AIN SHAMS UNIVERSITY – FACULTY OF ENGINEERING (ASU – FoE)

IN COLLABORATION WITH

SCHOOL OF ARCHITECTURE, COMPUTING AND ENGINEERING

BEng (Hons) Mechatronics and Automation Engineering

Programme Handbook

Academic Year 2019-2020

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1 WELCOME AND INTRODUCTION

Congratulations on your enrolment into the BEng (Hons) Mechatronics and Automation Engineering programme – a programme that has been validated by the University of East London (UEL), our collaborative partner in the UK. UEL is an internationally renowned university which just like Ain Shams University (ASU) strives to achieve the highest possible standard of academic excellence. Apart from being one of the UK's most diverse and fastest growing universities, UEL is a global learning community with internationally recognised research. We are most confident that our collaboration with UEL will yield significant academic benefits both for ASU as an institution, and for the students who will enrol the BEng (Hons) Mechatronics and Automation Engineering programme.

Our vision at ASU is to provide our students with a holistic education to develop them into well-rounded individuals who excel both academically and professionally in areas such as leadership, entrepreneurship, social and personal development and growth. The programme is thus aligned closely with the tenets of the National Authority for Quality Assurance and Accreditation of Education (NAQAAE). The framework for NAQAAE was established in 2006 by a presidential decree to enhance the quality of education in Egypt with a mandate to ensure the development of basic reference standards for education - National Academic Reference Standards (NARS).

According to the NARS, quality education that is based on well-defined standards is one of the most important determinants of national sustainable development in Egypt. Therefore, the requirements of the NARS form the basis for the development of the Mechatronics and Automation Engineering programme at ASU. Thus, the programme is designed to inspire students to be innovative and creative by using appropriate teaching and learning technologies and pursuing independent and life-long learning. Graduates of the programme are expected to be able to apply knowledge of mathematics and natural sciences to develop ways to economically utilize the materials and forces of nature for the benefit of society.

Our graduates are expected to have productive and very rewarding careers in a variety of capacities. The graduate of the program is expected to get a job in one of the following positions:

- Embedded systems
- Projects using Heavy earthmoving equipment and hydraulic and pneumatic machines
- Sales engineer for robotics and automation
- Automated manufacturing and production systems,
- Control engineer
- Maintenance engineer
- Robotics and automation industry
- Automobiles Industry
- Bionics system design

We are confident that you have made the right choice to continue your lifelong learning journey with ASU. We promise to make your time here with us a most enriching educational experience for you.

Assistant. Prof. Dr. Hany El sayed Saad
Assistant. Prof. Dr. Shady Ahmed Maged

Programme Leaders

2 INTRODUCTION TO THE PROGRAMME

Programme Philosophy

The BSc in Mechatronics and Automation program, introduced at Ain Shams University's Faculty of Engineering in 2013, aims to prepare mechanical engineers who are capable of generating effective solutions by using engineering approaches in the field of Mechatronics Engineering. The graduates of the program will be well versed in technology, social, and environmental issues. The Mechatronics and Automation program integrates multidisciplinary fields of science that includes mechanical engineering, Electronics, computer Science and control Engineering to enhance the safety, performance, efficiency, and the ability of solving real life problems associated with mechanical systems, industrial automation, mechatronic in automotive applications, mechatronic in healthcare and biomedical devices, nano/micro mechatronic systems.

The BEng (Hons) Mechatronics and Automation Engineering degree provides four different fields in which the students in this program can specialize. These four fields are: Autotronics, Nano-Mechatronics, Industrial Mechatronics, and Bio-Mechatronics. Each concentration includes 5 compulsory courses as the following.

- Autotronics: The concentration is to incorporate elements of mechanical, electrical, electronics, software and safety engineers as applied to the design, manufacture and operation of automobiles
- Nano-Mechatronics: the concentration is to how to integrate electrical and mechanical functionality on the nanoscale
- Industrial Mechatronics: the concentration of this area is to integrate control systems, electrical, electronic systems, computers and mechanical systems in automated manufacturing processes
- Bio-Mechatronics: the concentration aims to integrate parts of biological organisms, mechanical elements, and electronics for improving the quality life of humans. It also encompasses the field of robotics and neuro science

Furthermore, a validated degree via a UK HEI will provide the students with a richer competency and skills-set. Finally, the skills which the students will gain on the programme will enhance the Mechatronics engineering discipline in Egypt and build capacity for sustainable development of the built environment.

Programme duration and modes of study

The BEng (Hons) Mechatronics and Automation Engineering programme has a 4-year full-time or 8-year part-time mode. Students study the same modules in the first two years and select specialised modules in the final two years. In their third year (Level 5), students choose one of four tracks of specialisation,Autotronics field, a Nano-Mechatronics field, Industrial Mechatronics, or a Bio-Mechatronics Engineering field. They study the specific specialisation courses corresponding to the chosen field, and there are offered wide range of technical electives that students can chose from according to their field of interest, and their ambition in their future career.

A student cannot normally continue on a programme after four years of study in full time mode. In exceptional circumstances, this time limit may be extended. Students on Foundation Year programmes may continue after four years in a full time mode.

The time limit for completion of a programme in part time mode is eight years after first enrolment on the programme.

Programme aims and objectives

The main aim of "Mechatronics and automation program" at the "Faculty of Engineering" in "Ain Shams University" are to equip the student with the proper scientific knowledge and develop their skills to:

- Enrich the student's basic theoretical and practical knowledge of mechatronic system components, and design methodologies of mechatronic systems.
- Develop the student's ability to use the state-of-the-art technologies to find affordable, reliable and innovative solutions to improve our daily quality of life.
- Develop the student's ability to work within a multidisciplinary team during the analysis, design and implementation phases of mechatronics engineering projects, while applying ethical standards and environmental considerations.
- Develop the student's ability to conduct Research and Development (R&D) activities to create innovative mechatronic solutions having direct impact on industrial, commercial, and social scales
- Enrich the student's management and business skills to be able to effectively contribute and compete in local, regional and international markets
- Setup and operate automated and/or autonomous production lines which are based on embedded systems, PLCs and SCADA systems.
- Carry out the modern troubleshooting and maintenance techniques relevant to what we call it machine health monitoring (MHM) for both hardware and software or combined mechatronic products.
- Provide four different fields in which the students in this program can specialize in. These four fields are: Autotronics, Nanomechatronics, Industrial Automation, and Bio-mechatronics.

Programme Intended learning outcomes (ILO's)

The graduates of the BEng (Hons) Mechatronics and Automation Engineering program should be able to demonstrate the knowledge and understanding of:

- Concepts & theories of mathematics and sciences, appropriate to the discipline.
- Basics of information and communication technology (ICT)
- Characteristics of engineering materials related to the discipline.
- Principles of design including elements design, process and/or a system related to specific disciplines.
- Methodologies of solving engineering problems, data collection and interpretation
- Quality assurance systems, codes of practice and standards, health and

safety requirements and environmental issues.
- Business and management principles relevant to engineering.
- Current engineering technologies as related to disciplines.
- Topics related to humanitarian interests and moral issues.
- Technical language and report writing
- Professional ethics and impacts of engineering solutions on society and environment
- Contemporary engineering topics.
- The basic concepts and theories of mathematics, sciences, engineering projection and their applications within the field of mechatronics engineering.
- The basics, principles and theories relevant to mechanical engineering, and manufacturing technologies.
- The relevant contemporary issues in electrical engineering, electronics, and communication technology.
- The relevant contemporary issues in information technology, and control theory.
- The layout, the key parameters, system components and measurement system for industrial automation, autotronic, nano-mechatronic, or biomechatronic systems.
- Essentials of problem identification, formulation and solution in the mechanics, electronics and software in their interfacing
- The principles of sustainable design and development within the field of mechatronics engineering and its disciplines.
- The Basic principles and concepts of engineering techniques used in industrial automation, autotronic, nano-mechatronic, or biomechatronic systems
- Contemporary engineering technologies and issues in the specialization field (industrial automation, autotronic, nano-mechatronic, or biomechatronic systems).
- The hardware, software and networks of computer systems used in industry related to the specialization field (industrial automation, autotronic, nano-mechatronic, or biomechatronic systems) if exist.
- The current practices in maintenance and repair of different systems related to the specialization field (industrial automation, autotronic, nano-mechatronic, or biomechatronic systems) if applicable

Intellectual skills
- Select appropriate mathematical and computer-based methods for modelling and analysing problems.
- Select appropriate solutions for engineering problems based on analytical thinking.
- Think in a creative and innovative way in problem solving and design.
- Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.
- Assess and evaluate the characteristics and performance of components, systems and processes.

- Investigate the failure of components, systems, and processes.
- Solve engineering problems, often on the basis of limited and possibly contradicting information.
- Select and appraise appropriate ICT tools to a variety of engineering problems.
- Judge engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environmental impact.
- Incorporate economic, societal, environmental dimensions and risk management in design.
- Analyse results of numerical models and assess their limitations.
- Create systematic and methodical approaches when dealing with new and advancing technology.
- Integrate different forms of knowledge, ideas from other disciplines, and manage information retrieval to create new solutions.
- Select mathematical and computer-based methods to model and analyze mechatronic systems.
- Assess the characteristics and performance of mechatronic components, systems and fabrication processes.
- Design mechatronic components that can be used in the synthesis of industrial automation, autotronic, biomechatronic or nanomechatronic systems.
- Develop mechanical, electrical, electronic, programming and communication elements necessary for the development of mechatronic systems.
- Analyze and design new mechatronic systems or processes through the synthesis of creative and innovative ideas pulled in from a wide range of sources.
- Create and/or re-design mechatronic components/systems in the fields of industrial automation, autotronics, biomechatronics and nanomechatronics.
- Apply appropriate analysis techniques to extract and interpret useful information about the problems related to the specialization field
- Apply the different theories and identify the working principles of the different devices and systems to solve problems related to the specialization field (industrial automation, autotronic, nanomechatronic, or biomechatronic systems)

Professional and Practical skills

- Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.
- Professionally merge the engineering knowledge, understanding, and feedback to improve design, products and/or services.
- Create and/or re-design a process, component or system, and carry out specialized engineering designs.
- Practice the neatness and aesthetics in design and approach.
- Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyse and interpret results.
- Use a wide range of analytical tools, techniques, equipment, and software

packages pertaining to the discipline and develop required computer programs.
- Apply numerical modelling methods to engineering problems.
- Apply safe systems at work and observe the appropriate steps to manage risks.
- Demonstrate basic organizational and project management skills.
- Apply quality assurance procedures and follow codes and standards.
- Exchange knowledge and skills with engineering community and industry.
- Prepare and present technical reports.
- Apply engineering knowledge, understanding, and feedback to synthesize and integrate mechatronic subsystems to create custom solutions for different engineering problems.
- Choose a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.
- Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment related to mechatronic engineering specialization field.
- Model the scientific literature effectively and make discriminating use of web resources.
- Compete, in-depth, in at least one engineering discipline, specifically mechanics, electronics or interfacing and software
- Compete, in-depth, in one of mechatronic engineering specialization, namely industrial automation, autotronic, biomechatronic or nanomechatronic
- Apply the principles of sustainable design and development in design or redesign of mechatronic components/systems
- Utilize practical systems approach; to design and performance evaluation

Skills for life and work (general skills)
- Collaborate effectively within multidisciplinary teams.
- Work in stressful environment and within constraints.
- Communicate effectively.
- Demonstrate efficient IT capabilities.
- Lead and motivate individuals.
- Effectively manage tasks, time, and resources.
- Search for information and engage in life-long self-learning discipline.
- Acquire entrepreneurial skills.
- Refer to relevant literatures.

Programme Structure & Content

The BEng (Hons) Mechatronics and Automation Engineering degree is a four-year UEL/ASU double award programme, i.e. levels 3–6. The programme conforms to UEL's Academic Framework structure. Essentially, this means that 30-credit modules will be delivered across two semesters (September – May). The modules

have been repackaged from ASU existing programme(s) and /or modules, in order to comply with criteria UEL's Academic Framework.

All modules will be taught/delivered and assessed in English. Each module will have a named Module Leader from ASU. The Programme Leader, who has overall responsibility for the day-to-day running of the programme is Assistant. Prof. Dr. Hany Elsaid. Students will pay all tuition/study/workshop/course field trip fees directly to ASU. Details of the programme structure can be seen in below.

Intermediate Awards

If students are unable to complete their studies, the following awards can be made:
In order to gain a BEng unclassified degree (ordinary degree) students will need to obtain a minimum of 300 credits including:

- A minimum of 120 credits at level four or higher
- A minimum of 120 credits at level five or higher
- A minimum of 60 credits at level six or higher

In order to gain a Diploma of Higher Education students will need to obtain at least 240 credits including a minimum of 120 credits at level four or higher and 120 credits at level five or higher.

In order to gain a Certificate of Higher Education students will need to obtain 120 credits at level four or higher.

In order to gain a University Certificate students will need to obtain 40 credits at level three or higher.

Design of the Programme

The design and content of the Mechatronics and Automation Engineering undergraduate programme has been determined by a number of considerations including:

- to meet the national Benchmark Standards for Mechatronics engineering and the requirements of the National Framework for Higher Education Qualifications (see www.qaa.ac.uk for details).

- To meet the UEL Academic Framework Modular Regulations and other university policies (www.uel.ac.uk/academicframework).

- To reflect the research and professional interests of the staff. The options on offer are taught by staff who are specialists in these areas. In this way, you will be exposed to up to date research and also gain awareness of professional practice.

- To build up your knowledge and extend your skills as you go through the years. Each Year/Level of the programme draws on and expands material presented at earlier stages. You will be expected to tackle more specialist topics and in more breadth and depth, to develop more critical evaluation and

analysis of material, to begin to integrate material across modules, to rely less on basic text books and to read more original material, and to work more independently, with less guidance.

- To offer opportunities for you to develop career and work related skills. Certain modules are specifically designed to help you with this but all modules offer opportunities for practice and development.

Details of the programme structure:

Level	Year	Code[1]	Module title	credit	Core/ Pathway Related
Industrial Mechatronics, Nano-Mechatronics, Bio-Mechatronics & Autotronics tracks					
3	1	EG8311	Applied Mathematics and mechanics	30	Core
3	1	EG8312	Mechanical engineering basics	30	Core
3	1	EG8313	Circuit analysis and Programming	30	Core
3	1	EG8314	Design and Manufacturing Fundamentals	30	Core
Industrial Mechatronics, Nano-Mechatronics, Bio-Mechatronics & Autotronics tracks					
4	2	EG8421	Modelling and Control	30	Core
4	2	EG8422	Machine Design	30	Core
4	2	EG8423	Digital electronics and programming	30	Core
4	2	EG8424	Measurements and Instrumentation	30	Core
Industrial Mechatronics, Nano-Mechatronics, Bio-Mechatronics & Autotronics tracks					
5	3	EG8531	Mechatronic Applications	30	Core
5	3	EG8532	Embedded Systems	30	Core
5	3	EG8533	Mechatronic systems Design	30	Core
5	3	EG8534	Advanced manufacturing and Automation	15	Core
Nano-Mechatronics					
5	3	EG8535	Nano-Mechatronics (1)	15	Option
Autotronics					
5	3	EG8536	Autotronics (1)	15	Option
Bio-Mechatronics					
5	3	EG8537	Bio-mechatronics (1)	15	Option
Industrial Mechatronics					
5	3	EG8538	Industrial Mechatronics (1)	15	Option
Industrial Mechatronics, Nano-Mechatronics, Bio-Mechatronics & Autotronics tracks					
6	4	EG8641	Team Project	30	Core
6	4	EG8642	Advanced and Intelligent Machines	30	Core
6	4	EG8643	Professional Skills	30	Core
Industrial Mechatronics					
6	4	EG8644	Industrial Mechatronics (2)	30	Option
Nano-Mechatronics					
6	4	EG8645	Bio-mechatronics (2)	30	Option
Bio-Mechatronics					
6	4	EG8646	Nano-Mechatronics (2)	30	Option
Autotronics					
6	4	EG8647	Autotronics (2)	30	Option

[1] The listed modules' codes are temporary, and they will be updated latter according to the UEL partner Web Marks Entry (WME) system

Please note: Optional modules might not run every year, the programme team will decide on an annual basis which options will be running, based on student demand and academic factors, in order to create the best learning experience.
Additional details about the programme module structure: A core module for a programme is a module which a student must have passed (i.e. been awarded credit) in order to achieve the relevant named award. An optional module for a programme is a module selected from a range of modules available on the programme.

FoE-ASU modify the programmes bylaws every five years to cope with the advances in engineering technologies and/or enforcing corrective actions to face any deficiencies in the previous bylaws. The current enrolled students are registered on the mechatronics and automation engineering program 2013 bylaws, while the students who will register in the academic year 2019-2020 will be enrolled on the 2018 bylaws. For students who will be enrolled on the 2013 bylaw and want to obtain the BEng (Hons) from UEL an equivalence will be made for the courses achieved by student(s) to determined which level s/he will be enrolled at. As for students who will be enrolled on the 2018 bylaw and want to obtain the BEng (Hons) from UEL, they will register level UEL modules and follow either full time or part time study modes.

Module Code[2]	**Module Name**	**Bylaw 2013**		**Bylaw 2018**		**Assessment Method**
		Component of Assessment	**Percentage Weighting**	**Component of Assessment**	**Percentage Weighting**	
				MCTA Eng. Program (UEL) Foundation-ASU Level 1		
EG8311 30Credits	Applied Mathematics and mechanics	**PHM 113** Calculus for Engineers (3) - (3 Credits)	30%	**PHM131** Rigid Body Dynamics - (2 Credits)	35%	Portfolio of students' work includes a compilation of coursework of the 3 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		PHM 115 Differential Equations and Partial Differential Equations - (3 Credits)	35%	**PHM112** Differential Equations and Numerical Analysis - (4 Credits)	35%	
		PHM 114 Statistics and Probability for Engineering -(3 Credits)	35%	**PHM111** Probability and Statistics - (2 Credits)	30%	
EG8312 30Credits	Mechanical engineering basics	**MEP 112** Thermodynamics - (3 Credits)	30%	**MEP214** Thermal Power Engineering - (3 Credits)	30%	Portfolio of students' work includes a compilation of coursework of the 3 modules; each module includes samples of the following: Activities/Assignments Lab data sheets (1st Module) 2 Quizzes 1 Midterm Exam Final Exam
		MDP132 Structure and properties of Materials- (3Credits)	35%	**MDP151** Structures and properties of materials - (2Credits)	35%	
		MDP 151 Stress analysis -(3 Credits)	35%	**MDP212** Mechanics of Machines-(4 Credits)	35%	

[2] The listed modules' codes are temporary, and they will be updated latter according to the UEL partner Web Marks Entry (WME) system

EG8313 30Credits	Circuit analysis and Programming	**EPM 114** Electrical Circuits (1)-(3 Credits)	35%	**EPM116** Electrical Circuits and Machines -(4 Credits)	35%	Portfolio of students' work includes a compilation of coursework of the 3 modules; each module includes samples of the following: Activities/Assignments Lab data sheets (2nd Module) 2 Quizzes 1 Midterm Exam Final Exam
		ECE 142 Electronic circuits - (3 Credits)	30%	**ECE215** Introduction to Electronics -(2 Credits)	30%	
		CSE 122 Computer Programming (3 Credits)	35%	**CSE131** Computer Programming-(3 Credits)	35%	
EG8314 30Credit	Design and Manufacturing Fundamentals	**MDP 163** Machine Drawing and solid modelling - (3Credits)	35%	**MDP111** Mechanical Engineering Drawing -(3Credits)	35%	Portfolio of students' work includes a compilation of coursework of the 3 modules; each module includes samples of the following: Activities/Assignments Lab data sheets (2nd Module) 2 Quizzes 1 Midterm Exam Final Exam (except for the 2nd module in 2013 curricula the final exam will be a capstone project)
		MCT 151 Introduction to Mechatronics-(2 Credits)	30%	**MDP232** Industrial Project Management-(2 Credits)	30%	
		MDP 121 Manufacturing technology -(3 Credits)	35%	**MDP183** Manufacturing Technologies -(4 Credits)	35%	
				MCTA Eng. Program (UEL)Level 4 – (ASU)Level 2		
EG8421 30Credit	Modelling and Control	**MCT456** Dynamic Modeling and Simulation -(3 Credits)	35%	**MCT233** Dynamic Modeling and Simulation -(3 Credits)	35%	Portfolio of students' work includes a compilation of coursework of the 3 modules; each module includes samples of the following: Activities/Assignments Lab data sheets (1st& 2nd Modules) 2 Quizzes 1 Midterm Exam Final Exam
		MCT 371 Automatic Control - (3 Credits)	35%	**MCT211** Automatic Control - (3 Credits)	35%	
		MEP 233 Fluid Mechanics -(3 Credits)	30%	**MEP222** Introduction to Fluid mechanics-(3 Credits)	30%	
EG8422 30Credit	Machine Design	**MDP 267** Machine Elements Design - (3Credits)	35%	**MDP211** Machine Element Design - (4Credits)	35%	Portfolio of students' work includes a compilation of coursework of the modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam (except for the 3nrdmodule in 2018 curricula the final exam will be the submission of a capstone project)
		MDP 261 Machine Design - (3 Credits)	35%	**MDP112** Machine Construction - (3 Credits)	35%	
		MCT 251 Theory of machine and multi-body-(3 Credits)	30%	**MCT131** Introduction to Mechatronics-(3 Credits)	30%	
EG8423 30Credit	Digital electronics and programming	**CSE 115** Digital Design-(3 Credits)	30%	**CSE111** Logic Design-(3 Credits)	30%	Portfolio of students' work includes a compilation of coursework of the 3 modules; each module includes samples of the following: Activities/Assignments
		CSE 228 Advanced computer programming-(3 Credits)	35%	**ASU112** Report Writing & Communication skills- (2 Credits))	35%	

		EPM 282 Power Electronics and Drives- (3 Credits)	35%	**EPM353** Power electronics and motor drives- (3 Credits)	35%	Lab data sheets (1st Module) 2 Quizzes 1 Midterm Exam Final Exam
EG8424 30Credit	Measurements and Instrumentation	**MCT 241** Engineering Measurements -(3 Credits)	30%	**MCT231** Engineering Measurements -(3 Credits)	35%	Portfolio of students' work includes a compilation of coursework of the 3 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		MCT 242 Electronic Instrumentation-(3 Credits)	35%	**MCT232** Industrial electronics-(3 Credits)	35%	
		EPM 214 Electrical power engineering- (3 Credits)	35%	**MDP231** Engineering Economy-(2 Credits)	30%	
				MCTA Eng. Program (UEL)Level 5 – (ASU)Level 3		
EG8531 30Credit	Mechatronic Applications	**MCT 311** Introduction to Autotronics-(2 Credits)	20%	**MCT341** Introduction to Autotronics -(2 Credits)	20%	Portfolio of students' work includes a compilation of coursework of the 3 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		MCT 321 Introduction to Nano-Mechatronics -(2 Credits)	20%	**MCT342** Introduction to Nano-Mechatronics -(2 Credits)	20%	
		MCT 341 Introduction to BIo-Mechatronics -(2 Credits)	20%	**MCT343** Introduction to Bio-Mechatronics -(2 Credits)	20%	
		MCT 455 Industrial Robotics -(3Credits)	40%	**MCT344** Industrial Robotics -(3Credits)	40%	
EG8532 30Credit	Embedded Systems	**CSE 318** Microcontrollers-(3 Credits)	35%	**CSE211** Introduction to embedded systems-(3 Credits)	40%	Portfolio of students' work includes a compilation of coursework of the 3 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		CSE 347 Embedded system design-(3 Credits)	35%	**CSE411** Real time and embedded systems design -(3 Credits)	40%	
		ECE 255 Signals and systems-(3Credits)	30%	Marketing- (2 credits)	20%	
EG8533 30Credit	Mechatronic systems Design	**MCT 381** Design of mechatronics systems (1)- (3 Credits)	35%	**MCT331** Design of mechatronics systems (1)-- (3 Credits)	35%	Design portfolio, which is a compilation of students' coursework in the 3 modules. The first and second modules include samples of the students' report progress, report presentation, posters of the report and the project, and capstone project progress The third one includes a compilation of coursework includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		MCT 382 Design of mechatronics systems (2) -(3Credits)	35%	**MCT332** Design of mechatronics systems (2) -(3Credits)	35%	
		MCT 351 Pneumatics and hydraulics control -(3 Credits)	30%	**MCT311** Hydraulics and Pneumatics control -(3 Credits)	30%	
	Advanced	**MCT 333 CNC**	100%	**MCT312** Industrial	100%	Portfolio of students'

