



---

**October University for Modern Sciences and Arts  
(MSA)**

**B.Sc. Honours  
Mechatronics Systems Engineering**

**Student Handbook 2021/2022**

**Validated by the University of Greenwich,  
London UK**

Faculty of Engineering  
Mechatronics Systems Engineering:  
**Programme Leader: Prof. Dr. Mostafa Zaky Mohamed**

<p><b>Vision</b></p> <p>“The Faculty is nationally accredited, and internationally validated, and its programmes are among the top according to global subject ranking criteria”.</p>	<p>الرؤية</p> <p>"الكلية معتمدة قومياً ومعترف بها عالمياً وتحظى ببرامجها بترتيب متقدم فى التصنيف الدولى فى مجال الهندسة".</p>
<p><b>Mission</b></p> <p>“The Faculty of Engineering of October University for Modern Sciences and Arts offers modern educational programmes in cooperation with a British partner, supports entrepreneurship and meets job market needs, prepares graduates who are qualified with creative thinking and with engineering, technical, intellectual, professional, and managerial skills, conducts applied scientific research, and participates in community service and environmental development”.</p>	<p>الرسالة</p> <p>"تُقدم كلية الهندسة بجامعة أكتوبر للعلوم الحديثة والآداب برامج تعليمية حديثة، بالتعاون مع شريك بريطاني، تدعم قيادة الأعمال وتلبي احتياجات سوق العمل، وتُعد خريجين مؤهلين للتفكير الإبداعي ومزودين بمهارات هندسية وتقنية وذهنية ومهنية وإدارية؛ وتقوم بالبحث العلمي التطبيقي، وتساهم في خدمة المجتمع وتنمية البيئة".</p>

## القيم الجوهرية للكلية

Justice and Non-Discrimination	• العدالة وعدم التمييز
Quality and Excellence	• الجودة و التميز
Integrity and Honesty	• النزاهة والأمانة
Intellectual Freedom	• الحرية الفكرية
Transparency	• الشفافية
Creativity	• الإبداع
Respect and Acceptance of Others	• إحترام وقبول الآخر

## الأهداف الاستراتيجية للكلية

الأهداف الاستراتيجية	الأهداف الفرعية
1- إستيفاء متطلبات الإعتقاد من الهيئات القومية/الدولية.	1/1 تطوير عمل وحدة ضمان الجودة.
	2/1 تأهيل الكوادر الأكاديمية والإدارية فى مجالات الجودة.
	3/1 عمل توعية ونشر لثقافة الجودة.
	4/1 التقدم للإعتقاد القومى/الدولى.
2- تطوير الخدمات التعليمية للكلية.	1/2 تنمية مهارات وقدرات كوادر الكلية فى مجالات التعليم والتدريس والتقويم.
	2/2 تقديم تعليم إلكتروني يواكب التقنيات العالمية.
	3/2 تقديم دعم أكاديمي فعال للطلاب.
	4/2 إنشاء برامج تعليمية جديدة تواكب احتياجات سوق العمل.
	5/2 تطوير المعامل بأحدث الآلات والمعدات والأجهزة والبرمجيات.
3- عمل بحث علمي يلبي التطورات العالمية.	1/3 ربط البحث العلمي بالكلية باحتياجات الخطط بمستوياتها المختلفة.
	2/3 تطوير كفاءة أعضاء هيئة التدريس والهيئة المعاونة البحثية.
	3/3 نشر أبحاث وإقامة مؤتمرات وندوات وورش عمل علمية.
	4/3 عمل مشروعات بحثية ممولة محليا/دوليا.
	5/3 إنشاء برامج دراسات عليا.
4- تطوير المشاركة المجتمعية للكلية.	1/4 تحديد مجالات المشاركة المجتمعية لتلبي احتياجات المجتمع المختلفة.
	2/4 فتح مجال فى التعليم المستمر والتدريب للمجتمع الخارجى.
	3/4 إنشاء وحدات ذات طابع خاص .
	4/4 تحفيز مشاركة الخريجين والمجتمع الخارجى فى أنشطة الكلية.
5- تحقيق المرونة المؤسسية فى التعامل مع التحديات.	1/5 إعداد الكوادر الأكاديمية والإدارية للتعامل مع معطيات الظروف المحيطة.
	2/5 إعداد الطلاب للتعامل مع معطيات الظروف المحيطة.
6- توفير حياة جامعية ثرية ومتنوعة.	1/6 دعم الأنشطة المختلفة المقدمة للطلاب.
	2/6 نشر التجارب الناجحة من أبناء الكلية وخريجها.

# Contents

---

A. Purpose and status of your Student Handbook.....	5
B. University and Programme Academic Calendar 2019/2020.....	6
C. Faculty of Engineering Dean's Welcome.....	7
D. Introduction to MSA University.....	8
E. Introduction to the Faculty of Engineering.....	9
F. Introduction to the University of Greenwich .....	10
G. B.Sc. Honours of Mechatronics Systems Engineering Programme specification.....	11
H. Faculty Regulations: Industrial and Electrical Systems Engineering programmes....	22
I. Subject/Programme Staff List and Contact Details.....	24

## A. Purpose and Status of your Student Handbook

The purpose of this handbook is to provide you with information about your programme of study, and to direct you to other general information about studying for the University of Greenwich award.

This handbook must be read in conjunction with the University Catalogue and University Guide and Regulations (<http://www.gre.ac.uk/intranet/students.htm>).

The material in this handbook is as accurate as possible at the date of production.

Your comments on any improvements to this handbook are welcome - please put them in writing (with name of handbook) to the programme leader **Dr. Nahed Sobhi Abdel Nour**.

