد لكل مقرر امتحان تحريري في نهاية الفصل الدراسي لا تقل درجته عن ٤٠% من درجات المقرر، مع وضع القواعد والشروط المنظمة والتي تؤكد على وجوب حصول الطلاب على نسبة لا تقل عن ٤٠% في الامتحان التحريري من إجمالي درجته، لكي يعد ناجحا حتى لو كان مجموع درجاته في المقرر أعلي من الحد الأدني للنجاح. وفي حالة رسوب الطالب لهذا السبب يسجل (FF) أي راسب لرسوبه في الامتحان التحريري.

ت) يضـــع مجلس الأكاديمية القواعد المنظمة لتوزيع درجات أي مقرر طبقا لطبيعته على النحو التالي: الامتحانات الدورية الســـريعة (عددها ودرجة كل منها)، الأعمال الإضـافية التي يقوم بها الطالب، التقارير المقدمة عن أبحاث قام بإعدادها، الاختبارات العملية، الامتحان النهائي للمقرر.

ث) مدة الامتحان التحريري النهائي لاتقل عن ساعتين ويحدد مجلس الأكاديمية مدة الامتحان لكل مقرر حسب طبيعته.

ج) يعد الطالب راسباً إذا كان مجموع درجاته في المقرر أقل من ٦٠% أو لم يحضـر الامتحان التحريري في نهاية الفصـل الدراسـي لحرمانه من الدخول لتجاوز نسبة الغياب أو بقرار تأديبي. وفي حالة عدم أداء الطالب للامتحان النهائي للفصل الدراسي بعذر تقبله الأكاديمية يسمح للطالب إعادة تسجيل المقرر دراسة وامتحانا مع احتساب التقدير الذي يحصل عليه كاملا.

ح) تقيم بعض المقررات مثل التدريب العملي للمسـتوي صـفر والمسـتوى الأول ، والتدريب الصـناعي للمسـتوى الثاني والثالث على أساس ناجح / راسب (Pass/Fail) ولا تدخل في حساب المعدل التراكمي.

خ) يتم توثيق قرارات مجلس الأكاديمية المفسرة لهذه المادة في لائحة تنفيذية ملزمة ومعلنة.

مـادة [٣٨]

نسبـة الحضـور والحرمـان من الامتحـان والأعـذار:

أ) الحد الأدنى لنســبة الحضــور للمقرر لا تقل عن ٧٥% ليســمح للطالب بدخول الامتحان النهائي للمقرر .وفي حالة حرمانه من الامتحان يعتبر راسباً (يعطى درجة صفر في درجة الامتحان النهائي للمقرر).

ب) يحق لمجلس الأكاديمية حرمان الطالب من التقدم للامتحان كله أو في بعض المقررات إذا رأى أن انتظامه غير مرضي طبقاً لأحكام اللائحة الداخلية .وفي هذه الحالة يعتبر الطالب راسبا في المقررات التي حرم من التقدم للامتحان فيها.

جدول رقم (٣)

مفتـــــــاح الكـــــــــود $N_1 N_2 N_3$ $L_1 L_2 L_3$	
١- $L_1 L_2 L_3$ ثلاثة حروف ترمز إلى القسم والتخصص المسئول عن تدريس المقرر	
ARC	قسم العمارة
CMP	قسم الحاسبات
ELC	قسم الاتصالات
MTH	تخصص الرياضيات قسم العلوم الأساسية
PHY	تخصص الفيزياء قسم العلوم الأساسية
MEC	تخصص الميكانيكا قسم العلوم الأساسية
CHE	تخصص الكيمياء قسم العلوم الأساسية
MNF	قسم هندسة التصنيع
GEN	تخصص المواد الإنسانية وتتبع وكيل الأكاديمية إشرافيا
٢- N_1 رقم يرمز إلى المستوى التي تدرس به المادة	
المستوى الأول	$N_1 = 1$
المستوى الثاني	$N_1 = 2$
المستوى الثالث	$N_1 = 3$
المستوى الرابع	$N_1 = 4$
المستوى الخامس	$N_1 = 5$
٣- N_2 رقم يرمز إلى نوعية المادة التي ينتمي إليها المقرر	
مادة أساسية أو مادة تحضيرية	$N_2 = 0$
مادة هندسية أساسية	$N_2 = 1$
مادة هندسية تخصصية إجبارية	$N_2 = 2$
مادة هندسية تخصصية اختيارية	$N_2 = 3$
مادة إنسانية إجبارية	$N_2 = 4$
مادة إنسانية اختيارية	$N_2 = 5$
المشروع والندوات والتدريب الصناعي	$N_2 = 6$
٤- N_3 رقم يرمز إلى مسلسل المقرر داخل التخصص	