EG8534 15Credit	manufacturing and Automation	**and CAD/CAM**-(3Credits)		Automation -(3Credits)		work includes a compilation of coursework of the 2 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
EG8535 15 Credit ENG. Nano-mechatronics ***	Nano-Mechatronics (1)	Technical Elective (1) -**MCT 322** Nanotechnology-(3Credits)	50%	Technical Elective (1) –**MCT349** Material properties and Characterization-(3Credits)	50%	Portfolio of students' work includes a compilation of coursework of the 2 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		Technical Elective (2) -**MCT 323** Nano-Imaging and Testing- (3Credits)	50%	Technical Elective (2)- **MCT350** MEMS/NEMS Characterization: systems and Methods- (3Credits)	50%	
EG8536 15 Credit ENG. Autotronics ***	Autotronics (1)	Technical Elective (1) -**MEA 313** Automotive Theory - (3Credits)	50%	Technical Elective (1) – **MEA313** Automotive Theory - (3Credits)	50%	Portfolio of students' work includes a compilation of coursework of the 2 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		Technical Elective (2) -**MEA 323** Automotive Design -(3Credits)	50%	Technical Elective (2) – **MEA441** Engine Management Systems -(3Credits)	50%	
EG86537 15 Credit ENG. Bio-mechatronics ***	Bio-mechatronics (1)	Technical Elective (1) -**MCT 342** Introduction to Biomechanics -(3Credits)	50%	Technical Elective (1) – **MCT348** Introduction to Biomechanics -(3Credits)	50%	Portfolio of students' work includes a compilation of coursework of the 2 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		Technical Elective (2) -**MCT 343** Locomotion and Gait Analysis -(3Credits)	50%	Technical Elective (2) – **MCT347** Locomotion and Gait analysis -(3Credits)	50%	
EG8538 15 Credit ENG. Industrial mechatronics ***	Industrial Mechatronics (1)	Technical Elective (1) -**MCT 331** Industrial Mechanisms and robotics-(3 Credit)	50%	Technical Elective (1) – **MCT345** Industrial Mechanisms and robotics-(3 Credit)	50%	Portfolio of students' work includes a compilation of coursework of the 2 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		Technical Elective (2) -**MCT 332** Industrial Automation--(3 Credit)	50%	Technical Elective (2) –**MCT443** Design of Autonomous systems--(3 Credit)	50%	
				MCTA Eng. Program (UEL)Level 6 – (ASU)Level 4		
EG8641 30Credit	Team Project	**MCT498** Graduation project (1) -(3Credits)	50%	**MCT491** Mechatronics Graduation project (1) -(3Credits)	50%	Design portfolio, which is a compilation of students' coursework in the 2 modules. The first and second modules module include Thesis with topic selected by a student according to his/her area of interest upon advisors' approval
		MCT499 Graduation project (2) -(3Credits)	50%	**MCT492** Mechatronics Graduation project (2) -(3Credits)	50%	

EG8642 30Credit	Advanced and Intelligent Machines	**CSE 489** Machine Vision-3Credits)	35%	**CSE483** Computer Vision-(3Credits)	35%	Portfolio of students' work includes a compilation of coursework of the 3 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		MCT 461 Industrial Networks- (3 Credits)	35%	**MCT431** Industrial Communication and Networks Systems- (3 Credits)	35%	
		MCT 334 Rapid Prototyping-(3 credits)	30%	**CSE473** Computational intelligence-(2 credits)**)**	30%	
EG8643 30Credit	Professional Skills	**HUM 3113** Engineering Law - (3 Credits)	35%	**ASU113** Professional Ethics and Legislations - (3 Credits)	35%	Portfolio of students' work includes a compilation of coursework of the 2 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		HUM 014 Engineering Profession, Practice and Responsibilities - (3 Credits)	30%	**ASU114** Selected topics in contemporary issues- (2 Credits)	30%	
		HUM 111 Engineering Economy - (3Credits)	35%	**ASU321** Innovation and Entrepreneurship-(2 Credits)	35%	
EG8644 30Credit ENG. Industrial mechatronics ***	Industrial Mechatronics (2)	Technical Elective (3) – **MCT 432** Hybrid control systems(3Credits)	35%	Technical Elective (3) – **MCT411** Hybrid control systems(3Credits)	35%	Portfolio of students' work includes a compilation of coursework of the 4 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		Technical Elective (4) - **CSE 488** Computational Intelligence (3Credits)	35%	Technical Elective (4)-**MDP494** Advanced Manufacturing Technology & Prototyping (3Credits)	35%	
		Technical Elective (5) -(3Credits)- **MCT 431** Autonomous Systems	30%	Technical Elective (5) –**MCT449** Selected topics in industrial mechatronics (2Credits)	30%	
EG8645 30Credit ENG. Bio-mechatronics ***	Bio-mechatronics (2)	Technical Elective (3) -(3Credits)- **MCT 441** Smart Actuators and Sensors	30%	Technical Elective (5)- **MCT346** System Physiology - (2Credits)	30%	Portfolio of students' work includes a compilation of coursework of the 4 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		Technical Elective (4) -(3Credits)- **MCT 442** Biomedical Engineering	35%	Technical Elective (4)- **MCT442** Biomedical Engineering (3Credits)	35%	
		Technical Elective (5) -(3Credits)- **MCT 443** Rehabilitation Robots	35%	Technical Elective (3)- **MCT441** Rehabilitation Robots (3Credits)	35%	

EG8646 30Credit ENG. Nano-mechatronics ***	Nano-Mechatronics (2)	Technical Elective (3) -(3Credits)- **MCT 421** Introduction to MEMS/NEMS (2)	35%	Technical Elective (3) –**MCT432** MEMS Devices (3Credits)	35%	Portfolio of students' work includes a compilation of coursework of the 4 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		Technical Elective (4) -(3Credits)- **MCT 422** MEMS/NEMS Fabrication, Packaging, and Testing	30%	Technical Elective (4) –**MCT350** MEMS/NEMS Fabrication and Packaging (2Credits)	30%	
		Technical Elective (5) -(3Credits)- **MCT 423** Advanced MMS/NMS Design	35%	Technical Elective (5)-**MCT447** MEMS systems - (3Credits)	35%	
EG8647 30Credit ENG. Autotronics ***	Autotronics (2)	Technical Elective (3) -(3Credits)- **MCT 411** Automotive embedded Networking	35%	Technical Elective (3)-**MCT422** Automotive embedded Networking (3Credits)	35%	Portfolio of students' work includes a compilation of coursework of the 4 modules; each module includes samples of the following: Activities/Assignments 2 Quizzes 1 Midterm Exam Final Exam
		Technical Elective (4) -(3Credits)- **MCT 412** Autotronics	35%	Technical Elective (4) –**MCT446** Autotronics (3Credits)	35%	
		Technical Elective (5) -(3Credits)- **MEA 442** Engine Management systems	30%	Technical Elective (5) –**MEA322** Automotive Design (2Credits)	30%	

Notes:
*** = Elective (optional) module. Students to take one optional module

3 KEY STAFF AND CONTACT DETAILS

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UEL Academic Partnerships Office
apo@uel.ac.uk

Programme Organisation

The organisation and administration of the programme will be carried out through the following:

The Dean of Faculty of Engineering

Prof. M. Ayman Ashour is the Dean of Faculty of Engineering at ASU. He has overall responsibility for maintaining the high standards of quality and innovation in all our teaching and research activities.

The Programme Leader

Dr. Hany elsayed Saad is the programme leader for the BEng (Hons) mechatronics and automation Engineering programme. The programme leader represents the academic interests of the programme, coordinates the day-to-day business of programme, and has overall responsibility for students on the programme. The role of the programme leader is to guide each student registered on the programme through the duration of the programme and is the first port of contact when programme level issues occur. The programme leader, in conjunction with the academic support team, is responsible with the day-to-day running of the programme. The programme leader is there to resolve any issues that may arise at the programme level and will mediate between module leaders & the academic support team to resolve any programme level issues. If you have a problem with a particular module, and have not been able to resolve it by talking to the Module Leader, you should bring the matter to the Programme Leader. Programme Leaders are also responsible for liaison with Programme Representatives for the year. They also have other duties, which vary from year-to-year and are often connected with quality improvement projects.

The Programme Management Team

The Programme Management Team consists of the Programme Leader, Module Leaders, School Administrators and the Student Representatives, are collectively responsible for day-to-day running of the programme. We have Programme Committees and Meetings to discuss any issues that arise throughout the academic teaching and/or other subjects and these happen at least one per term.

The Module Leaders

Your Module Leaders are responsible for delivery and academic management of the module, including all module assessment tasks. The module leader is responsible for the delivery of an individual module and is tasked with providing the students with the necessary lecture and tutorial material and assessing the work submitted. They will take all of the lectures for their module. As far as possible any problems or questions concerning individual modules should be addressed to the Module Leader. In most cases this can be done within seminars, workshops or practical sessions. General academic advice can also be obtained from them.

External Examiners

External Examiners are responsible for providing an independent check that proper standards are being maintained and are allocated to modules by Subject Area. They review each piece of assessment before it is available to students, review samples of work each semester, and review student feedback and results.

Circumstances in which student can access UEL directly

You will find that for most issues that arise during the course of your studies academic and administrative staff at your location of study will be able to help, and further details are provided in this handbook. If, however you have concerns that lie outside the remit of these staff you can contact the UEL link person [see further details below] in the first instance who will be able to re-direct your enquiry as appropriate.

The UEL Academic Link Tutor is appointed to manage the relationship between the Programme Leader at ASU- FoE and UEL. Students may meet the UEL Link Person at Programme Committee Meetings.

Please contact your local Student Support/Administrative Office if you have any queries, in the first instance. If you have been advised by your local office to contact UEL then please send an e-mail to the contact UEL then please send an e-mail to the UEL Academic and Employer Partnerships Office at ***apo@uel.ac.uk***.

4 PROGRAMME OPERATION AND STUDENT REGISTRATION

Study Timings and Registration

The academic year will comprise of two main semesters:
First main semester (Fall): Begins early September and lasts for 15 weeks.
Second main semester (Spring): Begins early February and lasts for 15 weeks.

- New students' enrolment in the programme starts two weeks before the starting of the Fall semester, after fulfilling all the programmes requirements and paying the enrolment fees, as recommend by the Programs Administration Council and set by the Council of the Faculty of Engineering.
- Registration for any semester takes place within two weeks before the starting day of the semester. Registration is not final until the full tuition fees of the semester are paid.
- Registration in the Summer semester is optional.
- The student must register 60 credits per semester, after consulting the academic advisor, at the time of registration and according to the yearly rules issued by the Faculty and published in the student's guide. Registration is not final until the student pays the educational service fees for the semester.
- Late registration is not final unless there is a vacancy in the courses, and the student should pay late registration fees besides the prescribed academic service fees, in accordance with the recommendations of the Programmed Administration Council and approval of the Council of the Faculty of Engineering regarding this issue.
- The student may not register in any module without fulfilling all its prerequisites.

- The programme academic regulations are available at ***https://eng.asu.edu.eg/BylawsAndRegulations***
- The Local Attendance and Engagement policy is available at ***https://eng.asu.edu.eg/uploads/uploadcenter/asu_594_file.pdf***
- UEL University's academic regulations are available at: Academic Framework Regulations (see Manual of General Regulations, Part 3)
- ***https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Manual-of-General-Regulations***

It is essential that you log in to UEL direct and enrol with UEL using the UEL student number that you have be given prior to attending any lectures.

Once you have gained admission to the programme you must login to the UEL direct page using your student username which will be your UEL ID number and password and complete the on-line enrolment. ASU-FoE will assist and ensure that you

complete your online enrolment task promptly. UEL Direct is available at ***https://www.uel.ac.uk/students***

For general enquiries concerning enrolment, you must contact your local Student Support/Administrative Office for guidance in the first instance and then if you are advised to contact UEL, please send an e-mail to the UEL Academic and Employers Partnerships Office at***apo@uel.ac.uk***.

5 TEACHING, LEARNING AND ASSESSMENT

Learning and Teaching

ASU strives to create an enabling environment conducive to meaningful learning in which students from all backgrounds are supported by committed and qualified staff. The FoE promotes an ethos of reciprocity, service and tolerance and is supportive of academically underprepared students, women, minorities, international students, disabled students, mature or working students and other underrepresented groups. The administration, communication, support services and curricula reflect and value diversity and staff capacity and administrative infrastructure are sufficient to cater for the number of enrolled students so as not to compromise the student's support and developmental needs.

Students have sufficient access to technology to make it possible for them to successfully complete the programme. Information concerning student support services is made accessible to all students. This is mostly facilitated through fully fledged IT laboratories, and free Wi-Fi facilities. Services such as Learning support, additional tutorial support etc. are made available at all phases of a students' journey: on first entering the institution; and to ease the transition from Higher Education into the world of work. Teaching and Learning support to all the learners are provided using all the physical resources available at ASU and also provided by UEL such as online access to journals and databases.

The following summarizes the Learning and Teaching Policy at ASU which will govern this double award collaboration:

- Student evaluation and assessment is based on final exams, midterm exams, quizzes, coursework assignments, course projects, presentations, papers, essays, in/out of class participation, portfolios and many other innovative activities.
- Course instructors in the programme are carefully selected from the distinct full-time world-class faculty members of the Faculty of Engineering at Ain Shams University.
- With the majority of modules being delivered over the whole year there is excellent scope for formative Assessment to stretch and extend the students. Thus, a key feature of the courses is the emphasis on formative feedback and guidance to enable students to develop full understanding of the topics of study, prior to assessment taking place.
- Assessment for these programmes takes the form of examinations, course works, presentations and time constrained assessments.
- Each course syllabus contain: course objectives, textbook, outline, material, assessments, grading policy and outcome. Outlines contain sections covered every week with reference to chapters/sections in the textbook. The instructor will give the course syllabus to the students in the first class. The syllabus serves as a contract between the instructor and the students.

The following are not compulsory for the double award programmes but will be encouraged:

- The student should pass the ASU's requirements, which consist of humanities, social sciences, general culture courses. These courses represent 18 credit hours at ASU selected from a list of courses.
- The student should pass the ASU's College requirements, which consist of basic sciences and engineering courses. These courses should be studied by all students and they represent 46 credit hours.
- The student should perform summer training for 12 weeks during their study duration, and should be conducted during 3 summers. Training must be performed in an industrial/service facility related to the student's program or inside the faculty where it is delivered by staff members. The training must be under the full supervision of the faculty. The student submits their training portfolio to their Academic Advisor, who in turn assesses the outcomes and evaluates it.

ASU Attendance Policy

Across the faculty, consistent attendance of at least 75% and participation in program activities is part of the learning process. To meet all learning outcomes, FoE ASU expects full attendance in all lectures and insufficient attendance may result in an 'Incomplete' status for the course. The school should be notified of absences. In case of illness a recognized medical certificate should be supplied. Students are encouraged to communicate with their lecturer or course coordinator if they have any queries pertaining to their**.**

Assessment

The module specifications provide a detailed breakdown of the weighting and volume of assessment. For a formal description of the assessment process students should refer to the Academic Regulations on the UEL website or refer to details in the guide for students.

Assessment Arrangements

Each module assessment will be designed and set in accordance with the module specification. This will state the number of components to be assessed as well as the weighting of each component. Each assessment will be moderated/verified internally at ASU before it is sent to UEL for approval. All module or component assessments must be formally approved before they are issued to students. All assessments will be approved via the normal and established UEL procedure(s). A marking criteria will be published to students using either a rubric or more detailed written explanation and will be provided to students at the same time as the assessment specification/task. This will form part of the assessment brief which will be agreed with the external examiner.

Marking of assessments will use the full scope of marks, that is 0 – 100. A sample of 10% or 10 scripts (whichever is greater) must be second marked by ASU and this must cover the full range of marks. In the case of the research project (or similar work), the work of the entire cohort will be blind double-marked. The samples

(including both second marked and non-second marked) will be sent to UEL for forwarding to the External Examiner for review.

UEL will determine what documents/information is needed for an Assessment Board and this will be communicated to ASU in a timely manner.

All summative assignments will be marked anonymously where possible and subject to second marking. ASU will conduct a pre-board where all modules and profiles of students will be considered and this will be fed back to UEL who will consider these at the relevant UEL Assessment Board. The results will be considered at assessment boards, which will be held at UEL. Feedback will be given to all students especially on summative assessment tasks. Normally the module leader will choose how this is given, but generally it will be given individually (within 20 days).

UEL operates a minimum of 30% threshold in each component of assessment on a module. However, to pass the module students will need to achieve a weighted average of at least 40%. Progression to the next higher level (year) will only be permitted if the student has gained at least 90 credits during the academic year.

On the UEL/ASU double programme, students will not be permitted to study any level six (6) modules, if there are outstanding level four (4) modules. The Assessment Board at UEL (with representation by the Academic Link Tutor) will determine the progression decision of all students.

ASU Assessments vs UEL/ASU Double Assessment Arrangements

On the UEL/ASU double award programme, students must pass the agreed UEL module in conformity with all established rules and procedures as determined by UEL. If a student has failed a module or component of a module on the UEL/ASU double award programme, the student will be entitled to a resit opportunity. This will normally be in the early summer (July/August).

Students will be asked and expected to retake a module with attendance if a resit opportunity was not successfully passed, however this depends on the individual profile of the student – taking into consideration UEL policy/rules on retakes. The reassessment on modules is not permitted on the Egyptian award, however is possible on the UEL award.

UEL's "capping" regulations will apply for any resit or retake modules or components of modules. Passing an ASU module or component of a module does not automatically mean that the UEL/ASU double award module has been passed. There will be no averaging (mean) of module marks on ASU modules to determine UEL/ASU double award module marks. The marks of a module will be as specified on the module specification.

If a student fails a module on the ASU variant of the programme but passes the UEL/ASU double award module: This student would have been deemed to pass the module and would be given the credits for such module.

An agreed equivalence chart/table will be used to compare ASU marking/grading scheme to that of the UEL/ASU double programme. However, in all cases, on the UEL/ASU double award programme the full spectrum of marks (0-100) will be used.

Students will be entitled to UEL's "compensated pass" regulations on the double award programme. Summer training/placements/work is not a formal part of the UEL/ASU double programme, but will be encouraged.

Moderation of Assessment

Examinations and other assessments undergo a rigorous quality assurance process of moderation as follows:

Preparing the assessment brief / examination paper

- Module lecturers design/ write the questions / briefs and produce answers with marking schemes.
- Another lecturer checks the assessment questions, solutions and marking scheme.
- Copies of the assessment questions, answers and marking scheme are sent to UEL for checking and approval.
- UEL sends the assessments to external examiners for approval.

Marking of assessments

- Students' assessments are marked by the FoE- ASU teaching staff.
- A sample of 10% or 10 scripts, whichever is the higher, are double marked by another lecturer within FoE-ASU
- In the case of exam scripts the papers of the entire cohort is blind double-marked
- The double marked sample is sent to UEL for forwarding to the External Examiner
- The results are considered at assessment boards.

All summative assignments are marked anonymously where possible and subject to second marking. If they can't be marked anonymously, the assignments will be double-marked. The ASU examination board will conduct a pre-board where all modules and profiles of students will be considered. This will be fed back to UEL who will consider these at the relevant UEL Assessment Board.

Submission of Coursework

The module handbook/guidelines will explicitly detail how coursework should be submitted and these will (using student number, word count, word-processed). Submission dates will be available in the Module Guides and on the VLE.

We strongly suggest that you try to submit all coursework by the deadline set as meeting deadlines is expected in employment. However, in our regulations, UEL has permitted students to be able to submit their coursework up to 24 hours after the deadline. The deadline will be published in your module guide. Coursework which is submitted late, but within 24 hours of the deadline, will be assessed but subjected to a fixed penalty of 5% of the total marks available (as opposed to marks obtained).

Please note that if you submit twice, once before the deadline and once during the 24 hour late period, then the second submission will be marked and 5% deducted.

Further information is available in the Assessment & Feedback Policy at https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Assessment-and-Feedback-Policy.

Extenuating circumstances claims

Under certain circumstances, extenuation can be granted. Academic staff should direct students to FoE ASU support staff trained on UEL extenuation processes as outlined in UEL's extenuation policy as FoE – ASU will follow the process of UEL for the Extenuating circumstances:
https://www.uel.ac.uk/discover/governance/policies-regulations-corporate-documents/student-policies/extenuation-procedures
Normal UEL criteria will apply. A subcommittee will be set up at FoE - ASU under the guidance of the Academic Link Tutor. This committee will report its finding and determination to UEL (APO and ALT).

Breaches of Academic Misconduct Regulations

Assessment tasks are designed to reduce, as far as is practicable, the possibility of plagiarism and collusion and other instances of academic misconduct. Where an instance of academic misconduct is suspected, procedures detailed in Part 8 of Manual of General Regulations (Academic Misconduct Regulations of UEL) will be invoked. The cases will be identified through Turnitin facilities provided by UEL for the registered students and they will be dealt with the same procedures mentioned in the General Regulations manual. Students will be made aware of the Academic Integrity Policy to assist in the avoidance of plagiarism. As part of their induction, students will also be required to complete the academic integrity certificate on Moodle.

The following is a non-exhaustive list of examples of academic misconduct:

Plagiarism: representing another person's work or ideas as one's own, for example by failing to follow convention in acknowledging sources, use of quotation marks etc. This includes the unauthorised use of one student's work by another student and the commissioning, purchase and submission of a piece of work, in part or whole, as the student's own.

Collusion: cooperation in order to gain an unpermitted advantage. This may occur where students have consciously collaborated on a piece of work, in part or whole, and passed it off as their own individual efforts or where one student has authorised another to use their work, in part or whole, and to submit it as their own.

Misconduct in examinations (including in-class tests). Including, for example, when an examination candidate:

- copies from the examination script of another candidate;

- obtains or offers any other improper assistance from or to another candidate (or any other person unless an approved reader or scribe);
- has with them any unauthorised book (including mathematical tables), manuscript or loose papers of any kind, unauthorised electronic devices (including mobile telephones) or any source of unauthorised.
- allows himself/herself to be impersonated or when any person impersonates another examination candidate.