**Name of Head of School of Engineering at Medway**  
**Professor Ndy Ekere**

Pembroke  
Chatham Maritime  
Kent  
ME4 4TB

Telephone: +44 (0)1634 883016  
Fax: +44 (0)1634 883153  
Email: [n.n.ekere@gre.ac.uk](mailto:n.n.ekere@gre.ac.uk)

**Name of University Link Tutor**  
**Dr. David Armour-Chelu**

Central Avenue  
Chatham Maritime  
Kent  
ME4 4TB

Telephone: +44 (0)1634 883578  
Fax: +44 (0)1634 883153  
Email: [d.i.armour-chelu@gre.ac.uk](mailto:d.i.armour-chelu@gre.ac.uk)

**Name of MSA Dean of Engineering**  
**Prof. Dr. Nahed Sobhi Abdel Nour**

Room C 207  
Bldg. C

26 July Mehwar Road  
Intersection with Wahat Road  
6<sup>th</sup> October City

Telephone : 00202 33365037  
Fax : 00202 37603811  
Email: [nsobhi@msa.eun.eg](mailto:nsobhi@msa.eun.eg)

**Name of MSA Engineering Link Tutor**  
**Prof. Dr. Mostafa Zaky Mohamed**

Room H 215  
Bldg. H

26 July Mehwar Road  
Intersection with Wahat Road  
6<sup>th</sup> October City

Telephone : 00202 33365037  
Fax : 00202 37603811  
Email: [mzmohamed@msa.eun.eg](mailto:mzmohamed@msa.eun.eg)

## B. University and Programme Academic Calendar

### Fall 2021 Academic Calendar -Academic Year 2021 / 2022

Graduation Ceremony Class 2019/2020	Pls refer to MSA Official Facebook for dates
Graduation Ceremony Class 2020/2021	Pls refer to MSA Official Facebook for dates
Fall 2021 Semester	
Commencement of online Registration for Continuing Students & Approval of Online Schedules: Note: Each faculty will determine and publish its respective dates for registration on MSA official platforms. Students should kindly contact their faculties for exact dates	Sun 19 Sept 2021 – Thurs 30 Sept 2021
Newcomers Only: Orientation & Course Registration (Proceedings of the orientation day will be sent to students via email & MSA official platforms)	Sat 2 Oct – Wed 6 Oct 2021*
October 6th Armed Forces Victory	* Wed 6 Oct 2021 *Subject to transfer to Thursday 7 <sup>th</sup> Oct 2021 as per Governmental Official Announcement
First Day of Classes for <u>All students</u>	Sat 9 Oct 2021
Last Day of Classes for all students Fall 2021	Thurs 13 Jan 2022
New student Activity Week (Details to be sent via emails to students)	Sat 9 Oct 2021 - Thurs 14 Oct 2021
El Mawled El Nabawi	Tues 19 Oct* Subject to transfer to Thursday 21 Oct as per Governmental Official Announcement
Deadline to ADD, DROP, WITHDRAW Courses	Student should refer to their respective faculty for ADD, DROP, WITHDRAW Courses Deadline

BOS Board of Study Meeting (Manag, CS & Engineering) Board of Study Meeting (Pharmacy, Bio) Board of Study Meeting (Lang, Mcom & Arts)	Tues 9 Nov 2021 Wed 10 Nov 2021 Thurs 11 Nov 2021
MID Term Exams	Sat 20 Nov – Thurs 2 Dec 2021 Subject to amendment via MSA Examination Unit
Classes Resume	Students should refer to MSA Examination Unit & Respective Faculty for class resume date
Student Online Course & Instructors Evaluation	Dec 2021 – final exams
Registration date for UK Student Summer Abroad Programme (Academic, Cultural & Entertainment Programme)	Programme to be confirmed subject to Covid 19 unforeseen updates.
Commencement of Payment of Fees for Spring 2020	December 2021
Fall Senior Graduation Photo Week To be confirmed subject to further notice	Pls refer to MSA Official Facebook for dates
Western Christmas	Saturday 25 <sup>th</sup> Dec 2021

<b>New Year Commencement</b>	<b>Saturday 1<sup>st</sup> Jan 2022</b>
<b>Eastern Christmas</b>	<b>Fri 7<sup>th</sup> &amp; Sat 8<sup>th</sup> Jan 2022</b>
<b>Final Day of classes for Fall 2021</b>	<b>Thurs 13 Jan 2022</b>
<b>Final Exams Duration Fall 2021</b>	First day of exams: Sat 15 Jan 2022* Last day of exams: Thurs 10 Feb 2022* *Subject to amendment via Governmental Notice & MSA Examination Unit
<b>Baptism Day</b>	<b>Wed 19<sup>th</sup> Jan 2022</b>
<b>National Day</b>	<b>Monday 25<sup>th</sup> Jan 2022*</b> *Subject to transfer to Thursday 27 Jan as per Governmental official notice
<b>Moderation &amp; Fall University Assessment Boards</b>	<b>Exam Boards UoG: Mon 21 Feb 2022 UoB Exam Board: TBC</b>

### Spring 2022 & Summer 2022

<b>SPRING 2022 SEMESTER</b>	
<b>Schedule Registration starts</b> (Students should refer to his/her respective faculty for details)	<b>Tues 22 Feb 2022 – Fri 25 Feb 2022</b>
<b>First Day of Classes Spring 2022</b>	<b>Sat 26 Feb 2022</b>
<b>Last Day for Classes Spring 2022</b>	<b>Thurs 9 June 2022</b>
<b>Start of Additional 5% fine</b>	<b>Mon 7 March 2022</b>
<b>Start of Additional 10% fine</b>	<b>Mon 14 March 2022</b>
<b>Deadline to Add, Drop, Withdraw courses</b>	<b>Refer to respective faculty for dates and approval</b>
<b>BOS</b> Board of Study Meeting (Pharmacy, Bio) Board of Study Meeting (Manag, CS & Engineering) Board of Study Meeting (Lang, Arts & Design, Mcom)	<b>Tues 29 March 2022</b> <b>Wed 30 March 2022</b> <b>Thurs 31 March 2022</b>
<b>Start of Ramadan</b>	<b>Sat 2 April 2022*</b> Subject to amendment via governmental authorities
<b>Mid Term Exams</b>	<b>Sat 9 April 2022 - Thurs 21 April 2022</b>
<b>Student Online Course &amp; Instructors Evaluation</b>	<b>Mid April 2022 – final exams</b>
<b>Palm Sunday</b>	<b>Sun 17<sup>th</sup> April 2022</b>
<b>Holy Thursday</b>	<b>Thurs 21<sup>th</sup> April 2022</b>
<b>Sham El Nasseem &amp; Eastern Day</b>	<b>Sun 24<sup>th</sup> &amp; Mon 25<sup>th</sup> April 2022*</b> *Subject to amendment as per Governmental Official Announcement
<b>Sinai Liberation Day</b>	<b>Mon 25<sup>th</sup> April 2022*</b> *Subject to amendment as per Governmental Official Announcement

