Program Specification

Marine Engineering Diploma

Program Specifications for Marine Engineering Diploma

A- Basic Information

1- Program title: Marine Engineering Diploma

2- Program type: Single ✓ Double ☐ Multiple ☐

3- Department (s): Naval Architecture and Marine Engineering

4- Coordinator: Assoc. Prof. Dr. Moustafa Mohamed Moustafa

5- External evaluator(s): Prof. Dr. Mohamed A. Kotb

6- Last date of program specifications approval: August 2019

B- Professional Information

1. Program aims:

A. Understanding the engineering basic sciences.

B. Enhancing the individual skills of using computer programs, charts, tables, and standards in the different fields of Naval Architecture and Marine engineering applications.

C. Providing students with analytical and hands-on knowledge that allow him to excel in the different areas of Naval Architecture and Marine Engineering.

D. Communicating effectively in written, verbal and graphical forms.

E. Preparing students to communicate and work effectively in team and multi-disciplinary technical environments.

2. Graduate Attributes:

A. Application of the acquired specialized knowledge in his/her professional practice.

B. Identifying professional problems and proposing solutions.

C. Mastering of professional skills and the use of appropriate technological means in his/her professional practice.

D. Communication and leadership of a team to work through systematic professional work.

E. Decision making in the light of available information.

F. Employment of available resources efficiently.

G. Awareness of his/her role in the development of society and the preservation of the environment.

H. Act reflects commitment to integrity and credibility of the profession.

I. Awareness of the need to develop him/her self and to engage in continuous learning.

3. Intended Learning Outcomes (ILOs) for the whole program

Ship Production Diploma Program is designed to achieve the above objectives through the following Intended **Learning Outcomes (ILOs)**:

A. Knowledge and understanding			
NAQAAE Academic Reference Standards (ARS)	**ILOs**	**Graduate Attributes**	**Courses Covering such ILOs(by code)**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	A, C	NME501,NME502, NME506, NME511, NME522, NME523, NME524, NME525, NME529, NMEP98
	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field Ship structure and technology		NME518, NME519
	a1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of ship hydrodynamics.		NME501,NME506

	a1-4 Exhibit ability to in detail, creatively, with a high level of clarity and authority, using scientific scrutiny and adequate tools identify, explain, and assess issues pertinent to a Diploma Project in the research field, within which the project is placed.	A, B, C, D, E, F	NMEP98
A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-1 Discuss Social effects Maritime Industry.	G	NME506, NME519, NME521, NMEP98
	a2-2 Recognize the interaction between ship design and performance.		NME511, NME521, NMEP98
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	A3-1 Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.	H	NME506, NME521
A4- Basics and principles of quality in professional practice in the field of specialization.	A4-1 Explain Quality Assurance concepts of different Naval Architecture and MarineEngineering disciplines	C, E, F	NME502, NME518, NME522, NME523, NME524, NME525, NME529
B. Intellectual skills			
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	A	NME506, NME511, NME518, NME519, NME522, NME523, NME524, NME525, NME529, NMEP98
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.		NME501,NME506, NME518, NME521, NME529

B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related toNaval Architecture and Marine Engineering.	A, B	NME501,NME502, NME506
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	A, B, E, F	NME511, NME521, NMEP98
	b3-2 Perform applied research on industrial and societal concerns related to Naval Architecture and Marine Engineering field (Project).		NMEP98
	b3-3 Perform applied research on industrial and societal concerns problems related to Naval Architecture and Marine Engineering field (Project).		NMEP98
B4- Risk assessment in the professional practices.	b4-1 Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development.	G, H	NME506, NME521
B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	E	NME502, NME506, NME522
C. Professional and practical skills			
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest	A, B, C	NME502, NME506, NME511, NME522, NME523, NME524, NME525, NMEP98

	engineering techniques, skills, and tools.		
C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	I	NME501,NME506, NME511, NME518, NME519, NME521, NME522, NME523, NME524, NME525, NME 529, NMEP98
D. General and transferrable skills			
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	D	NME529, NMEP98
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	C, F, I	NME501,NME506, NME511, NME519, NME521, NME522, NME525
	d2-2 Employ the information technology skills to serve his / her career development.		NME523, NME524, NMEP98
D3- Apply self evaluation and define personal educational needs.	d3-1 Apply self evaluation and specify his educational needs related to Naval Architecture and Marine Engineering aspects.	I	NME521
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	I	NME518, NME521, NME529

D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	D, F	NME501,NME511
	d5-2 Manage the time use in a perfect way.		NME501,NME502
D6- Lead teams in familiar professional context .	d6-1 Lead a team work in specified familiar professional jobs.	D	NMEP98
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	I	NME506, NMEP98
	d7-2 Seek continuous learning through continuous education, organizing and participating in seminars, workshops, national and international conferences.		NMEP98

4. Program Academic Reference Standards (ARS)

The external references for standards considered in the development of this program were the Academic Reference Standards (ARS) for postgraduate programs prepared by the National Authority for Quality Assurance and Accreditation (NAQAAE) on 2009. These standards set out the attributes and academic characteristics that are expected to be achieved by the end of the program.

5. Program Structure and Contents:

5.1 Program Duration:

2 academic years

5.2 Program Structure:

Awarding a Diploma Degree in Marine Engineering required the following:

- Studying five courses amounting to 15 hours weekly during the first year (two of them are elective courses).
- Studying five courses amounting to 15 hours weekly during the second year (two of them are elective courses).

- Also, required for awarding the Diploma Degree in Marine Engineering is the execution of scientific research (4hours weekly during the second year) that terminated by writing a Project report containing the research results and its complete analysis and defending it successfully.

5.3- Program courses

(Marine Engineering Diploma – First Year)

Elective Courses				Basic Requirements Courses			
Code	Course Title	hrs /Week	Marks	Code	Course Title	hrs /Week	Marks
NME502	Operational Research	3	100	NME501	Numerical Methods and Programming	3	100
NME529	Marine Environment Pollution (1)	3	100	NME518	Ship Machinery	3	100
NME523	Marine Power Stations	3	100	NME524	Marine Auxiliary Machinery	3	100
				NME5xx	Elective Course (1)	3	100
				NME5xx	Elective Course (2)	3	100

(Marine Engineering Diploma – Second Year)

Elective Courses				Basic Requirements Courses			
Code	Course Title	hrs /Week	Marks	Code	Course Title	hrs /Week	Marks
NME519	Performance of Ship Machinery	3	100	NME522	Heat Application in Marine Engineering	3	100
NME506	Ship Rescue	3	100	NME525	Automatic Control Application in Marine Engineering	3	100
NME511	Ship Steering and Maneuverability	3	100	NME521	International Conventions & Ships Safety	3	100
				NME5xx	Elective Course (3)	3	100
				NME5xx	Elective Course (4)	3	100
				NMEP98	Project	4	200

6. Program admission requirements

According to the regulations set by the Faculty Council, graduate has to get a result of (Pass) at least to join the program of Marine Engineering diploma.

7. Regulations for progression and program completion

The post graduate student must get a minimum of 60% to pass each course. The student achieves one of the following grades in the examinations results and in the general grade according to the marks achieved:

- ***Distinction*** : 90% of the sum of marks or more
- ***Very Good*** : from 80% to less than 90%
- ***Good*** : from 70% to less than 80%
- ***Pass*** :from 60% to less than 70%

8. Evaluation of program intended learning outcomes

- Written examination for each year after 30 weeks.
- At the end of second year, each student presents his graduation project which is evaluated by a committee from a number of the department professors.

9. Program Matrix:

The following table explains the ILO's of Marine Engineering diploma program– Course (main ILOs) matrix.

Program Matrix: ILO's (Marine Engineering Diploma) – Course (main ILOs) matrix.

Code	Course Title	ILOs																											
		a1-1	a1-2	a1-3	a1-4	a2-1	a2-2	a3-1	a4-1	b1-1	b1-2	b2-1	b3-1	b3-2	b3-3	b4-1	b5-1	c1-1	c2-1	d1-1	d2-1	d2-2	d3-1	d4-1	d5-1	d5-2	d6-1	d7-1	d7-2
NME 501	Numerical Methods and Programming	×		×							×	×							×		×				×	×			
NME 502	Operational Research	×							×			×					×	×								×			
NME 506	Ship Rescue	×		×		×		×		×	×	×				×	×	×	×		×							×	
NME 511	Ship Steering and Maneuverability	×					×			×			×					×	×		×				×				
NME 518	Ship Machinery		×						×	×	×								×					×					
NME 519	Performance of Ship Machinery		×			×				×									×		×								
NME 521	International Conventions & Ships Safety					×	×	×			×		×			×			×		×		×	×					
NME 522	Heat Application in Marine Engineering	×							×	×							×	×	×		×								
NME 523	Marine Power Stations	×							×	×								×	×			×							
NME 524	Marine Auxiliary Machinery	×							×	×								×	×			×							
NME 525	Automatic Control Application in Marine Engineering	×							×	×								×	×		×								
NME 529	Marine Environment Pollution (1)	×							×	×	×								×	×				×					
NME P98	Project	×			×	×	×			×			×	×	×			×	×	×		×					×	×	×

- ***Program Coordination Committee:***

Programme coordinator: **Assoc. Prof. Dr. Moustafa Mohamed Moustafa**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date : August 2019

NME 501
Numerical Methods and Programming Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Numerical Methods and Programming	**Code Symbol**: **NME 501**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to provide the students with the essential knowledge to understand the methods of Solution and programming of linear and non-linear systems. Also, students get specifically acquainted with the differentiation and integration programming, curves and polynomials fitting and programming, surface creation. This course aims to provide the students with the skills and principles of Numerical Methods and Programming to solve several problems related to the field of marine engineering.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the concepts and theories of mathematics and computer science appropriate to their areas of specialization in Naval Architecture and/or Marine Engineering.	a1-1-1Identify linear and non-linear systems. a1-1-2 Categorize the methods of differentiation and integration programming. a1-1-3 Show the methods of curves and polynomials fitting and programming.

	a1-3Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of ship hydrodynamics.	a1-3-1 Show the methods of surface creation to check the hydrodynamics aspects of marine units.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Evaluate the results of any non-linear system to find the optimum ship design. b1-2-2 Formulate ship hydrostatical data using the differentiation and integration programming methods.
B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering.	b2-1-1 Solve non-linear system to get the hydrodynamic characteristics of marine units. b2-1-2 Create ship lines (ship hull) using the principles of curves and polynomials fitting and programming.
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional report on hydrodynamic characteristics of marine units and its hydrostatical data.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1 Use a programming software to solve several design problems in marine filed.
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5-1-1 Use different information recourses to collect the available data on Numerical Methods and Programming
	d5-2 Manage the time use in a perfect way.	d5-2-1 Plan to achieve the steps of programming any problem in marine field based on Numerical Methods and Programming.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	*Tut.*	*Lab.*	
Solution and programming of linear systems	18	18	---	---	a1-1-1, b1-2-1, d2-1-1, d5-1-1
solution and programming of non-linear systems	18	18	---	---	a1-1-1, b2-1-1, d2-1-1, d5-1-1
differentiation and integration programming	18	18	---	---	a1-1-2 , b1-2-2 , d2-1-1, d5-1-1
curves and polynomials fitting and programming	18	18	---	---	a1-1-3 , b2-1-2 , d2-1-1, d5-1-1
surface creation, applications on marine fields.	18	18	---	---	a1-3-1, b1-2-1, b1-2-2, b2-1-1, b2-1-2, c2-1-1, d2-1-1, d5-2-1
Total	90	90	---	---	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1), (a1-3)	B1(b1-2), B2 (b2-1)	C2(c2-1)	D2 (d2-1) D5 (d5-1), (d5-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
5%	**10%**	**20%**	**35%**	**20%**	**10%**	**--**	**100%**

6.Course Topics

Topic No.	Topic	Weeks
1st	Solution and programming of linear systems	1 - 6
2nd	solution and programming of non-linear systems	7 - 12
3rd	differentiation and integration programming	13– 18
4th	curves and polynomials fitting and programming	19–24
5th	surface creation, applications on marine fields.	25–30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**
Course ILOs	**Knowledge & Understanding**				
a1-1-1Identify linear and non-linear systems.	X	X			
a1-1-2 Categorize the methods of differentiation and integration programming.			X		
a1-1-3 Show the methods of curves and polynomials fitting and programming.				X	
a1-3-1 Show the methods of surface creation to check the hydrodynamics aspects of marine units.					X
Course ILOs	**Intellectual skills**				
b1-2-1 Evaluate the results of any non-linear system to find the optimum ship design.	X				X
b1-2-2 Formulate ship hydrostatical data using the differentiation and integration programming methods.			X		X
b2-1-1 Solve non-linear system to get the hydrodynamic characteristics of marine units.		X			X

b2-1-2 Create ship lines (ship hull) using the principles of curves and polynomials fitting and programming.				X	X
Course ILOs	**Professional and practical skills**				
c2-1-1 Prepare a professional report on hydrodynamic characteristics of marine units and its hydrostatical data.					X
Course ILOs	**General and transferrable skills**				
d2-1-1 Use a programming software to solve several design problems in marine filed.	X	X	X	X	X
d5-1-1 Use different information recourses to collect the available data on Numerical Methods and Programming	X	X	X	X	
d5-2-1 Plan to achieve the steps of programming any problem in marine field based on Numerical Methods and Programming.					X

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes(ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X	X											
	a1-1-2	X	X											
	a1-1-3	X	X											
	a1-3-1	X	X											
Intellectual Skills	b1-2-1	X	X			X								
	b1-2-2	X	X			X								
	b2-1-1	X	X			X								
	b2-1-2	X	X			X								
Professional Skills	c2-1-1	X	X			X								

General Skills	d2-1-1	X	X											
	d5-1-1	X	X											
	d5-2-1	X	X											

9- Assessment

9.1 Assessment Methods

Final Written Examination: to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources to collect the required data for ship outfitting and prepare technical reports.

11- List of references:

1. Claude Brezinski:"Numerical Methods and Algorithms", Springer, ISSN: 1571-5698, 2007.
2. Sastry S.S : " Introductory Methods of Numerical Analysis", Fifth Edition, PHI Learing Private Limited, New Delhi, 2012.
3. Timmy Siauw&Alexandre Bayen: "An Introduction to MATLAB Programming and Numerical Methods for Engineers", First Edition, Academic Press ©2014 , 2014.

Key words for Internet Search:

Numerical Methods, linear and nonlinear programming, curve and polynomials fitting, surface creation.

12- Program Coordination Committee:

Course Coordinator:

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed Moustafa**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 502
Course Specification
Operations Research

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: **Operations Research**	**Code Symbol**: **NME 502**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to provide the student with skills to deal with the problems facing the industrial establishments and formulate these problems in the form of mathematical models that can be solved to assist in making decisions in favor of the establishment such as reducing the cost, increasing the profit, determining the optimal production quantity. It also helps in optimal allocation of available resources such as manpower, machinery, equipment or materials as well as in optimal planning and Scheduling processes.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Show the importance Operation Research a1-1-2 Demonstrate the importance of formulating the problem correctly a1-1-3 Identify mathematical models of Operation Research a1-1-4 Describe and interpret special cases of optimal solution.

		a1.1.5 Show what is an assignment problem
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines	a4-1-1 Recognize different methods of finding Initial Basic Feasible solution to a Transportation problem a4-1-2 Distinguish among the different types of a Transportation Problem a4-1-3 Outline an assignment problem. a4-1-4 Identify different types of assignment problems.
B. Intellectual skills		
B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related toNaval Architecture and Marine Engineering.	b2-1-1 Select graphical and simplex methods to find optimal solution to LP problems b2-1-2 Choose different methods to find optimal solution to transportation problems. b2-1-3 Choose different methods to find optimal solution to assignment problems.
B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5-1-1 Select the different previous methods to take optimal decisions
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization..	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Use the concept of networks for the planning and management of projects
D. General and transferrable skills		

D5- Work in a team and apply time management.	d5-2 Manage the time use in a perfect way.	d5-2-1Use a network to display a Project d5-2-2 Scheduling a Project with CPM (Time Controlling) d5-2-3 Scheduling and Controlling Project Costs

3- <u>Course Contents</u>

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	*Tut.*	*Lab.*	
1. Nature of operation research	9	9	---	---	a1-1-1, d5-2-1
2. Overview of modeling approach	9	9	---	---	a1-1-2, a1-1-3,b5-1-1
3. Linear programming model – graphical method	6	6	---	---	a1-1-2 , a1-1-3 , a1-1-4,b2-1-1,b5-1-1
4. Linear programming model – simplex method	9	9	---	---	a1-1-2 , a1-1-3 , a1-1-4, b2-1-1, b5-1-1
5. Linear programming model – duality and dual simplex method	6	6	---	---	a1-1-2 , a1-1-3 , a1-1-4, b2-1-1,b5-1-1
6. Transportation problem	9	9	---	---	a1-1-4, a4-1-1,a4-1-2,b2-1-2, b5-1-1,
7. Assignment problem	9	9			a1-1-1,a1-1-2,a1-1-5, a4-1-3, a4-1-4,b2-1-3, b5-1-1
8. Network optimization models	12	12	----	----	a1-1-1, a1-1-2, b7-1-1, c1-1-1, d5-2-1
9. Project management with CPM	9	9			a1-1-1,a1-1-2,c1-1-1, d5-2-2, d5-2-3
10. Nonlinear programming	12	12			a1-1-1,a1-1-2,b2-1-1, b5-1-1
Total	90	90	---	---	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1) A4(a4-1)	B2(b2-1), B5(b5-1)	C1(c1-1)	D5 (d5-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**---**	**30%**	**70%**	**--**			**100%**