Fabrication or misrepresentation: the presentation of fabricated data, results, references, evidence or other material or misrepresentation of the same. Including, for example:

- claiming to have carried out experiments, observations, interviews or other forms of research which a student has not, in fact, carried out;
- claiming to have obtained results or other evidence which have not, in fact, been obtained;
- in the case of professional qualifications, falsely claiming to have completed hours in practice or to have achieved required competencies when this is not the case;

Failure to obtain ethical approval: where work is undertaken without obtaining ethical approval when there is a clear and unambiguous requirement to do so.
FoE ASU will use a range of mechanisms for determining academic misconduct including and not limited to, plagiarism software, internet searches, viva voce.

Feedback to Students

Feedback will be given to all students especially on summative assessment tasks. Normally the module leader will choose how this is given. The students are also provided with feedback on formative tasks –. The lecturer or the module leader will determine how this is given.
Feedback is central to learning and is provided to students to develop their knowledge, understanding, skills and to help promote learning and facilitate improvement.
All feedback will be as the following:

- provided within 20 working days
- given in relation to the learning outcomes and assessment criteria
- provided on both coursework and examinations
- clear, relevant, motivating, and constructive
- developmental, enabling students to both consolidate learning and achievement
- offered in a range of formats appropriate to the module e.g. electronically via Turnitin Grade Mark or other e-Submission tools where used, Audio file, Video file, or Screen cast.

Assessment Boards

Assessment Boards control, consider and adjudicate upon all assessments undertaken by students. The Board comprises a Chair (usually a Head of

Department), all those substantially involved such as lecturers/tutors/module leaders and the external examiner(s).

Mapping of assessment schedule to UEL Boards

Submission dates will be planned in collaboration with the UEL Academic Link Tutor to ensure that the marking process is complete and marks are entered in time for the appropriate board at UEL.

Use of Virtual Learning Environment (VLE) in the learning and assessment process;

Currently, the ASU uses a VLE where module content material such as lecture slides, tutorial and practical tasks are uploaded for the students to access.

Grades of the MCTA Program modules

The points of each credit hour are computed as follows:

Ain Shams University			University of East London
Percentage of total mark at ASU	**Grade**	**Points for GPA**	**Percentage equivalent at UEL**
97% and higher	A+	4.0	95% and higher
93% to less than 97%	A	4.0	82% to less than 95%
89% to less than 93%	A-	3.7	70% to less than 82%
84% to less than 89%	B+	3.3	66% to less than 70%
80% to less than 84%	B	3.0	63% to less than 66%
76% to less than 80%	B-	2.7	60% to less than 63%
73% to less than 76%	C+	2.3	56% to less than 60%
70% to less than 73%	C	2.0	53% to less than 56%
67% to less than 70%	C-	1.7	50% to less than 53%
64% to less than 67%	D+	1.3	45% to less than 50%
60% to less than 64%	D	1.0	40% to less than 45%
Less than 60%	F	0.0	Less than 40%

The marks of each module will be as specified on the module specification as in section 6.

Late submission/breach of regulations will cause failure in the entire portfolio assessment.

The student must attend at least 75% of the course.

The students work is submitted for each individual Ain Shams Course in the form and deadline instructed via ASU assignments and goes via the normal marking process. Further the student work for each individual Ain Shams courses is packed in a portfolio format for the submission requirement for the UEL degree.

Certificates/Awards

For the UEL/ASU double award programme, students will be issued a UEL certificate and a UEL Diploma Supplement. In addition, ASU will also issue their own certificate to students who have completed the programme. The calculation of the class of degree will be in accordance with UEL's degree classification calculations.

For students who have transferred to UEL (on campus in London): a UEL certificate will is issued together with a UEL Diploma Supplement. The calculation of the degree classification will be based on the proportion of the programme studied at UEL as per UEL's existing rule and regulations. b)ASU will determine at its discretion if credits can be brought back to ASU where the calculation of the class of degree will be determined by ASU.

References to student policies

ASU-FoE available at:
https://eng.asu.edu.eg/uploads/uploadcenter/asu_594_file.pdf
UEL available at:
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies

Also detailed in Appendix B which provides full information on referencing and the avoidance of plagiarism.

The electronic version of "Cite Them Right: *the essential referencing guide"* 9th edition, can be accessed whilst on or off campus, via UEL Direct. The book can only be read online and no part of it can be printed nor downloaded.

Reference to Appendix E containing information on Academic Misconduct and Plagiarism. Assessment and Feedback Policy available at:
https://eng.asu.edu.eg/uploads/uploadcenter/asu_594_file.pdf

Assessment and feedback are fundamental parts of your learning experience. The UEL Assessment and Feedback Policy seeks to:

- actively promote student success and academic achievement;
- provide clear, accurate, accessible information and guidelines to all staff and students on assessment and feedback;
- maximise the potential for consistency and fairness in assessment;
- locate assessment and feedback as an integral part of learning and teaching processes.

Every component of assessment that contributes to an award, at all levels, is subject to internal and External Examiner moderation. This ensures the maintenance of standards both internally and in comparison, with similar programmes delivered at other higher education institutions. The UEL Assessment and Feedback Policy outlines the process for the various stages of the marking process and is available at***https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Assessment-and-Feedback-Policy***

https://uelac.sharepoint.com/LibraryandLearningServices/Pages/Skillzone.aspx

As a student you will be taught how to write correctly referenced essays using UEL's standard Harvard referencing system from Cite Them Right**.** Cite them Right is the standard Harvard referencing style at UEL for all Schools apart from the School of Psychology which uses the APA system. This book will teach you all you need to know about Harvard referencing, plagiarism and collusion. The electronic version of "Cite Them Right: *the essential referencing guide"* 9th edition, can be accessed whilst on or off campus, via UEL Direct. The book can only be read online and no part of it can be printed nor downloaded.

Further information is available at Appendix E and the weblinks below

Harvard referencing
https://uelac.sharepoint.com/LibraryandLearningServices/Pages/Harvard-Referencing-.aspx

Academic Integrity
https://uelac.sharepoint.com/LibraryandLearningServices/Pages/Academic-integrity.aspx

Assessment Criteria

A student's performance will be marked and graded according to pre-specified and clear assessment criteria. These will normally be presented in one document combining marking and grading criteria. Further details can be found in section of the Assessment and Feedback Policy and can be found at:
www.uel.ac.uk/qa/policies/assessmentpolicy/

As your degree progresses, you will be assessed in a number of different ways. In addition to examinations, you will have a range of coursework assessments such as reports or presentations, for which you will be given clear guidance by the module leader including how you will be assessed for that piece of work.

The section below gives you a general guideline of what we are looking for at different levels of the programme:

Level 3

- Recall factual information.
- you can analyse and evaluate the information.

- You can follow guidelines in creating solutions to straightforward problems.

Work of a better standard usually reflects an approach where

- You have required little additional guidance in producing your work.
- You have shown initiative where appropriate.
- You meet your obligations to others
- You have fully appreciated the complexity of a task and managed your time and resources accordingly.
- Your work is presented with care and forethought.

Level 4

- You can present factual information.
- you can analyse and evaluate the information presented and draw some conclusions.
- You can follow guidelines in creating solutions to straightforward problems.

Work of a better standard usually reflects an approach where

- You have required little additional guidance in producing your work.
- You have shown initiative where appropriate.
- You meet your obligations to others
- You have fully appreciated the complexity of a task and managed your time and resources accordingly.
- Your work is presented with care and forethought.

Level 5

- Your work displays a detailed knowledge of the topic. You are aware of other contexts that can be applied to this knowledge.
- you can analyse data and situations in a range of different contexts.
- You can take information gathered or the ideas of others and re-format it to your own purpose.
- You can select appropriate evaluation techniques. You can use these to evaluate your own findings.

Work of a better standard usually reflects an approach where

- You have required minimal additional assistance
- You have been particularly creative in devising and implementing you chosen solution
- You have identified the key elements of problems and chosen the appropriate strategies to resolve them.
- You have communicated your work in a clear and concise manner.

Level 6

- Your work displays a comprehensive and detailed knowledge of the topic with areas of specialisation showing depth of understanding.
- You are aware of current developments.

- you can analyse data and situations in a range of different contexts.
- You can develop creative and innovative solutions with little guidance.
- You can review evidence critically and use your findings to support conclusions and recommendations.

Work of a better standard usually reflects an approach where

- You have not required any additional assistance
- You have proved you can manage your own learning and make full use of a wide range of resources.
- You have been confident in your ability to solve problems.
- You have communicated your work in a thoroughly professional and coherent manner.

Research Integrity

The University of East London conducts high quality, innovative research and is guided by the principles and standards outlined in The Concordat to Support Research Integrity, 2012; the University's Code of Practice for Research; Code of Practice for Research Ethics and Procedures for the Investigation of Misconduct in Research, for staff and students. The Concordat seeks to provide a national framework for good research governance and its conduct, and applies to all fields of research supporting a research environment that is underpinned by ethical values. The University adheres to its responsibility to support and promote the highest standards of rigour and integrity and embed a culture of honesty, transparency and care and respect for all participants and subjects of research. The University is committed to ensuring that research is conducted with integrity and good research practices are upheld.

Research Ethics

Research involving human participants, human material, including human tissue, embryos, foetuses and bodily fluids, from living or deceased participants, human data, personal, sensitive or otherwise, or non-human animal should comply with all legal and ethical requirements and other applicable guidelines. The University has established various Research Ethics Committees at University, School and College level to ensure appropriate ethical review of research projects involving human participation, human material or personal data. A proposed research study may require ethical approval from the main University Research Ethics Committee (UREC), one of the School Research Ethics Committees (SRECs), one of the College Research Ethics Boards (CREBs) or where applicable, Collaborative Partner Research Ethics Committees (CRECs). UREC reviews ethics applications from staff, MPhil, PhD, Post and Professional Doctorates and Masters by Research students. Please note, that Professional Doctorates from the School of Psychology are reviewed by the School of Psychology SREC. SRECs, CREBs and CRECs consider applications for ethical approval from taught Masters and undergraduate students.

Research involving human participation, human material or personal or sensitive data, where necessary, will require formal approval from UREC, SREC, CREB or

CREC before the research commences. Students should submit research projects involving human participants, human material, personal or sensitive data or non-human animal for ethical review, to one of the University's Research Ethics Committees listed above, and abide by the outcome of the review. The application for ethical approval should be submitted alongside copies of any supporting documentation which will be given to the participants, including a Participant Information Sheet, Consent Form, interview schedule, indicative topic guide, self-completion survey or questionnaire, debrief letter, and recruitment poster, where appropriate.

The Research Ethics Committees ensure that appropriate procedures for obtaining informed consent are observed, having particular regard to the needs and capacity of the subjects involved. The dignity, rights, safety and well-being of participants must be the primary consideration in any research study. Appropriate care must be taken when research projects involve vulnerable groups, such as elderly people, children, people with mental ill-health, and covert studies or other forms of research which do not involve full disclosure of the research to participants. The University's Research Ethics Committees also ensure that research projects of this nature have been submitted for approval to all applicable external bodies; ethical, regulatory or otherwise.
https://uelac.sharepoint.com/ResearchInnovationandEnterprise/Pages/Ethics.aspx

Students who wish to conduct research in the NHS or Health and Social Care must apply to the NHS for ethical approval through the Integrated Research Application System (IRAS). The online application for ethical approval will be reviewed by a NHS or Social Care Research Ethics Committee. Students who are conducting research with only NHS staff or only using NHS premises are required to apply to the relevant University Research Ethics Committee; UREC, SREC, CREB or CREC and the Health Research Authority (HRA) for ethical approval. Students should seek guidance from their supervisor to ensure that ethical approval is sought from the appropriate body.

Students conducting studies under the auspices of any of the UK Departments of Health and/or the HRA are required to submit copies of their NHS, Social Care or HRA ethics approval letter, Local Information pack, IRAS application form and a PDF of the IRAS document checklist to the UREC Committee. UREC will grant consent for the study and issue a combined approval and sponsorship letter, for the research, on behalf of the University. The University acts as a sponsor for NHS or Social Care approved research projects, and students should conduct their studies in accordance with the conditions specified in the NHS, Social Care or HRA ethics approval letter.
http://www.hra.nhs.uk/research-community/hra-approval-the-new-process-for-the-nhs-in-england

Students should understand their responsibilities to conduct research to high ethical standards and be aware of policies and procedures on good research practice. The University has established guidelines to preserve the confidentiality and security of personal data, relating to human participants and human material, involved in research projects. Students must comply with the regulations of appropriate regulatory or statutory bodies and any legal obligations when conducting or

collaborating in research in other countries. The legal and ethical requirements existing in the UK and in the countries where the research will take place should also be observed. Students should ensure that they have fully prepared for their planned research, allowing enough time to submit an application for ethical approval and obtain appropriate consent. It is advisable that students seek guidance from supervisors on proposed research projects.

The University complies with all applicable Data Protection laws and students should consult the University's Data Management policies:
https://uelac.sharepoint.com/ITServices/Pages/Our-Policies.aspx

While preparatory activity is permitted, no formal contact with potential participants, recruitment of human participants or data collection for the research study may commence until ethical approval from UREC, SREC, CREB, CREC, or a NHS or Social Care Research Ethics Committee is confirmed. Students must conduct the research project in accordance with the University's policies and the conditions of ethical approval specified in the ethics approval letter, throughout the length of the study. Amendments to an approved research study must be submitted to the relevant Research Ethics Committee for review, and ethical approval obtained before any changes to the project may be implemented. Please be aware, ethical approval for research projects cannot be granted retrospectively. Research conducted with human participants or human material, without ethical approval from the appropriate Research Ethics Committee, is considered misconduct in research and as such, students may be subject to formal investigation, which can result in the termination of the research project and misconduct proceedings.
https://uelac.sharepoint.com/ResearchInnovationandEnterprise/Pages/Ethics.aspx

Risk Assessment

The University has a duty of care to its researchers and a responsibility to safeguard the welfare of research participants. Risk management should be considered at the same time as planning a research project. A comprehensive risk assessment helps to identify and evaluate potential hazards associated with the research project. Students in consultation with their supervisors should put control measures in place to minimise the likelihood of an event occurring that will cause harm. A risk assessment must be completed for research taking place within and outside of the University, fieldwork and research conducted overseas, before the project commences. The risk assessment should be completed by the student in collaboration with the supervisor and authorised by the Dean of the School or Associate/Acting Dean. If students consider that human participants in their, or others,' research are subject to unreasonable risk or harm, they must report the concerns to their supervisor and, where necessary, to the appropriate regulatory authority. Similarly, concerns relating to the improper and/or unlicensed use or storage of human material or non-human animal or the improper use or storage of personal data, should also be reported.

Further guidance on risk assessments can be found in the University's Health & Safety Handbook:

https://uelac.sharepoint.com/HealthandSafetyUnit/Pages/H%26S-Handbook.aspx

6 MODULE SPECIFICATIONS

Module Specification

Module Title: Applied Mathematics and mechanics	**UEL Module Code:** EG3XXX **ASU Module Code:** EG8311 **Level:** 3 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Nabil Hammed
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite: None	**Excluded combinations:** None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The main aim of this module is to provide students with the opportunity to develop an understanding of trigonometric functions and the skills needed to apply advanced mathematical techniques such as algebra, calculus and statistics, to solve complex engineering problems. Additional techniques, including matrices and numerical methods, are introduced to enable students to solve linear and non-linear algebraic equations, partial differentiation, and differential equations.

Main Topics of the study

Vectors, Lines and Planes. Vector-valued functions. Partial derivatives. Multiple integrals. Calculus of vector fields. Introduction and classification of differential equations. First-order equations. Second-order equations. Laplace transform. Systems of first-order linear equations.

The nature of probability and statistics. Probability and counting rule. Frequency distributions and graphs. Data description. Discrete probability distributions. Continuous probability distributions. Confidence Intervals.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Identify the three-dimensional coordinate systems and functions of several variables.
2. Define the partial derivatives
3. Define basic concepts of probability, conditional probability and discrete random variables.
4. Recognize the second order ordinary differential equations
5. Identify continuous probability distributions: Normal distribution, standard normal distribution and exponential distribution

Thinking skills

6. Interpret the mathematical expectation, variance, covariance and correlation coefficient.
7. Use discrete probability distributions: binomial, Poisson, and hyper geometric distributions.

Subject-based practical skills

8. Collect, organization data, construct Frequency distributions and graphs.
9. Solve first order and higher order differential equations.

Skills for life and work (general skills)

10. Provide solutions for engineering problems, comprehensive analytical skills.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	1-3
Portfolio (2) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	4-7
Portfolio (3) (63 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	30%	8-10

Indicative reading for this module:

Core

Stewart, J., 2012. *Essential calculus: Early transcendentals*. Cengage Learning. Montgomery, D.C. and Runger, G.C., 2014. *Applied statistics and probability for engineers*. John Wiley and Sons.Zill, D., Wright, W.S. and Cullen, M.R., 2011. *Advanced engineering mathematics*. Jones &

Bartlett Learning. Chatfield, C., 2018. *Statistics for technology: a course in applied statistics*. Routledge.

Recommended

Shampine, L.F., 2018. Numerical solution of ordinary differential equations. Routledge.

Zill, D.G., 2012. A first course in differential equations with modeling applications. Cengage Learning.

Hardy, G.H., 2018. Course of pure mathematics. Courier Dover Publications.

Robert T. Smith & R.B. Minton "Calculus", 4th Edition 2010, McGraw Hill Higher Education

Wasow, W., 2018. Asymptotic expansions for ordinary differential equations. Courier Dover Publications

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 135 hours 67.5 hours	 Lectures Tutorials
2. Student learning time: 97.5 hours	 Background reading, preparation for examination, write-up time for coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Mechanical Engineering Basics	**UEL Module Code:** EG3XXX **ASU Module Code:** EG8312 **Level:** 3 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Nabil Hammed

Pre-requisite: None	**Pre-cursor:** None
Co-requisite: None	**Excluded combinations :** None

Location of delivery: ASU, Egypt

Main aim(s) of the module:

The module focuses on three main areas: introduction to the mechanical engineering basics; thermodynamics, structure and properties of material and machines mechanics. It also provides students with an opportunity to develop the skills needed to select and design for industrial mechatronic systems.

The student will know the different types of material, understand basic concepts and analysis techniques of thermal systems and be able to analyse the stress on machines.

The student will able to analyse systems involving basic heat and mass transfer, perform basic calculations of stress and evaluate Elastic Behaviour and Beams Deflection. In addition the module will introduce Finite Element Analysis (FEA) and Computer Implementation.

Main Topics of the study

Basic concepts and definitions, System and control volume, Property and state, Processes and cycles. Ideal gases, State equation, Specific heat at constant pressure and volume, Tables of thermodynamic properties, First law of thermodynamics, Internal energy and enthalpy.

Fundamentals of engineering materials. The internal structure of material. Good exploitation of the material requirements for a set of properties suitable for specific application. Material properties. Relationship between material properties and its internal structure

Fundamentals of Stress Analysis, Principles of Statics and its Application on Deformable Bodies, Stress and Strain, Elastic behaviour of simple elements, Principal stresses. Statically Indeterminate Beams. Introduction to Finite Element Analysis (FEA) and Computer Implementation.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Identify the difference between open systems and closed systems
2. Demonstrate the basics of thermodynamic skills to solve problems, conclude solutions and creative thinking to operate a power plant
3. Identify the role of electrons in various types of bonds between atoms.

Thinking skills

4. Explain the mechanism by which metals plastically deformed.
5. Define the basic thermodynamics skills to operate a power plant

Subject-based practical skills

6. Design a logical procedure for microscopic examination.
7. Contrast the characteristics and performance of different power cycles

Skills for life and work (general skills)

8. Write reports.
9. Deliver presentations using data.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (63 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	30%	1-3
Portfolio (2) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	4-6
Portfolio (3) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	7-9

Indicative reading for this module:

Core

Li, K., 2018. Applied thermodynamics: availability method and energy conversion. Routledge.
Sparrow, E.M., 2018. Radiation heat transfer. Routledge.
Callister Jr, W.D. and Rethwisch, D.G., 2012. *Fundamentals of materials science and engineering: an integrated approach*. John Wiley & Sons.

Recommended

Cengel, Y., 2014. *Heat and mass transfer: fundamentals and applications*. McGraw-Hill Higher Education.
Kalpakjian, S., Schmid, S.R. and Sekar, K.S., 2014. Manufacturing engineering and technology.
Anderson, D., Tannehill, J.C. and Pletcher, R.H., 2016. Computational fluid mechanics and heat transfer. CRC Press.
Kalpakjian, S., Schmid, S.R. and Vijai Sekar, K.S., 2014. Manufacturing engineering and technology. *Singapore: Pearson*.
Ashby, M.F., Shercliff, H. and Cebon, D., 2018. Materials: engineering, science, processing and design. Butterworth-Heinemann.
Smith, B.W. and Suzuki, K. eds., 2018. Microlithography: science and technology (Vol. 126). CRC press.
Abdel-Kader, M.G., Dugdale, D. and Taylor, P., 2018. Investment decisions in advanced manufacturing technology: A fuzzy set theory approach. Routledge.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 135 hours 82.5 hours 52.5 hours	 Lectures Tutorials Lab
2. Student learning time: 30 hours	Background reading, preparation for examination, write-up time for laboratory exercises and coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Circuit analysis and Programming	**UEL Module Code:** EG3XXX **ASU Module Code:** EG8313 **Level:** 3 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Nabil Hammed
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite: None	**Excluded combinations :** None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with knowledge about DC and AC circuits, theories and the ability to analyse and solve dc and ac circuits for different industrial applications. Also, it provides the students with the theory of semiconductors, PN Junctions, DC and Ac analysis of BJT transistors and Operational amplifiers.

Students will recognize methods of solving engineering problems and will be familiar with the concept of data structure in addition to be able to design algorithms to handle different data structures. Student will be able to program with C++ language.

Main Topics of the study

Electrical circuit variables and elements, Analysis of electrical circuits, Source transformation, Network theorems, Star-delta transformation, Application of network theorems on AC circuits, Electric power in AC circuits, Power factor, Circuits with nonlinear resistance. Transients in electrical circuits, Electric filters.
PN Junctions, Bipolar junction transistor, Biasing, Metal Oxide Semiconductor Field effect transistors. Logic gates using CMOS, FET applications. Transistor biasing stability. Transistor small signal models, Analysis of AF amplifiers, power amplifiers, Operational amplifiers, OP-AMP applications. I to V and V to I converters, Schmitt trigger, OP-AMP oscillators.

Introduction to problem analysis, Variables, Data types, Input and Output, Operators and simple functions, Selection structure, Repetition and Loop statements, Files, Pointers, S/W testing. Programming principles such as structuring, looping, data structures and abstract. Data type ADT. Arrays, list, stacks, queues, binary trees.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Recognize the voltage-current characteristics of different circuit elements
2. Define the different types of energy storage elements characteristics.
3. Define and apply the different theories that can be applied to electric circuits

Thinking skills

4. Describe diode applications.
5. Operate the circuits by resistances reduction method or other methods.
6. Interpret the programming concepts and different data structures.