Eid EL Fetr*	Sun 1 May – Wed 4 May 2022* *Subject to amendment via governmental official announcement
Labor Day	Thurs 5 <sup>th</sup> May 2022
Last date of classes Spring 2022	Thurs 9 June 2022
Spring 2021 Final Exams Start Date - End Date	Sat 11 June 2022 - Thurs 7 July 2022 As per Ministry
Eid El Adha	Fri 8 July 2022- Tues 12 July 2022* *Subject to amendment as per Governmental Official Announcement
June 2013 Revolution	Thurs 30 June 2022
Spring 2022 University Assessment Boards	UoG: Thur 21 July 2022 -UoB: (TBC)
July Revolution Day	Sat 23 July 2022* *Subject to amendment to as per Governmental Official Announcement
SUMMER SEMESTER 2022	
First day of classes Summer 2022	Sun 24 July 2022
Last day of classes Summer 2022	Wed 31 Aug 2022
Hejri Islamic new year	Sat 30 July 2022 Subject to amendment via governmental authorities
Summer 2022 Exams Start date - Summer 2022 Exams End date	Thurs 1 Sept – Wed 7 Sept 2022
Summer 2022 Exam Boards	UoG: Thurs 15 Sept 2022 UoB: TBC
Registration returning	Thursday 15 Sept 2022
Orientation new comer	Sat 17 Sept 2022- Thurs 22 Sept 2022
Fall 2022 (Tentative Date)	Sat 24 Sep 2022



## C. Faculty of Engineering Dean's Welcome

Welcome to the Faculty of Engineering at MSA University.

Programs in the Faculty are connected by a common focus of providing exceptional education in fields that directly support the Faculty of Engineering mission of enriching the quality of life for our students and the community connecting learning to life.

In carrying out this purpose, the Faculty of Engineering is committed to: providing high-quality programs of study, instruction and practice; understanding, promoting, and respecting diversity; supporting students, faculty, staff, and program development; insuring that resources support appropriate classroom and lab experiments; promoting internal and external partnerships; and ensuring students and staff to be engaged in activities that promote effective teaching, assessment, advisement, and professional and community service.

We are dedicated to providing you with the skills, creativity, and resolve to be effective in your future. The education you receive here will provide you with amazing opportunities – in your ability to work in your chosen profession, but more importantly in the way you view the world.

I hope you are able to take full advantage of these life-changing opportunities, and the challenges that accompany them. I wish you much continued success in your academic studies.

Sincerely yours,

*Nahed Sobhi*

Prof. Dr. Nahed Sobhi Abdel Nour  
Dean, Faculty of Engineering

## D. Introduction to MSA University

October University for Modern Sciences and Arts (MSA) has been established under Republican Decree No. 244 for 1996 to introduce state-of-the-art technologies and concepts in all disciplines. MSA is proud that its different programmes were fully accredited before the graduation of its first class in Spring 2000.

MSA is, by all means, the outcome of 4 decades of experience in the field of education on the local and international levels. Dar El Tarbiah was the first Language School founded by Egyptians in 1956. The institution has maintained an excellent reputation, based on the high quality of teaching and facilities that has been recognized both locally and internationally in GCE, IGCSE, GCSE, as well as Egyptian Thanaweya Amma and American Diploma. Our students' excellent performance in the British System has encouraged us to expand the British Section in our school to include both IGCSE & GCSE, simultaneously. Our success in teaching all AL and AS subjects for almost 12 years, with outstanding results in the IGCSE, encouraged us to complete the undergraduate programmes.

The English Language is the medium of instruction at MSA University. The current academic work of the university is divided into nine faculties, namely: Faculty of Management Sciences, Faculty of Engineering, Faculty of Computer Sciences, Faculty of Mass Communication, Faculty of Arts and Design, Faculty of Biotechnology, Faculty of Dentistry, Faculty of Pharmacy, and Faculty of Languages.. We are keen on providing our students with all the up-to-date tools needed to cope with the Information and Communication Technology Era. That is why we are dedicated to the pursuit of excellence in curricula, facilities, staff and students. That is the main reason why our modern and progressive policy has been internationally acknowledged by universities in the UK and USA, as we have several cooperation agreements with prominent universities there. MSA programmes are designed and implemented according to the most up-to-date international standards. All course outlines highlight the role of new and emerging technologies in meeting challenges posed by the Information and Communication Technology Era.

MSA aims to provide its students with an exceptional learning experience that will enable them to compete in the global highly competitive job market. The vast experience of Dar El Tarbiah Institution and MSA University in the field of education made its Top Management keen on adopting the British Education System due to its unique characteristics that provide students with the necessary up-to-date tools and skills in a flexible environment, while at the same time ensuring that students are highly committed and competitive.

**Institution Website:** [www.msa.eun.eg](http://www.msa.eun.eg)

## E. Introduction to the Faculty of Engineering

The faculty of Engineering at MSA offers five programmes: B.Sc. (Hons) Architectural Engineering, B.Sc. (Hons) Electrical Communication & Electronic Systems Engineering, B.Sc. (Hons) Computer Systems Engineering, B.Sc. (Hons) Industrial Systems Engineering, and B.Sc. (Hons) Mechatronics Systems Engineering. The Faculty of Engineering emphasizes creative and professional aspects of Engineering and Technology; students do not only learn theories, they also mix theory with practice. By the time they graduate, they would have been trained and qualified; and thus ready to work in the field as professionals.

The Faculty of Engineering offers a Mechatronics Systems Engineering (MSE) programme which is concerned with the integration of mechanics, electronics, control theory, and computer science within product design and manufacturing. This highly integrated approach creates smart, inventive and evermore efficient solutions for a wide range of high-tech engineering problems.

MSE programme has been developed so that it would follow reputable international standards. It meets with the criteria established by The Committee for Engineering Education Sector set up by The Supreme Council of Egyptian Universities, and fulfils local industrial and service sectors.

MSE B.Sc. (Hons) is awarded upon the successful completion of an approved curriculum comprised of 168 credit hours, normally effected and completed in five academic years (10 semesters).

MSE programme is designed for practicing engineers who aspire to become strong contributors to multidisciplinary design and product development teams working in the area of mechatronics. The programme provides engineers with a solid foundation in the core principles of their complementary discipline and augments this foundation with focused study in mechatronics at the intersection of electrical and mechanical engineering. A significant laboratory experience completes the programme and facilitates the transfer of new cross-disciplinary knowledge to professional practice. Participants are positioned to drive innovation in technology and product development.