6- Course Topics

Topic No.	Topic	Weeks
1st	Nature of operation research	1 -3
2nd	Overview of modeling approach	4- 6
3rd	Linear programming model – graphical method	7 – 8
4th	Linear programming model – simplex method	9 – 11
5th	Linear programming model – duality and dual simplex method	12 – 13
6th	Transportation problem	14 -16
7th	Assignment problem	17 - 19
8th	Network optimization models	20 - 23
9th	Project management with CPM	24 - 26
10th	Nonlinear programming	27 - 30

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Course ILOs	**Knowledge & Understanding**									
a1-1-1 Show the importance Operation Research	X						X	X	X	X
a1-1-2 Demonstrate the importance of formulating the problem correctly		X	X	X	X		X	X	X	X
a1-1-3 Identify mathematical models of Operation Research		X	X	X	X					
a1-1-4 Describe and interpret special cases of optimal solution.			X	X	X	X				
a1.1.5 Show what is an assignment problem							X			
a4-1-1 Recognize different methods of finding Initial Basic Feasible solution to a Transportation problem						X				
a4-1-2 Distinguish among the different types of a Transportation Problem						X				
a4-1-3 Outline an assignment problem.							X			
a4-1-4 Identify different types of assignment problems.							X			
Course ILOs	**Intellectual skills**									
b2-1-1 Select graphical and simplex methods to find optimal solution to LP problems			X	X	X					X
b2-1-2 Choose different methods to find optimal solution to transportation problems.						X				
b2-1-3 Choose different methods to find optimal solution to assignment problems.							X			
b5-1-1 Select the different previous methods to take optimal decisions		X	X	X	X	X	X	X		X
Course ILOs	**Professional and practical skills**									
c1-1-1 Select the concept of networks for the planning and management of projects								X	X	

Course ILOs	General and transferrable skills									
d5-2-1Use a network to display a Project	X							X		
d5-2-2 Scheduling a Project with CPM (Time Controlling)									X	
d5-2-3 Scheduling and Controlling Project Costs									X	

8- Teaching and Learning Method:

Course Intended learning outcomes(ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X												
	a1-1-2	X		X					X					
	a1-1-3	X		X		X			X					
	a1-1-4	X		X		X								
	a1-1-5	X		X		X								
	a4-1-1	X												
	a4-1-2	X		X		X			X					
	a4-1-3	X		X		X								
	a4-1-4	X							X					
Intellectual Skills	b2-1-1	X		X		X								
	b2-1-2	X				X			X					
	b2-1-3	X		X					X					
	b5-1-1	X				X								
Professional Skills	c1-1-1	X		X		X			X					
General Skills	d5-2-1	X		X					X					
	d5-2-2	X				X								
	d5-2-3	X		X										

9- Assessment

9.1 Assessment Methods

Final Written Examination: to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources to collect the required data for operations research.

11- List of references:

1. Frederick S. Hillier, Gerald J. Lieberman:"Introduction to Operations Research", McGraw-Hill, Seventh Edition, NY, 2001.
2. School of science and technology "Operations Research", National Open University of Nigeria, 2014.
3. Tommi Sottinen, "Operations Research with GNU Linear Programming Kit, University of Vaasa, 2009.
4. P. Rama Murthy,"Operation Research", New Age International (P) Ltd., Publishers, New Delhi, 2007.

- **Periodicals, Web sites, etc**

  1. Journal of Operations Research

- **Key words for Internet Search:**

Operations Research,

12- Program Coordination Committee:

Course Coordinator: **Dr. Mohamed A. Mansour**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME506
Ship Rescue
Course Specifications

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Ship Rescue	**Code Symbol**: **NME 506**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

The course aims to provide students with basic knowledge and skills that are related to marine salvage of different ship casualties. The course overviews all the scientific background previously covered in naval architecture and ship structural analysis to help salvage engineers to identify the situation in strandings and collisions.The student is intended to carry out all preliminary calculations required to manage ship refloating and other slavage techniques.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledgein the field ofNaval Architecture and Marine Engineering	a1-1-1 Recognize the basic principles of naval architecture (flotation, trim and stability) and ship strength and recognize their importance to define a ship casualty.

	a1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of ship hydrodynamics.	a1-3-1 Outline hydrodynamics characteristics of any marine unit during rescue operation.
A2- Mutual relation between professional aspects of professional practice and its effects on the environment.	a2-1 Discuss Social effects of Maritime Industry.	a2-1-1 Recognize the environmental impact of marine casualties a2-1-2 Show the regulations related to safety (SOLAS) and marine salvage practice .
	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Recognize the performance of different ship types during collisions and groundings.
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1 Show the basic steps of risk management. a3-1-2 Recognize the different actions required to ensure successful marine salvage.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate an investigatory approach for detecting problems sources
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Identify the main information required for salver engineers.
B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering.	b2-1-1 Choose approximate methods and formula to be used during salvage operation (hydrostatic and strength data)
B4- Risk assessment in the professional practices.	b4-1 Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development.	b4-1-1Evaluate different possible approaches to manage a given casualty b4-1-2 Identify the risks involved during common salvage operations.

B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5-1-1 Assess the possible decisions of a salver in the most common casualties (with special focus on navigation in Suez Canal) b5-1-2 Discuss risk management to the refloating operation of a grounded vessel.
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Design a complete hypothetical salvage plan to a given casualty.
C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional casualty analysis report.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1Apply computation tools (e.g., Excel) to simplify required computation tasks.
	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Use of a recent commercial software (e.g., HECSALV)
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	d7-1-1 Investigate a complete published recent salvage scenario.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Marine Casualties	15	15	--	--	a2-1-1, a2-2-1 c2-1-1
Salvage equipment and techniques	15	15	--	--	a2-1-2, a3-1-2, b1-2-1
Salvage Calculations	15	15	--	--	a1-1-1, a1-3-1, b2-1-1, d2-1-1, d2-2-1

Refloating and up righting of ships	15	15	--	--	a1-3-1, a3-1-2, b4-1-1, b5-1-1, c1-1-1, c2-1-1, d2-2-1, d7-1-1,
Risk assessment during salvage operations	15	15	--	--	a1-3-1, a3-1-1, b1-1-1, b4-1-2, b5-1-1, b5-1-2
Wrecking and ship breaking	15	15	--	--	a1-1-1, a2-1-1, a2-1-2
Total	90	90	--	--	

4- Relationship between the course and the programme

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1), (a1-3)A2(a2-1);A3(a3-1),	B1(b1-1), (b1-2), B2(b2-1), B4(b4-1), B5(b5-1)	C1(c1-1) C2(c2-1)	D2(d2-1), D7(d7-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionr y subjects**	**Total**
---	**---**	**30%**	**50%**	**10%**	**10%**	**--**	**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Marine Casualties	1-5
2nd	Salvage equipment and techniques	6-10
3rd	Salvage Calculations	11-15
4th	Refloating and up righting of ships	16-20
5th	Risk assessment during salvage operations	21-25
6th	Wrecking and ship breaking	26-30

7- ILOs Matrix Topics

Course topics	1^{st}	2^{nd}	3^{rd}	4^{th}	5^{th}	6^{th}
Course ILOs	**Knowledge & Understanding**					
a1-1-1 Recognize the basic principles of naval architecture (flotation, trim and stability) and ship strength and recognize their importance to define a ship casualty.			x			x
a1-3-1 Outline hydrodynamics characteristics of any marine unit during rescue operation.			x	x	x	
a2-1-1 Recognize the environmental impact of marine casualties	x					x
a2-1-2 Show the regulations related to safety (SOLAS) and marine salvage practice .		x				x
a2-2-1 Recognize the performance of different ship types during collisions and groundings.	x					
a3-1-1 Show the basic steps of risk management.					x	
a3-1-2 Recognize the different actions required to ensure successful marine salvage.		x		x		
Course ILOs	**Intellectual skills**					
b1-1-1 Demonstrate an investigatory approach for detecting problems sources					x	
b1-2-1 Identify the main information required for salver engineers.		x				
b2-1-1 Choose approximate methods and formula to be used during salvage operation (hydrostatic and strength data)			x			
b4-1-1Evaluate different possible approaches to manage a given casualty				x		
b b4-1-2 Identify the risks involved during common salvage operations.					x	
b5-1-1 Assess the possible decisions of a salver in the most common casualties (with special focus on navigation in Suez Canal)				x	x	
b5-1-2 Discuss risk management to the refloating operation of a grounded vessel.					x	
Course ILOs	**Professional and practical skills**					
c1-1-1 Design a complete hypothetical salvage plan to a given casualty.				x		
c2-1-1 Prepare a professional casualty analysis report.	x			x		
Course ILOs	**General and transferrable skills**					
d2-1-1Apply computation tools (e.g., Excel) to simplify required computation tasks.			x			
d2-2-1 Use of a recent commercial software (e.g., HECSALV)			x	x		
d7-1-1 Investigate a complete published recent salvage scenario.				x		

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x			x	x								
	a1-3-1	x			x	x								
	a2-1-1	x	x				x							
	a2-1-2	x												
	a2-2-1	x			x	x								
	a3-1-1	x												
	a3-1-2		x	x										
Intellectual Skills	b1-1-1				x	x			x					
	b1-2-1	X							x					
	b2-1-1				x	x								
	b4-1-1			x			x							
	b4-1-2	X	x	x										
	b5-1-1	X		x										
	b5-1-2													
Professional Skills	c1-1-1													
	c2-1-1								x	x				
General skills	d2-1-1				x	x							x	
	d2-2-1				x	x							x	
	d7-1-1				x				x	x				

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- <u>Facilities required for teaching and learning</u>

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to use a commercial computer software for salvage assistance (HECSALV).

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- <u>List of references:</u>

1- HECSALV (2005), Tanker Tutorial, Herbert Software Solutions, Inc.
2- Milwee, J., "Modern Marine Salvage ",Cornell Maritime Press; 1st edition (July 1996)
3- National Geographic, Salvage Code Red,DVD, release date: December 8, 2010
4- NAVSEA (S0300-A6-MAN-010), 2006: U.S. Navy Salvage Manual, Volume 1, Stranding and Harbor Clearance, Published By Direction of Commander, Naval Sea Systems Command, 412 pp
5- NAVSEA (S0300-A6-MAN-050), 2013 : U.S. Navy Ship Salvage Manual Volume 5 (Pol Offloading), Published by Direction of Commander, Naval Sea Systems Command, 212 pp

12- <u>Program Coordination Committee:</u>

Course Coordinator: **Dr. Heba El-Kilani**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 511
Course Specification

Ship Steering and Maneuverability

Post Graduate Course Specification

Program on which the course is given	Naval Architecture &Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture &Marine Engineering
Department offering the course	Naval Architecture &Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Ship Steering and Maneuverability	**Code Symbol: NME 511**	
Lecture	**3 hours**	
Tutorial	---------	
Laboratory	---------	
Total	**3 hours**	
Full academic year	**Prerequisite**	-------------

C- Professional Information

1- Course Aims:

This course is very useful and important to the students of Diploma program, where it provides them with advanced theory of ship steering and controllability. Also, it provides them with the principles of ship directional stability, course-keeping and maneuverability. The linear equations of planar ship motions are studied, together with the dynamic ship turning path simulation. The course aims also to study the influences of propeller, rudder, and ship form on effective ship steering and ship inherent stability. Also, the course introduces the types of ship maneuvers and location of ship pivoting point. In this course, ship steering in restricted waterways is included, together with the bank-, squat-, and blockage- effects act on ships that navigate in restricted waterways. Dynamics of two-way traffic simulation of ship navigation in restricted channels are studied.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering.	a1-1-1 Outline the different theories and linear equations of ship planar motions. a1-1-2 Recognize the factors that affect ship steering.

A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Identify the parameters of ship directional stability and its indices. a2-2-2 Recognize the concepts and types of ship maneuvers. a2-2-3 Show the dynamics of ship turning path and how to determine the ship pivot point location. a2-2-4 Describe the dynamics of ship steering in restricted waterways, together with bank-, squat-, and blockage effects. a2-2-5 Show how to simulate the dynamics of ship steering in two-way traffic in restricted channel.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate the ability to determine the parameters of ship directional stability and its indices.
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Choose the suitable parameters and factors that improve ship steering quality. Determine the rudder deflection and time required to achieve a specific ship turn to a new course. b3-1-2 Analyze and investigate ship steering quality through model test results. Also, apply modern theories, methods and computer programs in ship steering.
C. Professional and practical skills		
C1- Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Choose specific ship's hull design configuration for better steering quality. Practicing the ability of rudder design for better steering quality.

C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare search reports for specific types of ship maneuvers. c2-1-2 Use methods to determine the effects of bank-, squat-, and two- way traffic effects on ship steering in restricted waterways and channels.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1 Apply course skills on ship steering in restricted waterways (bank– squat-effects and ships in two- way traffic) and in career development.
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5-1-1 lead a team to complete report about types of maneuvers and an accurate rudder design.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1. Ship steering and linear equations of ship horizontal motions, stability indeces.	15	15	-	--	a1-1-1, b1-1-1
2. Ship maneuvers, and ship directional stability	15	15	-	--	a2-2-1, a2-2-2, b1-1-1, c1-1-1, c2-1-1
3. Ship parameters and configurations affecting ship steering	15	15	-	--	a2-2-1, b1-1-1
4. Dynamics of ship steering in restricted waterways (Bank-, Squat-, and Blockage Effects)	15	15	-	--	a2-2-4, a2-2-5, c2-1-2, d2-1
5. Two-way Traffic in Restricted Channels	15	15			a2-2-4, a2-2-5, c2-1-2, d2-1-1
6. Ship Rudder Hydrodynamic Design	15	15	-	--	b3-1-1, d5-1-1
Total	**90**	**90**	**-**	**--**	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1) A2(a2-2)	B1(b1-1) B3(b3-1)	C1(c1-1) C2(c2-1)	D2(d2-1) D5(d5-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**15%**	**30%**	**35%**	**10**	**10**		**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Ship steering and linear equations of ship horizontal motions, stability indeces	**1-5**
2nd	Ship maneuvers, and ship directional stability	**6-10**
3rd	Ship parameters and configurations affecting ship directional stability	**11-15**
4th	Dynamics of ship steering in restricted waterways (Bank-, Squat-, and Blockage Effects)	**16-20**
5th	Two-way Traffic in Restricted Channels	**21-25**
6th	Ship Rudder Hydrodynamic Design	**26-30**

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-1-1 Outline the different theories and linear equations of ship planar motions.	x	x				
a1-1-2 Recognize the factors that affect ship steering..	x	x				
a2-2-1 Identify the parameters of ship directional stability and its indices.	x	x				
a2-2-2 Recognize the concepts and types of ship maneuvers.	x	x				
a2-2-3 Show the dynamics of ship turning path and how to determine the ship pivot point location.	x	x				
a2-2-4 Describe the dynamics of ship steering in restricted waterways, together with bank-, squat-, and blockage effects.	x	x				
a2-2-5 Show how to simulate the dynamics of ship steering in two-way traffic in restricted channel.	x	x				
Course ILOs	**Intellectual skills**					
b1-1-1 Demonstrate the ability to determine the parameters of ship directional stability and its indices.			x	x		x
b3-1-1 Choose the suitable parameters and factors that improve ship steering quality. Determine the rudder deflection and time required to achieve a specific ship turn to a new course.				x	x	x
b3-1-2 Analyze and investigate ship steering quality through model test results. Also, apply modern theories, methods and computer programs in ship steering.				x	x	x
Course ILOs	**Professional and practical skills**					
c1-1-1 Choose specific ship's hull design configuration for better steering quality. Practicing the ability of rudder design for better steering quality.			x		x	x
c2-1-1 Prepare search reports for specific types of ship maneuvers.			x	x	x	x
c2-1-2 Use methods to determine the effects of bank-, squat-, and two- way traffic effects on ship steering in restricted waterways and channels.			x	x	x	x

Course ILOs	General and transferrable skills					
d2-1-1 Apply course skills on ship steering in restricted waterways (bank– squat- effects and ships in two- way traffic) and in career development.				x		x
d5-1-1 lead a team to complete report about types of maneuvers and an accurate rudder design.			x	x	x	x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x				x								
	a1-1-2	x				x								
	a2-2-1	x				x								
	a2-2-2	x				x								
	a2-2-3					x								
	a2-2-4	x				x								
	a2-2-5	x				x								
Intellectual Skills	b1-1-1		x											
	b3-1-1		x											
Professional Skills	c1-1-1		x											
	c2-1-1		x										x	
General Skills	d2-1-1		x							x				
	d5-1-1		x							x				

9- Assessment

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	29
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- List of References:

11.1. Lecture Notes:

1- Prof. Dr. Mo'men Gaafary, "Ship Steering and Maneuverability", Department of Naval Architecture & Marine Engineering, Faculty of Engineering, Port Said University, Egypt.