Subject-based practical skills

7. Design BJT and FET applications.
8. Select different solution alternatives for the engineering problems

Skills for life and work (general skills)

9. Write reports.
10. Deliver presentations using data.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments. Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	1-2
Portfolio (2) (63 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	30%	3-6
Portfolio (3) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	7-10

Indicative reading for this module:

Core

Irwin, J.D. and Nelms, R.M., 2011. Basic engineering circuit analysis.
Olivier, J.C., 2018. *Electrical Circuits: A Primer*. Artech House.
Sedra, A.S. and Smith, K.C., 2016. *Microelectronic circuits*. Oxford University Press.

Recommended

Malek, D.S., 2012. Java Programming: From Problem Analysis to Program Design.
Gaddis, T., 2018. *Starting Out with C++: From Control Structures through Objects Brief*

<table>
<tr><td colspan="2">Version, Student Value Edition Plus MyLab Programming with Pearson eText--Access Card Package. Pearso
Alexander, C.K. and Sadiku, M.N., 2009. Fundamentals of electric circuits. Qinghua University Press.
Salam, M.A. and Rahman, Q.M., 2018. Fundamentals of Electrical Circuit Analysis (pp. 1-463). New York: Springer.
Duffy, D.J., 2018. Introduction to the Boost C++ Libraries Volume III–Algorithms, Concurrency, Generic Programming and Higher-order Functions, Numerics.</td></tr>
<tr><td>Indicative learning and teaching time
(10 hrs per credit):</td><td>Activity</td></tr>
<tr><td>1. Student/tutor interaction:

105 hours
75 hours
75 hours</td><td>

Lectures
Tutorials
Lab</td></tr>
<tr><td>2. Student learning time:

45 hours</td><td>
Background reading, preparation for examination, write-up time for laboratory exercises and coursework</td></tr>
<tr><td>Total hours (1 and 2):</td><td>300 hours</td></tr>
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Module Specification

Module Title: Design and Manufacturing Fundamentals	**UEL Module Code:** EG3XXX **ASU Module Code:** EG8314 **Level:** 3 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Nabil Hammed
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite: None	**Excluded combinations :** None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with knowledge and understanding the basic considerations of machine parts and assembly drawing. The module will also introduce students to solid modelling such as parametric part design. Procedural modeling. 3D solid modeling. Assembly: basics, design. Drafting: basics, workbench. Visualization. Generative shape design. Sheet metal design. Weldment features. Predictive analysis and simulation.

Students will be able to develop the skills to demonstrate understanding of the importance of production engineering and the difference between forming and machining processes.

The student will able to build the student background in mechatronic systems and help students to develop a thorough understanding of the analysis and design of different mechatronic systems.

Main Topics of the study

Machine parts, assembly drawing and workshop working drawings. Introduction to solid modelling. Sketcher workbench, Solid work features, Modelling techniques, Part design, Parametric part design and Assembly. Sheet metal design and Weldment features. Predictive analysis and simulation.

Introduction to manufacturing, Casting processes, Metal forming processes, Joining of metals, Welding processes, Adhesive welding. Machining Processes and the details of the machines. Methods of tools and work piece fixation and Machining time.

Introduction. Analog electronics. Digital electronics. Actuators. Microprocessors. Fundamental concepts of mechatronics, common elements making up mechatronic systems. Interfacing electromechanical systems to microcontrollers. Components and measurement equipment used in the design of mechatronic products

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Recognize the different modelling techniques.
2. Explain the fundamental concepts of production technology.

Thinking skills

3. Illustrate the concept of metal removal.
4. Interpret the characteristics of mechatronics and microcontroller based systems.

5. Analyse how to model and simulate solid parts.

Subject-based practical skills

6. Analyse mechatronic systems and select the best sensor and actuator for an application.
7. Evaluate the fit of a mechatronic system for a specific user

Skills for life and work (general skills)

8. Write a technical report according to the scientific standards guideline.
9. Present the report in oral seminar.
10. Effectively manage tasks, time, and resources.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	1-4
Portfolio (2) (63 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	30%	5-7
Portfolio (3) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	8-10

Indicative reading for this module:

Core

Munford, P. and Normand, P., 2015. *Mastering Autodesk Inventor 2016 and Autodesk Inventor LT 2016: Autodesk Official Press*. John Wiley & Sons.
Kalpakjian, S., Vijai Sekar, K.S. and Schmid, S.R., 2014. Manufacturing engineering and technology. .

Recommended

Hitomi, K., 2017. Manufacturing systems engineering: A unified approach to manufacturing technology, production management and industrial economics. Routledge.
Janschek, K., 2014. Mechatronic Systems Design: Methods, Models, Concepts.
Kececi, E.F., 2018. Mechatronic Components: Roadmap to Design. Butterworth-Heinemann.
Youssef, H.A. and El-Hofy, H.A., 2008. Machining technology: machine tools and operations. CRC Press.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 45 hours 90 hours	 Lectures Tutorials Lab
2. Student learning time: 45 hours	 Background reading, preparation for examination, write-up time for laboratory exercises and coursework
Total hours (1 and 2):	300hours

Module Specification

Module Title: Modelling and Control	**UEL Module Code:** EG4XXX **ASU Module Code:** EG8421 **Level:** 4 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Ahmed Samy
Pre-requisite: EG8311	**Pre-cursor:** None	
Co-requisite: None	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with the skills to analyse and design dynamic systems. The module will also enable students to design and implement different types of controllers and apply it to real machines. The module will also provide the students with different properties of fluids and behaviour of fluids.

Students will be able to develop the skills to formulate and analyse a modelling problem using Matlab environment and develop controllers on the LabVIEW program; understand the concepts of viscous flow modelling and multibody dynamics.

Main topics of study:

Introduction to systems modelling and simulation, modelling techniques and methods. Modelling of mechanical and vibration systems. Electrical and electromechanical systems modelling: Thermal and fluidic systems modelling. Model linearization and analysis, modelling using transfer function and block diagrams, state space modelling representation.

Concepts and Fundamentals of open loop, closed loop, cascaded and feedforward control systems. The application of modelling techniques for control systems analysis. Determination of the plant and system responses in the time and frequency domains. Using software packages. The industrial control equipment components and the corresponding specifications. The control system analysis tools and performance evaluation. Design control system compensators using the methods of Root-Locus, Frequency response, and pole- placement. P, PI, and PID controller tuning using Zeigler-Nichols and Cohen-Coon methods and applying that on a mini-Project.

Properties of Fluids, Pressure Measurement, Forces on Submerged Bodies, Viscous Boundary Layers, Continuum Hypothesis, Streamlines, Continuity Equation. Classification of Flow Fields, Major and Minor Losses in Pipes, Similitude and Dimensional Analysis, Lagrangian and Eulerian Coordinates, Transport Theorem on a Control Volume, Navier Stokes Equation.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Identify the basics of dynamic and vibration systems, elements of mechanical and electrical systems and explain the modelling and simulation steps
2. Define the basic functions and features of the different types of control systems, the

fundamental concepts of: “open loop ", “feedback", " linear and nonlinear systems", "feedforward", "compensators" and "controller tuning".
3. Define fluid properties, stresses in fluids at rest and motion and types of flows.
4. Identify the elements of thermal and fluid systems modelling.

Thinking skills

5. Derive the governing equations of fluid flow: continuity, energy and momentum equations from principles of mass, energy and momentum conservation and Bernoulli's equation.
6. Calculate and choose appropriate values of the P, PI, PID controller parameters to obtain a desired behaviour of the system using Zeigler-Nichols and Cohen-Coon methods.

Subject-based practical skills

7. Apply the adequate mathematical tools to model and simulate some important dynamic processes and exploring its behaviour (using the concept of VI in LabVIEW and MATLAB, etc.).
8. Apply modelling and simulation fundamentals to dynamic systems and analyse and simulate mechatronic systems
9. Design control system compensators using Root-Locus, Frequency response methods and the pole- Placement techniques, a complete process control system or a servo system as the first phase of the implementation of the Mini-Project

Skills for life and work (general skills)

10. Undertake independent research

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content, and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	1-4
Portfolio (2) (63 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	30%	5-7
Portfolio (3) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	8-10

Reading and resources for the module:

Core

Karnopp, D.C., Margolis, D.L. and Rosenberg, R.C., 2012. *System Dynamics: Modeling, Simulation, and Control of Mechatronic Systems*. John Wiley & Sons.

Franklin G.F. and others 2016, Feedback Control of Dynamic Systems, 7th edition.

Munson B. R. , Young D. F. and Okishi T. H. 2009, Fundamentals of Fluid Mechanics, 6th Ed., John Wiley & Sons, Inc ,

Recommended

White F. M. 2012, Fluid Mechanics, 7th Ed., McGraw-Hill, ISBN 0-07-116848-6.

Streeter, V.L., Wylie, E.B. and Bedford, K.W. 2004, Fluid Mechanics, 9th edition, McGraw Hill.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 82.5 hours	 Background reading, preparation for examination, write-up time for coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Machine Design	**UEL Module Code:** EG4XXX **ASU Module Code:** EG8422 **Level:** 4 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Ahmed Samy
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite: None	**Excluded combinations:** None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with the skills to analyse and design mechanisms and machine elements. The module will also enable students to calculate stresses and deflection and analyse velocities and accelerations as well for mechanisms. The module will also provide the students with different concepts of mechatronic systems and actuators.

Students will be able to develop the skills to construct and design a mechatronic system starting from the conceptual design, mechanism analysis, stresses and rigidity calculations; understand the concepts of mechatronic system.

Main topics of study:

General concepts of Stress and Strain, Types of Stresses, Thermal Stresses, Theories of Elastic Failure. Constructional details as affected by manufacturing, assembly, and strength considerations, Connections, Power Screw and its joints, Seals, Springs, Reverse Engineering.

Multibody systems, computational dynamics, motion and constraints, reference frames, kinematic analysis, force analysis, planar and spatial dynamics, rigid body mechanics, deformable bodies, computer and numerical methods. Mechanisms: open and closed-chain systems, four-bar mechanism, inversions of reciprocating engines, inversions of double slider mechanisms, motor vehicle steering mechanism, hook's joint, cams, gears. Kinematics: kinematics of rigid bodies, velocity equations, acceleration equations, computational methods in kinematics, computer implementation, kinematic modelling and analysis. Dynamics: D'Alembert's principle and Newton-Euler equations, constrained dynamics, augmented formulation, Lagrange multipliers, virtual work.

Design for Fatigue, Design of Machine Elements, Design of Power Transmission Elements, Selection of Bearings, Design of Pressure Cylinders. Use of interactive Finite Element computer programs for problem solving is illustrated and used.

Mechatronics design philosophy and methodologies, mechatronics system components, optimal machine design, configuration and synergetic integration. Applications in automotive industry, manufacturing, medical and healthcare, etc. Beginning levels on programming, building electrical and electronics circuits, building simple mechatronic systems. Practice through Labs and projects.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Define the type of loads and stresses applied on the mechanical equipment and all the necessary checks for each part of any mechanical part.
2. Describe and define the fundamental concepts of mechanisms: “chain", “links, joints, open kinematics chain, closed kinematics chain".

Thinking skills

3. Analyse the load and stress applied on each mechanical element.
4. Select alternative design of the required mechanical equipment
5. Analyse the kinematics and dynamics of any mechanism, cams and gears

Subject-based practical skills

6. Evaluate alternative design solutions for subsystems
7. Choose and design appropriate sensors, actuator systems and control systems for the mechatronic systems based on their applications.

Skills for life and work (general skills

8. Write technical reports and conduct presentation about design of any mechanical equipment.
9. Work in a team to solve and design mechanical equipment

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content, and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	1-3
Portfolio (2) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	4-6
Portfolio (3) (63 hours) Coursework (progress report, presentation, and capstone project progress) Practical (face-to-face) examination	30%	7-9

Reading and resources for the module:

Core

Budynas, R.G. and Nisbett, K.J., 2014. Shigley's mechanical engineering design (in SI units). .
Norton, R.L., 2004. *Design of machinery: an introduction to the synthesis and analysis of mechanisms and machines*. Boston: McGraw-Hill Higher Education
Janschek, K., 2014. Mechatronic Systems Design: Methods, Models, Concepts.

Recommended

Rattan, S.S., 2014. *Theory of machines*. Tata McGraw-Hill Education. Cetinkunt, S., 2015. *Mechatronics with experiments*. John Wiley & Sons.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 82.5 hours	Background reading, preparation for examination, write-up time for coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Digital electronics and programming	**UEL Module Code:** EG4XXX **ASU Module Code:** EG8423 **Level:** 4 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Ahmed Samy
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite: None	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with the skills to apply Boolean algebra to switching logic design and simplification and analyse a given digital system and decompose it into logical blocks involving both combinational and sequential circuit elements.

The module will also provide experience in using a high-level programming language and knowledge of the basics of object-oriented approach by a good programming style with reasonable size on a computer. The module will also provide the students with different type of power electronics converters used for AC/AC, DC/DC, and DC/AC energy conversions and demonstrate the characteristics, operation and application of different power electronics converters and build the student knowledge with the basic concepts and characteristics of electric drive systems including DC, AC, and stepper motors.

The module will also help students to gather information and data and choose suitable visual Aids and use computer and construct tables, graphs and different visual Aids. Also student will be able to prepare, write and revise a report and learn how to do a presentation and apply for a job.

Main topics of study:

Switching functions: main operators, postulates and theorems, analysis and synthesis of switching functions, incompletely specified functions. Design using NAND and NOR gates. Design of combinational circuits using hardware description languages. Storage devices:1-bit storage, set-reset FF, clocked SR FF, positive and negative-edge triggered SR-FF, JK-FF, race-around condition, master-slave JK-FF, D-FF, T-FF, excitation table. Sequential circuits: state table and transition diagram, design of digital sequential systems, counters, shift registers. Adders, subtracters, decoders, coders, multiplexer/demultiplexer, memories. Design of sequential circuits using hardware description languages. Implementation of logic circuits on FPGA. Introduction to microprocessors.

Basic concepts of object-oriented programming. Modular design. Exception handling and class libraries. Input/Output and streams. Reflection. Concurrent programming. Distributed programming. Multithreaded programming. Dynamic data structures. Template functions and classes. Graphical User Interface (GUI) programming. Graphics. Typography and writing, types of engineering reports, content and appearance, communication types, infographics in reports and presentations, types of graphs.

Single and three phase Ac controllers, Integral cycle control, the single and two thyristor choppers, single phase and Bridge inverter circuits, Dc motor, drives, and servomotors. Ac drives, basics of industrial motor control, Criteria for selecting drive components, Equivalent circuit of dc motors, Permanent magnet dc motors, Adjustable speed dc drives, Induction motor drives,

Slip power recovery from an induction motor, Forced commutated, Variable frequency ac motor drives, Injection braking of induction motors, Synchronous motor drives, Stepper motor drives, Computer controlled drives. Applications.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Define the different types of logic gates and logic functions.
2. Explain the concept of Boolean functions and Boolean algebra to simplify logic circuits using the Boolean algebra and Karnaugh maps
3. Define fundamental programming concepts such as variables, conditional statements, looping constructs, and functions (procedures).
4. Describe the distinction between objects and primitive types.

Thinking skills

5. Analyse and design combinational logic circuits and sequential circuits
6. Select a suitable power electronics switch for certain application and design the power electronics converters and electrical drive systems then evaluate its performance

Subject-based practical skills

7. Design and implement logic circuits and digital computer components.
8. Design the gating circuits for power MOSFETS and Thyristors
9. Experiment and test DC/DC, AC/AC, and DC/AC converters

Skills for life and work (general skills)

10. Explain ideas effectively through presentation and work in a team

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content, and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The

VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (63 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	30%	1-4
Portfolio (2) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	5-7
Portfolio (3) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	8-10

Reading and resources for the module:

Core

Rashid, M.H. ed., 2017. *Power electronics handbook*. Butterworth-Heinemann. .
Bell, C.G., Mudge, J.C. and McNamara, J.E., 2014. *Computer Engineering: A DEC View of Hardware Systems Design*. Digital Press.

Recommended

Mohan, N. and Undeland, T.M., 2007. *Power electronics: converters, applications, and design*. John Wiley & sons.
Bose, B.K., 2002. *Modern power electronics and AC drives* (Vol. 123). Upper Saddle River, NJ: Prentice hall.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 82.5 hours	 Background reading, preparation for examination, write-up time for coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Measurements and Instrumentation	**UEL Module Code:** EG4XXX **ASU Module Code:** EG8424 **Level:** 4 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Ahmed Samy
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite: None	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with knowledge of the performance characteristics of measuring instruments and error estimation and ability to design measurement system.

The module will deliver an experience in building blocks of the OP-Amp and determine the function of each block and analyse and design the OP-Amp application circuits.

The module will also Enrich the student knowledge about the application side of electrical power systems.
The module will also make engineering students familiar with the basics and concepts of engineering economy and introduce different types of project in practical application and model real life problems

Main topics of study:

Functional elements of an instrument, classification and configuration of measured systems, analog and digital sensors, input-output configuration of instruments, variable conversion elements and signal amplification, methods of correction for interfering and modifying inputs. Design criteria and dynamic performance of ideal measurement systems: generalized performance characteristics of instruments, static and dynamic performance, accuracy, statistical analysis of measurement errors, calibration and regression. Measuring devices and sensors.

Application of electronic instrumentation methodology (modelling, analysis and design) and tools (sensors, instruments, basic electronic hardware and simulation software). Switched capacitor power supply. Time base generators. Active filters, Analog multiplier. Sample and hold circuits. Sensors and transducers. Data transmission. Digital to analog converters and vice versa. Voltage to frequency and vice versa. Data acquisition systems.

Operational amplifiers (OP-AMPs): difference amplifier, specifications, frequency characteristics, applications: adder, subtracter, integrator, differentiator, electronic analogue computation, I to V and V to I converters, comparators, Active filters, Schmitt trigger, OP-AMP oscillators. Timing: Ring Oscillators, Relaxation Oscillators, 555 timers, Voltage Controlled Oscillators.

Principles of engineering economy, cost estimation and cost terminology, Accounting, Balance sheet, Profit loss statement, interest rates, different types of payments, Payback period, Evaluation of alternatives, Depreciation methods, Replacement analysis, Determination of the economic life of challenger and defender, evaluation of public projects.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Explain the performance characteristics of measuring instruments
2. Identify the basic concepts and circuits of DAC's and ADC's and predict the operation of Astable and Monostable circuits.
3. Explain the fundamentals of passive and active filters, their design and applications in communication engineering.
4. Define the static characteristic of measuring instruments and estimate its performance, error and uncertainty.
5. Choose the proper device for the measurement and calculate different measuring variables using equations
6. Define the different characteristics and models describing different machines (dc machines, synchronous machines).

Thinking skills

7. Apply the different theories to model and solve the transformer and magnetic circuits and illustrate the different characteristics of 3 phase induction motors.
8. Apply mathematics, science and engineering principles and apply a systematic process to making economic decisions

Skills for life and work (general skills)

9. Present technical reports about basics of engineering economy and different analysis and solving techniques.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content, and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	1-3
Portfolio (2) (73.5 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	35%	**4-6**
Portfolio (3) (63 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	30%	**7-9**

Reading and resources for the module:

Core

Guru, S. B. 2008, *Electric Machinery and Transformers*. 3rd. ed. New York: Oxford University Press.
Blank, L., and Tarquin, A. 2017, *Engineering Economy*, 8th Edition, McGraw-Hill.
Garrett, P.H., 2005. *High performance instrumentation and automation*. Crc Press.

Recommended

Razavi, B., 2011. RF Microelectronics (Prentice Hall Communications Engineering and Emerging Technologies Series).
Sedra, A.S. and Smith, K.C., 2014. Microelectronic Circuits.
Doebelin, E.O. and Manik, D.N., 2007. Measurement systems: application and design. Holman, J.P. and Gajda, W.J., 2001. *Experimental methods for engineers* (Vol. 2). New York: McGraw-Hill.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practicals
2. Student learning time:	 Background reading, preparation for examination, write-up time

82.5 hours	for coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Mechatronics applications	**UEL Module Code:** EG5XXX **ASU Module Code:** EG8531 **Level:** 5 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Nessren Zamzam
Pre-requisite: EG8422	**Pre-cursor:** None	
Co-requisite:	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with knowledge and understanding of the principles of mechatronics application such as Mechatronics in Automotive, Methods for design, fabrication, and packaging of Nano-Mechatronic systems, Introduction to biomechatronic systems. Human motion control, physiological sensory system, physiological motor control, central nervous system, impaired motor control, assistive motor control, human-robot interaction, biomimetic and bioinspired systems. The module will also give the students Introduction to robotics systems such as history of robotics, kinematics analysis. Trajectory planning and Dynamics analysis.

Main topics of study:

Vehicle main systems: propulsion systems, braking systems, suspension systems, steering systems. Engine starting system, fuel supply system and ignition system. Also fundamental knowledge and experience in the Methodologies for design, fabrication, and packaging of Nano-Mechatronic systems.

Introduction to biomechatronic systems: definition of biomechatronic, principles of applying mechatronics theory to biotechnology. Human motion control, physiological sensory system, assistive motor control, human-robot interaction, biomimetic and bioinspired systems.

History of robotics, types of robotics (Serial, parallel, walking, bipedal, etc.), robotics applications, Transformation. Kinematics analysis forward and inverse kinematics, Jacobian matrix, singularities. Trajectory planning: joint and Cartesian planning. Dynamics analysis: inverse and forward dynamics. Control: computed torque techniques, joint space control, PD control stability

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Identify knowledge about Automotive Engineering.
2. Recognize the design, manufacture, and maintenance of major subsystems and technologies associated with mobility.
3. Identify the diverse applications of robots

Thinking skills

4. Apply mechanisms of operation of modern MEMS sensors, actuators and measuring instruments in different fields of application.
5. Interpret the basic analysis and design tools (Finite Element Modeling) of MEMS based actuators and sensors.

Subject-based practical skills

6. Relate human body function and dysfunction to mechatronic systems.
7. Operate the position of the industrial robot.
8. Design a small medical device using biomechatronic systems

Skills for life and work (general skills)
9. Share ideas with others effectively.
10. Gain access to data and information from libraries and internet related to course subjects

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.
Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content, and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (42 hours) **Coursework (** Activities/Assignments) **Written Examination (** Quizzes, 1 Midterm Exam, Final Exam **)**	20%	1-3
Portfolio (2) (42 hours) **Coursework (** Activities/Assignments) **Written Examination (** Quizzes, 1 Midterm Exam, Final Exam **)**	20%	4-6
Portfolio (3) (42 hours) **Coursework (** Activities/Assignments) **Written Examination (** Quizzes, 1 Midterm Exam, Final Exam **)**	20%	7-8
Portfolio (4) (84 hours) **Coursework (** Activities/Assignments) **Written Examination (** Quizzes, 1 Midterm Exam, Final Exam **)**	40%	9-10
Indicative reading for this module:		

Core

Bonnick, A. and Newbold, D., 2011. *A practical approach to motor vehicle engineering and maintenance*. Routledge. .

Reif, K., 2014. Automotive Mechatronics. Germany: Springer Fachmedien Wiesbaden.

Maluf, N. and Williams, K., 2004. Introduction to microelectromechanical systems engineering. Artech House.

Xie, M., 2003. Fundamentals of robotics: linking perception to action (Vol. 54). World Scientific Publishing Company.