MSE graduates should be capable of adapting to the ever-evolving engineering tools and procedures in the practice of all aspects of life long mechatronics systems engineering profession. Graduates should be able to tackle unstructured engineering problems as a teamwork to think critically, function perfectly, and communicate effectively.

## F. Introduction to The University of Greenwich

### **The programmes**

The programme is validated by The University of Greenwich. This means that students, successfully completing all parts of the programme, will receive a dual award: the B.Sc. (Hons) from the University of Greenwich, and the B.Sc. (Hons) from October University for Modern Sciences and Arts (MSA); and may, if they wish to, attend the appropriate Greenwich graduation ceremony. Students will enrol as students of October University for Modern Sciences and Arts (MSA), and will be registered with the University of Greenwich.

If a student does not complete the full programme, he/she will be given a transcript recording any individual elements of the programme successfully completed.

The programme is supervised by the Dean of the Faculty of Engineering Prof. Nahed Sobhi Abdel Nour, Campus Building C, *Address* 26 July Mehwar Road Intersection with Wahat Road, 6<sup>th</sup> October City, Telephone: 33365037, Fax: 37603811.

### **The University regulations**

MSA acts in accordance with its procedures, discussed in the University Assessment Board, in the case of student dishonesty or a student appeal.

### **Further Documents held by MSA**

The Faculty should, also, hold reference copies of the following documents for consultation by the students and staff:

- The University of Greenwich Charter for Students on Collaborative Programmes.
- The Memorandum of Co-operation for the Programme. This is the formal agreement between Greenwich University and MSA University on the delivery of the Programme.
- Quality Assurance Agency for Higher Education Code for England and Wales: Code of Practice: Collaborative Provision.

## G. B.Sc. Honours Mechatronics Systems Engineering Programme specification

<b>1. Awarding Institution</b>	October University for Modern Sciences and Arts / The University of Greenwich.
<b>2. Teaching Institution</b>	October University for Modern Sciences and Arts (MSA)
<b>3. Programme Accredited by</b>	Supreme Council for Egyptian Universities
<b>4. Final Qualification</b>	B.Sc. (Hons) Mechatronics Systems Engineering (MSE)
<b>5. Programme</b>	Mechatronics Systems Engineering (MSE)
<b>6. UCAS Code</b>	None
<b>7. Relevant QAA subject Benchmark group</b>	Mechatronics Systems Engineering (MSE) for MSA Award and Mechatronics Engineering for the University of Greenwich Award
<b>8. Academic Year</b>	2017/2018

<b>9. Reference Points</b>
<p>The following reference points were used in designing the programme:</p> <ul style="list-style-type: none"> <li>• Supreme Council for Egyptian Universities (SCEU) Regulations.</li> <li>• Criteria established by the Committee for Engineering Education set up by SCEU.</li> <li>• QAA guidelines for programme specifications.</li> <li>• MSA University Council.</li> <li>• Faculty of Engineering Quality Assurance Audit Unit.</li> </ul>

<b>10. Educational Aims of the Programme</b>
<p>MSE programme has the following educational objectives:</p> <ol style="list-style-type: none"> <li>1. To enable the graduates to understand the interdisciplinary fundamentals of mechanical engineering, electrical engineering, control systems, computer engineering and their integration.</li> <li>2. To enable the graduates to successfully identify problems, design and optimize integrated solutions by focusing on modern Mechatronics engineering practices.</li> <li>3. To enable the graduates to innovate, develop and adopt new directions in their advance education.</li> <li>4. To develop strong team skills among the graduates in order to enable them to communicate and work effectively while solving complex problems in a multidisciplinary environment.</li> </ol>

## **I. B.Sc. Honours Mechatronics Systems Engineering Programme specification (Cont.)**

### **Overall Structure of the Programme**

**MSE** programme offers 56 modules over 10 semesters, normally completed in 5 academic years. These modules draw upon specialized professional knowledge and skills in English Language proficiency, Advanced Mathematics, Basic Sciences, Mechanical Engineering fundamentals, Computer Science, Electronics Engineering, Social Sciences and Humanities, together with the Mechatronics Engineering discipline, and elective modules.

**MSE** modules include, specifically, subject areas such as: Workshop Technology, Engineering Materials, Computer Programming, Thermodynamics, Electric Circuits, Stress Analysis, Machine Elements Design and Drawing, Electronic Circuits, Manufacturing Processes, Fluid Mechanics, Numerical Analysis, Sensors and Data Acquisition System, Machine Design, Heat Transfer, Electric Drive Systems, Digital logic Control, Numerical Control Machines and CAD/CAM, Vibration, Mechatronics Modelling and Simulation, Hydraulic and Pneumatic Control, Automatic Control, Robotics, Industrial Automation, Artificial Intelligence, Microprocessors and Microcontrollers, Mechatronics System Design, Troubleshooting of Mechatronics System, Embedded Computer Systems, Digital Signal Processing, Noise and Acoustic Control, Renewable Energies, and Computer Communication Networks.

## I. B.Sc. Honours Mechatronics Systems Engineering Programme specification (Cont.)

### Levels and Modules

The following is the analysis of the Mechatronics Systems Engineering Programme into subject-area blocks and their percentages, as well as input/output, and depth/breadth of the core.

#### I- Advanced Mathematics:

Students are required to take a solid foundation in Advanced Mathematics over six semesters (3 academic years). This is executed by a two-course sequence in Calculus, and by individual courses in Probability and Statistics, Linear Algebra, Differential Equations, and Numerical Analysis.

MAT 151 Calculus I.

MAT 161 Calculus II.

MAT 251 Linear Algebra.

MAT 261 Differential Equations.

MAT 351 Mathematical Analysis and Numerical Methods.

MAT 361 Probability and Statistics

New comers are given extra tutorial sessions in Calculus for remedial preparation.

#### II- Basic Sciences:

Students are required to take a number of specially designed scientific courses to provide them with a solid background in Engineering Physics, and Computer Programming.

BSC 152 Engineering Physics I.

BSC 162 Engineering Physics II.

COM 155 Introduction to Information Technology.

COM 253 Engineering Computer Programming.