11.2. Recommended Books:

1. J.P. Comstock, "Principals of Naval Architecture", SNAME Publications, 2012
2. K. J. Rawson, E.C. Tupper, "Basic Ship Theory", Longman, 2009.
3. Mo'men Gaafary, and Mosaad Mosleh, "Hydrodynamics of Proposed Two-Way Traffic in Suez Canal with Steering Control," IMAM'07, Varna, Bulgaria, 2007.
4. Mo'men Gaafary, "Pitch and Heave Dynamic Stability of Submarines," IMAM'07, Varna, Bulgaria, 2007.
5. Mo'men Gaafary, "Dynamic Forces and Response of SWATH Ship in Lateral Waves" Black Sea International Maritime Engineering, Varna, Bulgaria, 2010.
6. Mo'men Gaafary, "Dynamic Effects of Semi-Submersible Platform in Beam Sea Waves" Black Sea International Maritime Engineering, Varna, Bulgaria, 2010.

11.3. Key words for Internet Search:

Ship Steering, Ship Course-Keeping, Ship Maneuverability, Ship Directional Stability, Ship Steering in Restricted Waterways and Channels, Two-Way Traffic in Canals.

Course Coordinator: Prof. Dr. Mo'men Gaafary

Program coordinator: Assoc. Prof. Dr. Moustafa Mohammed

Head of the Department: Assoc. Prof. Dr. Saad Bahey Eldeen

Date: August 2019

NME518

Ship Machinery

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma.
Date of specification approval	August 2019

A- Basic Information

Title: **Ship Machinery**	**Code Symbol**: **NME 518**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to acquire the student with the essential knowledge and necessary practical concerning the classification of the internal combustion engines, gas turbine, marine steam boilers and turbines. The principles operation of the internal combustion engines are among the main aims of the course. Also, the course provides the students with the necessary professional skills concerning the calculations of the clean energy (wind, solar, tide and waves).

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledgein the field ofNaval Architecture and Marine Engineering.	a1-1-1 Show the requirements of Classification Societies. a1-1-2 Categorize the different types of marine engine. a1-1-3 Categorize the different types of gas turbine and steam turbines.

A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines .	a4-1-1 Identify the safety instructions for steam boilers. a4-1-2 Identify the maintenance procedure for internal combustion engines, steam and gas turbines. a4-1-3 Identify the required measures to increase the obtained energy from wind, solar, tide and waves.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Design a hybrid propulsion system using the obtained energy from solar, wind or waves. b1-1-2 Design a maintenance schedules for ship machineries.
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Analyze information about the weather forecasts during the year.
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional report for the maintenance and operation of ship machinery.
D. General and transferrable skills		
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d4-1-1 Use different information recourses to collect the available data for ship machinery.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	*Tut.*	*Lab.*	
General considerations for the choice of marine engines	12	12	---	---	a1-1-2, a4-1-1, d4-1-1
Requirements of Classification Societies	18	18	---	---	a1-1-1, d4-1-1
Marine steam boilers and turbines	15	15	---	---	a1-1-3 , a4-1-1,a4-1-2, b1-1-2 , c2-1-1, d4-1-1
Internal combustion engines	15	15	---	---	a1-1-2 , b1-1-1, b1-1-2, c2-1-1, d4-1-1
Gas turbines	15	15	---	---	a1-1-3, a4-1-2, b1-1-2, c2-1-1, d4-1-1
Clean energy (wind, solar, tide and waves)	15	15	---	---	a4-1-3, b1-1-1 , b1-2-1, d4-1-1
Total	90	90	---	---	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-2) A4(a4-1)	B1(b1-1),(b1-2)	C2(c2-1)	D4(d4-1)

5- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**---**	**30%**	**70%**	**--**			**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	General considerations for the choice of marine engines	1 - 4
2nd	Requirements of Classification Societies	5 - 10
3rd	Marine steam boilers and turbines	11 – 15
4th	Internal combustion engines	16 – 20
5th	Gas turbines	21 – 25
6th	Clean energy (wind, solar, tide and waves)	26 - 30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-1-1		X				
a1-1-2	X			X		
a1-1-3			X		X	
a4-1-1			X			
a4-1-2	X		X		X	
a4-1-3						X
Course ILOs	**Intellectual skills**					
b1-1-1				X		X
b1-1-2			X	X	X	
b1-2-1						X
Course ILOs	**Professional and practical skills**					
c2-1-1			X	X	X	
Course ILOs	**General and transferrable skills**					
d4-1-1	X	X	X	X	X	X

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes(ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X	X											
	a1-1-2	X	X											
	a1-1-3	X	X											
	a4-1-1	X	X											
	a4-1-2	X	X											
	a4-1-3	X	X											
Intellectual Skills	b1-1-1	X	X			X								
	b1-1-2	X	X			X								
	b1-2-1	X	X			X								
Professional Skills	c2-1-1	X	X											
General Skills	d4-1-1													

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination: to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some Internet research assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources to collect the required data for ship outfitting and prepare technical reports.

11- List of references:

1- Harrington R.Y., Marine Engineering, 2nd edition, SNAME, USA 1992.

2- Mina Morgan, "Marine Technology Reference book", first edition Butterworth Ltd., Uk 1995.

3- Mc-George H.D., Marine Auxiliary Machinery, 7th edition, Butterworth, London 1995.

4- LR, 'Rules and Regulations for the classification of ships', part 5 Main and Auxiliary Machinery, 2016.

5- D.A. Taylor: " Introduction to Marine Engineering", Elsevier Science, 2014.

12- Program Coordination Committee:

Course Coordinator: Dr. Waleed Yehia

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME519
Ship Machinery Performance
Course Specification

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: **Ship Machinery performance**	**Code Symbol**: **NME 519**	
Lecture	3 hours	
Tutorial /Laboratory	---	
Total	3hours	Bylaw 2000

B- Professional Information

1- **Course Aims:**

The aims of this course are to provide the Student, upon completing the Naval Architecture and Marine Engineering master Program, with the advanced knowledge and skills of how to deal with different ship propulsion machinery and auxiliary equipments on shipboard. This course will also provide students with the ability to be familiar with the main principles of electric power generators for ship activities. The students have to know the different parameters and variables affecting the machinery performance and overall power plant efficiency. The students have to be families how to design, select and arrange the deck machinery and engine room equipments. They have to be capable of install, design and laying the machinery and ship hull piping systems.

2- **Intended Learning Outcomes (ILOs)**

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledgein the field ofNaval Architecture and Marine Engineering.	a1-2-1 Identify the different types of ship machinery. a1-2-2 Identify the properites and specification of the elements.

A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-1Discuss Social effects Maritime Industry.	a2-1-1 Identify the differnt source of marine pollution a2-1-2 Show the mothedology applide to reduce the ship emission.
B. Intellectual skills		
B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering.	b-2-1-1 Evaluate the ability to estimate the missed date to solve the problems. b-2-1-2 Predict the required element and components of the system by applying the modern computational methods b2-1-3 Solve the engineering problems related to Marine engineering and Engine performance.
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare and evaluate a professional report of the specific marine engineering topics. c2-1-2 Design the repair and maintenance programs sheets and plan.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1 use computer program to calculate all the marine index.

3- **Course Contents**

Topic	***Total Hours***	***Contact hrs***			***Course ILOs Covered (By No.)***
		Lec.	**Tut.**	**Lab.**	
Control and control device	18	18	-	-	a1-2-1, a1-2-2, a2-1-1, a2-1-2

Performance factor for reduction gears and part loads	12	12	-	-	a1-2-1, c2-1-1
Interconnection between main and auxiliary machinery	12	12	-	-	a2-1-2, b1-1-1, c2-1-1,
Load and weather effects on engine performance.	12	12	-	-	a1-2-1, a1-2-2, d2-1-1
Engine efficiency and performance after accidents	15	15	-	-	a1-2-2, c2-1-1
Effects of maintenance and repair	12	12	-	-	b1-1-1, d2-1-1
Reliability of marine engines	9	9			b1-1-1,d2-1-1
Total	90				

4- **Relationship between the course and the programme**

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-2) A2(a2-1)	B1(b1-1),	C2(c2-1)	D2(d2-1)

5- **Course Subject Area:**

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**40%**	**40%**	**20%**	**--**	**--**	**--**	**100%**

6- **Course Topics.**

Topic No.	Topic	Weeks
1st	Control and control device	1-6
2nd	Performance factor for reduction gears and part loads	7-10
3rd	Interconnection between main and auxiliary machinery	11-14
4th	Load and weather effects on engine performance.	15-18

5th	Engine efficiency and performance after accidents	19-23
6th	Effects of maintenance and repair	24-27
7th	Reliability of marine engines	28-30

7- **ILOs Matrix Topics**

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Course ILOs	**Knowledge & Understanding**						
a1-2-1	x	x		x			
a1-2-2	x			x	x		
a2-1-1	x						
a2-1-2	x		x				
Course ILOs	**Intellectual skills**						
b1-1-1			x			x	x
Course ILOs	**Professional and practical skills**						
c2-1-1		x	X		x		
Course ILOs	**General and transferrable skills**						
d2-1-1				x		x	x

8- **Teaching and Learning Method:**

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	**Presentation and Movies**	**Discussion**	**Tutorial**	**Problem solving**	**Brainstorming**	**Projects**	**Report**	**Self learning**	**Cooperative**	**Discovering**	**Computer Simulation**	**Practical Experiments**
Knowledge & understanding	a1-2-1	x							x					
	a1-2-2	x							x					
	a2-1-1	x							x					
	a2-1-2	x							x					
Intellectual Skills	b1-2-1	x		x		x	x							
Professional and practical skills	C2-1-1	x												
General and transferrable skills	d2-1-1	x				x								

9- **Assessment**

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- **Facilities required for teaching and learning**

- Teaching aids such as overhead projector, data show and computer.
- Regular visit to the Shipyard and power plant sites.

A. laboratory Usage:

none.

B. Library Usage:

Students should be encouraged to use library.

11- **List of references:**

1- Harrington R.Y., Marine Engineering, 2nd edition, SNAME, USA 1992.
2- Mina Morgan, "Marine Technology Reference book, 3rd edition Butterworth Ltd., Uk 2005.
3- P. Breeze, Power Generation Technologies, Elsevier Science, 2014.
4- Mc-George H.D., Marine Auxiliary Machinery, 10th edition, Butterworth, London 2008.
5- LR, 'Rules and Regulations for the classification of ships', part 5 Main and Auxiliary Machinery, 2017.
6- D.A. Taylor, Introduction to marine engineering, Elsevier, 2nd edition 2003.
7- SNAME and RINA periodicals- 2016-2017

8- **Program Coordination Committee:**

Course Coordinator: **Prof. Adel A. Tawfik**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 521
International Conventions and Ship Safety
Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: **International Conventions and Ship safety**	**Code Symbol**: **NME 521**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

The course aims to provide students with awareness of different conventions imposed to maritime industry and its impact on design and operations of ships, and the professional and ethical responsibilities of engineers, law and regulations, environmental science and the impact of engineering solutions in a global and societal context.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A2- Mutual relation between professional aspects of professional practice and its effects on the environment.	a2-1 Discuss Social effects of Maritime Industry.	a2-1-1 Identify different threats arising from maritime industry.
	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Recognize the role of legislations in the main evolution in ship design .

A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1Recognize the role of different regulations and conventions during the process of ship design and operation.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Identify the main features and actions controlled by conventions and/or regulations in a given project, e.g., ship conversion or ship repair.
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-2 Perform applied research on industrial and societal concerns related to Naval Architecture and Marine Engineering field (Project).	b3-1-1 Analyze the requirements of formal safety assessment of bulk carriers
B4- Risk assessment in the professional practices.	b4-1 Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development.	b4-1-1 Evaluate Risk assessment in offshore industry
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare professional reports to show the compliance of a given ship with SOLAS and /or MARPOL, or other IMO conventions.
		c2-1-2 Design specific checklists to facilitate inspection tasks related to regulations.
D. General and transferrable skills		
D3- Apply self evaluation and define personal educational needs.	d3-1 Apply self evaluation and specify his educational needs related to Naval Architecture and Marine Engineering aspects.	d3-1-1 Apply self evaluation to assess the acquired awareness of the legislations related to a specific unit (e.g. harbor tug)
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d4-1-1 Plan visits and personal contacts to discuss the responsibilities of inspectors in Port State, classification societies and different national

		authorities.
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	d7-1-1 Investigate a complete published recent conventions and regulations and their updates.

3- <u>Course Contents</u>

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1-Marine activities	9	9	-	--	A2-1-1; d4-1-1
2- Marine accidents	12	12	--	--	A2-1-1; b3-1-1 ;b4-1-1;d7-1-1;
3- Environmental pollution	12	12	-	--	A2-1-1; a2-2-1; b4-1-1
4- Conventions for pollution control	12	12	-	--	A3-1-1;a2-2-1; b4-1-1, c2-1-1; d4-1-1,d7-1-1
5- Navigation conventions	15	15	-	--	A3-1-1;c2-1-2; d4-1-1, d7-1-1
6- Safety and rescue equipment	15	15	-	--	A3-1-1; b3-1-1; b4-1-1; c2-1-1; c2-1-2
7- Certifications and classification	15	15	-	--	B1-2-1; d2-2-1; d3-1-1, d7-1-1
Total	90	90			

4- <u>Relationship between the course and the programme</u>

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A2(a2-1); (a2-2); A3(a3-1)	B1(b1-2), B3(b3-1), B4(b4-1)	C2(c2-1)	D3(d3-1); D4(d4-1); D7(d7-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
70%	**---**	**----**	**15%**	**--**	**15%**	**---**	**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Marine activities	1-3
2nd	Marine accidents	4-7
3rd	Environmental pollution	8-11
4th	Conventions for pollution control	12-15
5th	Navigation conventions	16-20
6th	Safety and rescue equipment	21-25
7th	Certifications and classification	26-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Course ILOs	**Knowledge & Understanding**						
a2-1-1 Identify different threats arising from maritime industry.	x	x	x				
a2-2-1 Recognize the role of legislations in the main evolution in ship design .			x	x			
a3-1-1Recognize the role of different regulations and conventions during the process of ship design and operation.				x	x	x	
Course ILOs	**Intellectual skills**						
b1-2-1 Identify the main features and actions controlled by conventions and/or regulations in a given project, e.g., ship conversion or ship repair.							x

b3-1-1 Analyze the requirements of formal safety assessment of bulk carriers		x				x	
b4-1-1 Evaluate Risk assessment in offshore industry				x			x
Course ILOs	**Professional and practical skills**						
C2-1-1 Prepare professional reports to show the compliance of a given ship with SOLAS and /or MARPOL, or other IMO conventions.				x			
C2-1-2 Design specific checklists to facilitate inspection tasks related to regulations.					x		
Course ILOs	**General and transferrable skills**						
d3-1-1 Apply self evaluation to assess the acquired awareness of the legislations related to a specific unit (e.g. harbor tug)							x
d4-1-1 Plan visits and personal contacts to discuss the responsibilities of inspectors in Port State, classification societies and different national authorities.	x				x		
d7-1-1 Investigate a complete published recent conventions and regulations and their updates.		x		x	x		x

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a2-1-1	x	x				x							
	a2-2-1		x							x				
	a3-1-1	x		x										
Intellectual Skills	b1-2-1	x							x					
	b3-1-1	x	x											
	b4-1-1	x								x				
Professional Skills	c2-1-1								X					
	c2-1-2								x	x				
General Skills	d3-1-1									x				
	d4-1-1			x						x	x			
	d7-1-1									x				

9- Assessment

9.1 Assessment Methods

Final Written Examination   to assess students' knowledge.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector -Library.

A. laboratory Usage:

None

B. Library Usage:

Students should be encouraged to use library technical resources .

11- List of references:

1- MARPOL conventions "International Convention for the Prevention of Pollution from Ships, 73/78", www.imo.org

2- International Convention for the Safety of Life at Sea (SOLAS)

3- IMO Vega computer package, version 2.1

4- Marine Pollution (4th Edition) R.B. Clark, C. Frid and M Atttrill, Oxford Science Publications, 1997,

5- Oil Spill Response in the Marine Environment J.W. Doerffer, Pergamon Press, 1992

6- www.eagle.org

7- www.imo.org

12- Program Coordination Committee:

Course Coordinator: **Dr. Heba S. El-Kilani**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME522

Heat Applications in Marine Engineering

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Heat Application in Marine Engineering	**Code Symbol**: **NME 522**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	

B- Professional Information

1- Course Aims:

Prepare the students to be familiar with the heat applications in marine engineering . The students have to know how to select and arrange the different heat insulation in cargo compartments, engine room, and accommodation. They have to be capable of install, inspect and laying the air conditioning systems and cooling equipment in ships. The student should be familiar with different methods using for water desalination and heat treatment of oil and fuel.

After finishing the course, the student will have good knowledge and understanding to deal with the modern power stations and advanced methods for air conditioning and cooling applicatios on board ships. They should know how to calculate the cooling and heating load in propelling machinery. After completion of this course, the student should be able to:

- Configure all the heating and cooling machinery and component onboard ships.
- Understand and discuss the different concepts of heat transfer laws.
- Critically evaluate and compare various concepts of marine power stations
- Determine the concept and functions of the most heating and cooling operation in ship board.
- Design and install the various heat exchangers and air condition systems.
- Carry on the required calculations to determine cooling load and insulation.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the concepts and theories of mathematics and computer science appropriate to their areas of specialization in Naval Architecture and/or Marine Engineering.	a1-1-1 Outline a comparative study of marine power stations.
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines.	a4-1-1 Outline a comparsion between the different heating and cooling components.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Predict and define the suitable systems of heating and cooling aboard ship.
B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5-1-1 Demonstrate how to use the different safety equipment and insulation devices.
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Identify the limit state function.
C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Choose the topics and headlines to write a report for a limited task

D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1 Use computer program to calculate all the marine index.