Recommended

Habib, M.K. and Davim, J.P., 2013. Interdisciplinary mechatronics: engineering science and research development. John Wiley & Sons.

Lenarčič, J. and Roth, B. eds., 2006. Advances in robot kinematics: mechanisms and motion. Springer Science & Business Media.

Reif, K., 2014. Fundamentals of automotive and engine technology. Springer: Bosch professional automotive information.

Spong, M.W., Hutchinson, S. and Vidyasagar, M., 2006. *Robot modeling and control*.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 82.5 hours	Background reading, preparation for examination, write-up time for laboratory exercises and coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Embedded Systems	**UEL Module Code:** EG5XXX **ASU Module Code:** EG8532 **Level:** 5 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Nessren Zamzam
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite:	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

This module explains the roles and functions of microcontrollers. Acquaintance with microcontrollers and their simulators and debuggers. Design of embedded systems using real-time hardware and software components. Communicating, linking, interfacing, and processing techniques for embedded systems. Programming models. Also the concept and aspects of the consumer behaviour, studying the markets. Market mix, segmentation, targeting, and positioning.

Main topics of study:

Identify the importance of microcontrollers, the roles and functions of microcontrollers. Acquaintance with microcontrollers and their simulators and debuggers. Understanding different addressing modes. Programming, debugging, and simulating assembly language programs. Developing a prototype for an embedded system. Interrupts and serial I/O. Memory Expansion. Microcontroller interfaces. Interfacing techniques. Interfacing requirements. A typical microcontroller system is utilized in this course with typical software-based applications. Interfacing with USB, I2C, SPI, CAN, LIN

Real-time system types, characteristics, and applications. Tasks, scheduling algorithms, and schedulability. Real-time system analysis. Real-time operating systems: synchronization, real-time memory management. Developing embedded software, Memory maps and boot kernels, firmware, and ROM-resident system code. Design of embedded systems using real-time hardware and software components. Communicating, linking, interfacing, and processing techniques for embedded systems.

Programming models: disciplines, methods, development. Machine instruction format and instruction timing. Interface between OS, ISA, and RTL layers of the virtual machine model. Interrupts and exception handling. Hardware interfacing and device driver programming. Algorithm analysis of embedded programs. Debugging live systems.

The concept and aspects of the consumer behaviour, studying the markets. Market mix, segmentation, targeting, and positioning.

The product strategy: branding, packaging, product mix, product life cycle, new products development. The pricing strategy: The importance of pricing, Methods of pricing. Distribution strategy: distribution channels, distribution outlets. Promotion strategy: advertising and personal selling.

Learning Outcomes for the module
At the end of this module, students will be able to:

Knowledge
1. Recognize different digital representation.
2. Identify CAN and LIN bus technologies

Thinking skills
3. Load, simulate, and debug assembly language program
4. Write embedded C program

Subject-based practical skills
5. Design and Develop Embedded C projects on Easy Pic V7 board
6. Implement projects using ADD A, I2C, LCD…etc. Peripherals
7. Build projects in OSA RTOS environment
8. Design embedded systems using finite state machine FSM

Skills for life and work (general skills)
9. Share ideas with others effectively.
10. Plan time effectively and efficiently.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content, and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (84 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	40%	1-4
Portfolio (2) (84 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	40%	5-7

Portfolio (3) (42 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	20%	8-10

Indicative reading for this module:

Core

Mazidi, M.A. and Causey, D., 2009. HCS12 microcontroller and embedded systems using Assembly and C with CodeWarrior. Pearson/Prentice Hall.
Mazidi, M.A., Mazidi, J.G. and McKinlay, R.D., 2006. The 8051 microcontroller and embedded systems: using Assembly and C (Vol. 626). Pearson/Prentice Hall.
Wilmshurst, T., 2006. Designing embedded systems with PIC microcontrollers: principles and applications. Elsevier.

Recommended

Mazidi, M.A. and Causey, D., 2009. HCS12 microcontroller and embedded systems using Assembly and C with CodeWarrior. Pearson/Prentice Hall.
Kotler, P., 2002. Marketing places. Simon and Schuster.
Iovine, J., 2004. PIC microcontroller project book. McGraw-Hill, Inc
Morales, M., 2013. An Introduction to the Tiva™ C Series Platform of Microcontrollers. Texas Instruments, April.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 82.5 hours	 Background reading, preparation for examination, write-up time for laboratory exercises and coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Mechatronic Systems Design	**UEL Module Code:** EG5XXX **ASU Module Code:** EG8533 **Level:** 5 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Nessren Zamzam
Pre-requisite: EG8421, EG8422	**Pre-cursor:** None	
Co-requisite:	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

This module explain Mechatronics Systems and Components, Mechatronics Design Process and Methodology, system requirements and constraint, mechatronics system hierarchy, Basic Pneumatic and hydraulic circuitry, Essential tools for the mechatronics design approach using the V-model. Design and implementation of the Discrete Event Mechatronics Module (DE-MM).

Main topics of study:

Explain mechatronics systems: definitions and impact on industry. Mechatronics system hierarchy, basic Mechatronics design methodology: traditional approaches, V-model, nested Vmodel, simplified examples. Essential tools for the mechatronics design approach using the V-model: MATLAB/SIMULINK, PROTEUS VSM, SOLID WORKS packages, LabVIEW with examples. Design and implementation of the Discrete Event Mechatronics Module (DE-MM): Choice of sensors, actuators, controller, implementation in the form of mini-projects.

Process Control Embedded Mechatronics Module (PC-EMM): implementation using any microcontroller based embedded system in the form of mini-project. Construction of mobile robots, the level of mobile robots in the hierarchy of the mechatronic systems.

Programmable Logic Controllers (PLC): Introduction, Hardware, programming Languages, Programming functions, Analogue modules, Special functions. Supervisory Control and Data Acquisition (SCADA)

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Demonstrate knowledge of hydraulic power transmission and storage of energy for both the hydrostatic and the hydrodynamic systems
2. Define, understand and solve problems in hydraulic and pneumatic power transmission systems in many engineering applications

Thinking skills

3. Differentiate between nomenclatures of the different types of hydraulic and Explain pneumatic systems and their respective design procedure.
4. Apply actuator sizing techniques to select the proper actuators
5. Develop plans for managing a project efficiently

Subject-based practical skills

6. Design a complete mechatronic system using the fundamental principles and skills he gained during this course and other courses

7. Evaluate alternative design solutions for subsystems

Skills for life and work (general skills)

8. Share ideas with others effectively.
9. Write reports in accordance with the standard scientific guidelines.
10. Present reports, discuss results and defend his/her ideas of experiments

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content, and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

This module include samples of the students' report progress, report presentation, posters of the report and the project, and capstone project progress

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (progress report, presentation, and capstone project progress) Practical (face-to-face) examination	35%	1-3
Portfolio (1) (73.5 hours) Coursework (progress report, presentation, and capstone project progress) Practical (face-to-face) examination	35%	4-7
Portfolio (1) (63 hours) Coursework (Activities/Assignments) Written Examination (Quizzes, 1 Midterm Exam, Final Exam)	30%	8-10

Indicative reading for this module:

Core

Cetinkunt, S., 2015. Mechatronics with experiments. John Wiley & Sons.
Isermann, R., 2007. Mechatronic systems: fundamentals. Springer Science & Business Media.
Janschek, K., 2011. Mechatronic systems design: methods, models, concepts. Springer Science & Business Media.

Recommended

Bishop, R.H., 2005. Mechatronics: an introduction. CRC Press.
Bolton, W., 2003. Mechatronics: electronic control systems in mechanical and electrical engineering. Pearson Education.
Esposito, A., 2000. Fluid power with applications. Prentice-Hall International.
Cundiff, J.S., 2001. Fluid power circuits and controls: fundamentals and applications. CRC Press
Rabie, M.G., 2009. Fluid power engineering/M. Galal Rabie. New York: McGraw-Hill,.
Alciatore, D.G., 2007. Introduction to mechatronics and measurement systems. Tata McGraw-Hill Education.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 82.5 hours	Background reading, preparation for examination, write-up time for laboratory exercises and coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Advanced Manufacturing and Automation	**UEL Module Code:** EG5XXX **ASU Module Code:** EG8534 **Level:** 5 **Credit:** 15 **ECTS credit:** 7.5	**Module Leader**: Dr Nessren Zamzam
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite:	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

This module provide Introduction to advanced manufacturing including the working principles and applications of Computer Aided Manufacturing (CAM), CAD/CAM, Computer Numerical Control (CNC), unconventional machining. This module is also provide automation history and applications, Automation system architecture and components, PLC based automation (PLC). Analogue Modules and Special Functions. Communications and Networks within automation systems; Supervisory Control and Data Acquisition (SCADA); Internet of Things (IoT) based Industrial Automation; Automation Systems Security. Applications and case studies relevant to the mechatronics and mechanical Engineering.

Main topics of study:

Introduction to advanced manufacturing including the working principles and applications of Computer Aided Manufacturing (CAM), CAD/CAM, Computer Numerical Control (CNC), Digital manufacturing processes, rapid prototyping techniques and tools: 3D printing, 3D scanning.

Automation history and applications, Automation system architecture and components, Design of combinational and Sequential logic systems, Hardware considerations and wirings of automated systems.

PLC based automation (PLC): hardware, wiring, programming Languages (Ladder diagram (LLD), function block (FB), structured text, and sequential functional chart (SFC)), Analogue Modules and Special Functions. Supervisory Control and Data Acquisition (SCADA); Distributed Control Systems (DCS); Internet of Things (IoT) based Industrial Automation;

Learning Outcomes for the module
At the end of this module, students will be able to:

Knowledge

1. Demonstrate ability in diagnosis programming skills.
2. Demonstrate understanding of the different machine elements, both mechanical and electronic.

Thinking skills

3. Program PLCs using ladder diagram, Instruction list and sequential function charts programming languages.
4. Simulate CNC Part Program using CNC simulator
5. Identify the suitable programming language
6. Identify industrial control loops.

Subject-based practical skills

7. Construct CNC Part Program.

Skills for life and work (general skills)

8. Write technical reports in accordance with standard scientific guidelines.
9. Work coherently and successfully as a part of a team.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content, and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (105 hours) **Coursework (** Activities/Assignments) **Written Examination (** Final Exam **)**	100%	1-9

Indicative reading for this module:

Core

Barnatt, C., 2016. 3D Printing Third Edition. CreateSpace Independent Publishing Platform.
Radhakrishnan, P., Subramanyan, S. and Raju, V., 2008. Cad/Cam/Cim. New Age International.

Recommended

Boyer, S.A., 2009. SCADA: supervisory control and data acquisition. International Society of Automation.
Bailey, D. and Wright, E., 2003. Practical SCADA for industry. Elsevier.
Marihart, D.J., 2001. Communications technology guidelines for EMS/SCADA

systems. IEEE Transactions on Power Delivery, 16(2), pp.181-188.
Barnatt, C., 2013. 3D printing: the next industrial revolution. Nottingham: ExplainingTheFuture. com.
Nee, A.Y.C., 2015. Handbook of manufacturing engineering and technology. Springer.
Knapp, E.D. and Langill, J.T., 2014. Industrial Network Security: Securing critical infrastructure networks for smart grid, SCADA, and other Industrial Control Systems. Syngress.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 60 hours 20 hours 30 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 40 hours	 Background reading, preparation for examination, write-up time for laboratory exercises and coursework
Total hours (1 and 2):	150 hours

Module Specification

Module Title: Nano-Mechatronics (1)	**UEL Module Code:** EG5XXX **ASU Module Code:** EG8535 **Level:** 5 **Credit:** 15 **ECTS credit:** 7.5	**Module Leader**: Dr Nessren Zamzam
Pre-requisite:	**Pre-cursor:** None	
Co-requisite: EG8531	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

This module provides the students with a review on Material basics. The student will classify the Material characterization techniques such as x-ray diffraction, Fluorescence, Raman spectroscopy, IR spectroscopy and Ellipsometry. In addition to MEMS characterization, fundamentals of light, Laser doppler velocimetry, Two-beam interference, Spectrometers, Spectral imaging, Microscopy, Coherence imaging, Optical profilometry, Scanning probe microscopes, Impedance analyzes, Frequency response extraction.

Main topics of study:

Review on Material basics: Atomic structure and crystalline structure, and mechanical properties of materials, Electronic properties of materials, Electronic devices, Thermal properties of materials, Optical properties of materials, Properties of Silicon and other relevant materials like glass, polymers, and ceramics, Reliability tests, Material characterization techniques such as x-ray diffraction, Fluorescence, Raman spectroscopy, IR spectroscopy and Ellipsometry.

Analyze to MEMS characterization, fundamentals of light, Laser doppler velocimetry, Two-beam interference, Spectrometers, Spectral imaging, Microscopy, Coherence imaging, Optical profilometry, Scanning probe microscopes, Impedance analyzes, Frequency response extraction.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Explain mechanisms in materials used in Nanotchnology and MEMS.
2. Analyse the required basics material properties to use them in MEMS design.
3. Determine the fundamentals of characterization techniques of micro/nano structures.

Thinking skills

4. Apply different analytical methods for MEMS sensors design to build system
5. components
6. Use MEMS design tools to design components that achieve certain performance specifications

Subject-based practical skills

7. Predict performance of instrument
8. Analyse performance of instrument

Skills for life and work (general skills)

9. Propose reasonable solutions for analytical problems

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content, and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (52.5 hours) Coursework (Activities/Assignments) Written Examination (Final Exam)	50%	1-5
Portfolio (2) (52.5 hours) Coursework (Activities/Assignments) Written Examination (Final Exam)	50%	6-9

Indicative reading for this module:

Core

Callister, W.D. and Rethwisch, D.G., 2007. Materials science and engineering: an introduction (Vol. 7, pp. 665-715). New York: John Wiley & Sons.
Cengel, Y.A., Klein, S. and Beckman, W., 1998. *Heat transfer: a practical approach* (Vol. 141). New York: McGraw-Hill.

Recommended

Tanaka, N., 2017. Electron Nano-imaging. Springer Japan KK
Bhushan, B. ed., 2017. Springer handbook of nanotechnology. Springer.
Ensur
Cohen, S.H. and Lightbody, M.L. eds., 2007. Atomic force microscopy/scanning tunneling microscopy 3. Springer Science & Business Media
Alvi, P.A., 2014. MEMS Pressure Sensors: Fabrication and Process Optimization. Lulu. com.
Zhang, D. ed., 2012. Advanced mechatronics and MEMS devices (Vol. 23). Springer Science & Business Media.
Adams, T.M. and Layton, R.A., 2009. Introductory MEMS: Fabrication and Applications.

Concordia University. Bhushan, B. ed., 2017. Springer handbook of nanotechnology. Springer	
Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 60 hours 20 hours 30 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 40 hours	 Background reading, preparation for examination, write-up time for laboratory exercises and coursework
Total hours (1 and 2):	150 hours

Module Specification

Module Title: Autotronics (1)	**UEL Module Code:** EG5XXX **ASU Module Code:** EG8536 **Level:** 5 **Credit:** 15 **ECTS credit:** 7.5	**Module Leader**: Dr Ghada Shided
Pre-requisite	**Pre-cursor:** None	
Co-requisite:EG8531	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with knowledge about the design of clutch, suspension, gearbox, brakes and steering systems. The module will also help the students to demonstrate knowledge and understanding of the performance of tires, brakes and steering systems.

This module provides the students with a review of combustion, applications of heat generation inside the engine, work transfer, cooling across the cylinder walls. In addition to solve problems in acquiring power in various engineering applications, predict the necessary flow parameters when analysing typical design features of the internal combustion engines and share ideas of updated problems of heat generation related to the installation of engines in industry while effectively working in a team under controlled supervision

Main topics of study:

Automotive Theory: Automotive propulsion systems: types, traction forces calculations for manual and automatic transmissions, rolling resistance and tire slip, air and gradient resistances, vehicle acceleration and surplus effort. Automotive braking systems: types and performance. Automotive basic handling characteristics. Automotive design: Dry and Wet automotive clutch design. Manual transmission design.

Automotive suspension system: components, design factors, static and dynamic loads. Automotive steering system: components, static and dynamic loads. Engine Management Systems: Engine control unit architecture, Gasoline engine fuel and ignition management types, sensors, actuators, Diesel engine fuel supply system, unit injector system, common rail system, exhaust gas treatment, diesel electronic control system, emission control systems, fault diagnosis, tuning methods and upgrades.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Explain the vehicle performance.
2. Analyse the calculation tractive effort factors and the factors affecting selection appropriate engine

Thinking skills

3. Differentiate among different engines performance
4. Predict the vehicle accretion

5. Select the appropriate steering and suspension components
6. Illustrate the methods of controlling the power output of petrol and Diesel engines

Subject-based practical skills
7. Design automotive clutch and gear box
8. Evaluate the performance of engines in terms of the torque and speed

Skills for life and work (general skills)
9. Work as a part of a team in different workshops and projects.
10. Provide solutions for engineering problems

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content, and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (52.5 hours) Coursework (Activities/Assignments) Written Examination (Final Exam)	50%	1-5
Portfolio (2) (52.5 hours) Coursework (Activities/Assignments) Written Examination (Final Exam)	50%	6-10

Indicative reading for this module: :

Core

Wong, J.Y., 2008. Theory of ground vehicles. John Wiley & Sons.
Ferguson, C.R. and Kirkpatrick, A.T., 2015. Internal combustion engines: applied thermosciences. John Wiley & Sons.

<table>
<tr><td colspan="2">Fenton, J. and Hodkinson, R., 2001. Lightweight electric/hybrid vehicle design. Elsevier.

Recommended

Fenton, J. and Hodkinson, R., 2001. Lightweight electric/hybrid vehicle design. Elsevier.
Ganesan, V., 2015. Internal combustion engines. McGraw Hill Education (India) Pvt Ltd.
Ehsani, M., Gao, Y., Longo, S. and Ebrahimi, K., 2018. Modern electric, hybrid electric, and fuel cell vehicles. CRC press.
Ferguson, C.R. and Kirkpatrick, A.T., 2015. Internal combustion engines: applied thermosciences. John Wiley & Sons.</td></tr>
<tr><td>Indicative learning and teaching time
(10 hrs per credit):</td><td>Activity</td></tr>
<tr><td>1. Student/tutor interaction:

60 hours
20 hours
30 hours</td><td>

Lectures
Tutorials
Laboratories/Practical</td></tr>
<tr><td>2. Student learning time:

40 hours</td><td>
Background reading, preparation for examination, write-up time for laboratory exercises and coursework</td></tr>
<tr><td>Total hours (1 and 2):</td><td>150 hours</td></tr>
</table>

Module Specification

Module Title: Bio-mechatronics (1)	**UEL Module Code:** EG5XXX **ASU Module Code:** EG8537 **Level:** 5 **Credit:** 15 **ECTS credit:** 7.5	**Module Leader**: Dr Ghada Shided
Pre-requisite:	**Pre-cursor:** None	
Co-requisite:EG8531	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with the knowledge of how biological materials behave mechanically and how to relate kinematics and kinetics vary among anatomic regions.

The module also enables the students to describe basic human locomotion and to propose engineering solution to assist basic locomotion function.

Main topics of study:

Introduction to biomechanics: soft tissues, the anatomy of human movements, methods of biomechanics analysis, mechanics in physiology, mechanical properties of bone and cartilage, mechanical properties and structural behaviour of biological tissues, visco-elasticity of tissues, muscles, Hill's muscle model, modelling of muscle forces and mechanics Bio viscoelastic, kinematics, kinetics, static and dynamics of human models, upper and lower limbs biomechanics of human, biomechanical modeling and simulation of anthropomorphic and biosystems.

Locomotion and Gait Analysis: Basic anatomical terms, anatomical planes, motor control, centre of gravity, normal gait, rolling over, rising to stand and sitting down, walking models, climbing stairs and ramps models, jumping models, balance model, pathological and other abnormal gaits, methods of gait analysis, locomotion measurement systems, measurement parameters

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge
1. Explain the control of human locomotion
2. Explain how the mechanical principles are applied to human body.

Thinking skills
3. Relate locomotion sub phases to important kinematic and kinetic events.
4. Identify defects in gait that can be solved with engineering solutions

Subject-based practical skills
5. Analyse forces imposed on body parts during various activities.
6. Design a simple substitute of body part based on its biomechanical behaviour
7. Use available open access software for gait analysis

Skills for life and work (general skills)
8. Provide solutions for engineering problems

9. Share information and work in teams

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (52.5 hours) Coursework (Activities/Assignments) Written Examination (Final Exam)	50%	1-4
Portfolio (2) (52.5 hours) Coursework (Activities/Assignments) Written Examination (Final Exam)	50%	5-9

Indicative reading for this module:

Core

Segil, J. ed., 2018. Handbook of Biomechatronics. Academic Press.
Norkin, C.C. and White, D.J., 2016. Measurement of joint motion: a guide to goniometry. FA Davis.
.

Recommended

Lyshevski, S.E., 2018. Electromechanical systems, electric machines, and applied mechatronics. CRC press.
Xie, S. and Meng, W., 2017. Biomechatronics in Medical Rehabilitation. Springer International Publishing.
Ulloa, J.G., 2018. Applied Biomechatronics Using Mathematical Models. Academic Press.
Humphrey, J. and Delange, S.L., 2016. Introduction To Biomechanics. Springer-Verlag New York

<table>
<tr><td colspan="2">Latash, M.L. and Zatsiorsky, V., 2015. Biomechanics and motor control: defining central concepts. Academic Press.
Xie, S. and Meng, W., 2017. Biomechatronics in Medical Rehabilitation. Springer International Publishing.
Villadsen, J., Lee, S.Y., Nielsen, J. and Stephanopoulos, G. eds., 2016. Fundamental bioengineering (Vol. 1). John Wiley & Sons.</td></tr>
<tr><td>Indicative learning and teaching time
(10 hrs per credit):</td><td>Activity</td></tr>
<tr><td>1. Student/tutor interaction:

60 hours
30 hours
30 hours</td><td>

Lectures
Tutorials
Laboratories/Practical</td></tr>
<tr><td>2. Student learning time:

30 hours</td><td>
Background reading, preparation for examination, write-up time for laboratory exercises and coursework</td></tr>
<tr><td>Total hours (1 and 2):</td><td>150 hours</td></tr>
</table>

Module Specification

Module Title: Industrial Mechatronics (1)	**UEL Module Code:** EG5XXX **ASU Module Code:** EG8538 **Level:** 5 **Credit:** 15 **ECTS credit:** 7.5	**Module Leader**: Dr Ghada Shided
Pre-requisite:	**Pre-cursor:** None	
Co-requisite:EG8531	**Excluded combinations :** None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with knowledge and skills to design a system; component and process to meet the required needs within realistic constraints. The module also explains how to select appropriate mathematical and computer-based methods for modelling, analysing problems to design different types of industrial mechanism, and test the system integration

The module also enables the students to program PLCs using ladder diagram, Instruction list and sequential function charts programming languages, design and tune industrial process control and read piping and instrumentation diagrams and identify industrial control loops.