BSC 164 Industrial Chemistry

#### III- Engineering Fundamentals Breadth:

Students are required to take basic subjects to give them breadth in Engineering fundamentals, as well as a solid foundation in Design and Manufacturing areas.

#### Basic Engineering Courses:

GSE 153	Engineering Mechanics I.
GSE 154	Engineering Graphics.
GSE 163	Engineering Mechanics II.
GSE 165	Workshop Technology.
GSE 252	Engineering Materials.
GSE 254	Fundamentals of Thermodynamics
GSE 255	Electric Circuits Analysis
GSE 264	Rigid Body Dynamics
GSE 265	Electronic Circuits Analysis
GSE 353	Fundamentals of Fluid Mechanics.
GSE 356	Kinematics of Mechanical Systems.
GSE 363	Fundamentals of Heat Transfer.
GSE 366	Dynamics of Mechanical Systems.

#### Design and Manufacturing Engineering Courses:

DES 262	Stress Analysis.
DES 263	Machine Elements Design & Drawing.
MFG 352	Manufacturing Processes.
DES 362	Machine Design.
MFG 455	Numerical Control Machines and CAD/CAM.

## **I. B.Sc. Honours Mechatronics Systems Engineering Programme specification (Cont.)**

### **IV- Mechatronics Engineering Core:**

Students are required to take a number of comprehensive modules designed to provide essential subjects in the major area:

MSE 354	Electric Machines.
MSE 355	Sensors, Measurements and Data Acquisition System.
MSE 364	Electric Drive Systems.
MSE 365	Introduction to Mechatronics.
MSE 451	Digital Logic Control I.
MSE 452	Mechanical Vibrations.
MSE 453x	MSE Elective I.
MSE 454	Mechatronics Modelling and Simulation.
MSE 461	Digital Logic Control II.
MSE 462	Robotics.
MSE 463x	MSE Elective II.
MSE 464	Automatic Control.
MSE 465	Microprocessor and Microcontroller Systems.
MSE 551	Artificial Intelligence
MSE 552	Hydraulic & Pneumatic Control.
MSE 553x	MSE Elective III.
MSE 561	Mechatronics System Design.
MSE 562	Industrial Automation.
MSE 563x	MSE Elective IV.

### **V- Humanities Courses**

Students are required to take three humanity courses, to realize the humanistic dimensions of engineering and its impact on society. Humanity courses are taught by the Faculty of Engineering. Also, students are required to take three modules in English Language to enhance their reading and writing skills. These modules are offered by the Faculty of Languages.

#### **Humanity Courses**

HUM 266	Ethics, Safety & Legislations
HUM 456	Project Management
HUM 466	Engineering Economy

### **VI- English Language Proficiency:**

Students are required to take three courses in English Language to enhance their reading and writing skills. These courses are offered by the Faculty of Languages.

ENG 156	Academic English Writing.
ENG 166	Technical English Writing.
ENG 256	Research English Writing.



## **I. B.Sc. Honours Mechatronics Systems Engineering Programme specification (Cont.)**

### **VII- Mechatronics Engineering Electives:**

As seen in the Mechatronics Engineering Core, students majoring in MSE may choose 4 modules (12 credit hours) to support the graduation project, one module selected from each elective as follows:

**MSE Elective I:** MSE 4531: Digital Signal Processing

MSE 4532: Computer Communication Networks

MSE 4533: Quality Management and Assurance

MSE 4534: Renewable Energies

**MSE Elective II:** MSE 4631: Image Processing

MSE 4632: Industrial Electronics in Practice

MSE 4633: Noise and Acoustic Control

MSE 4634: Embedded Computer Systems

**MSE Elective III:** MSE 5531: Digital Control Systems

MSE 5532: Troubleshooting of Mechatronics System

MSE 5533: Special Topics in Computer Engineering

MSE 5534: Mechatronics Systems in Automobiles

**MSE Elective IV:** MSE 5631: Special Topics in Robotics

MSE 5632: Advanced Control Systems

MSE 5633: Advanced Artificial Intelligence

MSE 5634: Special Topics in Mechatronics

MSE 5635: Special Topics in Electronics

### **VIII- Graduation Project:**

Students are required to register 6 credit hours in two successive semesters – after a completion minimum of 138 credit hours – for conducting a graduating project.

MSE 554	Graduation Project (Part I)
MSE 564	Graduation Project (Part II)