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
General review of heat transfer laws	12	12	-	-	a1-1-1, a4-1-1, c1-1-1
Heat insulation in machinery spaces.	12	12	-	-	a1-1-1, c1-1-1, c2-1-1
Heat insulation in cargo compartments	12	12	-	-	b1-1-1, c2-1-1,
Application of air condition in ships	12	12	-	-	a1-1-1, d2-1-1
Cooling processes in ships	12	12	-	-	b5-1-1, c2-1-1
Efficiency of cooling and heating loads	12	12	-	-	b1-1-1, b5-1-1,d2-1-1
Relationship of cooling and heating rates in propulsion machinery	9	9			b1-1-1, b5-1-1,d2-1-1
Effect of operation functions on engine performance.	9	9			b5-1-1, c2-1-1
Total	90				

4- <u>Relationship between the course and the programme</u>

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1) A4(a4-1)	B1(b1-1), B5(b5-1),	C1(c1-1), C2(c2-1)	D2(d2-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	40%	50%	10%	--	--	--	100%

Course Contents

6- Course Topics.

Topic No.	Topic	Weeks
1st	General review of heat transfer laws	1-4
2nd	Heat insulation in machinery spaces.	5-8
3rd	Heat insulation in cargo compartments	9-12
4th	Application of air condition in ships	13-16
5th	Cooling processes in ships	17-20
6th	Efficiency of cooling and heating loads	21-24
7th	Relationship of cooling and heating rates in propulsion machinery	25-27
8th	Effect of operation functions on engine performance.	28-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
Course ILOs	**Knowledge & Understanding**							
a1-1-1	x	x		x				
a4-1-1	x							
Course ILOs	**Intellectual skills**							
b1-1-1			x			x	x	
b5-1-1					x	x	x	x
Course ILOs	**Professional and practical skills**							
c1-1-1	x	x						
c2-1-1		x	X		x			x
Course ILOs	**General and transferrable skills**							
d2-1-1				x		x	x	

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brainstorming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x							x					
	a4-1-1	x							x					
Intellectual Skills	b1-2-1	x		x		x	x							
	b5-1-1	x		x		x	x							
Professional Skills	c1-1-1	x				x			x					
	c2-1-1	x												
General and transferrable skills	d2-1-1	x				x								

9- Assessment

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

- Teaching aids such as overhead projector, data show and computer.
- Regular visit to the Shipyard and power plant sites.

A. laboratory Usage:

none.

B. Library Usage:

Students should be encouraged to use library.

11- List of references:

1- Mina Morgan, "Marine Technology Reference book",3rd st edition Butterworth Ltd., Uk 2008.
2- LR, 'Rules and Regulations for the classification of ships', part 5 Main and Auxiliary Machinery, 2016.
3- Jan F.Kreider, handbook of heating, ventilation and air condition, CRC press, 2001.
4- D.A. Taylor, Introduction to Marine Engineering, Elsevier Science, 2014.
5- P. Breeze, Power Generation Technologies, Elsevier Science, 2014.
6- SNAME and RINA periodicals- 2016-2017

12- Program Coordination Committee:

Course Coordinator: **Prof. Adel A. Tawfik**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME523

Marine Power Stations

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Marine Power Station	**Code Symbol**: **NME 523**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	

B- Professional Information

1- Course Aims:

Prepare the students to be familiar with the modern marine power stations. The students have to know how to design, select and arrange the optimum marine engines, heat exchangers, safety equipment and piping systems. They have to be capable of install, design and laying the piping systems and components for ship hull and machinery. The student should be familiar with different methods using to reduce the pollution and calculate the machinery power.

After finishing the course, the student will have good knowledge and understanding to deal with the modern power stations and advanced methodsd to reduce the marine pollution and design the piping systems and there components. After completion of this course, the student should be able to:

- Configure and descript the equipments and components of modern marine power plants.
- Understand and discuss the different methods using to reduce marine pollution.
- Critically evaluate and compare various concepts of marine power stations
- Determine the concept and functions of the most safety and oil treatment equipment.
- Design and install the various heat exchangers and piping systems.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the concepts and theories of **mathematics and computer science** appropriate to their areas of specialization in Naval Architecture and/or Marine Engineering.	a1-1-1 Outline a comparative study of marine power stations.
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines.	a4-1-1 Outline a comparsion between the different power stations and components.
B. Intellectual skills		
B1- Analyze and evaluate the information in the field of specialization, and relate it to solve problems.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and/or marine engineering.	b1-1-1 Predict and define the suitable systems of marine power stations and piping systems.
C. Professional and practical skills		
C1- Master the basic as well as the latest professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Identify the limit state function.
C2- Write and evaluate technical and professional reports.	c2-1 Write and evaluate a professional report on the specific area of the marine industries.	C2-1-1 Choose the topics and headlines to write a report for a limited task
D. General and transferrable skills		
D2- Use information technology to enhance his professional practice	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Use computer program to calculate all the marine index.

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Study of modern trend in marine power stations	18	18	-	-	a1-1-1, a4-1-1, c1-1-1
Waste heat recovery	12	12	-	-	a1-1-1, c1-1-1, c2-1-1
Calculation of machinery power and energy	12	12	-	-	b1-1-1, C2-1-1,
Design of heat exchangers	12	12	-	-	a1-1-1, d2-2-1
Design of marine piping systems and materials	15	15	-	-	c2-1-1
Safety equipment onboard ship	12	12	-	-	b1-1-1, d2-2-1
Purifiers and pollution control in power stations	9	9			b1-1-1, d2-2-1
Total	90				

4- <u>Relationship between the course and the programme</u>

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1) A4(a4-1)	B1(b1-1)	C1(c1-1), C2(c2-1)	D2(d2-2)

5- <u>Course Subject Area:</u>

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disscretionry subjects**	**Total**
---		**20%**	**20%**	**60%**	**--**		**100%**

6- Course Contents

Topic No.	Topic	Weeks
1st	Study of modern trend in marine power stations	1-6
2nd	Waste heat recovery	7-10
3rd	Calculation of machinery power and energy	11-14
4th	Design of heat exchangers	15-18
5th	Design of marine piping systems and materials	19-23
6th	Safety equipment onboard ship	24-27
7th	Purifiers and pollution control in power stations	28-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Course ILOs	**Knowledge & Understanding**						
a1-1-1	x	x		x			
a5-1-1	x						
Course ILOs	**Intellectual skills**						
b1-1-1			x			x	x
Course ILOs	**Professional and practical skills**						
c1-1-1	x	x					
C2-1-1		x	X		x		
Course ILOs	**General and transferrable skills**						
d2-2-1				x		x	x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	**Presentation and Movies**	**Discussion**	**Tutorial**	**Problem solving**	**Brainstorming**	**Projects**	**Report**	**Self learning**	**Cooperative**	**Discovering**	**Computer Simulation**	**Practical Experiments**
Knowledge & understanding	a1-1-1	x							x					
	a5-1-1	x							x					

Intellectual Skills	b1-2-1	x		x		x	x							
Professional Skills	c1-1-1	x				x			x					
	C2-1-1	x												
General and transferrable skills	d2-2-1	x				x								

9- Assessment

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

- Teaching aids such as overhead projector, data show and computer.
- Regular visit to the Shipyard and power plant sites.

A. laboratory Usage:

none.

B. Library Usage:

Students should be encouraged to use library.

11- List of references:

1- Harrington R.Y., Marine Engineering, 2^{nd} edition, SNAME, USA 1992.

2- Mina Morgan, "Marine Technology Reference book",1^{st} edition Butterworth Ltd., Uk 1995.

3- Mc-George H.D., Marine Auxiliary Machinery, 11th edition, Butterworth, London 2014.

4- LR, 'Rules and Regulations for the classification of ships', part 5 Main and Auxiliary Machinery, 2016.

5- D.A. Taylor, Introduction to marine engineering, Elsevier, 2^{nd} edition 2003.

6- D.A. Taylor, Introduction to Marine Engineering, Elsevier Science, 2014.

7- Breeze, Power Generation Technologies, Elsevier Science, 2014.

8- Frank Kreith, Raj M. Manglik, and Mark S. Bohn, Principles of Heat Transfer, 7th ed., Cengage Learning, Inc., 2011.

12- Program Coordination Committee:

Course Coordinator: **Prof. Adel A. Tawfik**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME524

Marine Auxiliary Machinery

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Marine Auxiliary Machinery	**Code Symbol**: **NME 523**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	

B- Professional Information

1- Course Aims:

Prepare the students to be familiar with the ship auxiliary machinery. The students have to know how to select and arrange the different auxiliary machinery such as pumps, electric generators, mooring equipments and cargo handling machinery. They have to be capable of install, inspect and laying the piping systems and auxiliary components for ship loading and unloading machinery. The student should be familiar with different methods using for water desalination and treatment equipment for sewage and sanitary water.

After finishing the course, the student will have good knowledge and understanding to deal with the modern power stations and advanced methodsd to reduce the marine pollution and design the piping systems and there components. After completion of this course, the student should be able to:

- Configure all the auxiliary machinery and component onboard ships.
- Understand and discuss the different methods using to generate the electric power , moor and load the ship.
- Critically evaluate and compare various concepts of marine power stations
- Determine the concept and functions of the most safety and oil treatment equipment.
- Design and install the various heat exchangers and piping systems.
- Carry on the required calculations to determine piping and pumping systems.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the concepts and theories of mathematics and computer science appropriate to their areas of specialization in Naval Architecture and/or Marine Engineering.	a1-1-1 Outline a comparative study of marine power stations.
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines.	a4-1-1 Outline a comparsion between the different power stations and components.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Predict and define the suitable systems of marine power stations and piping systems.
C. Professional and practical skills		
C1- Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Identify the limit state function.
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	C2-1-1 Choose the topics and headlines to write a report for a limited task

D. General and transferrable skills		
D2- Use information technology to enhance his professional practice.	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Use computer program to calculate all the marine index.

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Standard specification of auxiliary engines	12	12	-	-	a1-1-1, a4-1-1, c1-1-1
Classification societies requirements	12	12	-	-	a1-1-1, c1-1-1, c2-1-1
Auxiliary engines (steam- gas- hydraulic- electric- diesel)	12	12	-	-	b1-1-1, c2-1-1,
Electric generation onboard ships	12	12	-	-	a1-1-1, d2-2-1
Pipes, valves and pumps	12	12	-	-	c2-1-1
Safety and firefighting equipment onboard ship	12	12	-	-	b1-1-1, d2-2-1
Mooring and Loading and unloading equipment	9	9			b1-1-1, d2-2-1
Desalination and sewage treatment stations.	9	9			c2-1-1
Total	90				

4- <u>Relationship between the course and the programme</u>

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1) A4(a4-1)	B1(b1-1)	C1(c1-1), C2(c2-1)	D2(d2-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
--		**20%**	**20%**	**60%**	**--**		**100%**

Course Contents

6- Course Topics.

Topic No.	Topic	Weeks
1st	Standard specification of auxiliary engines	1-4
2nd	Classification societies requirements	5-8
3rd	Auxiliary engines (steam- gas- hydraulic- electric-diesel)	9-12
4th	Electric generation onboard ships	13-16
5th	Pipes, valves and pumps	17-20
6th	Safety and firefighting equipment onboard ship	21-24
7th	Mooring and Loading and unloading equipment	25-27
8th	Desalination and sewage treatment stations.	28-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
Course ILOs	**Knowledge & Understanding**							
a1-1-1	x	x		x				
a4-1-1	x							
Course ILOs	**Intellectual skills**							
b1-1-1			x			x	x	
Course ILOs	**Professional and practical skills**							
c1-1-1	x	x						
c2-1-1		x	X		x			x
Course ILOs	**General and transferrable skills**							
d2-2-1				x		x	x	

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brainstorming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x							x					
	a4-1-1	x							x					
Intellectual Skills	b1-2-1	x		x		x	x							
Professional Skills	c1-1-1	x				x			x					
	C2-1-1	x												
General and transferrable skills	d2-2-1	x				x								

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- <u>Facilities required for teaching and learning</u>

- Teaching aids such as overhead projector, data show and computer.
- Regular visit to the Shipyard and power plant sites.

A. laboratory Usage:

none.

B. Library Usage:

Students should be encouraged to use library.

11- List of references:

1- Mc-George H.D., Marine Auxiliary Machinery, 7th edition, Butterworth, London 1995.

2- LR, 'Rules and Regulations for the classification of ships', part 5 Main and Auxiliary Machinery, 2016.

3- D.A. Taylor, Introduction to Marine Engineering, Elsevier Science, 2014.

4- Breeze, Power Generation Technologies, Elsevier Science, 2014.

5- Bruce R. Munson and Donald F. Young, Fundamentals of fluid mechanics, 6th ed., John Wiley & sons, 2009.

6- Frank Kreith, Raj M. Manglik, and Mark S. Bohn, Principles of Heat Transfer, 7th ed., Cengage Learning, Inc., 2011.

12- Program Coordination Committee:

Course Coordinator: **Prof. Adel A. Tawfik**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME525

Automatic Control Application in Marine Engineering

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Automatic control application in marine engineering	**Code Symbol**: **NME 525**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	

B- Professional Information

1- Course Aims:

Prepare the students to be familiar with the modern automatic control methods and processes in marine power stations. The students have to know how to design, select and arrange the digital control circuits, air control circuits, hydraulic control circuits and simulation. They have to be capable of install, design and laying the control systems of marine propulsion machinery and adjustment. The student should be familiar with different methods using to control the mooring systems, cargo handling systems, steering systems and control the performance sensitivity of ship operation.After finishing the course, the student will have good knowledge and understanding to deal with the modern automatic control circuits to umprove the ship performance and increase the overall operationg efficience.

2- <u>Intended Learning Outcomes (ILOs)</u>

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Outline a comparative study of marine power stations.
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines.	a4-1-1 Outline a comparsion between the different power stations and components.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Predict and define the suitable systems of marine power stations and piping systems.
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Identify the limit state function.
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Choose the topics and headlines to write a report for a limited task
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1 Use computer program to calculate all the marine index.

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Modeling and simulation	18	18	-	-	a1-1-1, a4-1-1, c1-1-1
Digital control circuits	12	12	-	-	a1-1-1, c1-1-1, c2-1-1
Air control circuits, hydraulic control circuits, pneumatic control circuits.	12	12	-	-	b1-1-1, c2-1-1,
Optimum control systems and filters	12	12	-	-	a1-1-1, d2-1-1
Control system of marine engines and adjustment	15	15	-	-	a1-2-1, c2-1-1
Control circuits of ship maneuvering and cargo handling systems	12	12	-	-	b1-1-1, d2-1-1
Performance sensitivity of control systems and estimation of efficiency	9	9			b1-1-1, d2-1-1
Total	90				

4- <u>Relationship between the course and the programme</u>

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1) A4(a4-1)	B1(b1-1)	C1(c1-1), C2(c2-1)	D2(d2-1)

5- Course Subjects Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---		30%	50%	20%	--		100%

6- Course Topics.

Topic No.	Topic	Weeks
1st	Modeling and simulation	1-6
2nd	Digital control circuits	7-10
3rd	Air control circuits, hydraulic control circuits, pneumatic control circuits.	11-14
4th	Optimum control systems and filters	15-18
5th	Control system of marine engines and adjustment	19-23
6th	Control circuits of ship maneuvering and cargo handling systems	24-27
7th	Performance sensitivity of control systems and estimation of efficiency	28-30

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	**Knowledge & Understanding**						
a1-1-1	x	x		x			
a4-1-1	x						
Course ILOs	**Intellectual skills**						
b1-1-1			x			x	x
Course ILOs	**Professional and practical skills**						
c1-1-1	x	x					
C2-1-1		x	X		x		
Course ILOs	**General and transferrable skills**						
d2-1-1				x		x	x

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brainstorming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x							x					
	a4-1-1	x							x					
Intellectual Skills	b1-2-1	x		x		x	x							
Professional Skills	c1-1-1	x				x			x					
	c2-1-1	x												
General and transferrable skills	d2-1-1	x				x								

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- <u>Facilities required for teaching and learning</u>

- Teaching aids such as overhead projector, data show and computer.
- Regular visit to the Shipyard and power plant sites.

A. laboratory Usage:

none.

B. Library Usage:

Students should be encouraged to use library.

11- <u>List of references:</u>

1. S. Barnett, Polynomials and Linear Control Systems, Marcel Dekker, New York, NY, 1983.
2. Carlos A. Smith and Armando B. Corripio, Principles and Practice of Automatic Process Control, 2nd edition, John Wiley& Sons, Inc. 1979.
3. B. D. O. Anderson and J. B. Moore, Optimal Control Linear Quadratic Methods, Dover Publica tions, 2007.
4. R. C. Dorf and R. H. Bishop, Modern Control Systems , Prentice Hall, tenth edition, 2004
5. LR, 'Rules and Regulations for the classification of ships', part 5 Main and Auxiliary Machinery, 2009.