Main topics of study:

Industrial Mechanisms: introduction, historical development of the automation and assembly mechanisms, advantages of automatic assembly. Gripping mechanisms, biomimetic robotic mechanisms. Introduction to autonomous systems: autonomous versus automatic systems, automated and autonomous human-centered technical systems, Planning and actuation: task decomposition, reactive behavior, preplanned knowledge and skill-based behaviour. Knowledge-base: facts and procedures, acquisition, exploration, skill transfer, learning. Autonomous systems architecture: behavioural principles, multi-level control concepts. Applications of autonomous systems.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Analyse solutions for the Mechatronics fields problem

Thinking skills

2. Discuss the fundamental principles of machinery.
3. Estimate the motion design of mechanisms.

Subject-based practical skills

4. Design Human Machine Interface from piping and instrumentation diagrams and industrial process controllers.
5. Identify at an appropriate level the design, production, interfacing and software needs of different parts of Mechatronics systems.
6. Synthesize and design machines and mechanisms.
7. Apply general and personal skills to analyse alternative solutions to machinery problems and selecting the optimum one.

Skills for life and work (general skills)

8. Establish initiative and leadership abilities.
9. Communicate and share ideas ethically in any team work.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (52.5 hours) Coursework (Activities/Assignments) Written Examination (Final Exam)	50%	1-5
Portfolio (2) (52.5 hours) Coursework (Activities/Assignments) Written Examination (Final Exam)	50%	6-9

Indicative reading for this module:

Core

Noble, D., 2017. Forces of production: A social history of industrial automation. Routledge.
Waldron, K.J., Kinzel, G.L. and Agrawal, S.K., 2016. Kinematics, dynamics, and design of machinery. John Wiley & Sons.

Recommended

Dana, N.F. and Yendol-Hoppey, D., 2015. The PLC book. Corwin Press.
Zurawski, R., 2016. Integration technologies for industrial automated systems. CRC Press
Khurmi, G., 2017. Textbook of Machine Design. SCH.

Manesis, S. and Nikolakopoulos, G., 2018. Introduction to Industrial Automation. CRC Press. Noble, D., 2017. Forces of production: A social history of industrial automation. Routledge. Sharma, K.L.S., 2016. Overview of industrial process automation. Elsevier. Hitomi, K., 2017. Manufacturing systems engineering: A unified approach to manufacturing technology, production management and industrial economics. Routledge.	
Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 60 hours 20 hours 20 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 50 hours	 Background reading, preparation for examination, write-up time for laboratory exercises and coursework
Total hours (1 and 2):	150 hours

Module Specification

Module Title: Team Project	**UEL Module Code:** EG6XXX **ASU Module Code:** EG8641 **Level:** 6 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Ghada Shided
Pre-requisite: EG8533	**Pre-cursor:** None	
Co-requisite:	**Excluded combinations :** None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module represents the graduation project, where the students work under the supervision of faculty members. The graduation project should be linked with the field chosen by the student.

The module enables the students also to identify of the importance of engineering management in construction projects, describe the project life cycle, compare between the different types of organization, construct a network for any project and to control the cost through the project life cycle.

Main topics of study:

All the learned topics in the previous three levels related to the field chosen by the students A single or group project performed under the supervision of a faculty member and an industrial entity. The main topics of study:

- Project Overview and Understanding
- Identification of a suitable project topic
- Research methods
- Project Design
- Project Implementation
- Project testing, validation, and verification
- Project Documentation and Presentation

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Describe project life cycle.
2. Conduct a literature review in the project domain.

Thinking skills

3. Follow sound design methodology throughout the project
4. Apply the engineering knowledge and skills earned throughout the program.

Subject-based practical skills

5. Design a system and formulation of the real problem actually available in industry.
6. Solve engineering problems and implement solutions based on what has already studied in

the program as the project must be capstone.

Skills for life and work (general skills)

7. Write technical reports in accordance with standard scientific guidelines.
8. Work coherently and successfully as a part of a team.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (52 hours) Coursework (progress report) Dissertation	50%	1-4
Portfolio (2) (52 hours) Coursework (progress report) Dissertation	50%	5-9

Reading and resources for the module:

Core

Bartol, K, Martin, D, Tein, M & Matthews, G 2011, Management: a pacific RIM focus, 6th edn, McGraw-Hill, North Ryde, NSW.

Davidson, P, Simon, A, Woods, P & Griffin, R 2009, Management, 4th Australasian edn, John Wiley & Sons, Milton, QLD.

Recommended

Toft, Y., Howard, P. and Jorgensen, D., 2003. Changing paradigms for professional engineering practice towards safe design—an Australian perspective. *Safety Science*, *41*(2-3), pp.263-276.

Indicative learning and teaching time (10 hrs per credit):	**Activity** 300 hours of directed and self-directed study as described below
1. Student/tutor interaction: 100 hours	Tutorials, seminars and workshops, juries, study trips, mid-year and end of year presentations and exhibitions,
2. Student learning time: 200 hours	Studio work, research, fieldwork. group work, portfolio
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Advanced and Intelligent Machines	**UEL Module Code:** EG6XXX **ASU Module Code:** EG8642 **Level:** 6 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Ghada Shided

Pre-requisite: None	**Pre-cursor:** None
Co-requisite:	**Excluded combinations :** None

Location of delivery: ASU, Egypt

Main aim(s) of the module:

The module trains students to use and develop image filtering techniques, and to edge detection methods. The module also, provide students with the Advanced knowledge about the evolution of computer networks and the Internet, trains students to apply a top-down approach to present the different network layers starting from the application layer and ending with the physical layer. The module enables the students to understand the history of RP development and enabling technologies, the Advanced of free form fabrication as a part of shape engineering, the Advanced of various types of additive manufacturing and their classification, the various techniques of design for additive manufacturing (DFAM) process, the Advanced of 3D scanning and digital manufacturing in both virtual reality and virtual prototyping.

Main topics of study:

Computer vision: introduction. The analysis of the patterns in visual images with the view to understanding the objects and processes in the world that generates them. Image representation and processing. Feature extraction and selection. Object recognition and probabilistic inference. Dynamic and hierarchical processing. Multi-view geometry. Projective reconstruction. Tracking and density propagation. Visual surveillance and activity monitoring. Medical imaging. Applications. Industrial Communications and Networks Systems: Introduction: signalling, data communication, protocols, layered architecture, network standards. Industrial network standards and protocols: EIA-232, EIA-485, DH-485 and industrial local area networks, industrial Ethernet, Power over Ethernet (PoE), fibre optics, Modbus, Modbus+, Modbus/TCP, HART, AS-i, DeviceNet, Controller Area Network (CAN) and CAN bus, FieldBus, ProfiBus, TCP/IP. ZigBee wireless sensor and control network: IEEE 802.15.4 protocol, addressing, routing, ZigBee RF4CE. Industrial network security: vulnerabilities, threat detection, risk assessment, monitoring and control, standards and regulations, securing industrial networks. Applications. Computational Intelligence: Definitions, learning theory, soft-computing paradigm. Fuzzy systems: Fuzzy sets and relations, operations on fuzzy sets, fuzzy logic, approximate reasoning, fuzzy control. Neural networks: machine learning using neural networks, supervised learning, unsupervised learning, competitive learning, reinforcement learning, neuro-dynamic programming, and neuro-fuzzy systems. Evolutionary computation: genetic algorithms, genetic programming, genetic optimization, machine learning using genetic algorithms. Particle swarm optimization. Bayes networks. Artificial immune systems. Rough theory. Granular computing. Chaos theory. Tools

used in developing computational intelligence algorithms. Applications: intelligent control systems, object recognition, applications in mobile robots.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Analyse image filtering and noise removal techniques

Thinking skills

2. Investigate the different methods for image filtering
3. Suggest different methods for edge detection
4. Analyse methods for segmentation

Subject-based practical skills

5. Evaluate network performance.
6. Construct networking simulation packages.

Skills for life and work (general skills)

7. Operate effectively in a team
8. Provide solutions for engineering problems, comprehensive analytical skills.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Learning will be supported through information on the VLE and an accompanying core textbook. The information on the VLE adds extra content and integrates additional resources (such as journal articles and case studies) to support those topics not covered by the core textbook. The VLE encourages deep learning through the use of activities, self-assessment questions and other

formative assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	35%	1-4
Portfolio (2) (73.5 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	35%	5-7
Portfolio (3) (63 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	30%	8

Reading and resources for the module:

Core

James F. Kurose and Ross, K.W., 2008. *Computer Networking: A top-down approach*. Pearson/Addison Wesley, Szeliski, R., 2010. *Computer vision: algorithms and applications*. Springer Science & Business Media.

Recommended

Tanenbaum, A.S. and Wetherall, D., 2014. *Computer networks*. Harlow, Essex: Pearson,. Oppenheimer, P., 2011. Top-down network design.

Indicative learning and teaching time (10 hrs per credit):	**Activity** 300 hours of directed and self-directed study as described below
1. Student/tutor interaction: 100	Tutorials, seminars and workshops, juries, study trips, mid-year and end of year presentations and exhibitions, (225 Hours)
2. Student learning time: 200	Studio work, research, fieldwork. group work, portfolio work (75 Hours)
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Professional Skills	**UEL Module Code:** EG6XXX **ASU Module Code:** EG8643 **Level:** 6 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Fady Naeem
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite: None	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

This module explains the concepts, theory and practice of engineering ethics. Familiarizes the student with the meaning, history and different aspects of engineering. Demonstrates the professional practice, responsibilities, health and safety and engineering ethics in academia and in the workplace, working in teams on majority of the assignments in this course, exposure to national legislation related to education and engineering ethics.

Main topics of study:

Describe the knowledge of Engineering Profession and demonstration of relevant laws and regulations governing the engineering works in all fields. Engineer Liabilities and Rights. Local and International contracts and administrative laws. Writing a contract. Settlement of disputes in local and international contracts. Health and Safety Issues for Engineering Projects, including environmental concerns. Ways for effective studying and critical thinking.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Investigate the legal responsibilities and rights within the triangle relation between: engineer, client and contractor.
2. Demonstrate the government regulations for the engineering works in all fields.
3. Appraise the role of engineer in all legal activities as well as contracts, claims and disputes during execution.
4. Develop Gantt and PERT charts.

Thinking skills

5. Analyse legal actions and problems.
6. Design the legal reports, contracts, and arbitration file in accordance with the local and international laws and regulations.
7. Develop plans for managing a project efficiently.

Skills for life and work (general skills)

8. Prepare well written study plan and skills
9. Prepare technical effective studying reports.
10. Effectively manage tasks, time, and resources.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through case studies, and discussion groups in small group tutorials.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	35%	1-4
Portfolio (2) (63 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	30%	5-6
Portfolio (3) (73.5 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	35%	7-10

Reading and resources for the module:

Core
Yates, W.D., 2017. *Safety Professional's Reference and Study Guide*. CRC Press.

Recommended
Gharaf, A., Principles of Business law, Cairo, 1995.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 100 hours 100 hours	 Lectures Tutorials
2. Student learning time: 100 hours	Background reading, preparation for examination, write-up time for coursework.

Total hours (1 and 2):	300 hours

Module Specification

Module Title: Industrial Mechatronics (2)	**UEL Module Code:** EG6XXX **ASU Module Code:** EG8644 **Level:** 6 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Fady Naeem
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite: EG8538	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with Advanced definitions and concepts of DES, hybrid control system (HCS) and the typical configurations and types. To give students an appreciation of the HCS as applied on the hierarchical motion control and the DCS. To train students on the application of modelling and simulation techniques such as Petri Nets, SFC and Grafcets for DES and HCS. Students will be able to design the controllers of DES and HCS. Train students to P, PI, PID controller tuning using Zeigler-Nichols and Cohen-Coon methods and applying that on the Mini-Project and using the designed VI's.

Main topics of study:

Introduction to hybrid control systems: basic concepts, time-driven versus event driven control systems, discrete event system, finite-state automata, hybrid control architecture. Digital control fundamentals, Digital control systems: digitization, analysis of discrete systems, Z-transform, digital control systems design. Design and control of discrete event mechatronic systems, GRAFCET, SFC, Petri-nets: basics, comparison of Petri-nets and automata, control using Petri-nets. Timed and hybrid control: timed automata, timed Petri-nets, hybrid systems. Markov chains, design of controlled Markov chains. Design of fault diagnosis and supervisory control systems. Case studies and applications of hybrid control applications in industrial and manufacturing. Selected topics in recent directions and applications in industrial mechatronics

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Explain the functions and features of the Hybrid Control Systems (HCS)
2. Explain the different models in HCS.

Thinking skills

3. Apply the adequate tools to model and simulate DES, HCS and exploring its behaviour.
4. Solve with examples the different types of Petri Nets (PN).
5. Use the matrix method to get the marking and the reachability graphs of the PN.
6. Analyse and explain how to use hybrid PN to the controller design of HCS.

Subject-based practical skills

7. Apply the SFC and Grafcet techniques to design of the controllers of DES.

8. Implement an actual DES and HCS on-site or using the designed system in the Mini-project.

Skills for life and work (general skills)

9. Conclude and develop innovative solutions
10. Operate effectively in a team

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turn it in Gradebook for the assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	35 %	1-4
Portfolio (2) (73.5 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	35%	5-7
Portfolio (3) (63 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	30%	8-10

Reading and resources for the module:

Core
S. Engell, G. Frehse, and E. Schnieder (Eds.): Modelling, Analysis, and Design of Hybrid Systems, © Springer-Verlag Berlin Heidelberg 2008.

Recommended
David, R. and Alla, H., 2010. Discrete, Continuous, and Hybrid Petri Nets.

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 82.5 hours	 Background reading, preparation for examination, write-up time for coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Bio-mechatronics (2)	**UEL Module Code:** EG6XXX **ASU Module Code:** EG8645 **Level:** 6 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Fady Naeem
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite:	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with the knowledge of biomedical engineering and its applications. Helps students to establish a competence and insight into multidisciplinary fields of biomedical and their application in mechatronics and bionics. Appreciate the most important types of health impairment. Understand the basic rehabilitation technics, and the medical concepts behind them.
Realize the importance of robots in the rehabilitation field and implement human-robot interaction techniques, relevant to rehabilitation. To be able to design simple rehabilitation robots

Main topics of study:

Fundamental of biomedical engineering, tissue engineering, artificial organs, implanted prostheses, lower and upper prosthetic and orthotics types and designs, basic concepts of medical instrumentation, biological signals, biomedical sensors: biopotential measurements, blood gas sensors, EMG, ECG, and EEG Sensors. Biosignal processing: physiological origins of biosignals, signal acquisition and manipulation, frequency domain representation of biological signal, wavelet transform and Fourier analysis, Fourier transform, sampling and filtering, EKG acquisition principle and analysis, medical imaging. Introduction to rehabilitation robots, the role of robotic in rehabilitation, physical Human-Robot Interaction (HRI), impedance and admittance control, cognitive Human-Machine Interface (HMI), Human- Computer Interface (HCI) and Brain Computer Interface (BCI). Rehabilitation robotics of patients with motor disorders, pathological tremor, stroke, amputation, paralysis and disability management. Game based rehabilitation robotics, design and control of biomechatronic and bionic robots, case studies: upper and lower limb bionic prostheses (prosthetic hand, arm, leg, knee and ankle), upper and lower limb exoskeletons/orthoses, and wheelchair.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Outline the principles of engineering techniques used in biomedical engineering.
2. Identify and analyse the bio signal characteristics of EMG, EEG and ECG.
3. Define the biomedical, clinical and rehabilitation engineering terminology.

Thinking skills

4. Select the signal acquisition and analysis techniques of bio potential signals.
5. Apply statistical analysis, Frequency, Fourier analysis, and wavelet transform to extract

useful information about human activities and health.

Subject-based practical skills

6. Critically appraise available human-robot interaction technology and solutions.
7. Model and simulate biomedical systems
8. Design of simple robots to support rehabilitation tasks.

Skills for life and work (general skills)

9. Operate effectively in a team

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (63 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	30%	1-3
Portfolio (2) (73.5 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	35%	4-6
Portfolio (3) (73.5 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	35%	7-9

Reading and resources for the module:

Core

Bronzino, J.D. and Peterson, D.R., 2015. *The Biomedical Engineering Handbook: Four Volume Set*. CRC Press. Xie, S., 2016. Advanced robotics for medical rehabilitation. *Springer Tracts in*

Advanced Robotics, *108*, pp.1-357. **Recommended** Sawhney, G.S., 2007. *Fundamental of biomedical engineering*. New Age International. Siciliano, B. and Khatib, O. eds., 2016. *Springer handbook of robotics*. Springer. Kommu, S.S. ed., 2007. *Rehabilitation robotics*. BoD–Books on Demand.	
Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 82.5 hours	Background reading, preparation for examination, write-up time for coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Nano-Mechatronics (2)	**UEL Module Code:** EG6XXX **ASU Module Code:** EG8646 **Level:** 6 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Fady Naeem
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite:	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

To build the student background and knowledge and enhance their skills in the fields of:
MEMS fabrication technology. art CMOS and MEMS process interactions and integration and design tools (Finite Element Modeling) of MEMS based actuators and sensors In addition some typical MEMS System to enrich their design capabilities.

Main topics of study:

Introduction to MEMS characterization, fundamentals of light, Laser doppler velocimetry, Two-beam interference, Spectrometers, Spectral imaging, Microscopy, Coherence imaging, Optical profilometry, Scanning probe microscopes, Impedance analyzes, Frequency response extraction. Introduction to MEMS design, second order system and damping in MEMS, Fundamentals of mechanics, MEMS beams, Electrostatic actuators, Thermal actuators, Piezoelectric actuators, Capacitive sensing, Thermal sensing, Piezoresistive sensing, Micromirrors, Microlenses, Microfluidics, Finite element modeling and design, Layout editors, MPW runs and design rules. MEMS applications such as RF MEMS. Biomedical MEMS, Optical MEMS, Optofluidics. Example of Microsystems such as accelerometers, gyroscopes, telecommunication, MEMS FTIR spectrometers, MEMS OCT. System issues and considerations such as Noise in MEMS systems, Signal amplification, Sensor specification, Sensors electronics interfaces, System design and analysis flows.

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Demonstrate different system components in a MEMS system.
2. Evaluate different types of MEMS actuation techniques.
3. Compare different MEMS design CAD tools.

Thinking skills

4. Apply different analytical methods for MEMS sensors design to build system components.
5. Use MEMS design tools to design components that achieve certain performance specifications.

Subject-based practical skills

6. Use TCAD tools to simulate processes and technologies.

Skills for life and work (general skills)

7. Operate effectively in a team

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) **Coursework (** Activities/Assignments) **Written Examination (**quizzes, midterm, Final Exam**)**	35%	1-2
Portfolio (2) (63 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	30%	3-5
Portfolio (3) (73.5 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	35%	6-7

Reading and resources for the module:

Core

Neudeck, G.W. and Pierret, R.F., 2002. Introduction to microelectronic fabrication. *Modular Series on Solid State Devices*, *5*.

.Younis, M.I., 2011. *MEMS linear and nonlinear statics and dynamics* (Vol. 20). Springer Science & Business Media.

Recommended

Madou, M.J., 2018. Fundamentals of microfabrication and nanotechnology, Three-volume set.

Kaajakari, V., 2009. Practical MEMS: Analysis and Design of Microsystems, MEMS Sensors (Accelerometers, Pressure Sensors, Gyroscopes), Sensor Electronics, Actuators, RF MEMS, Optical MEMS, and Microfluidic Systems. *Small Gear*. Bao, M., 2005. *Analysis and design principles of MEMS devices*. Elsevier.	
Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practical
2. Student learning time: 82.5 hours	Background reading, preparation for examination, write-up time for coursework
Total hours (1 and 2):	300 hours

Module Specification

Module Title: Autotronics (2)	**UEL Module Code:** EG6XXX **ASU Module Code:** EG8647 **Level:** 6 **Credit:** 30 **ECTS credit:** 15	**Module Leader**: Dr Fady Naeem Needed
Pre-requisite: None	**Pre-cursor:** None	
Co-requisite:	**Excluded combinations :**None	
Location of delivery: ASU, Egypt		

Main aim(s) of the module:

The module provides students with knowledge of combustion, applications of heat generation inside the engine, work transfer, cooling across the cylinder walls. Enrich the student knowledge about Automotive control systems. Enable students to develop a thorough understanding of mechatronic engineering principles that is uniquely automotive in nature. Provide the students with the technical background about embedded system design.

Main topics of study:

Dry and Wet automotive clutch design. Manual transmission design. Automotive suspension system: components, design factors, static and dynamic loads. Automotive steering system: components, static and dynamic loads. Modeling and control algorithms of advanced braking systems: Anti-lock Braking system, electronic braking distribution system and Brake-By-Wire system. Modeling and control algorithms of semi-active and active suspension systems. Driving assistance system: automatic cruise control system, Drive-By-Wire system, passive and active driving safety systems. Traction and stability control systems. Modeling and control algorithms of advanced handling systems: electronics steering assist and Steer-By-Wire systems. Advanced engine emissions control systems for gasoline and diesel engines. Hybrid vehicles: types, configurations and control strategies. Automated Manual transmission: types and control strategies.

Introduction to automotive embedded networking - Automotive CAN network simulation using CANoe (Vector Germany) evaluation version - Principles of CAPL script to simulate external events and network communications - Introduction to CAN bus protocol - TIVA C embedded development using CAN bus - MISRA static code checking guidelines - MISRA and Code Composer Texas Instruments tools - Real Time Operating System on TIVA C - OSEK network management standard - OSEK NM simulation using CANoe - OSEK state machine C development - Introduction to AutoSar Automotive embedded development standard - AutoSar Real Time Environment (RTE) - AutoSar Basic Software (BSW) - AutoSar Software Components (SWC).

Learning Outcomes for the module

At the end of this module, students will be able to:

Knowledge

1. Demonstrate the main vehicles control systems.
2. Evaluate the behaviour of different vehicle control systems.
3. Distinguish the layout and the key parameters for industrial automation, autotronic, nano-mechatronic, or biomechatronic systems.

Thinking skills

4. Evaluate the performance of engines in terms of the torque and speed
5. Make the preliminary design calculations for the sizes of cylinders, crankshaft as related to the compression ratio and volumetric capacity
6. Develop mechanical, electrical, electronic, programming and communication elements necessary for the development of mechatronic systems.

Subject-based practical skills

7. Performing tests on automotive system hardware.
8. Check of the efficiency for industrial systems employing engines to ensure high efficiency under different operating conditions
9. Write the necessary software for the equipment and the control of the mechatronic systems

Skills for life and work (general skills)

10. Operate effectively in a team

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

Lectures are the key method for introducing new material. They are presented to the whole group and are formal in delivery.

Tutorial sessions allow students to meet with their peers in small groups and focus on the practical application of their studies through problem-based classes and project work.

Practical and laboratory work will usually be on a one to small group basis which provides the opportunity for discussion and contextualising of study issues in a flexible manner.