# I. B.Sc. Honours Mechatronics Systems Engineering Programme specification (Cont.)

56					Five-Year Plan				168	
Courses					Fall Semester				Credits	
Year 1	Code	Subject	Cr.	Prereq.	Code	Subject	Cr.	Prereq.	Year 1	
	MAT 151	Calculus I	3	None	MAT161	Calculus II	3	MAT 151		
	BSC 152	Engineering Physics I	3	None	BSC 162	Engineering Physics II	3	BSC 152		
	GSE 153	Engineering Mechanics I	3	None	GSE 163	Engineering Mechanics II	3	GSE 153		
	GSE 154	Engineering Graphics	3	None	BSC 164	Industrial Chemistry	3	None		
	COM 155	Int. to Information Tech.	3	None	GSE 165	Workshop Technology	3	None		
	ENG 156	Academic English Writing	3	None	ENG 166	Technical English Writing	3	ENG 156		
Year 2	Code	Subject	Cr.	Prereq.	Code	Subject	Cr.	Prereq.	Year 2	
	MAT 251	Linear Algebra	3	MAT 161	MAT 261	Differential Equations	3	MAT 161		
	GSE 252	Engineering Materials	3	BSC 152	DES 262	Stress Analysis	3	GSE 252		
	COM 253	Eng. Computer Programming	3	COM 155	DES 263	Machine Elements Design & Drawing	3	GSE 154		
	GSE 254	Fund. of Thermodynamics	3	BSC 152	GSE 264	Rigid body Dynamics	3	GSE 163		
	GSE 255	Electric Circuits Analysis	3	BSC 162	GSE 265	Electronic Circuits Analysis	3	GSE 255		
	ENG 256	Research English Writing	3	ENG 166	HUM 266	Ethics, Safety & Legislations	3	GSE 165		
Year 3	Code	Subject	Cr.	Prereq.	Code	Subject	Cr.	Prereq.	Year 3	
	MAT 351	Mathematical Analysis and Numerical Methods	3	MAT 261	MAT 361	Probability & Statistics	3	MAT 351		
	MFG 352	Manufacturing Processes	3	GSE 165	DES 362	Machine Design	3	DES 263		
	GSE 353	Fund. of Fluid Mechanics	3	BSC 152	GSE 363	Fund. of Heat Transfer	3	GSE 254		
	MSE 354	Electric Machines	3	GSE 255	MSE 364	Electric Drive Systems	3	MSE 354		
	MSE 355	Sensors, Measurements and Data Acquisition System	3	GSE 265	MSE 365	Introduction to Mechatronics	3	MSE 355		
	GSE 356	Kinematics of Mechanical Systems	3	GSE 264	GSE 366	Dynamics of Mechanical Systems	3	GSE 356		
Year 4	Code	Subject	Cr.	Prereq.	Code	Subject	Cr.	Prereq.	Year 4	
	MSE 451	Digital Logic Control I	3	GSE 265	MSE 461	Digital Logic Control II	3	MSE 451		
	MSE 452	Mechanical Vibrations	3	GSE 264	MSE 462	Robotics	3	GSE 366		
	MSE 453x	MSE Elective I	3	Min. 108 Cr.	MSE 463x	MSE Elective II	3	Min. 126 Cr.		
	MSE 454	Mechatronics Modelling and Simulation	3	MAT 361	MSE 464	Automatic Control	3	MSE 454		
	MFG 455	Numerical Control Machines and CAD/CAM	3	MFG 352	MSE 465	Microprocessor and Microcontroller Systems	3	MSE 365		
	HUM 456	Project Management	3	MAT 361	HUM 466	Engineering Economy	3	MAT 361		
Year 5	Code	Subject	Cr.	Prereq.	Code	Subject	Cr.	Prereq.	Year 5	
	MSE 551	Artificial Intelligence	3	MSE 465	MSE 561	Mechatronics System Design	3	MSE 551		
	MSE 552	Hydraulic & Pneumatic Control	3	GSE 353 & MSE 464	MSE 562	Industrial Automation	3	MSE 552		
	MSE 553x	MSE Elective III	3	Min. 144 cr.	MSE 563x	MSE Elective IV	3	Min. 156 cr.		
	MSE 554	Graduation Project (Part I)	3	Min. 138 Cr.	MSE 564	Graduation Project (Part II)	3	MSE 554		

## I. B.Sc. Honours Mechatronics Systems Engineering Programme specification (Cont.)

### Basic Sciences & Industrial Engineering Laboratories

Course	Experiments	Location
Engineering Physics I BSC152	<ul style="list-style-type: none"> <li>Determining the Acceleration due to Gravity Using a Simple Pendulum.</li> <li>Determining the Elastic Constant of a Spring</li> <li>Determining the Coefficient of Viscosity for a Liquid</li> <li>Determining the Value of Joule's Equivalent of Heat</li> <li>Determining the Acceleration due to Gravity Using the free Fall Method</li> <li>Determining Young's Modulus</li> <li>Determining the Specific Heat of a Solid</li> </ul>	E243, C214
BSC 162 Engineering Physics II	<ul style="list-style-type: none"> <li>Determination of the Dielectric Constant</li> <li>Determination of the time Constant</li> <li>Determination of an Unknown Resistance</li> <li>Determination of the Total Resistance of a Series DC Circuit</li> <li>Determination of the Total Resistance of a Parallel DC Circuit</li> <li>Determination of the Fill Factor of a Photovoltaic Cell</li> <li>Determination of The Horizontal Component of the Earth's Magnetic Field</li> <li>Determination of the velocity of Sound</li> <li>The Hall Effect.</li> </ul>	Physics Lab
BSC164 Industrial Chemistry	<ul style="list-style-type: none"> <li>Total alkalinity of water samples.</li> <li>Total hardness of water samples.</li> <li>Properties of lubricating oils.</li> <li>Chemistry of cements.</li> <li>Chemistry of polymers.</li> <li>Experiments of applied chemistry.</li> </ul>	Chemistry Lab
GSE153 Engineering Mechanics I	<ul style="list-style-type: none"> <li>Statics.</li> <li>Friction.</li> <li>Newton's second law</li> <li>Linear and angular momentum</li> <li>Kinetic energy.</li> <li>Free fall.</li> <li>Projectiles.</li> </ul>	Engineering Mechanics Lab
GSE163 Engineering Mechanics II	<ul style="list-style-type: none"> <li>Center of gravity.</li> <li>Determination of the moment of inertia.</li> <li>Determination of the angular velocity and the angular acceleration.</li> <li>Centrifugal force as a function of mass, angular velocity and radius.</li> <li>Determination and conservation of the angular momentum.</li> <li>Physical pendulum.</li> </ul>	Engineering Mechanics Lab

<b>Course</b>	<b>Experiments</b>	<b>Location</b>
COM 155 Introduction to Information Technology	<ul style="list-style-type: none"> <li>• Computer Structures.</li> <li>• Operating System (Windows)</li> <li>• Office Software.</li> <li>• Auto-Cad Software.</li> <li>• MATLAB Software.</li> </ul>	Computer Lab
COM 253 Engineering Computer Programming	<ul style="list-style-type: none"> <li>• Programme C++ Struction.</li> <li>• C++ simple data type.</li> <li>• Input / Output statement.</li> <li>• Assignment statement.</li> <li>• Decision statement.</li> <li>• Logical expression.</li> <li>• Repetition statement.</li> <li>• One and multidimensional arrays.</li> <li>• String manipulations.</li> <li>• Built-in function.</li> <li>• Passing value and reference argument.</li> <li>• Local and global identifiers.</li> <li>• Two-Dimensional arrays.</li> <li>• Structures and pointers.</li> <li>• Object orientation.</li> <li>• Operators and function over loading.</li> <li>• Polymorphism.</li> <li>• Multiple inheritances.</li> <li>• Abstract classes and default parameters.</li> </ul>	Computer Lab
GSE 165 Workshop Technology	<ul style="list-style-type: none"> <li>• Metal Machining (Turning, Boring, Facing, Milling, and Drilling Machines).</li> <li>• Metal Forming (Rolling, Shearing, and Binding Machines).</li> <li>• Metal Welding (Welding, and cutting Equipment).</li> <li>• Metal Forging (Drop hammer forging, Press forging, and Roll forging Machines).</li> <li>• Wood Processing (Sawing, Surfacing, Drilling, and Joining machines).</li> <li>• Electric (AC and DC motors, 1- and 3-phase connections, Circuit Breakers, and Electrical Accessories).</li> <li>• Plumbing (Water pressure Test, Piping, and Plumbing accessories).</li> <li>• Metrology (Measuring Instruments, and Surface Roughness instruments)</li> </ul>	University Workshops