12- <u>Program Coordination Committee:</u>

Course Coordinator: **Dr. WaleedYehia**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 529
Marine Environment Pollution (1)
Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Marine Environment Pollution (1)	**Code** : **NME 529**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to instruct the students about all regulations of IMO concerned with marine pollution sit also aims to introduce them the different sources of marine pollution. This course gives also the essential knowledge about the cleanup methods of pollution due to oil spill. Equipment and marine units for treatment of marine pollution take a recognized portion of this course. This course provides also a study about the different structural ship design for minimum pollution and the other sources of pollution due to ship.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledgein the field ofNaval Architecture and Marine Engineering	a1-1-1 Show the regulations of IMO concerned with marine pollutions a1-1-2 Categorize the different types of marine pollutions a1-1-3 Categorize the cleanup methods of pollution due to oil spill.

A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines	a4-1-1 Identify the ways of buring of oil at sea. a4-1-2 Define the methods of oil sinking a4-1-3 Identify the different types of chemical dispersants.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate treatment methods using aircraft b1-1-2 Demonstrate equipment adapted for helicopter b1-1-3 Demonstrate equipment adapted for airplanes
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Identify air blast sprayers. b1-2-2 Identify spray unit system.
C. Professional and practical skills		
C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional report for double hull tanker legislation
D. General and transferrable skills		
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	d1-1-1 Use communication skills to collect new information about the recent cleanup methods of oil spill and equipment used for treatment of marine pollution.
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d4-1-1 Use different information recourses to collect the available data for marine's air pollution concerns.

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	*Tut.*	*Lab.*	
1. IMO Regulations concerned with Marine Pollution	12	12	---	---	a1-1-1, d4-1-1
2. Sources of Marine Pollution	18	18	---	---	b1-1-1 , b1-2-1, b1-2-2, c2-1-1 , d4-1-1
3. Cleanup Methods of Oil Spill	15	15	---	---	a1-1-1 , a1-1-2 , c2-1-1, d1-1-1, d4-1-1
4. Equipment used for treatment ofMarine Pollution	15	15	---	---	a4-1-3 , b1-1-3, d1-1-1, d4-1-1
5. New Ship Design for minimum Pollution	15	15	---	---	a1-1-2, a4-1-2, b1-1-1,b1-1-2, c2-1-1,d4-1-1
6. Other Sources of Pollution due to Ships	15	15	---	---	a1-1-1, a1-1-3, a4-1-1, b1-2-2,c2-1-1, d4-1-1
Total	90	90	---	---	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1), A4(a4-1)	B1(b1-1),(b1-2)	C2(c2-1)	D1(d1-1) D4(d4-1)

5- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**---**	**30%**	**70%**	**--**			**100%**

6- Course Contents

Topic No.	Topic	Weeks
1st	IMO Regulations concerned with Marine Pollution	1 - 4
2nd	Sources of Marine Pollution	5 - 10
3rd	Cleanup Methods of Oil Spill	11 – 15
4th	Equipment used for treatment ofMarine Pollution	16 – 20
5th	New Ship Design for minimum Pollution	21 – 25
6th	Other Sources of Pollution due to Ships	26 - 30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-1-1 Show the regulations of IMO concerned with marine pollutions	X		X			X
a1-1-2 Categorize the different types of marine pollutions			X		X	
a1-1-3 Categorize the cleanup methods of pollution due to oil spill.						X
a4-1-1 Identify the ways of buring of oil at sea.						X
a4-1-2 Define the methods of oil sinking					X	
a4-1-3 Identify the different types of chemical dispersants.				X		
Course ILOs	**Intellectual skills**					
b1-1-1 Demonstrate treatment methods using aircraft		X			X	
b1-1-2 Demonstrate equipment adapted for helicopter		X			X	
b1-1-3 Demonstrate equipment adapted for airplanes						X
b1-2-1 Identify air blast sprayers.				X		
b1-2-2 Identify spray unit system.		X				

Course ILOs	Professional and practical skills					
c2-1-1 Prepare a professional report for double hull tanker legislation		X	X		X	X
Course ILOs	**General and transferrable skills**					
d1-1-1 Use communication skills to collect new information about the recent cleanup methods of oil spill and equipment used for treatment of marine pollution.			X	X		
d4-1-1 Use different information recourses to collect the available data for marine's air pollution concerns.	X	X	X	X	X	X

8- Teaching and Learning Method:

Course Intended learning outcomes(ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X												
	a1-1-2	X	X						X					
	a1-1-3	X	X						X					
	a4-1-1	X												X
	a4-1-2	X												X
	a4-1-3	X												X
Intellectual Skills	b1-1-1	X				X								
	b1-1-2	X				X								
	b1-1-3	X	X						X					
	b1-2-1	X				X								
	b1-2-2	X	X											
Professional Skills	c2-1-1	X							X					
General Skills	d1-1-1								X	X				
	d4-1-1								X	X				

9- Assessment

9.1 Assessment Methods

Final Examination:	Written	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources to collect the required data for marine pollution and prepare technical reports.

11- List of references:

1 Prof. Dr.- Ing. Laila Kamar":"Marine Pollution and Protection of the Marine Environment"Department of Naval Architecture and Marine Engineering (prepared by the course coordinator)

2 12.2 Essential books (text books)

- **Recommended books**

1 International Tanker Owners Pollution Federation, Effects of Oil Spills, http://www.itopf.com/marine-spills/effects, accessed July 2010.

2 National Research Council. Oil in the Sea III: Inputs, Fates, and Effects. Washington, DC: National Academies Press; 2003.

3 Boyd J. N., Scholz D. & Hayward Walker A. :" Effects of Oil and Chemically Dispersed Oil in the Environment", IOSC 2001.

4 Landis WG. The Exxon Valdez Oil Spill Revisited and the Dangers of Normative Science. Integ Environ Assess Manag 2007.

5 Exxon Valdez Oil Spill Trustee Council. Legacy of an Oil Spill, 20 Years after Exxon Valdez: Exxon Valdez Oil Spill Trustee Council, 2009 status report. Anchorage, AK: Exxon Valdez Oil Spill Trustee Council; 2009.

- **Periodicals, Web sites, etc**

_Periodical & Web sites of RINA & SNAME

12- <u>Program Coordination Committee:</u>

Course Coordinator: **Prof. Dr. Laila Kamar**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME P98
Post Graduate Project
Course Specifications

Post Graduate Course Specification

Program on which the course is given	Naval Architecture &Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture &Marine Engineering
Department offering the course	Naval Architecture &Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Project	**Code Symbol**: **NME P98**	
Lecture	**3 hours**	
Tutorial	---------	
Laboratory	---------	
Total	**3 hours**	
Full academic year	Prerequisite	--------------

B- Professional Information

1- Course Aims:

This course is important to post graduate students of Diploma program, where it is an independent work leading to writing an extensive article.
Also, each student should prepare a theoretical study which might include some experimental work. A complete analysis is required for each part of the project performed under a specific topic that is relevant to the diploma field of study.
The project is supposed to be presented by each student in front of the department faculty members. The dicussion and the study report are evaluated and given marks by the supervisors.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Identify project requirements. a1-1-2 Recognize the related subjects to the project topic.

	a1-4 Exhibit ability to in detail, creatively, with a high level of clarity and authority, using scientific scrutiny and adequate tools identify, explain, and assess issues pertinent to a Diploma Project in the research field, within which the project is placed.	a1-4-1 Select issues pertinent to a Diploma Project in the research field
A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-1 Discuss Social effects Maritime Industry.	a2-1-1 Identify the project core of study either theoretical or experimental.
	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Outline the methods of solving all the project requirements. a2-2-2 Outline complete analysis for each required part of the project. a2-2-3 Outline a full report illustrating all important parts of the project.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate basic hydrodynamic theory. b1-1-2 Identify the related subjects to the project topic. b1-1-3 Investigate the project core of study either theoretical or experimental.
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Choose the methods of solving all the project requirements.
	b3-2 Perform applied research on industrial and societal concerns related to Naval Architecture and Marine Engineering field (Project).	b3-2-1 Conduct a complete analysis for each required part of the project.
	b3-3 Perform applied research on industrial and societal concerns problems related to Naval Architecture and Marine Engineering field (Project).	b3-3-1 Prepare a full report illustrating all important parts of the project.
C. Professional and practical skills		

C1- Apply professional skills in the field of specialization. .	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Analyze the related subjects to the project topic.
C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Identify the project core of study either theoretical or experimental.
D. General and transferrable skills		
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	d1-1-1 Use communication skills to interact with marine engineers in Suez canal authority and their companies to collect the required data for the project.
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1 Use state-of-the-art computer design tools and applications to perform the required mission.
	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Identify the project core of study either theoretical or experimental. d2-2-2 Plan to enhance the personal skills related to project requirements.
D6- Lead teams in familiar professional context.	d6-1 Lead a team work in specified familiar professional jobs.	d6-1-1 Lead a team to collect data about all important parts of the project.
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	d7-1-1 Improve the included information of the project.
	d7-2 Seek continuous learning through continuous education, organizing and participating in seminars, workshops, national and international conferences.	d7-2-1 Present the project information in a seminar.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Understanding project requirements	15	15	--	--	a1-1-1, a1-1-2, a1-4-1, b1-1-1, b1-1-2, b1-1-3
Review of the related subjects to the project topic	15	15	--	--	a1-1-1, a1-1-2, a1-4-1, b1-1-1, b1-1-2, b1-1-3, c1-1-1
Defining the project core of study either theoretical or experimental	15	15	--	--	a2-2-1, b1-1-1, b1-1-2, b1-1-3, c2-1-1, c2-1-2, d2-2-1, d2-2-2
Introducing the methods of solving all the project requirements	15	15	--	--	a2-2-1, a2-2-2, a2-2-3, b3-1-1, b3-2-1, b3-3-1, d2-2-1, d2-2-2
Making complete analysis for each required part of the project	15	15	--	--	a2-2-1, a2-2-2, a2-2-3, b3-1-1, b3-2-1, b3-3-1
Writing a full report illustrating all important parts of the project	15	15	--	--	a2-2-1, a2-2-2, a2-2-3, b3-1-1, b3-2-1, b3-3-1, c2-1-1, c2-1-2, d1-1-1, d2-1-1, d6-1-1, d7-1-1, d7-2-1
Total	**90**	**90**	--	--	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1), (a1-4) A2(a2-1),(a2-2)	B1(b1-1) B3(b3-1), (b3-2), (b3-3)	C1(c1-1) C2(c2-1)	D1(d1-1) D2(d2-1), (d2-2) D6(d6-1) D7(d7-1), (d7-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	15%	30%	35%	10	10		100%

6- Course Topics.

Topic No.	Topic	Weeks
1st	Understanding project requirements	**1-5**
2nd	Review of the related subjects to the project topic	**6-10**
3rd	Defining the project core of study either theoretical or experimental	**11-15**
4th	Introducing the methods of solving all the project requirements	**16-20**
5th	Making complete analysis for each required part of the project	**21-25**
6th	Writing a full report illustrating all important parts of the project	**26-30**

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-1-1	x	x				
a1-1-2	x	x				

a1-4-1	x	x				
a2-1-1			x			
a2-2-1				x	x	x
a2-2-2				x	x	x
a2-2-3				x	x	x
Course ILOs	**Intellectual skills**					
b1-1-1	x	x	x			
b1-1-2	x	x	x			
b1-1-3	x	x	x			
b3-1-1				x	x	x
b3-2-1				x	x	x
b3-3-1				x	x	x
Course ILOs	**Professional and practical skills**					
c1-1-1		x				
c2-1-1			x			x
Course ILOs	**General and transferrable skills**					
d1-1-1						x
d2-1-1						x
d2-2-1			x	x		
d2-2-2			x	x		
d6-1-1						x
d7-1-1						x
d7-2-1						x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x				x			x	x				
	a1-1-2	x				x			x	x				
	a1-4-1	x				x			x	x				
	a2-1-1	x				x			x	x				
	a2-2-1	x				x			x	x				
	a2-2-2	x				x			x	x				
	a2-2-3	x				x			x	x				
Intellectual Skills	b1-1-1		x	x					x	x				
	b1-1-2		x	x					x	x				
	b1-1-3		x	x					x	x				
	b3-1-1		x	x					x	x				
	b3-2-1		x	x					x	x				
	b3-3-1		x	x					x	x				
Professional Skills	c1-1-1		x	x					x	x				
	c2-1-1		x	x					x	x				
General and transferrable skills	d1-1-1		x	x					x	x				
	d2-1-1		x	x					x	x				
	d2-2-1		x	x					x	x				
	d2-2-2		x	x					x	x				
	d6-1-1		x	x					x	x				
	d7-1-1		x	x					x	x				
	d7-2-1		x	x					x	x				

9- Assessment

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of these **project reports.**

11- References:

Library & previous project reports & department library. Department of Naval Architecture & Marine Engineering, Faculty of Engineering, Port Said University, Egypt.

Course Coordinator: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

Program Specification

Ship Production Diploma

Program Specifications for Ship Production Diploma

A- Basic Information

1- Program title: Ship Production Diploma

2- Program type: Single ☑ Double ☐ Multiple ☐

3- Department (s): Naval Architecture and Marine Engineering

4- Coordinator: Assoc. Prof. Dr. Moustafa Mohamed Moustafa

5- External evaluator(s): Prof. Dr. Mohamed A. Kotb

6- Last date of program specifications approval: August 2019

B- Professional Information

1. Program aims:

A. Understanding the engineering basic sciences.

B. Enhancing the individual skills of using computer programs, charts, tables, and standards in the different fields of Naval Architecture and Marine engineering applications.

C. Providing students with analytical and hands-on knowledge that allow him to excel in the different areas of Naval Architecture and Marine Engineering.

D. Communicating effectively in written, verbal and graphical forms.

E. Preparing students to communicate and work effectively in team and multi-disciplinary technical environments.

2. Graduate Attributes:

A. Application of the acquired specialized knowledge in his/her professional practice.

B. Identifying professional problems and proposing solutions.

C. Mastering of professional skills and the use of appropriate technological means in his/her professional practice.

D. Communication and leadership of a team to work through systematic professional work.

E. Decision making in the light of available information.

F. Employment of available resources efficiently.

G. Awareness of his/her role in the development of society and the preservation of the environment.

H. Act reflects commitment to integrity and credibility of the profession.

I. Awareness of the need to develop him/her self and to engage in continuous learning.

3. Intended Learning Outcomes (ILOs) for the whole program

Ship Production Diploma Program is designed to achieve the above objectives through the following Intended **Learning Outcomes (ILOs)**:

A. Knowledge and understanding			
NAQAAE Academic Reference Standards (ARS)	**ILOs**	**Graduate Attributes**	**Courses Covering such ILOs(by code)**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	A, C	NME501,NME502, NME506, NME512, NME516, NME517, NME520, NME527, NMEP98
	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field Ship structure and technology		NME514, NME516, NME526, NME527, NME528
	a1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of ship hydrodynamics.		NME501,NME506

	a1-4 Exhibit ability to in detail, creatively, with a high level of clarity and authority, using scientific scrutiny and adequate tools identify, explain, and assess issues pertinent to a Diploma Project in the research field, within which the project is placed.	A, B, C, D, E, F	NMEP98
A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-1 Discuss Social effects Maritime Industry.	G	NME506, NME516, NME517, NME521, NME527, NMEP98
	a2-2 Recognize the interaction between ship design and performance.		NME516, NME520, NME521, NME527, NMEP98
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	A3-1 Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.	H	NME506, NME516, NME520, NME521, NME527
A4- Basics and principles of quality in professional practice in the field of specialization.	A4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines	C, E, F	NME502, NME512, NME514, NME520, NME526, NME527, NME528
B. Intellectual skills			
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	A	NME506, NME512, NME514, NME516, NME517, NME520, NME528, NMEP98
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.		NME501,NME506, NME512, NME514, NME521, NME528

B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering.	A, B	NME501,NME502, NME506, NME526
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	A, B, E, F	NME516, NME517, NME520, NME521, NME527, NMEP98
	b3-2 Perform applied research on industrial and societal concerns related to Naval Architecture and Marine Engineering field (Project).		NMEP98
	b3-3 Perform applied research on industrial and societal concerns problems related to Naval Architecture and Marine Engineering field (Project).		NMEP98
B4- Risk assessment in the professional practices.	b4-1 Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development.	G, H	NME506, NME520, NME521, NME526
B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	E	NME502, NME506, NME512, NME520, NME526
C. Professional and practical skills			
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest	A, B, C	NME502, NME506, NME512, NME516, NME517, NME526, NME527, NMEP98

	engineering techniques, skills, and tools.		
C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	I	NME501,NME506, NME514, NME516, NME520, NME521, NME526, NME527, NME528, NMEP98
D. General and transferrable skills			
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	D	NME512, NME520, NMEP98
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	C, F, I	NME501,NME506, NME517, NME521
	d2-2 Employ the information technology skills to serve his / her career development.		NME512, NME516, NME520, NME527, NMEP98
D3- Apply self evaluation and define personal educational needs.	d3-1 Apply self evaluation and specify his educational needs related to Naval Architecture and Marine Engineering aspects.	I	NME521, NME526
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	I	NME514, NME521, NME526, NME528

D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	D, F	NME501,NME516, NME520, NME526, NME527
	d5-2 Manage the time use in a perfect way.		NME501,NME502, NME520
D6- Lead teams in familiar professional context .	d6-1 Lead a team work in specified familiar professional jobs.	D	NMEP98
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	I	NME506, NMEP98
	d7-2 Seek continuous learning through continuous education, organizing and participating in seminars, workshops, national and international conferences.		NMEP98

4. Program Academic Reference Standards (ARS)

The external references for standards considered in the development of this program were the Academic Reference Standards (ARS) for postgraduate programs prepared by the National Authority for Quality Assurance and Accreditation (NAQAAE) on 2009. These standards set out the attributes and academic characteristics that are expected to be achieved by the end of the program.