Formative feedback will be provided for all activities. This may take the form of question and answer sessions within lectures; through worked examples, design exercises and discussion groups in small group tutorials; through submitting tutorial questions and formative reports for feedback; comments on the tutorial/practical work during the session, response to emails, the use of the Forum facility on the VLE (for generic feedback) and Turnitin Gradebook for the assessments.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
Portfolio (1) (73.5 hours) Coursework (Activities/Assignments) Practical (face-to-face) Examination	35%	1-3
Portfolio (2) (73.5 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam)	35%	4-7
Portfolio (3) (63 hours) Coursework (Activities/Assignments) Written Examination (quizzes, midterm, Final Exam**)**	30%	8-10

Reading and resources for the module: **Core** Reif, K., 2015. Automotive Mechatronics: Automotive Networking, Driving Stability Systems, Electronics.Gupta, H.N., 2012. *Fundamentals of internal combustion engines*. PHI Learning Pvt. Ltd.. . Navet, N. and Simonot-Lion, F. eds., 2017. *Automotive Embedded Systems Handbook*. CRC Press. **Recommended** Bonnick, A. and Newbold, D., 2011. *A practical approach to motor vehicle engineering and maintenance*. Routledge. “ “ Reif, K., 2015. Gasoline engine management. *Friedrichshafen: Springer*. Ward, D.D., 2006. MISRA standards for automotive software.		
Indicative learning and teaching time (10 hrs per credit):	**Activity**	
1. Student/tutor interaction: 120 hours 75 hours 22.5 hours	 Lectures Tutorials Laboratories/Practical	
2. Student learning time: 82.5 hours	Background reading, preparation for examination, write-up time for coursework	
Total hours (1 and 2):	300 hours	

7 PLACEMENT REQUIREMENTS

Although there is no compulsory placement system we encourage all students to seek work experience during their during the summer vacations. Training could be performed in an industrial/service facility related to the student's program, and must be under the full supervision of the faculty according to the requirements stipulated in Article (37) of the ASU Credit-hour Educational Programmes bylaws. The training is mandatory for the normal ASU degree.

https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Manual-of-General-Regulations

(Manual of General Regulations: Part 13 Suitability Procedure)

Scholarships

The student who achieves an accumulative GPA of 3.6 or higher after any semester and did not fail any course throughout his course of study is included in the Dean's List and receives partial exemption from charges on the next semester. This exemption is dependent on the student’s GPA as recommended by the Programmes Administration Council in this regard and after approval of the Council of the Faculty of Engineering. The student who keeps an accumulative GPA of 3.3 or higher in every semester all through his course of study and does not fail any course, graduates with an Honor Degree, which is documented in his graduation certificate. Additionally, the top 30 students in Thanaweya Amma, mathematics section, who enrolled in the credit hours programmes, are fully exempted from paying any tuition fees in their first semester. To maintain this exemption in the following semesters, the student should maintain an accumulative GPA of 3.6 or higher in every semester. This exemption is declined once the student fails to achieve this accumulative GPA in any semester. The faculty sets a system for encouraging distinguished students through reducing their tuition fees in accordance with their accumulative GPAs. At the beginning of each semester, the distinguished students' list is announced together with the associated tuition fees reductions.

8 PROGRAMME MANAGEMENT

Students' support and guidance are provided through a range of resources. A welcome and induction process is delivered in their first week, where all students are guided to their programme studies.

The programme pays special attention to the learning management system that helps students and staff members to intercommunicate effectively in terms of course material, assignment, term-work marks … etc.

The programme's learning management system is setup to have a page for each course studied during the semester. The student can access courses from the main programme web-page.

All electronic services provided to the students requires the use of university e-mail, hence, it is created automatically for the programme's student when first enrolled to the programme, and he retains this e-mail until he graduates.

The Student Information System (SIS) is the place where students can access all your academic records. It can be reached on the main programme web-page, which also provides brief information about the mission and vision of the programme, and the important dates related to student academic activities.

Every student is assigned an Academic Advisor who is one of the faculty members and may continue with the student for the whole study duration. The Academic Advisor should follow-up with the student, assist in selecting courses each semester, and request to place the student under probation for one semester.

For each hour (lectures or tutorials) the instructor should have an office hour. It could be twice a week for 1.5 hours each. Office hours will be determined in the first class and will be posted on the Instructor's office door.

Students will be given a student handbook at the start of their programme of study.

Programme Committees provide a formal structure for student participation and feedback on their programme of study. Programme committees provide a forum in which students can express their views about the management of the programme, and the content, delivery and assessment of modules, in order to identify appropriate actions to be taken. Terms of reference are provided in Appendix D.

Students Involvement

There are different facilities that ensure students involvement that include:

a) Students' Affairs Administration

The students' affairs administration is chaired by the Vice-Dean for education and students' affairs and is located in the main building. This administration has representatives at the programmes' administration offices (Ground Floor of the New Educational Building). The secretariat of each programme (at the programmes

secretariat office – Ground Floor of the New Educational Building) also collaborates with the previous representatives in accomplishing the following tasks:

- Archiving of the students' files.
- Issuing the students' identity cards.
- Electronic recording of the students' course registration, add/drop, and withdraw.
- Processing the students' course evaluation at the end of each semester.
- Issuing the students' records at the end of each semester.
- Issuing the students' graduation certificates.
- Processing the students' appeals and requests.

b) Students' Union

The students' union is also under the general supervision of the Vice-Dean for education and students' affairs. As part of the Faculty of Engineering, the programmes' students are members in the union and have similar rights and benefits as the mainstream students, including entering the union's yearly elections.

c) Financial Affairs Administration

The programmes' financial affairs administration, located at the Ground Floor of the New Educational building, is responsible for issuing the payment orders for the students' tuition fees at the beginning of each semester. The administration is also responsible for collecting the copies of the students' payment receipts, which should be presented by the students after making their payment at the Faculty treasury. Programmes' students who fail to present copies of the payment to the programmes' financial administration risk having no payment records at the programmes.

d) Library

The Faculty library provides a service specially designed to fulfil the requirements of all academic programmes. It is open for all Faculty members for reference use and borrowing. The main library has a shelf space for over 46,000 books on all subjects forming part of the Faculty curriculum. It has 353 technical periodicals (the Faculty receives 23 periodicals yearly on a regular basis). Additionally, it has more than 3,340 Ph.D. and M.Sc. theses resulting from all Faculty departments' activities. The students' library has multiple copies of textbooks, amounting to over 13,000, available for short-term borrowing to students. According to the Engineering Faculties libraries development project, annexed to the Ministry of Higher Education, the library is interconnected through the Internet with all the libraries of engineering faculties nationwide. VTLS library software system has been installed which contains all the modules to provide library services to the Faculty community.

e) ASU-FoE Information Systems

ASU-FoE have a solid understanding of the importance of information systems in each aspect in the CHEP academic environment. Hence, a comprehensive web portal has been created for CHEP that has all information and services needed for the student, parents, and staff members. Learning Management System (LMS) is

one of the available services at the ASU-FoE portal for all students mainly to have their course materials posted regularly on it with a dedicated protected access to the courses he enrolled in them. More importantly, a comprehensive Student Information System (SIS) is another service that is available on the portal to all parties involved in the system. The student can use SIS to access academic records, undertake module registration, request to open module that are not offered, or even request advising appointment with academic advisors.

9 STUDENT SUPPORT

9.1 Local arrangements for academic and pastoral care for students

Induction

Students' support and guidance are provided through a range of resources. A welcome and induction process starts in their first week, where all students are guided to their programme studies. Student induction and orientation takes place on the first day of each academic year. The purpose of induction is to introduce new students to their peers, the academic and support staff, to familiarize them with the access to and use and of facilities and to outline the relevant Policies, Procedures, Rules and Regulations. Information on the programme, student support services and the teaching and learning philosophy adopted by the College is communicated verbally and in writing.

Currently, at the beginning of the each programme, the faculty meets and greets the new cohort and addresses the following topics in an induction programme:

(1) Programme Structure (how and when modules are assessed)
(2) Programme Content
(3) Assessment Grading
(4) Attendance
(5) Responsibilities they have in learning process – the importance of meeting assessment deadlines
(6) Importance of presenting authentic work and being clear on what constitutes plagiarism rules
(7) Appeals procedures
(8) Allocation of Personal Tutors
(9) Access to UEL electronic learning resources
(10) Access to UEL Library and Learning Services
(11) UEL Academic Framework
(12) Assessment regulations
(13) Extenuation

At the start of the programme each student will be given either a hard copy of the programme handbook or access to the VLE where this will be published.

Equality and Diversity

The curriculum has been designed to meet the needs of all undergraduate students, with all ages, genders, or learning / physical disabilities. There is a strong emphasis on work-based learning. By using a full range of assessment techniques this enables students with different learning styles to be accommodated for. ASU has a policy of designing an inclusive curriculum where appropriate adjustments are made to the design, delivering and assessment process to cater for students with any learning difficulties. Teaching materials and module content has been designed to be inclusive addressing the needs of our diverse student body. Teaching methods include lectures, seminars, tutorials, discussions and workshops to address the needs of diverse learning needs.

English language Support

For those who require additional support in English language additional sessions are scheduled by ELTU (English Language Teaching Unit).

Student mentorship

The Academic staff must provide each and every student with the support required to perform academically, and encourage active engagement from the students through:

- Establishing a supportive relationship with all students
- Adopting a creative approach to teaching and learning
- Providing regular constructive assessment feedback
- Mentoring and coaching

Students may make an appointment to meet with any tutor or the programme leader to discuss their progress and request additional assistance with managing their workload or to ask for additional tutoring in an area that she/he may be struggling with.

Academic Advisor

All students enrol on the programme will be assigned an Academic Advisor (AA).
This Academic Advisor will:

- Assist students with the process of induction and orientation into academic life and the University/College community and respond promptly to any communication from him/her;
- Work with students to build personal academic relationships;
- Retain an interest in their students' personal and general academic and professional development throughout their academic careers while at the University/College, providing information and guidance on academic choice;
- Monitor both academic performance and student engagement in a proactive manner and advise on constructive strategies to enable improvement, for example through the use of a personal portfolio or personal development plan;
- Listen and offer students help and advice about pastoral/non-academic matters and to signpost students to other student services for further assistance if necessary;
- Ensure that a note is kept of discussions at each meeting (with the student) and any follow-up actions agreed with the student;
- Provide references to students in their quest for employment of further study.

Academic Support Systems

AT ASU, students have full access to all required facilities and receive the best preparation for their undergraduate studies. These are including Library, Lab Room, ICT Room, Photocopying Facilities, etc. In addition, all students are assigned an Academic Advisor. Students participate in class activities that help develop their presentation and language skills, leadership skills, critical thinking skills and social skills, giving them greater confidence for their future academic challenges.

Teaching

At the FoE, teaching follows university practice with lectures, tutorials, assignments, projects and in college tests designed by an experienced teaching team. The programme's learning management system is setup to have a page for each course studied during the semester. The student can access their courses from the main programme web-page. All electronic services provided to the students requires the use of university e-mail, hence, it is created automatically for the programme's student when they are first enrolled to the programme, and they retain this e-mail until they graduate.

Student Affairs

At ASU there are Student Affairs Officers who offer friendly and caring support and mentorship to students, not just for academic matters but also for personal problems. Throughout the programme, the Students' Affairs Officer organizes weekly meetings, business trips and outings to places of interest in and around Cairo, as well as international trips during the summer holiday.

Safe Environment: FoE ASU provides a safe, caring and nurturing learning environment with friendly, supportive mentors and teachers who have many years of experience in teaching and mentoring.

ASU have 13 hospitals that support all student issues like mental health and others.

Technical support for learners and staff

ASU employs a team of technical IT support and professional services staff to help staff and students with their teaching and assessment activities. The centre employs a dedicated IT Manager to provide the learners and staff with the necessary advice about the technical needs of the mode of study throughout the length of the programme. The students and staff have the full access to the ICT room, photocopiers, printers and e-library throughout the course of the term. The IT team provide learners and teaching staff with the necessary technical support in using 'Turnitin' software throughout the assignment submission and assessment process.

The team provides specialist technical support for teaching, learning and assessment activities to ensure they run smoothly. This can be anything from preparing resources, operating specialist laboratories and quantity surveying, to setting up classrooms.

Technical teams frequently have responsibility for related areas such as managing health and safety, contingency planning and capital planning, maintenance of both hardware and software.

Information on how the entitlements of disabled students have been addressed within curriculum design:

As a UEL validated programme, the curriculum has been designed to adequately address needs and requirements of disabled students. From a local perspective the

programme team will ensure that if there are disabled students on the programme the following will apply:

- Step free access to laboratories/classes
- Larger fonts sizes for presentation materials
- The use of scribes
- Voice recorders will be allowed (with the permission of the presenting lecturer)
- Extra time for examinations
- Use of word processor (PC) without Internet access for examinations.
- Separate room for special needs students (if requested)

Access to UEL Academic Link Tutor (ALT)

All ASU students on the proposed programmes (being submitted for approval) will have access to the respective Academic Link Tutor generally via email. Students are encouraged to discuss any issue or concerns with their in-house tutors at the first instance before contacting the Academic Link Tutor.

UEL Resources

As UEL registered students, FoE - ASU students will also have access the following UEL resources: UEL Library including e-resources, databases and e-journals (subject to licence allowances)
Study skills Plus – an online diagnostic and assessment tool which can help students develop their core English and maths skills.
UEL Direct
Information and communications technology (ICT) resources such as Office365

The role of the UEL Academic Partnership Office (APO)

The APO will work in liaison with the ALT, however principally the role of the APO is administrative support for the ALT and the Partner. The APO will be the first point of contact for the partner and will channel concerns, issues, queries to all UEL Central Services such as Registry, Assessment Unit, The Hub, Courses and Systems, UEL Library and so on.

Student Feedback Mechanisms

Student representatives will be either elected or nominated for each programme. These representatives are the means of formal communication to the various committees at FoE - ASU Campus and UEL. There will be two formal meetings per year with the student representatives, module leaders and the programme coordinator at FoE - ASU Campus. The External Examiner report will also be made available for students to access. The issues raised at these meetings will be communicated to the Academic Link Tutor or APO at UEL. Actions resulting from these issues will be monitored and taken in the next committee meeting, where the representative will get an update, if not solved then and there.

We ask that student representatives discuss all matters informally with their Module Tutor at FoE - ASU before raising them at committee level. It should be possible to solve most problems by an informal approach. The earlier the programme team are made aware of any problems, the earlier FoE - ASU will attempt to correct problems. Student support is appreciated and acknowledged consistently in the student End-of-Module Evaluation Questionnaires and verbal feedback. The information collected from the Questionnaires is delivered to the Senior Management of FoE - ASU for analysis and taking any remedial actions.

Academic Progress

Students on the double degree programme will be able to access their records/profile via UEL Direct. ASU also has its own The Student Information System (SIS) platform where students can access all their academic records. It can be reached on the main programme web-page, which also provides brief information about the mission and vision of the programme, and the important dates related to student academic activities. Students receive an Academic report on a quarterly basis to assist them to monitor their progress and to identify any areas of concern. Students also meet with the Academic Head and the relevant facilitators to discuss their progress. Recommendations for improvement are made and the feedback is minuted.

Students with learning challenges

Students with learning challenges are accommodated as far as possible, taking the current College resources into consideration. The Academic Board is responsible for approving any recommendations made by the Student Counselor to accommodate a student with any of the following learning challenges:

- A cognitive disadvantage which affects their ability to learn at the same rate as their peers.
- A specific learning difficulty which may or may not be linked to a cognitive disability
- A speech and language impairment affecting their ability to comprehend
- A physical disability and sensory impairment
- An emotional disability which can affect their ability to learn
- An extended period of absence which could occur for a variety of reasons
- A behavioral impairment affecting their ability to concentrate and therefore learn effectively
- Students who speak a different language at home than the one they speak at College

Online information and support:

As previously mentioned, the programme team will use their own VLE. A bespoke section will be created for

- Induction information
- Academic support for students available both at FoE - ASU and UEL
- FoE - ASU Student Enquiries Desk opening hours
- FoE - ASU Library opening hours
- Link to UEL Library online resources
- Copy of Programme Handbook

Please refer to Appendix F for Student Entitlements, for support available at UEL.

10 RESOURCES

a) Local library and IT resources

ASU - FoE central library serves students and researchers in various fields besides the Digital Library to provide an online service for users. There is (1) central library with (3) halls according to the following:

- The student library hall contains (16,461) books.
- The teaching staff hall contains (29,607) books.
- Digital Library Hall

The Digital Library serves to provide an online Service for users. It gives online access to the contents of the library, including books and theses. The digital library website: ***http://srv2.eulc.edu.eg/eulc_v5/libraries/start.aspx***

Other learning resources are the Egyptian Bank of Knowledge (EBK) through the website: ***http://www.ekb.eg/*** "Egyptian Knowledge Bank", is one of the largest national projects that is concerned with education in Egypt, it aims to provide huge and diversified sources for knowledge and culture for free. It comes after contracting with several international publishing houses to publish their contents in all scientific and cultural disciplines, to have the system for the new Egyptian Cultural Revolution completed. Generally, 25 global publishing house used to provide their contents & technologies using the Egyptian Knowledge Bank. E-Mail Services involved a developed Cooperation of the University with Microsoft Corporation to Serve Undergraduate and Postgraduate Students offering new features for the official e-mail users.

b) Other local resources relevant to supporting the programme

The faculty offers students Training Support through **Global Training Technology Centre**. It aims to be a centre for innovation in technology and entrepreneurship, as to form a link between academic study and labour market. The centre offers training programmes to serve students and graduates at the same time, these training programmes aim to develop the creative sense of the trainees in order to integrate them into creative and innovative works that would serve the industrial field and the community. Depends on the overlap between the different disciplines in various fields and at various levels. The centre is nearly 1000 m² area, it works as the headquarters for the students to practice their activities in the future, and the college is preparing the headquarters of the centre to accommodate the necessary training activities.

Employability and Career Development Centre (ECDC) is a Centre constructed through the collaboration between Ain Shams University and the American University, it has a permanent headquarter in Faculty of Engineering and another headquarter in Ain Shams University. It provides special training programmes for students in order to develop their capabilities in the professional and employment fields. The centre aims to guide the trainee to his excellence and weaknesses points, and how to raise points of excellence and overcome weaknesses.

The number of computers available to students is about 600 modern machines. A suitable number of computers are available for faculty members in their respective laboratories and offices in different sections. The number of computers available to employees is 250 devices. Computer labs are run centrally for students. The method of using these labs has been adopted by setting a nominal fee of not less than two pounds per hour to use the central labs which are open to access the network, while the student does not bear any burdens to enter the laboratories associated with the ministry while the Income is suitable for the maintenance and modernization of computers in college. The databases and information systems of faculty staff members, their assistants, students, graduate students, expatriates, administrators and libraries have been developed and updated. The databases are continuously updated.

The Faculty of Engineering has a website through the main website of Ain Shams University. The website is: ***https://eng.asu.edu.eg/***. The website provides various services for students and faculty members by presenting the internal regulations of the bachelor's degree course as well as higher education. The site is being developed and data recorded within it are consistently updated. The contents of the various educational materials are displayed. The course schedules and exam results are announced at the end of the semester. The site is available in Arabic and English so that the user can choose the appropriate language. This site is regularly updated by site administrators and college administration. E-mail access is also available to the faculty members and the assistant staff and the students on the website of the College.

In order to update the educational services to the international standards, an online portal was developed in order to open the access to students and staff members to perform efficiently online. Students can view their courses, submit coursework and view their grades. Staff members can upload their lectures, view the online submissions and grade online. An information technology unit was set up for the electronic portal of the college to be the main focus of interaction between students and faculty.

11 INFORMATION ABOUT QUALITY AND STANDARDS

Assuring the quality and standards of the award

You are enrolled on a programme of study leading to the award of a degree of the University of East London (UEL). As such, you are regarded as a student of the University of East London as well as ASU- FoE and both institutions work together to ensure the quality and standards of the programme on which you are registered. The final responsibility for all quality assurance, validation and standards' matters rests with UEL.

Some of the ways in which we ensure the quality and standards of the programme include:

Approval of the programme and institution at which you are studying

Before the programme started, our University, through an approval process, checked that:

- there would be enough qualified staff to teach the programme;
- adequate resources would be in place;
- the overall aims and objectives were appropriate;
- the content of the programme met national benchmark requirements, where applicable
- the programme met any professional/statutory body requirements if applicable;
- the proposal met other internal quality criteria covering a range of issues such as admissions policy, teaching, learning and assessment strategy and student support mechanisms.

Appointment of external examiners

- The standard of this programme is monitored by at least one external examiner external to UEL, appointed by UEL. External examiners have two primary responsibilities:
- To ensure the standard of the programme;
- To ensure that justice is done to all students.
- External examiners fulfill these responsibilities in a variety of ways including:
- Approving exam papers/assignments;
- Attending assessment boards;
- Reviewing samples of student work and moderating standards;
- Ensuring that regulations are followed;
- Providing feedback to the University through an annual report that enables us to make improvements for the future.

Review and Enhancement Process

- This annual review includes the evaluation of and the development of an action plan based on:
- external examiner reports and accreditation reports (considering quality and standards);

- statistical information (considering issues such as the pass rate);
- student feedback obtained via programme committee and module evaluation questionnaires.
- Periodic reviews of the partnership and programme
- This is undertaken by a panel that includes at least two external subject specialists. The panel considers documents, looks at student work, speaks to students and speaks to staff before drawing its conclusions.

Award certificates

Issuing transcripts of results to students, and award certificates to successful students on programmes.

The student who achieves an accumulative GPA of 3.6 or higher after any semester and did not fail any course throughout his course of study is included in the Dean's List and receives partial exemption from charges on the next semester. This exemption is dependent on the student's GPA as recommended by the Programme Administration Council in this regard and after approval of the Council of the Faculty of Engineering.

Students who complete 480 credits, graduate with an Honours Degree, which is documented in their graduation certificate. The faculty sets a system for encouraging distinguished students through reducing their tuition fees in accordance with their academic performance. At the beginning of each semester, the distinguished students' list is announced together with the associated tuition fees reductions.

Students who manage to fulfil all graduation requirements will be awarded a double Honours degree from ASU and UEL in Mechatronics and Automation Engineering.

Equality and Diversity

ASU Equality and Diversity Strategy

- ASU commits to ensuring equality and diversity in its campus. Equality is ensured for everyone regardless any grounds of discrimination such as gender, age, colour, disability and religion.
- The university supports a safe environment for both working and studying. The university environment must be free of bullying, harassment, and any form of discrimination. Any act of the aforementioned will not be tolerated and any complaints will be taken seriously. Anyone who feels being subjected to these acts is encouraged to raise complaints.
- All academic staff members, students and employees are supposed to treat each other with mutual respect and fairness. Everyone should respect the presence of individual differences, diversity in culture, personal opinions and beliefs.
- Equal opportunities and access to facilities are allowed for all staff and students. Each staff member or student is given full support to develop their skills and talents. Selection for employment, promotion, training, or any other benefits will be based on aptitude and ability.

UEL Equality and Diversity Strategy

https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies (for all general policies)

12 ACADEMIC APPEALS

12.1 Students who wish to appeal against decisions of an Assessment Board, should notify the Credit Hours Engineering programs at Ain Shams University in writing, via official appeal forms downloadable via
https://eng.asu.edu.eg/uploads/uploadcenter/asu_337_file.pdf
https://www.uel.ac.uk/about/about-uel/governance/policies-regulations-corporate-documents/student-policies

Students who wish to appeal against a decision of an Assessment Board may appeal in accordance with the procedure for *Appeals against Assessment Board decisions* (Manual of General Regulations, Part 7 Appeals against Assessment Board Decisions).

12.2 Disagreement with the academic judgement of a Board of Examiners' decision cannot, in itself constitute a reason to Appeal. Academic judgement is a judgement that is made about a matter where only the opinion of an academic expert will suffice. For example, a judgement about assessment or degree classification or a judgement about a decision where a student is required to repeat or take further assessment will usually be academic judgement, and a student cannot appeal simply because they believe they ought to have received a higher grade or mark. For further information on the scope of this procedure, please refer to section 4 of Part 7 of the Manual of General Regulations.