Course	Experiments	Location
<p style="text-align: center;">MSE 354 Electric Machines &amp; MSE 364 Electric Drive Systems</p>	<ul style="list-style-type: none"> <li>• Investigation of conventional operation of induction motor.</li> <li>• Torque/speed characteristics of cage rotor induction motor at different frequencies/speeds.</li> <li>• Speed and acceleration/deceleration characteristics of an induced motor at different motor loads.</li> <li>• Investigation of inverter operation and performance.</li> <li>• Investigation of stepper motor performance.</li> <li>• Evaluation of the advantages and disadvantages of stepper motor system compared with conventionally energized motors, and the techniques, which used to overcome them.</li> <li>• Speed control without feedback using the full-wave half-controlled bridge.</li> <li>• Speed control without feedback using the single thyristor fed from an uncontrolled full-wave rectifier bridge.</li> <li>• Speed control of DC motor with both armature voltage feedback and armature current feedback.</li> <li>• Speed control of DC motor with speed feedback from a tachogenerator.</li> <li>• Speed control of DC motor and PID control of error signal.</li> <li>• AC Vector Drive operation and programming.</li> <li>• Variable Frequency AC Motor Drive operation.</li> <li>• Single-Phase Uncontrolled rectifiers supplying variable loads.</li> <li>• Single-Phase Controlled rectifiers supplying variable loads.</li> <li>• Three-Phase Uncontrolled rectifier.</li> <li>• Three-Phase half controlled/fully controlled rectifier.</li> <li>• DC/DC Converters (Buck, Boost and Buck Boost)</li> <li>• Single-Phase (PWM) Inverter.</li> <li>• Single-phase AC Voltage controlled converter with R and RL Loads.</li> <li>• Three-Phase AC Voltage controller with related applications.</li> <li>• Commutated (SCR) circuits (UPS) Uninterruptable Power Supply.</li> </ul>	<p style="text-align: center;">University Workshops</p>

<p>MSE 365 Introduction to Mechatronics MSE 454 Mechatronics Modeling and Simulation MSE 464 Automatic Control MSE 5632 Advanced Control Systems MSE 561 Mechatronics System Design MSE 562 Industrial Automation</p>	<ul style="list-style-type: none"> <li>• Investigation the characteristics of a Pressure Sensor.</li> <li>• Investigation the characteristics of a Level Sensor.</li> <li>• Investigation the characteristics of a flow Sensor.</li> <li>• Investigation the characteristics of a Resistance Temperature Detector.</li> <li>• Open Loop Process control investigation and performance assessment.</li> <li>• Closed Loop Process control investigation and performance assessment.</li> <li>• PID Controller tuning using process simulator.</li> <li>• Disturbance Effect and Disturbance Elimination.</li> <li>• Operational Amplifier Amplification&amp; Attenuation Circuits.</li> <li>• Operational Amplifier Comparator Circuits.</li> <li>• Operational Amplifier Differentiator and Integrator Circuits</li> <li>• Direct online motor starter.</li> <li>• Star/Delta motor starter.</li> <li>• Forward/Reverse motor operation.</li> <li>• Forward/Reverse motor operation using Timer.</li> <li>• Remote/Local motor operation.</li> <li>• Phase sequence detection.</li> <li>• Motor Overload and Short Circuit Protection.</li> <li>• Star/Delta motor starter using smart relay.</li> <li>• Two motors sequential operation.</li> <li>• Remote/Local motors controlled operation.</li> <li>• Fundamentals and basic terminology for PLCs</li> <li>• Design and function Logical operations, memory functions, timing and counting functions, edge response, controlling program sequences, processing analog variables.</li> <li>• Addressing Program structures</li> <li>• Planning an automation system</li> <li>• Programming using IL/ST editors conforming to IEC 1131</li> <li>• Preparing a PLC for operation, program diagnostics</li> <li>• Field bus systems for automation</li> <li>• Bus structures, access techniques, interfaces, packet structure, error checking, diagnostic capabilities</li> <li>• Transmission and error checking</li> <li>• Connecting external components</li> <li>• Design and project configuration for a PLC.</li> <li>• Creating assignment list.</li> <li>• Programming of binary and word operation.</li> <li>• Programming of counter and timers, comparison and arithmetic function.</li> <li>• Program structure, calling subroutines.</li> <li>• Commissioning, testing and fault finding on an automation system</li> <li>• Diagnostic functions.</li> <li>• Documentation and archiving.</li> </ul>	<p>University Workshops</p>
---	---	-----------------------------