5. Program Structure and Contents:

5.1 Program Duration:

2 academic years

5.2 Program Structure:

Awarding a Diploma Degree in Ship Production required the following:

- Studying five courses amounting to 15 hours weekly during the first year (two of them are elective courses).
- Studying five courses amounting to 15 hours weekly during the second year (two of them are elective courses).

- Also, required for awarding the Diploma Degree in ship Production is the execution of scientific research (4hours weekly during the second year) that terminated by writing a Project report containing the research results and its complete analysis and defending it successfully.

5.3- Program courses

(Ship Production Diploma – First Year)

Elective Courses				Basic Requirements Courses			
Code	Course Title	hrs /Week	Marks	Code	Course Title	hrs /Week	Marks
NME502	Operational Research	3	100	NME501	Numerical Methods and Programming	3	100
NME506	Ship Rescue	3	100	NME512	Economics of Marine Systems	3	100
NME516	Ship Vibrations	3	100	NME514	Ship Outfitting	3	100
				NME5xx	Elective Course (1)	3	100
				NME5xx	Elective Course (2)	3	100

(Ship Production Diploma – Second Year)

Elective Courses				Basic Requirements Courses			
Code	Course Title	hrs /Week	Marks	Code	Course Title	hrs /Week	Marks
NME517	Ship Structural Design (1)	3	100	NME521	International Conventions & Ships Safety	3	100
NME520	Marine Measuring Tools	3	100	NME527	Ship Construction (1)	3	100
NME526	Under Water Technology	3	100	NME528	Ships Production & Quality Assurance	3	100
				NME5xx	Elective Course (3)	3	100
				NME5xx	Elective Course (4)	3	100
				NMEP98	Project	4	200

6. Program admission requirements

According to the regulations set by the Faculty Council, graduate has to get a result of (Pass) at least to join the program of ship production diploma.

7. Regulations for progression and program completion

The post graduate student must get a minimum of 60% to pass each course. The student achieves one of the following grades in the examinations results and in the general grade according to the marks achieved:

- ***Distinction*** : 90% of the sum of marks or more
- ***Very Good*** : from 80% to less than 90%
- ***Good*** : from 70% to less than 80%
- ***Pass*** :from 60% to less than 70%

8. Evaluation of program intended learning outcomes

- Written examination for each year after 30 weeks.
- At the end of second year, each student presents his graduation project which is evaluated by a committee from a number of the department professors.

9. Program Matrix:

The following table explains the ILO's of ship production diploma program– Course (main ILOs) matrix.

Program Matrix: ILO's (Ship Production Diploma) – Course (main ILOs) matrix.

Code	Course Title	ILOs																									
		a1-1	a1-2	a1-3	a1-4	a2-1	a2-2	a3-1	a4-1	b1-1	b1-2	b2-1	b3-1	b3-2	b3-3	b4-1	b5-1	c1-1	c2-1	d1-1	d2-1	d2-2	d3-1	d4-1	d5-1	d5-2	d6-1	d7-1	d7-2
NME 501	Numerical Methods and Programming	×		×							×	×							×		×				×	×			
NME 502	Operational Research	×							×			×					×	×								×			
NME 506	Ship Rescue	×		×		×		×		×	×	×				×	×	×	×		×							×	
NME 512	Economics of Marine Systems	×							×	×	×						×	×		×		×							
NME 514	Ship Outfitting		×						×	×	×								×					×					
NME 516	Ship Vibrations	×	×			×	×	×		×			×					×	×			×			×				
NME 517	Ship Structural Design (1)	×				×				×			×					×			×								
NME 520	Marine Measuring Tools	×					×	×	×				×			×	×		×	×		×			×	×			
NME 521	International Conventions & Ships Safety					×	×	×			×		×			×			×		×		×	×					
NME 526	Under Water Technology		×						×			×				×	×	×	×				×	×	×				
NME 527	Ship Construction (1)	×	×			×	×	×	×				×					×	×			×			×				
NME 528	Ships Production & Quality Assurance		×						×	×	×								×					×					
NME P98	Project	×			×	×	×			×			×	×	×			×	×	×		×					×	×	×

- ***Program Coordination Committee:***

Programme coordinator: **Assoc. Prof. Dr. Moustafa Mohamed Moustafa**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date : August 2019

NME 501
Numerical Methods and Programming Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Numerical Methods and Programming	**Code Symbol**: **NME 501**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to provide the students with the essential knowledge to understand the methods of Solution and programming of linear and non-linear systems. Also, students get specifically acquainted with the differentiation and integration programming, curves and polynomials fitting and programming, surface creation. This course aims to provide the students with the skills and principles of Numerical Methods and Programming to solve several problems related to the field of marine engineering.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the concepts and theories of mathematics and computer science appropriate to their areas of specialization in Naval Architecture and/or Marine Engineering.	a1-1-1Identify linear and non-linear systems. a1-1-2 Categorize the methods of differentiation and integration programming. a1-1-3 Show the methods of curves and polynomials fitting and programming.

	a1-3Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of ship hydrodynamics.	a1-3-1 Show the methods of surface creation to check the hydrodynamics aspects of marine units.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Evaluate the results of any non-linear system to find the optimum ship design. b1-2-2 Formulate ship hydrostatical data using the differentiation and integration programming methods.
B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering.	b2-1-1 Solve non-linear system to get the hydrodynamic characteristics of marine units. b2-1-2 Create ship lines (ship hull) using the principles of curves and polynomials fitting and programming.
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional report on hydrodynamic characteristics of marine units and its hydrostatical data.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1 Use a programming software to solve several design problems in marine filed.
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5-1-1 Use different information recourses to collect the available data on Numerical Methods and Programming
	d5-2 Manage the time use in a perfect way.	d5-2-1 Plan to achieve the steps of programming any problem in marine field based on Numerical Methods and Programming.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	*Tut.*	*Lab.*	
Solution and programming of linear systems	18	18	---	---	a1-1-1, b1-2-1, d2-1-1, d5-1-1
solution and programming of non-linear systems	18	18	---	---	a1-1-1, b2-1-1, d2-1-1, d5-1-1
differentiation and integration programming	18	18	---	---	a1-1-2 , b1-2-2 , d2-1-1, d5-1-1
curves and polynomials fitting and programming	18	18	---	---	a1-1-3 , b2-1-2 , d2-1-1, d5-1-1
surface creation, applications on marine fields.	18	18	---	---	a1-3-1, b1-2-1, b1-2-2, b2-1-1, b2-1-2, c2-1-1, d2-1-1, d5-2-1
Total	90	90	---	---	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1), (a1-3)	B1(b1-2), B2 (b2-1)	C2(c2-1)	D2 (d2-1) D5 (d5-1), (d5-2)

5- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
5%	**10%**	**20%**	**35%**	**20%**	**10%**	**--**	**100%**

6.Course Topics

Topic No.	Topic	Weeks
1st	Solution and programming of linear systems	1 - 6
2nd	solution and programming of non-linear systems	7 - 12
3rd	differentiation and integration programming	13– 18
4th	curves and polynomials fitting and programming	19–24
5th	surface creation, applications on marine fields.	25–30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**
Course ILOs	**Knowledge & Understanding**				
a1-1-1Identify linear and non-linear systems.	X	X			
a1-1-2 Categorize the methods of differentiation and integration programming.			X		
a1-1-3 Show the methods of curves and polynomials fitting and programming.				X	
a1-3-1 Show the methods of surface creation to check the hydrodynamics aspects of marine units.					X
Course ILOs	**Intellectual skills**				
b1-2-1 Evaluate the results of any non-linear system to find the optimum ship design.	X				X
b1-2-2 Formulate ship hydrostatical data using the differentiation and integration programming methods.			X		X
b2-1-1 Solve non-linear system to get the hydrodynamic characteristics of marine units.		X			X

b2-1-2 Create ship lines (ship hull) using the principles of curves and polynomials fitting and programming.				X	X
Course ILOs	**Professional and practical skills**				
c2-1-1 Prepare a professional report on hydrodynamic characteristics of marine units and its hydrostatical data.					X
Course ILOs	**General and transferrable skills**				
d2-1-1 Use a programming software to solve several design problems in marine filed.	X	X	X	X	X
d5-1-1 Use different information recourses to collect the available data on Numerical Methods and Programming	X	X	X	X	
d5-2-1 Plan to achieve the steps of programming any problem in marine field based on Numerical Methods and Programming.					X

8- Teaching and Learning Method:

Course Intended learning outcomes(ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X	X											
	a1-1-2	X	X											
	a1-1-3	X	X											
	a1-3-1	X	X											
Intellectual Skills	b1-2-1	X	X			X								
	b1-2-2	X	X			X								
	b2-1-1	X	X			X								
	b2-1-2	X	X			X								
Professional Skills	c2-1-1	X	X			X								

General Skills	d2-1-1	X	X											
	d5-1-1	X	X											
	d5-2-1	X	X											

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination: to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	31
Total	100%	

10- <u>Facilities required for teaching and learning</u>

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources to collect the required data for ship outfitting and prepare technical reports.

11- <u>List of references:</u>

1. Claude Brezinski:"Numerical Methods and Algorithms", Springer, ISSN: 1571-5698, 2007.
2. Sastry S.S : " Introductory Methods of Numerical Analysis", Fifth Edition, PHI Learing Private Limited, New Delhi, 2012.
3. Timmy Siauw&Alexandre Bayen: "An Introduction to MATLAB Programming and Numerical Methods for Engineers", First Edition, Academic Press ©2014 , 2014.

Key words for Internet Search:

Numerical Methods, linear and nonlinear programming, curve and polynomials fitting, surface creation.

12- <u>Program Coordination Committee:</u>

Course Coordinator:

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed Moustafa**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 502
Course Specification
Operations Research

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: **Operations Research**	**Code Symbol**: **NME 502**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to provide the student with skills to deal with the problems facing the industrial establishments and formulate these problems in the form of mathematical models that can be solved to assist in making decisions in favor of the establishment such as reducing the cost, increasing the profit, determining the optimal production quantity. It also helps in optimal allocation of available resources such as manpower, machinery, equipment or materials as well as in optimal planning and Scheduling processes.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Show the importance Operation Research a1-1-2 Demonstrate the importance of formulating the problem correctly a1-1-3 Identify mathematical models of Operation Research a1-1-4 Describe and interpret special cases of optimal solution.

		a1.1.5 Show what is an assignment problem
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines	a4-1-1 Recognize different methods of finding Initial Basic Feasible solution to a Transportation problem a4-1-2 Distinguish among the different types of a Transportation Problem a4-1-3 Outline an assignment problem. a4-1-4 Identify different types of assignment problems.
B. Intellectual skills		
B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related toNaval Architecture and Marine Engineering.	b2-1-1 Select graphical and simplex methods to find optimal solution to LP problems b2-1-2 Choose different methods to find optimal solution to transportation problems. b2-1-3 Choose different methods to find optimal solution to assignment problems.
B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5-1-1 Select the different previous methods to take optimal decisions
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization..	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Use the concept of networks for the planning and management of projects
D. General and transferrable skills		

D5- Work in a team and apply time management.	d5-2 Manage the time use in a perfect way.	d5-2-1Use a network to display a Project d5-2-2 Scheduling a Project with CPM (Time Controlling) d5-2-3 Scheduling and Controlling Project Costs

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	*Tut.*	*Lab.*	
1. Nature of operation research	9	9	---	---	a1-1-1, d5-2-1
2. Overview of modeling approach	9	9	---	---	a1-1-2, a1-1-3,b5-1-1
3. Linear programming model – graphical method	6	6	---	---	a1-1-2 , a1-1-3 , a1-1-4,b2-1-1,b5-1-1
4. Linear programming model – simplex method	9	9	---	---	a1-1-2 , a1-1-3 , a1-1-4, b2-1-1, b5-1-1
5. Linear programming model – duality and dual simplex method	6	6	---	---	a1-1-2 , a1-1-3 , a1-1-4, b2-1-1,b5-1-1
6. Transportation problem	9	9	---	---	a1-1-4, a4-1-1,a4-1-2,b2-1-2, b5-1-1,
7. Assignment problem	9	9			a1-1-1,a1-1-2,a1-1-5, a4-1-3, a4-1-4,b2-1-3, b5-1-1
8. Network optimization models	12	12	----	----	a1-1-1, a1-1-2, b7-1-1, c1-1-1, d5-2-1
9. Project management with CPM	9	9			a1-1-1,a1-1-2,c1-1-1, d5-2-2, d5-2-3
10. Nonlinear programming	12	12			a1-1-1,a1-1-2,b2-1-1, b5-1-1
Total	90	90	---	---	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1) A4(a4-1)	B2(b2-1), B5(b5-1)	C1(c1-1)	D5 (d5-2)

5- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**---**	**30%**	**70%**	**--**			**100%**

6- Course Topics

Topic No.	Topic	Weeks
1st	Nature of operation research	1 -3
2nd	Overview of modeling approach	4- 6
3rd	Linear programming model – graphical method	7 – 8
4th	Linear programming model – simplex method	9 – 11
5th	Linear programming model – duality and dual simplex method	12 – 13
6th	Transportation problem	14 -16
7th	Assignment problem	17 - 19
8th	Network optimization models	20 - 23
9th	Project management with CPM	24 - 26
10th	Nonlinear programming	27 - 30

7- <u>ILOs Matrix Topics</u>

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**
Course ILOs	**Knowledge & Understanding**									
a1-1-1 Show the importance Operation Research	X						X	X	X	X
a1-1-2 Demonstrate the importance of formulating the problem correctly		X	X	X	X		X	X	X	X
a1-1-3 Identify mathematical models of Operation Research		X	X	X	X					
a1-1-4 Describe and interpret special cases of optimal solution.			X	X	X	X				
a1.1.5 Show what is an assignment problem							X			
a4-1-1 Recognize different methods of finding Initial Basic Feasible solution to a Transportation problem						X				
a4-1-2 Distinguish among the different types of a Transportation Problem						X				
a4-1-3 Outline an assignment problem.							X			
a4-1-4 Identify different types of assignment problems.							X			
Course ILOs	**Intellectual skills**									
b2-1-1 Select graphical and simplex methods to find optimal solution to LP problems			X	X	X					X
b2-1-2 Choose different methods to find optimal solution to transportation problems.						X				
b2-1-3 Choose different methods to find optimal solution to assignment problems.							X			
b5-1-1 Select the different previous methods to take optimal decisions		X	X	X	X	X	X	X		X
Course ILOs	**Professional and practical skills**									
c1-1-1 Select the concept of networks for the planning and management of projects								X	X	

Course ILOs	General and transferrable skills									
d5-2-1Use a network to display a Project	X							X		
d5-2-2 Scheduling a Project with CPM (Time Controlling)									X	
d5-2-3 Scheduling and Controlling Project Costs									X	

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes(ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X												
	a1-1-2	X		X					X					
	a1-1-3	X		X		X			X					
	a1-1-4	X		X		X								
	a1-1-5	X		X		X								
	a4-1-1	X												
	a4-1-2	X		X		X			X					
	a4-1-3	X		X		X								
	a4-1-4	X							X					
Intellectual Skills	b2-1-1	X		X		X								
	b2-1-2	X				X			X					
	b2-1-3	X		X					X					
	b5-1-1	X				X								
Professional Skills	c1-1-1	X		X		X			X					
General Skills	d5-2-1	X		X					X					
	d5-2-2	X				X								
	d5-2-3	X		X										

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination: to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	31
Total	100%	

10- <u>Facilities required for teaching and learning</u>

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources to collect the required data for operations research.

11- <u>List of references:</u>

1. Frederick S. Hillier, Gerald J. Lieberman:"Introduction to Operations Research", McGraw-Hill, Seventh Edition, NY, 2001.
2. School of science and technology "Operations Research", National Open University of Nigeria, 2014.
3. Tommi Sottinen, "Operations Research with GNU Linear Programming Kit, University of Vaasa, 2009.
4. P. Rama Murthy,"Operation Research", New Age International (P) Ltd., Publishers, New Delhi, 2007.