12.3 Students are strongly advised to make every reasonable effort to resolve their appeal informally, through meeting with the member of staff most directly concerned with the matter, such as the Programme or Module Leader, before proceeding to submission of a formal Academic Appeal. At open conciliation stage the appeal should be raised as soon as possible and normally no more than 10 working days after the publication of relevant assessment results via UEL Direct.

12.4 Further information about the UEL appeals process, including copies of the formal Notification of Appeal Form, is available for view at
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Student-Appeals

12.5 To help you decide whether your query would be an Appeal or Complaint, please refer to ***https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies***

13 If you would like to lodge a formal appeal or have any queries, please email the Institutional Compliance Office at appeals@uel.ac.uk COMPLAINTS

If you feel that you have not received the standard of service which it would be reasonable to expect, you may be entitled to lodge a complaint, in accordance with

section 14 of the *Manual of General Regulations*. The Complaints Procedure should be used for serious matters, and not for minor things such as occasional lapses of good manners or disputes of a private nature between staff and students. A complaint may be submitted collectively by a group of students who should nominate a spokesperson who will be the channel of communication for the group, however, a complaint may not be lodged by a third party on behalf of the complainant. The complaints procedure is an internal process.

Separate procedures exist for the following, which therefore cannot form the substance of a complaint:

- appeals against the decisions of Assessment Boards (see Part 7 of the Manual of General Regulations);
- appeals against annual monitoring reviews, transfer of research degree registration or oral examination decision for postgraduate research students (see Part 9 of the Manual of General Regulations);
- appeals against the decisions of the Extenuation Panel (see Part 6 of the Manual of General Regulations);
- complaints against the Students' Union (see the Complaints Procedure in the Students' Union constitution);
- appeals against decisions taken under disciplinary proceedings (see Part 12 of the Manual of General Regulations);
- complaints about businesses operating on University premises, but not owned by our university (contact the Deputy Vice-Chancellor and Chief Operating Officer);
- complaints about the behaviour of other students (see Part 12 of the Manual of General Regulations this Manual);
- appeals against the decisions of Academic Misconduct Panels (see Part 8 of the Manual of General Regulations)
- appeals against the decisions of Attendance Appeal Panels (see the University's Attendance Policy).

13.3 Students wishing to submit a complaint must, in the first instance, follow the complaints policy of ASU - FoE which aligns to the Office of the Independent Adjudicator's good practice framework (https://www.oiahe.org.uk/media/96361/oia-good-practice-framework.pdf). The ASU - FoE complaints policy is available at:
https://eng.asu.edu.eg/front/bylaws/show/appeals
https://eng.asu.edu.eg/uploads/uploadcenter/asu_337_file.pdf

13.4 ASU - FoE will administer all stages of its complaints policy and, upon exhaustion of this policy, will issue a formal letter to the complainant notifying them that its complaints policy has been exhausted. If the complainant is still not satisfied with the outcome they will be entitled to request that the University of East London undertake a review of their complaint.

13.5 The University of East London will conduct a review of the complaint in accordance with Stage 3 of its own Complaints Procedure. The University of East London Complaints Procedure is available at:

https://www.uel.ac.uk/discover/governance/policies-regulations-corporate-documents/student-policies/manual-of-general-regulations

13.6 The University of East London will administer the Stage 3 review in accordance with its Complaints Procedure and, upon completion of the review, will issue a Completion of Procedures Letter. If the complainant is still not satisfied with the outcome they will be entitled to make a complaint to the Office of the Independent Adjudicator.

13.7 Complainants are strongly advised to make every reasonable effort to resolve their complaint informally through meeting with the member of ASU - FoE staff most directly concerned with the matter, such as the Programme or Module Leader, before submitting a formal complaint.

13.8 Complaints must normally be lodged within the set time limits outlined in the relevant complaints policy. This ensures that the people involved still remember the case, and the facts can be established.

13.9 If you would like to request that the University of East London undertake a review, following the exhaustion of the ASU – FoE complaints policy, please email the Institutional Compliance Office at complaints@uel.ac.uk

14 EXTENUATION

General Information about extenuation can be found at
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Extenuation-Procedures
www.uel.ac.uk/about/about-uel/governance/policies-regulations-corporate-documents/student-policies

Seeking Advice: Academic Advisor

Every student is assigned an Academic Advisor who is one of the faculty members and may continue with the student for the whole study duration.

The Academic Advisor may ask the student to repeat courses which he already passed or ask him to register in additional courses to raise his accumulative GPA to that required for graduation.

Extenuation procedures (Manual of General Regulations) for ASU – FoE is available at: ***https://eng.asu.edu.eg/uploads/uploadcenter/asu_1768_file.pdf***

The University of East London has agreed, through Academic Board, procedures governing extenuation for students concerning the assessment process.

The BEng Mechatronics and Automation Engineering programme will be subject to equivalent procedures, with the process being administered by, and the panel being held within Ain Shams University – Faculty of Engineering

If granted by the panel, **Extenuation can**

(i) Allow students to hand in coursework up to 7 days late.

or

(ii) Allow students to proceed to their next attempt uncapped.

Extenuation doesn't

(i) Give students more attempts to pass a module
(ii) Reschedule exams
(iii) Uncap a capped module
(iv) Give students a higher mark.
(v) Allow students to hand in work over 7 days late.

The basic principle is that extenuation should put you in the same position that you would have been in had you not missed the exam or handed in the assessment late – it does not confer any advantages.

UEL decided that its procedures would be

- Evidentially based
- Handled centrally by an panel of senior staff (not devolved to various parts of the organisation)
- Retain student anonymity where possible

The extenuation procedures are intended to be used rarely by students not as a matter of course.

The procedures govern circumstances which

- Impair the performance of a student in assessment or reassessment
- Prevent a student from attending for assessment or reassessment
- Prevent a student from submitting assessed or reassessed work by the scheduled date

Such circumstances would normally be

- Unforeseeable - in that the student could have no prior knowledge of the event concerned
- Unpreventable - in that the student could do nothing reasonably in their power to prevent such an event
- Expected to have a serious impact

Examples of circumstances which would normally be regarded as serious are:

- *A serious personal illness* (which is not a permanent medical condition – this is governed by disability procedures)
- *The death of a close relative immediately prior to the date of assessment*

Examples of circumstances which would *not* normally be regarded as extenuating circumstances are:

- Failure of computer equipment / USB stick
- Transport problems, traffic jams, train delays
- Misreading the exam timetables / assessment dates
- Minor illnesses

The judgement as to whether extenuation is granted is made by a panel of senior persons in the organisation who make this judgement on the basis of the evidence the student provides (not on their knowledge of the student) – where possible the identity of the student is not made available to the panel. The judgement is made on the basis that the circumstances could reasonably be thought to be the sort of circumstances which would impair the performance of the student etc. The actual performance of the student is not considered and is not available to the panel.

It is the responsibility of the student to notify the panel, with independent evidential documentary support, of their claim for extenuation.

More information and student guidance notes can be found at:
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Extenuation-Procedures

Appendix A

Academic Calendar 2019/2020

Semester	Activity	From	To
First Semester Fall 2019	Course Registration	07/09/2019	19/09/2019
	Classes	21/09/2019	02/01/2020
	Adding Courses	21/09/2019	26/09/2019
	Dropping Courses	21/09/2019	03/10/2019
	Midterm Exams	08/11/2019	15/11/2019
	Withdraw Courses	19/10/2019	28/11/2019
	Final Exams	04/01/2020	24/01/2020
	Break	25/01/2020	06/02/2020
Second Semester Spring 2020	Course Registration	01/02/2020	06/02/2020
	Classes	08/02/2020	21/05/2020
	Adding Courses	08/02/2020	13/02/2020
	Dropping Courses	08/02/2020	20/02/2020
	Midterm Exams	27/03/2020	03/04/2020
	Withdraw Courses	07/03/2020	16/04/2020
	Final Exams	27/05/2020	19/06/2020
	Break	20/06/2020	09/07/2020
Summer 2020 Semester	Course Registration	27/06/2020	02/07/2020
	Classes	04/07/2020	20/08/2020
	Adding Courses	04/07/2020	06/07/2020
	Dropping Courses	04/07/2020	09/07/2020
	Withdraw Courses	08/08/2020	13/08/2020
	Final Exams	21/08/2020	28/08/2020
	Break	29/08/2020	17/09/2020
Start of Academic Year 2020/2021		19/09/2020	

USEFUL WEB PAGES **APPENDIX B**

Academic Appeals
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Student-Appeals

Academic Integrity Policy
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies

Accreditation of Experiential Learning
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Manual-of-General-Regulations
(Manual of General Regulations – Part 2 – Admission of Students)

Assessment and Feedback Policy
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Assessment-and-Feedback-Policy

Civic Engagement
https://www.uel.ac.uk/Connect/Civic-Engagement

Complaints procedure
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Student-Complaint-Procedure

Equality and Diversity Strategy
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies
(for all general policies)

Extenuating Procedures
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Extenuation-Procedures

Library and Learning Services
https://www.uel.ac.uk/lls/

Manual of General Regulations
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Manual-of-General-Regulations

Referencing guidelines
https://uelac.sharepoint.com/LibraryandLearningServices/Pages/Harvard-Referencing-.aspx

Skills Curriculum
https://www.uel.ac.uk/discover/governance/policies-regulations-corporate-documents/student-policies/skills-curriculum

Skills Portal
https://uelac.sharepoint.com/LibraryandLearningServices/Pages/Skillzone.aspx

Suitability Procedures
https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Manual-of-General-Regulations
(Manual of General Regulations – Part 13 – Suitability Procedure)

Write it Right***http://writeitright.uelconnect.org.uk/***

UEL Intranet (UEL ID required to login) ***https://www.uel.ac.uk/students***

APPENDIX C

Student Attendance and Engagement Policy – Guidance for Students

Teaching Policy

Language: English language should be used for lectures, discussions, exams, and all verbal and electronic communications.

Module Guide: Each module guide should contain: module objectives, core and recommended textbooks, outline, material, assessments, grading policy and outcome. Outline should contain sections covered every week with reference to chapters/sections in the textbook. The instructor/module leader should give the module guide to the students during the first class. The module guide serves as a contract between the instructor and the students.

Textbook: The instructor is free to select/recommend a textbook but it should be international and available. The textbook information should be provided to the administration office or the unit head before the first class of the course.

Attendance: Attendance is taken in lecture and tutorial classes. It is assigned a percentage based on the grading policy. Students should not be allowed to enter the class after 5 minutes from the scheduled time. No eating, drinking, or mobile use in the class. If the student wants to leave the class for any reason, he will not be allowed to come back to the class. The student's attendance should not be less than 75% during the course. Otherwise, the student should not be allowed to attend the final exam.

Assignments: Assignments are given every week (detailed are spelled out in the module), preferably from the textbook. Assignments should constitute 20% of the total grade. Instructors are allowed to drop the least assignment from the grade. The assignment is collected at the end of the tutorial period of the next week. Instructors may grade only selected problems from the assignment. The graded assignment should be returned and discussed with the class.

Quizzes: Unannounced quizzes are given in the tutorials to force the students to study and be ready all time. These quizzes should constitute 10% of the total grade. The quiz is given at the end of the session for 15 minutes max. Up to 6 quizzes can be given and the least one can be dropped from the grade. The graded quiz and the model answer should be returned the following tutorial and discussed with the class.

Exams: One midterm exam should be given. Time should be indicated in the module guide. This exam will be held during lectures/tutorials based on course progress and will constitute 25% of the grade. The instructor can arrange for a bigger or more suitable room for the midterm exam. The final exam constitutes 40% of the grade. It should be a comprehensive exam covering all material. The student fails the course if he gets less than 30% of the final exam total grade. Instructors may select to have all exams open-book or closed-book.

APPENDIX D
UNIVERSITY OF EAST LONDON

TITLE: PROGRAMME COMMITTEE (COLLABORATIVE)

TERMS OF REFERENCE

To be responsible for assuring and enhancing the quality of the student experience at programme level by:

- Providing a forum in which students can express their views about the management of the programme, and the content, delivery and assessment of modules, or equivalent, in order to identify appropriate actions to be taken in response to the issues raised and to ensure that the implementation of these actions is tracked.

- Providing formal yearly student feedback on the programme as input into the preparation of the Programme REP.

- Reviewing programme questionnaire results and making recommendations and changes arising from these.

- Receiving, considering and approving the Programme REP and identifying responsibilities for action to be taken before it is considered by School Learning and Teaching Quality Committee.

- Reviewing progress on REP action plans at each meeting.

- Reviewing the relevant documentation and other evidence prepared for Academic and collaborative Institutional Review and other external review processes.

- Reviewing proposals for modification of the programme structure (validated programmes only) and noting implementation arrangements for modifications.

- Advising the Programme Leader on mechanisms by which University policy statements, which have an impact on programme design and delivery, are implemented.

MEMBERSHIP

Programme Leader (Chair)
Administrator/Servicing Officer (ex-officio)
Programme staff making a significant teaching contribution to the programme
Learning Support Services representative
Technician representative (for laboratory based programmes)
Dean of School/department or equivalent (ex officio)
UEL Dean of School/Associate Dean of School, or equivalent (ex officio)

UEL link person (ex officio)
Two student representatives for each level and at least one part-time student (where appropriate)

The meeting will be held once per semester/term and will be quorate if 40% of the members are present.

APPENDIX E

ACADEMIC MISCONDUCT

For the purposes of university's regulations, academic misconduct is defined as any type of cheating in an assessment for the purposes of achieving personal gain. Examples of such misconduct are given below: the list is **not** exhaustive and the use of any form of unfair or dishonest practice in assessment can be considered potential misconduct.

Coursework Submitted for Assessment

For coursework submissions, academic misconduct means:

(a) The presentation of another person's work as one's own with or without obtaining permission to use it.

(b) The inclusion within one's own work of material (written, visual or oral), originally produced by another person, without suitable acknowledgment.

(c) The submission, as if it were one's own work, of anything which has been offered to you for your use, but which is actually not your own work.

(d) The inclusion within one's work of concepts paraphrased from elsewhere without citing your source.

(e) The inclusion in submitted work of sections of text, whether from electronic or hard copy sources, without appropriate acknowledgement of the source.

(f) The submission of work that the student, as the author, has previously submitted, without suitable acknowledgement of the source of their previous work; this should not normally be more than a short quotation as the same work cannot be submitted for different assignments.

(g) Including or quoting the work of other students in one's work, with the exception of published work, or outputs held in the library as a learning resource, which should be cited and acknowledged appropriately.

(h) Being party to any arrangement whereby the work of one candidate is represented as that of another.

(i) The submission, as your own work, of any work that has been purchased, or otherwise obtained from others, whether this is from other students, online services, "cheat sites", or other agents or sources that sell or provide assignments.

(j) Practices such as 'cutting and pasting' segments of text into your work, without citing the source of each.

(k) For work not intended to be submitted as a collaborative assignment: producing work with one or more other students, using study practices that mean the submitted work is nearly identical, overall or in part, to that of other students.

(l) Offering an inducement to staff and/or other persons connected with assessment.

Examinations

For examinations, academic misconduct means:

(a) Importation into an examination room of materials or devices other than those which are specifically permitted under the regulations applying to the examination in question.

(b) Reference to such materials (whether written or electronically recorded) during the period of the examination, whether or not such reference is made within the examination room.

(c) Refusing, when asked, to surrender any materials requested by an invigilator.

(d) The application of an electronic device, unless this has been expressly permitted for that examination.

(e) Copying the work of another candidate.

(f) Disruptive behaviour during examination or assessment.

(g) Obtaining or seeking to obtain access to unseen examination questions prior to the examination.

(h) Failure to observe the instructions of a person invigilating an examination, or seeking to intimidate such a person.

(i) Offering an inducement to invigilators and/or staff and/or other persons connected with assessment.

Where academic misconduct is suspected, the matter will be dealt with under the *Procedure to be followed in the event of a suspected case of academic misconduct, Part 8, paragraph 4 (or, for postgraduate research students, Appendix I)* of the Manual of General Regulations (available for view at ***https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies/Manual-of-General-Regulations***). If it is determined that academic misconduct has taken place, a range of penalties may be prescribed which includes expulsion from the programme.

PLAGIARISM - A GUIDANCE NOTE FOR STUDENTS

1. Definition of Plagiarism

Our University defines plagiarism and other academic misconduct in Part 8 of the UEL Manual of General Regulations (to which all students are referred upon joining UEL), which is reprinted in "The Essential Guide to the University of East London". In this document, the following example of an assessment offence is given:

The submission of material (written, visual or oral), originally produced by another person or persons or oneself, without due acknowledgement*, so that the work could be assumed to be the student's own. For the purposes of these Regulations, this includes incorporation of significant extracts or elements taken from the work of (an)other(s) or oneself, without acknowledgement or reference*, and the submission of work produced in collaboration for an assignment based on the assessment of individual work. (Such misconduct is typically described as plagiarism and collusion.)

The following note is attached:
*(Note: To avoid potential misunderstanding, any phrase that is not the student's own or is submitted by the student for a different assessment should normally be in quotation marks or highlighted in some other way. It should also be noted that the incorporation of *significant* elements of (an) other(s) work or of one's own work submitted for a different assessment, even with acknowledgement or reference, is unacceptable academic practice and will normally result in failure of that item or stage of assessment.)

2. Plagiarism in Greater Detail

Work that students submit for assessment will inevitably build upon ideas that they have read about or have learnt about in lectures. That is perfectly acceptable, provided that sources are appropriately acknowledged. It should be noted, however, that the wholesale reproduction of the ideas and words of others, however well referenced, is likely to lead to failure at assessment (see section 6 below)

The submission of work that borrows ideas, words, diagrams, or anything else from another source (or sources), without appropriate acknowledgement, constitutes plagiarism. Plagiarism is not limited to unattributed cutting-and-pasting; it includes the reproduction, without acknowledgement, of someone else's work, taken from a published (or unpublished) article, a book, a website, a friend's (or anybody else's) assignment, or any other source.

When an assignment or report uses information from other sources, the student must carefully acknowledge exactly what, where and how s/he has used them. If someone else's words are used, they must be within quotation marks and a reference must follow the quotation. (See section 6 for further guidance on referencing.)

Where a concept or argument in another source is paraphrased (rather than directly quoted), quotations marks should not be used, but it will still be necessary to acknowledge the source. Remember, however, that the making of simple changes to the wording of a source, while retaining the broad structure, organisation, content and/or phraseology of the source, is unacceptable academic practice and will probably be regarded as plagiarism. (For helpful tips on how to avoid plagiarism, see "The Study Skills Handbook" by Dr Stella Cottrell, pages 122-125.)

3. Collusion

Collusion is the term used to describe any form of joint effort intended to deceive an assessor as to who was actually responsible for producing the material submitted for assessment. Clearly, students are encouraged to discuss assignments with their peers, but each student must always ensure that, where an individual assignment is specified, the report/essay submitted is entirely the student's own. Students should, therefore, never lend work (in hard or electronic copy) to friends. If that work is subsequently plagiarised by a "friend", an act of friendship might lead to a charge of collusion.

4. When to Reference

Our regulations do not distinguish between deliberate and accidental plagiarism, but you will not be accused of plagiarism, provided that you properly reference everything in your work that was said, written, drawn, or otherwise created by somebody else.

You need to provide a reference:

- when you are using or referring to somebody else's words or ideas from an article, book, newspaper, TV programme, film, web page, letter or any other medium;

- when you use information gained from an exchange of correspondence or emails with another person or through an interview or in conversation;

- when you copy the exact words or a unique phrase from somewhere;

- when you reprint any diagrams, illustrations, or photographs.

You do not <u>need</u> to reference:

- when you are writing of your own experience, your own observations, your own thoughts or insights or offering your own conclusions on a subject;

- when you are using what is judged to be common knowledge (common sense observations, shared information within your subject area, generally accepted facts etc.) As a test of this, material is probably common knowledge if
  - you find the same information undocumented in other sources;
  - it is information you expect your readers to be familiar with;
  - the information could be easily found in general reference sources.

5. <u>How to Reference</u>

Our University has agreed on a single version of the Harvard referencing system (the School of Psychology uses the American Psychological Association (APA) referencing style) and this (along with APA) can be found in Cite Them Right:

Pears, R. and Shields, G (2013) *Cite Them Right.* Newcastle: Pear Tree Press
Cite Them Right is available on line and hard copies can be found in our libraries and bookshops

6. <u>Plagiarism, or Unacceptable Academic Practice</u>?

If work that you submit for assessment includes substantial and significant elements of other sources and all of those sources are appropriately acknowledged, you will not have plagiarised, but you will be culpable of unacceptable academic practice, because there will be too little of your "own voice" to allow your knowledge to be assessed. Work that you submit for assessment must:

- use your own words;
- provide a critical commentary on existing literature;
- aim for novelty and originality;
- demonstrate your understanding of the subject area by paraphrasing.
  Work that does not meet those criteria will fail.

APPENDIX F

COLLABORATIVE STUDENT ENTITLEMENTS AT UEL

[Please append the student entitlement letter provided by UEL]

APPENDIX G

HEALTH AND SAFETY

- One of the principle roles of Ain Shams University administration is controlling dangers and risks. The University is aware that failures in health and safety administration can possibly prompt loss of life, injury, and damage to the University properties.
- According to the University, a fundamental standard of the Health and Safety policy is that it is in the hands of the individuals who cause the dangers and risks to manage and control them.
- The University appoints persons “capable to advice” to help with identifying, recognizing and controlling health and security dangers and risks. They may work in any sector of the University.
- Each College of the University holds a responsibility regarding the management and use of its own health and security policies and strategies. Despite that, the University and Colleges are still obliged to coordinate on the mutual matters of health and security which affect the more extensive University community.
- Heads of the different Departments must set out their own organizational courses of action for the safety measures. In addition, they abide by the general University Health and Safety Policies and are responsible for their implementation and management in their own departments and domains of responsibility.
- Each Head of Department might set up a Departmental Safety Policy, which works hand in hand with this University Health and Safety Policy to satisfy the prerequisite Health and Safety at Work measures.
- Each Head of Department must guarantee that everybody who might be influenced by the activities of the Department, knows about the health and security policies and arrangements, and has sufficient knowledge, information, time, preparation and supervision authority to allow for the identification, recognition and control of the dangers and risks to health and security.
- The supervisor of any departmental activity (field trip, practical work, office work or teaching activities) must have a comprehensive understanding of the related dangers and risks and conduct the risk assessment suitable for the circumstances of the activity. This is to fulfil the requirements of the Health and Safety at Work Regulations and different measures which state that no work might be attempted unless reasonable and adequate risk assessment has been done to define a safe and secure system of work.
- All University staff members are expected to be fully aware of both the University and Department policies and know that they hold the responsibility of this aspect for all those under their supervision or management. This implies ensuring and promoting good working practices and environment. It also includes ensuring that practical and office work is

done in safe spaces, equipment being maintained and checked in safe procedures, that the policies and strategies are being implemented and disseminated and that immediate reporting of any accidents or dangers takes place in order to take the necessary measures.

- The health and safety policy is also abiding to any private body or entity working inside the University premises. They must coordinate with the University on all matters related to health and safety management.