<p>MSE 552 Hydraulic &amp; Pneumatic Control MSE 562 Industrial Automation MSE561 Mechatronics System Design</p>	<ul style="list-style-type: none"> <li>Investigation of types of automatic system and patterns of control</li> <li>Characteristic and configuration of automatic system.</li> <li>Optimization of manufacture system and distribution of pressure air.</li> <li>Basic principle and law of electronic engineering.</li> <li>Functions and structures of pneumatic and electric control devices.</li> <li>Pneumatic sequence control circuit design (Timer/Counter).</li> <li>Speed control of cylinder (Meter-in, Meter-out).</li> <li>Operation principle and structure of solenoid valve.</li> <li>Pneumatic and electric magnetic circuit's configuration (Relay).</li> <li>Cascade and stepper control circuit design.</li> <li>Concepts of sensor and location of sensor in automatic system.</li> <li>Analog and digital signal and conversion.</li> <li>Defect chasing of electric pneumatic system.</li> <li>Components characteristics of hydraulic control system (Structure and operation principle).</li> <li>Characteristic of hydraulic energy, power pack configuration and functions.</li> <li>Basic hydraulic control circuit (Including motor and speed control circuits): <ul style="list-style-type: none"> <li>Speed increasing and differential medium/stop circuit/counter-balancing/no load/constant/memory.</li> </ul> </li> <li>Hydraulic location control and speed control (Meter-in, Meter-out) circuit</li> <li>Cross-sectional area and pressure relationship calculation of hydraulic cylinder, and measurements of pressure, pressure losses, and flux.</li> <li>Comprehension of hydraulic valve and hydraulic device (Pressure/direction/flux control valve): <ul style="list-style-type: none"> <li>Shut-off valve, classification valve, applications of accumulator</li> </ul> </li> <li>Summary of electronic hydraulic and basic logic of electronic (Signal)</li> <li>Apply and comprehension of operation principle/functions of hydraulic solenoid valves</li> <li>Hydraulic and electronic sequence control circuit design and system configurations</li> </ul>	<p>CNC machine Lab</p>
<p>MSE 355 Sensors, Measurements and Data Acquisition System MSE 365 Introduction to Mechatronics MSE 561 Mechatronics System Design MSE 562 Industrial Automation</p>	<ul style="list-style-type: none"> <li>Operational and technical communication.</li> <li>Designing and testing electric, pneumatic and hydraulic control systems.</li> <li>Programming mechatronic systems.</li> <li>Testing and setting functions on mechatronic systems.</li> <li>Commissioning and operating mechatronic systems.</li> <li>Maintaining mechatronic systems.</li> <li>Development of automated visual inspection system</li> <li>E-Automatic Assembly and Color sorting using computer vision.</li> </ul>	<p>Electrical Lab</p>
<p>MSE 365 Introduction to Mechatronics MSE 462 Robotics MSE 561 Mechatronics System Design MSE 562 Industrial Automation</p>	<ul style="list-style-type: none"> <li>Robot programming and application development</li> <li>Robot sensor integration and application</li> <li>Calibrations of vision system</li> <li>Development of automated visual inspection system</li> <li>E-Automatic Assembly and Color sorting using computer vision.</li> </ul>	<p>CAD/CAM/CAE Lab</p>

## H. Faculty Regulations Mechatronics Systems Engineering Programmes

- Engineering students, who passed the English Placement Test and registered ENG156 or above, must complete 56 courses (168 credit hours) with a Cum. GPA 2.0 as minimum, in not less than four years and half-academic years.
- The 56 courses are distributed over the 5 academic years as follows:

level	Fall Semester		Spring Semester	
	Courses	Credits	Courses	Credits
1 <sup>st</sup>	6	18	6	18
2 <sup>nd</sup>	6	18	6	18
3 <sup>rd</sup>	6	18	6	18
4 <sup>th</sup>	6	18	6	18
5 <sup>th</sup>	4*	12	4*	12

\*including the Graduation Project (Part I & II)

### Graduation Project Regulations

- Registration of Graduation Project (Part I) requires the following:
  - A minimum Cum. GPA of 2.0.
  - A minimum credits of 138.
- Registration of Graduation Project (Part II) requires the following:
  - A minimum Cum. GPA of 2.0.

### ENG 50 & 80 & 90 Student Regulations

- ENG50 students could register 3 courses, in addition to the intensive English course requirement.
- ENG80 students could register 4 courses, in addition to the intensive English course requirement.
- ENG90 students could register 5 courses, in addition to the intensive English course requirement.
- ENG50 & 80 & 90 students, who pass the intensive English requirements and more to register ENG156, will be treated as newcomers; and therefore, they can register 6 courses regardless of their GPA.



## **J. Faculty Regulations Mechatronics Systems Engineering Programmes (cont.)**

### **Students on Probation Regulations**

- Student who gets a Cum. GPA less than 2.0, he/she becomes on probation and will not be allowed to register the following semester, unless he/she signs a warning and his/her parents will be notified officially.
- Student who reaches a probation level 6 or above, his/her parents will be notified officially, and will not be able to register the following semester unless his/her parents meet the Dean.
- Student, who continues to get a Cum. GPA less than 2.0 and reaches probation level 10, will be dismissed from the Faculty and will not be able to return.

### **Deprived Students Regulations**

- Student is aware upon registration that he/she is not allowed being absent for any excuses (medical, travel, accident, or any other reasons) more than 25 % in any course. Otherwise, he/she will be deprived from the course, and be given an Automatic “F1”.

## K. Subject/Programme Staff List and Contact Details

### Mechatronics Systems Engineering (MSE) Department Full-Time Staff Contacts

No	Name	Title	E-mail	Room
1	Mostafa Zaky Mohamed	Professor - Head of MSE Department	mzmohamed@msa.edu.eg	H 215
2	Ahmed Badawy Abdelmageed Badawy	Associate Professor	ahbadawy@msa.edu.eg	H 215
3	Khaled Nagdy Salama Fares	Associate Professor	knfaris@msa.edu.eg	H 215
4	Amgad Mohammed Bayoumy Aly	Associate Professor	ambayoumy@msa.edu.eg	H 215
5	Hussein Hamdy Hussein Shehata	Lecturer	hhshehata@msa.edu.eg	H 215

### Full-Time Lecturer Assistant and Teaching Assistant Contacts

No	Name	Title	E-mail	Room
1	Abdelrahman Marzouk Ahmed Elkattan	Lecturer Assistant	abmarzouk@msa.edu.eg	E 200
2	Ahmed Moustafa Ahmed Hussein	Lecturer Assistant	amahussein@msa.edu.eg	D 126
3	Wael Sami Abdel Hamed Taie	Lecturer Assistant	wtaie@msa.edu.eg	E 200
4	Mahmoud Mostafa Hanafy Ibrahim	Teaching Assistant	mamhanafy@msa.edu.eg	E 200
5	Mina Sameh Ghobrial Elias	Teaching Assistant	mghobrial@msa.edu.eg	D 126
6	Nada Selim Kassem Hashim Kassem	Teaching Assistant	naselim@msa.edu.eg	E 200
7	Shahd Ehab Aly Nasr Askr	Teaching Assistant	shehab@msa.edu.eg	E 200
8	Youssef Hossam Ali Ahmed Hamdy	Teaching Assistant	yhossam@msa.edu.eg	E 200

### Lab Technicians

No	Name	E-mail	Room
1	Emad Mostafa Tawfek Aly - Part time	emtawfeek@msa.edu.eg	D 121 & D 122 & D 122 A
2	Mahmoud Gaber Hagag Mahmoud	mahagaeg@msa.edu.eg	D 121 & D 122 & D 122 A