- **Periodicals, Web sites, etc**

  1. Journal of Operations Research

- **Key words for Internet Search:**

Operations Research,

12- <u>Program Coordination Committee:</u>

Course Coordinator: **Dr. Mohamed A. Mansour**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME506
Ship Rescue
Course Specifications

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Ship Rescue	**Code Symbol: NME 506**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

The course aims to provide students with basic knowledge and skills that are related to marine salvage of different ship casualties. The course overviews all the scientific background previously covered in naval architecture and ship structural analysis to help salvage engineers to identify the situation in strandings and collisions.The student is intended to carry out all preliminary calculations required to manage ship refloating and other slavage techniques.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledgein the field ofNaval Architecture and Marine Engineering	a1-1-1 Recognize the basic principles of naval architecture (flotation, trim and stability) and ship strength and recognize their importance to define a ship casualty.

	a1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of ship hydrodynamics.	a1-3-1 Outline hydrodynamics characteristics of any marine unit during rescue operation.
A2- Mutual relation between professional aspects of professional practice and its effects on the environment.	a2-1 Discuss Social effects of Maritime Industry.	a2-1-1 Recognize the environmental impact of marine casualties a2-1-2 Show the regulations related to safety (SOLAS) and marine salvage practice .
	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Recognize the performance of different ship types during collisions and groundings.
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1 Show the basic steps of risk management. a3-1-2 Recognize the different actions required to ensure successful marine salvage.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate an investigatory approach for detecting problems sources
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Identify the main information required for salver engineers.
B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering.	b2-1-1 Choose approximate methods and formula to be used during salvage operation (hydrostatic and strength data)
B4- Risk assessment in the professional practices.	b4-1 Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development.	b4-1-1Evaluate different possible approaches to manage a given casualty b4-1-2 Identify the risks involved during common salvage operations.

B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5-1-1 Assess the possible decisions of a salver in the most common casualties (with special focus on navigation in Suez Canal) b5-1-2 Discuss risk management to the refloating operation of a grounded vessel.
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Design a complete hypothetical salvage plan to a given casualty.
C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional casualty analysis report.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1Apply computation tools (e.g., Excel) to simplify required computation tasks.
	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Use of a recent commercial software (e.g., HECSALV)
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	d7-1-1 Investigate a complete published recent salvage scenario.

3- <u>Course Contents</u>

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Marine Casualties	15	15	--	--	a2-1-1, a2-2-1 c2-1-1
Salvage equipment and techniques	15	15	--	--	a2-1-2, a3-1-2, b1-2-1
Salvage Calculations	15	15	--	--	a1-1-1, a1-3-1, b2-1-1, d2-1-1, d2-2-1

Refloating and up righting of ships	15	15	--	--	a1-3-1, a3-1-2, b4-1-1, b5-1-1, c1-1-1, c2-1-1, d2-2-1, d7-1-1,
Risk assessment during salvage operations	15	15	--	--	a1-3-1, a3-1-1, b1-1-1, b4-1-2, b5-1-1, b5-1-2
Wrecking and ship breaking	15	15	--	--	a1-1-1, a2-1-1, a2-1-2
Total	90	90	--	--	

4- <u>Relationship between the course and the programme</u>

Field	Academic Reference Standard(ARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1), (a1-3)A2(a2-1);A3(a3-1),	B1(b1-1), (b1-2), B2(b2-1), B4(b4-1), B5(b5-1)	C1(c1-1) C2(c2-1)	D2(d2-1), D7(d7-1)

5- <u>Course Subject Area:</u>

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionr y subjects**	**Total**
---	**---**	**30%**	**50%**	**10%**	**10%**	**--**	**100%**

6- <u>Course Topics.</u>

Topic No.	Topic	Weeks
1st	Marine Casualties	1-5
2nd	Salvage equipment and techniques	6-10
3rd	Salvage Calculations	11-15
4th	Refloating and up righting of ships	16-20
5th	Risk assessment during salvage operations	21-25
6th	Wrecking and ship breaking	26-30

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th
Course ILOs	**Knowledge & Understanding**					
a1-1-1 Recognize the basic principles of naval architecture (flotation, trim and stability) and ship strength and recognize their importance to define a ship casualty.			x			x
a1-3-1 Outline hydrodynamics characteristics of any marine unit during rescue operation.			x	x	x	
a2-1-1 Recognize the environmental impact of marine casualties	x					x
a2-1-2 Show the regulations related to safety (SOLAS) and marine salvage practice .		x				x
a2-2-1 Recognize the performance of different ship types during collisions and groundings.	x					
a3-1-1 Show the basic steps of risk management.					x	
a3-1-2 Recognize the different actions required to ensure successful marine salvage.		x		x		
Course ILOs	**Intellectual skills**					
b1-1-1 Demonstrate an investigatory approach for detecting problems sources					x	
b1-2-1 Identify the main information required for salver engineers.		x				
b2-1-1 Choose approximate methods and formula to be used during salvage operation (hydrostatic and strength data)			x			
b4-1-1Evaluate different possible approaches to manage a given casualty				x		
b b4-1-2 Identify the risks involved during common salvage operations.					x	
b5-1-1 Assess the possible decisions of a salver in the most common casualties (with special focus on navigation in Suez Canal)				x	x	
b5-1-2 Discuss risk management to the refloating operation of a grounded vessel.					x	
Course ILOs	**Professional and practical skills**					
c1-1-1 Design a complete hypothetical salvage plan to a given casualty.				x		
c2-1-1 Prepare a professional casualty analysis report.	x			x		
Course ILOs	**General and transferrable skills**					
d2-1-1Apply computation tools (e.g., Excel) to simplify required computation tasks.			x			
d2-2-1 Use of a recent commercial software (e.g., HECSALV)			x	x		
d7-1-1 Investigate a complete published recent salvage scenario.				x		

8- **Teaching and Learning Method:**

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x			x	x								
	a1-3-1	x			x	x								
	a2-1-1	x	x				x							
	a2-1-2	x												
	a2-2-1	x			x	x								
	a3-1-1	x												
	a3-1-2		x	x										
Intellectual Skills	b1-1-1				x	x			x					
	b1-2-1	X							x					
	b2-1-1				x	x								
	b4-1-1			x			x							
	b4-1-2	X	x	x										
	b5-1-1	X		x										
	b5-1-2													
Professional Skills	c1-1-1													
	c2-1-1								x	x				
General skills	d2-1-1				x	x							x	
	d2-2-1				x	x							x	
	d7-1-1				x				x	x				

9- **Assessment**

9.1 Assessment Methods

Final Written Examination	:	to assess students’ knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- <u>Facilities required for teaching and learning</u>

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to use a commercial computer software for salvage assistance (HECSALV).

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- <u>List of references:</u>

1- HECSALV (2005), Tanker Tutorial, Herbert Software Solutions, Inc.
2- Milwee, J., "Modern Marine Salvage ",Cornell Maritime Press; 1st edition (July 1996)
3- National Geographic, Salvage Code Red,DVD, release date: December 8, 2010
4- NAVSEA (S0300-A6-MAN-010), 2006: U.S. Navy Salvage Manual, Volume 1, Stranding and Harbor Clearance, Published By Direction of Commander, Naval Sea Systems Command, 412 pp
5- NAVSEA (S0300-A6-MAN-050), 2013 : U.S. Navy Ship Salvage Manual Volume 5 (Pol Offloading), Published by Direction of Commander, Naval Sea Systems Command, 212 pp

12- <u>Program Coordination Committee:</u>

Course Coordinator: **Dr. Heba El-Kilani**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME512
Marine Systems Economics
Course Specifications

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: **Marine Systems Economics**	**Code Symbol**: **NME 512**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to provide the students who - are graduated as marine engineers – with the principles of economics and the applications of economics in the fields of Naval Architecture & Marine Engineering .

The information given includes the economical terminology , interest relationships , Design and operation Criteria , Profitability of ships , Optimum speeds and economical life of ships , permissible price of ships , replacement of ships , and elements of marine transport , making feasibility studies of marine projects , putting specifications and contracting terms , also tabulating works and planning .

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering,	a1-1-1 Identify the economical abbreviations applicable to marine engineering fields. a1-1-2 State the elements of marine transport tasks and documentations, And containerization activities. a1-1-3 Identify the time value of cash flow .
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines	a4-1-1 Identify the feasibility of engineering projects. a4-1-2 Outline a comparison between different alternatives in ship design and operation a4-1-3 Show how evaluating the optimum life, optimum speed, permissible price and operation constraints of ships .
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate the linkage between design and operation of ships, and to make the design which is to be the most profitable during operation .
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Identify the time value of money. b1-2-2 Evaluate the feasibility of a ship design or operation project. b1-2-3 Determine the costs of building a ship.

B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5-1-1 Choose economic criteria and decision making considering different economical, technical and environmental issues .
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Design numerical flow chart to determine optimum ship characteristics. c1-1-2 Analyze cost and freight statistics
D. General and transferrable skills		
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	d1-1-1 Use Communicate skills to get the recent information related to ship economy.
D2- Use information technology to improve his/her professional practice.	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Use computers software to analyze statistical information about expenses of operating ships and rates of escalation

3- <u>Course Contents</u>

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Introduction to Engineering Economics , Definitions , Ship design Economics , Traditional and Modern Approaches of Ship Design , Interest Relationships	9	9	--	--	a1-1-1, a1-1-2 a1-1-3, b5-1-1, d1-1-1, d2-2-1
Economic Criteria for Design and Operation Profitability of ships before and after Tax	9	9	--	--	a1-1-3, b1-1-1 b1-2-1, b5-1-1
Profitability of ships before and after Tax	6	6	--	--	a4-1-1, a4-1-2, d2-2-1

Computer Aided Ship Design Economics , Optimum Speeds ,Economical Life and Permissible Price of Ships	9	9	--	--	a4-1-3,c1-1-1
Estimation of Cost of Building and Operating Ships	6	6	--	--	a1-1-2, a4-1-2, b1-2-3
Optimum Life and Replacement Analyses, Optimum life in case of borrowed capitals.	9	9	--	--	a4-1-1, a4-1-3, b1-2-1
Permissible Price of Ships , permissible price of ships in case of borrowed capitals	9	9	--	--	a4-1-3, a6-1-2
Relative costs of ship design parameters	6	6	--	--	b1-2-3, b5-1-1
Economy propellers for reduced power operation	3	3	--	--	c1-1-2
Feasibility of larger diameter propellers in ballast trips	6	6	--	--	a4-1-1, b1-2-2, d1-1-1
Designing ships for fuel economy	6	6	--	--	a4-1-2, b1-1-1, c1-1-2
Priorities for reducing fuel bill	3	3	--	--	b1-1-1,b5-1-1
Chartering of Ships , Elements of Marine Transport , multipurpose ships, Stowage factors, Bill of Lading , Freight Rate , Containerization ,Contracting and planning	9	9	--	--	a1-1-2, a4-1-2, b1-1-1, d1-1-1, d2-2-1
Total	90				

4- <u>Relationship between the course and the programme</u>

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1), A4(a4-1)	B1(b1-1), (b1-2) B5(b5-1)	C1(c1-1)	D1(d1-1), D2(d2-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
20%	---	30%	30%	20%	-------	---------	100%

6- Course Topics

Topic No.	Topic	Weeks
1st	Introduction to Engineering Economics , Definitions , Ship design Economics , Traditional and Modern Approaches of Ship Design , Interest Relationships	1-3
2nd	Economic Criteria for Design and Operation Profitability of ships before and after Tax	4-6
3rd	Profitability of ships before and after Tax	7-8
4th	Computer Aided Ship Design Economics , Optimum Speeds ,Economical Life and Permissible Price of Ships	9-11
5th	Estimation of Cost of Building and Operating Ships	12-13
6th	Optimum Life and Replacement Analyses , Optimum life in case of borrowed capitals	14-16
7th	Permissible Price of Ships , permissible price of ships in case of borrowed capitals	17-19
8th	Relative costs of ship design parameters	20-21
9th	Economy propellers for reduced power operation	22-22
10th	Feasibility of larger diameter propellers in ballast trips	23-24
11th	Designing ships for fuel economy	25-26

12th	Priorities for reducing fuel bill	27-27
13th	Chartering of Ships , Elements of Marine Transport , multipurpose ships, Stowage factors, Bill of Lading , Freight Rate , Containerization ,Contracting and planning	28-30

7- <u>ILOs Matrix Topics</u>

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**	**11th**	**12th**	**13th**
Course ILOs	**Knowledge & Understanding**												
a1-1-1	x												
a1-1-2	x				x								x
a1-1-3	x	x											
a4-1-1			x			x				x			
a4-1-2			x		x						x		x
a4-1-3				x		x	x						
Course ILOs	**Intellectual skills**												
b1-1-1		x									x	x	x
b1-2-1		x				x							
b1-2-2										x			
b1-2-3					x			X					
b5-1-1	x	x						X				x	
Course ILOs	**Professional and practical skills**												
c1-1-1				x									
c1-1-2									x		x		
Course ILOs	**General and transferrable skills**												
d1-1-1	x									x			x
d2-2-1	x		x										x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x			x	x								
	a1-1-2	x			x	x								
	a1-1-3	x			x	x								
	a4-1-1	x			x	x								
	a4-1-2	x			x	x								
	a4-1-3	x			x	x								
Intellectual Skills	b1-1-1	x			x	x								
	b1-2-1	x		x	x									
	b1-2-2	x		x	x									
	b1-2-3	x		x	x									
	b5-1-1	x		x	x									
Professional Skills	c1-1-1	x		x	x									
	c1-1-2	x		x	x									
General Skills	d1-1-1	x												
	d2-2-1	x												

Column group heading: Teaching and Learning Method

9- Assessment

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some Internet research assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- List of references:

[1] Prof.Dr. GalalYounis" Lecture Notes on Ship Economy ", Department of Naval Architecture &Marine Engineering, Faculty of Engineering , Port said , 2003 www.gyounis.net/lectures/Ship Economy.

[2] Harry Benford" Fundamentals of Ship Design Economics", University of Michigan , Department of Naval Architecture & Marine Engineering , ANN RBOR ,1965.

[3] Harry Benford" Profitability Before and After Tax", University of Michigan , Department of Naval Architecture & Marine Engineering , ANN ARBOR ,1966.

[4] Galal Younis: "The Permissible price of Ships in case of Borrowed Capitals", IX Symposium of Theory and Practice of Shipbuilding Dubrovnik , Croatia 19-21 April 1990.

[5] GalalYounis: "A New Method for Predicting Optimal Life of Ships in Cases of Equity and Borrowed Capitals", IX Symposium of Theory and Practice of Shipbuilding Dubrovnik , Croatia 19-21 April 1990.

[6] D.G.M. Watson: " Designing Ships for Fuel Economy " RINA Nov. 1981.

[7] R.F. Burnett: "Designing Ships for Fuel Economy", Shipbuilding & Marine Engineering International, Dec. 1981.

[8] R.F. Burnett: "Priorities for Reducing the Fuel Bill", Shipbuilding & Marine Engineering International , April 1982.

[9] SMM: “Economy Propellers for Reduced Power Operation”, Stone Manganeze Marine Technical Brief No.17 , Nov.1980.

[10] J. Carreyette: “Preliminary Ship Cost Estimation”, RINA, No.4, July 1978.

[11] G.Younis: “The Feasibility of Larger Diameter Propellers in Ballast Trips”, 3rd IMAM , Athens , Greece 1984 .

[12] R. Taggart: "Ship Design and Construction", SNAME Publications , 1980

[13] L. Blank & Antony Tarquin: "Engineering Economy" McGraw-Hill, 1983

[14] Osama Ellian " Fuel and Energy saving Strategies on Ships" A Lloyd's Register Association Paper, 2015

[15]https://web.facebook.com/groups/1819292491715304/?ref=bookmarks

12- Program Coordination Committee:

Course Coordinator: **Prof. Dr. Galal M. Younis**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME514

Ship Outfitting

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma.
Date of specification approval	August 2019

A- Basic Information

Title: **Ship Outfitting**	**Code Symbol**: **NME 514**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to instruct the students about all ship outfitting systems onboard any ship. It also aims to introduce them with the main differences between these systems. Moreover, it gives them a general idea about the job required from each system. Checking and inspection procedure done by the Maritime Inspection Organization is also introduced.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledgein the field Ship structure and technology.	a1-2-1 Identify the requirements of Classification Societies for ship outfitting. a1-2-2 Identify the different types of deck machinery. a1-2-3 Identify the different types of life saving equipment.

A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines.	a4-1-1 Recognize quality assurance concepts for wateright doors. a4-1-2 Recognize quality assurance concepts for deck machinery. a4-1-3 Recognize quality assurance concepts for ship piping systems. a4-1-4 Recognize quality assurance concepts for life saving equipment.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Design a special type of Cargo Derricks b1-1-2 Design of different piping systems. b1-1-3 Design of a specified steering system
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Evaluate stresses on the mast and boom of deck cargo derricks. b1-2-2 Evaluate the adequacy of life saving equipment.
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional report for deck machinery and other equipment
D. General and transferrable skills		
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d4-1-1 Use different information recourses to collect the available data for ship outfitting.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	*Tut.*	*Lab.*	
1. Requirements of Classification Societies	12	12	---	---	a1-2-1, d4-1-1
2. Design of Cargo Derricks	18	18	---	---	a4-1-4, b1-1-1 , b1-2-1, c2-1-1 , d4-1-1
3. Design of Anchors and Capstans	15	15	---	---	a1-2-2 , a1-2-1 , c2-1-1 , d4-1-1
4. Design of Steering Piping systems	15	15	---	---	a4-1-3 , b1-1-3 , d4-1-1
5. Deck Machinery	15	15	---	---	a1-2-2 , a4-1-2 , b1-1-1 , c2-1-1 , d4-1-1
6. Safety Appliances	15	15	---	---	a1-2-3 , a1-2-1 , a4-1-4 , a4-1-1 , b1-1-2 , b1-2-2 , c2-1-1 , d4-1-1
Total	90	90	---	---	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-2) A4(a4-1)	B1(b1-1),(b1-2)	C2(c2-1)	D4(d4-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**---**	**30%**	**70%**	**--**			**100%**

6.Course Topics.

Topic No.	Topic	Weeks
1st	Requirements of Classification Societies	1 - 4
2nd	Design of Cargo Derricks	5 - 10
3rd	Design of Anchors and Capstans	11 – 15
4th	Design of Steering Piping systems	16 – 20
5th	Deck Machinery	21 – 25
6th	Safety Appliances	26 - 30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-2-1 Identify the requirements of Classification Societies for ship outfitting.	X		X			X
a1-2-2 Identify the different types of deck machinery.			X		X	
a1-2-3 Identify the different types of life saving equipment.						X
a4-1-1 Recognize quality assurance concepts for wateright doors.						X
a4-1-2 Recognize quality assurance concepts for deck machinery.					X	
a4-1-3 Recognize quality assurance concepts for ship piping systems.				X		
a4-1-4 Recognize quality assurance concepts for life saving equipment.		X			X	
Course ILOs	**Intellectual skills**					
b1-1-1 Design a special type of Cargo Derricks		X			X	
b1-1-2 Design of different piping systems.						X
b1-1-3 Design of a specified steering system				X		
b1-2-1 Evaluate stresses on the mast and boom of deck cargo derricks.		X				
b1-2-2 Evaluate the adequacy of life saving equipment.						X

Course ILOs	Professional and practical skills					
c2-1-1 Prepare a professional report for deck machinery and other equipment		X	X		X	X
Course ILOs	**General and transferrable skills**					
d4-1-1 Use different information recourses to collect the available data for ship outfitting.	X	X	X	X	X	X

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes(ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-2-1	X												
	a1-2-2	X	X						X					
	a1-2-3	X	X						X					
	a4-1-1	X												X
	a4-1-2	X												X
	a4-1-3	X												X
	a4-1-4	X												X
Intellectual Skills	b1-1-1	X				X								
	b1-1-2	X				X								
	b1-1-3	X	X						X					
	b1-2-1	X				X								
	b1-2-2	X	X											
Professional Skills	c2-1-1	X							X					
General Skills	d4-1-1								X	X				

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination: to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources to collect the required data for ship outfitting and prepare technical reports.

11- List of references:

1. David J. Eyres : “ Ship Construction“, Sixth Edition, Butterworth - Heinemann, ELSEVIER, 2007.
2. The Society of Naval Architects of Korea: “Shipbuilding Technology“, 2015.

Periodicals, Web sites, etc

1. Journal of Ship Research
2. Marine Talk Newsletter

Key words for Internet Search:

Deck machinery, Safety Appliances, Steering System, Ship Outfitting

12- Program Coordination Committee:

Course Coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME516
Ship Vibrations
Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma.
Date of specification approval	August 2019

A- Basic Information

Title: **Ship Vibrations**	**Code Symbol**: **NME 516**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

The course aims to provide students with basic knowledge and skills that are required to carry out Vibration Analysis on Ships. the course gives students an advanced theoretical background in the fundamental vibration diagnoses and limitations. Familiarize students with shipboard vibration types and compatibility problem in design and in-service stages.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Recognize vibration theories
A2- Mutual relation between professional aspects of professional	a2-1 Discuss Social effects of Maritime Industry.	a2-1-1 Define the limitation and vibration criteria

practice and its effects on the Environment.	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Investigate vibration related problems onboard ships
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1Recognize theories used for vibration analysis
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate an investigatory approach for detecting problems sources
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Analyze vibration measurement data and technical raised problems
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Identify problem sources via measurements analysis
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 prepare a professional measurement report for torsional vibration
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Employ course skills in career development
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5-1-1 practice in a team to complete an accurate test/measurement

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1. Theory of vibration and monitoring equipments identifications	15	15	-	--	a1-1-1, a2-1-1 a2-2-1, a3-1-1
2. Hull structural Vibrations	15	15			a1-1-1, a2-1-1 a2-2-1, a3-1-1
3. Shafting and Propeller Vibrations	15	15	-	--	b1-1-1, c1-1-1, c2-1-1, d5-1-1,
4. Hull- Propeller- Engine foundation compatibly	15	15	-	--	b1-1-1, b3-1-1, c2-1-1, d2-2-1, d5-1-1,
5. Vibration monitoring analysis theory and its characteristics	15	15	-	--	b3-1-1, c1-1-1, c2-1-1, d5-1-1
6. Vibration limits and criteria	15	15	-	--	b1-1-1, b3-1-1, c1-1-1, c2-1-1, d1-1-1, d2-2-1, d5-1-1
Total	90		-	--	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1),(a1-2) A2(a2-1), (a2-2) A3(a3-1)	B1(b1-1), B3(b3-1)	C1(c1-1) C2(c2-1)	D2(d2-2) D5(d5-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**---**	**30%**	**70%**	**--**			**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Theory of vibration and monitoring equipments identifications	1-5
2nd	Hull structural Vibrations	6-10
3rd	Shafting and Propeller Vibrations	11-15
4th	Hull- Propeller- Engine foundation compatibly	16-20
5th	Vibration monitoring analysis theory and its characteristics	21-25
6th	Vibration limits and criteria	26-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-1-1 Recognize vibration theories	x	x				
a2-1-1 Define the limitation and vibration criteria	x	x				
a2-2-1 Investigate vibration related problems onboard ships	x	x				
a3-1-1Recognize theories used for vibration analysis	x	x				

Course ILOs	Intellectual skills					
b1-1-1 Demonstrate an investigatory approach for detecting problems sources			x	x		x
b3-1-1 Analyze vibration measurement data and technical raised problems				x	x	x
Course ILOs	**Professional and practical skills**					
c1-1-1 Identify problem sources via measurements analysis			x		x	x
c2-1-1 prepare a professional measurement report for torsional vibration			x	x	x	x
Course ILOs	**General and transferrable skills**					
d2-2-1 Employ course skills in career development				x		x
d5-1-1 practice in a team to complete an accurate test/measurement			x	x	x	x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x												
	a1-1-2	x				x								
	a2-1-1	x				x								
	a2-2-1	x				x								
	a3-1-1	x				x								
Intellectual Skills	b1-1-1		x											
	b3-1-1		x											
Professional Skills	c1-1-1		x											
	c2-1-1		x										x	
General Skills	d2-2-1		x							x				
	d5-1-1		x							x				

9- Assessment

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- List of references:

[1] Daniel, J., "Engineering Vibration", Prentice-Hall, Inc., Asimon & Schuster Company, Englwood cliffs, New Jersey, 1994.

[2] Khurmi, R. S., Gupta, J.K., "Theory of Machines", 11th Edition, Chapter 24, Eurasia Publishing house Ltd., New Delhi, 1994.

[3] Todd, F.H., "Ship Hull Vibration" Edward Arnold Publisher Ltd., London, 1961.

[4] Veritec, (Marine Technology Consultants), "Vibration Control in Ships," VERITEC, Noise and

[5]Meirovitch, Leonard. Fundamentals of vibrations. Waveland Press, 2010.

[6]Thomson, William. Theory of vibration with applications. CRC Press, 2008.

[7]Ogata, Katsuhiko, and Yanjuan Yang. Modern control engineering. Vol. 4. India: Prentice hall, 2002.

[8]Feese, T., and Hill, C., "Guidelines for Preventing Torsional Vibration Problems in Reciprocating Machinery," Gas Machinery Conference, Nashville, Tennessee, October 7, 2002

[9]Magazinvoić G. “Shafting Vibration Primer” technical report, CADEA, Split, Croatia, 2002.

[10]G.Rajko “Propeller Shaft Excitation in the Ship Design Evaluation Procedure”, Brodogradnja, Vol.53, 2005

[11]H. Tienhaara “Guidelines to engine dynamics and vibrations”, Värtsilä NSD Switzerland Ltd, 2004

12- Program Coordination Committee:

Course Coordinator: **Dr. Waleed Yehia**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019.

NME517
Ship Structural Design(1)
Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma.
Date of specification approval	August 2019

A- Basic Information

Title: **Ship Structural Design (1)**	**Code Symbol**: **NME 517**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

The course aims to improve the students knowledge and skills that are required to carry out a complete ship structural design, based on the principles of structural analysis of different levels of structural response and assess the ultimate strength of ship panels.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Identify the role of different theories used in structural analysis in ship structural design. a1-1-2 Define the different cases of limit state design
A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-1 Identify the different structural design aspects made to improve the ship structural behavior during accidents.	a2-1-1 Recognize the appropriate acceptance criteria according to Rules

B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate different theories to assess the strength of ship modules (plates , stiffeners and stiffened panels) b1-1-2 Create idealization to solve structural problems by simplified formulae.
B3- Analytical reading of researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Investigate a detailed case study of a reported structural failure.
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Use the different analytical and numerical tools to perform the design of some ship structural components.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Employ the information technology skills to serve his / her career development.	d2-1-1 Collect casualties reports (Ship Structure Committee or other sources)

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1-Theory of plates and shells	18	18	-	--	a1-1-1, b1-1-1, c1-1-1
2- Theory of plasticity	12	12			a1-1-2, c1-1-1
3- Limit state analysis	12	12	-	--	a1-1-2, a2-1-1, b1-1-1, b3-1-1, d2-1-1
4- Applications of the Finite element method	12	12	-	--	a1-1-1, c1-1-1,
5- Dynamics of ship structures	12	12	-	--	A1-1-1, a2-1-1, b1-1-1, b1-1-2, c1-1-1

6- Applications of elastic stability problems	12	12	-	--	A1-1-2, c1-1-1
7- Introduction to structural optimization	12	12	-	--	A1-1-1, c1-1-1
Total	**90**				

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1) A2(a2-1)	B1(b1-1) B3(b3-1)	C1(c1-1)	D2(d2-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	---	---	**70%**	**20%**	**10%**	---	**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Theory of plates and shells	1-6
2nd	Theory of plasticity	7-10
3rd	Limit state analysis	11-14
4th	Applications of the Finite element method	15-18
5th	Dynamics of ship structures	19-22
6th	Applications of elastic stability problems	23-26
7th	Introduction to structural optimization	27-30

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	**Knowledge & Understanding**						
a1-1-1 Identify the role of different theories used in structural analysis in ship structural design.	x			x	x		x
a1-1-2 Define the different cases of limit state design		x				x	
a2-1-1 Recognize the appropriate acceptance criteria according to Rules			x		x		
Course ILOs	**Intellectual skills**						
b1-1-1 Demonstrate different theories to assess the strength of ship modules (plates , stiffeners and stiffened panels)	x		x		x		
b1-1-2 Create idealization to solve structural problems by simplified formulae.					x		
b3-1-1 Investigate a detailed case study of a reported structural failure.			x				
Course ILOs	**Professional and practical skills**						
c1-1-1 Use the different analytical and numerical tools to perform the design of some ship structural components.	x	x		x	x	x	x
Course ILOs	**General and transferrable skills**						
d2-1-1 Collect casualties reports (Ship Structure Committee or other sources)			x				

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x												
	a1-1-2	x				x								
	a2-1-1	x				x								
Intellectual Skills	b1-1-1		x											
	b1-1-2		x											

	b3-1-1													
Professional Skills	c1-1-1							x					x	

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- <u>Facilities required for teaching and learning</u>

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- <u>List of references:</u>

[1] Paik, J., Thaymballi, A., "Ultimate limit state design of steel plated structures", J.Wiley, 2003.

[2] O.F.Hughes& J. Paik et al., 'Ship structural analysis and design', SNAME, 2010

[3]Timoshenko, S., Woinowsky-Krieger, S., "Theory of plates and shells", Textbook publishers, 2003

[4]http://www.shipstructure.org/

12- <u>Program Coordination Committee:</u>

Course Coordinator: **Dr. Heba S. El-Kilani**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME520

Marine Measuring Tools

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma.
Date of specification approval	August 2019

A- Basic Information

Title: **Marine Measuring Tools**	**Code Symbol**: **NME 520**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

Familiarize students with main principles of measurements, Definition of instrumentation, description of measuring instruments and statistical analysis of experimental data and calculating errors. The students should be aware of measurement procedures during sea trails and diagnostic investigation of problems sources throughout measurements. The course covers the basic control and measurements of propulsion and auxiliary machineries. Ultrasonic testing and investigation skills are also presented by this course.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Recognize theories used for diferent parameters measuremnts. a1-1-2 Identify the normal and limitations for various paremeters to satisfy functional performance

A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Investigate performance related problems through measurements
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1 Recognize theories used for error calculation
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines .	a4-1-1 Outline quality assurance concept to new built/running ships structure and equipment
B. Intellectual skills		
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Analyze measurement data and technical raised problems
B4- Risk assessment in the professional practices.	b4-1 Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development.	b4-1-1 Evaluate the applied and new market marine systems.
B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5-1-1 Assess the possible decisions of repair or renewal of marine systems.
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional measurement report for sea trails or investigation reports
D. General and transferrable skills		
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	d1-1-1 Use quality assurance and investigate tests both onboard ships and in shipyards

D2- Use information technology to improve his/her professional practice.	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Apply course skills in career development
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5-1-1 Practice in a team to complete an accurate test/measurement
	d5-2 Manage the time use in a perfect way.	d5-2-1 Apply time management in test procedure

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1. Basic principles of measurements and instrumentation	15	15	-	--	a1-1-1, a1-1-2, a2-2-1, a3-1-1, a4-1-1
2. Measurements analysis and error calculations	15	15	-	--	a1-1-1, a1-1-2, a2-2-1, a3-1-1, a4-1-1
3. Sea Trials Measurements	12	12	-	--	b4-1-1, c2-1-1, d1-1-1, d5-1-1, d5-2-1
4. Main propulsion and Auxiliary Engines Measurements and Control	15	15	-	--	b3-1-1, b5-1-1, c2-1-1, d2-2-1, d5-1-1, d5-2-1
5. Vibration Measurement Analysis and Condition Monitoring	15	15	-	--	b3-1-1, b4-1-1, c2-1-1, d5-1-1, d5-2-1
6. Ultrasonic Testing and Investigations	15	15	-	--	b3-1-1, b4-1-1, b5-1-1, c2-1-1 d1-1-1, d2-2-1, d5-1-1, d5-2-1
Total	90		-	--	

4- <u>Relationship between the course and the programme</u>

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1) A2(a2-2) A3(a3-1) A4(a4-1)	B3(b3-1), B4(b4-1) B5(b5-1)	C2(c2-1)	D1(d1-1) D2(d2-2) D5(d5-1), (d5-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	30%	70%	--			100%

Course Contents

6- Course Topics.

Topic No.	Topic	Weeks
1st	Basic principles of measurements and instrumentation	1-5
2nd	Measurements analysis and error calculations	6-10
3rd	Sea Trials Measurements	11-15
4th	Main propulsion and Auxiliary Engines Measurements and Control	16-20
5th	Vibration Measurement Analysis and Condition Monitoring	21-25
6th	Ultrasonic Testing and Investigations	26-30

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th
Course ILOs	**Knowledge & Understanding**					
a1-1-1 Recognize theories used for diferent parameters measuremnts.	x	x				
a1-1-2 Identify the normal and limitations for various paremeters to satisfy functional performance	x	x				
a2-2-1 Investigate performance related problems through measurements	x	x				
a3-1-1 Recognize theories used for error calculation	x	x				

a4-1-1 Outline quality assurance concept to new built/running ships structure and equipment	x	x				
Course ILOs	**Intellectual skills**					
b3-1-1 Analyze measurement data and technical raised problems				x	x	x
b4-1-1 Evaluate the applied and new market marine systems.			x	x	x	x
b5-1-1 Assess the possible decisions of repair or renewal of marine systems.						x
Course ILOs	**Professional and practical skills**					
c2-1-1 Prepare a professional measurement report for sea trails or investigation reports			x	x	x	x
Course ILOs	**General and transferrable skills**					
d1-1-1 Use quality assurance and investigate tests both onboard ships and in shipyards			x			x
d2-2-1 Apply course skills in career development				x		x
d5-1-1 Practice in a team to complete an accurate test/measurement			x	x	x	x
d5-2-1 Apply time management in test procedure			x	x	x	x

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x												
	a1-1-2	x				x								
	a2-2-1	x				x								
	a3-1-1	x				x								
	a4-1-1		x							x				
Intellectual Skills	b3-1-1		x											
	b4-1-1		x											
	b5-1-1		x											

Professional Skills	c2-1-1		x										x	
General Skills	d1-1-1		x							x				
	d2-2-1		x							x				
	d5-1-1		x							x				
	d5-2-1		x							x				

9- Assessment

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- List of references:

1- Dominique P., “Fundamentals of Instrumentation and Measurement,” London W1T, ISTE Ltd, 2007

2- A.K.sawhney and P.Sawheny, "A course in Mechanical Measurements and Instrumentation", Dhanpat Rai, Delhi 1998.

3- 2- Holman, "Experimental Methods for Engineering", McGraw Hill 1984.

4- ITTC Recommended procedures “Speed/Power Trial preparation”, 7.5-04-0101.1, 23rd ITTC 2002;

5- International standard ISO 15016 and ISO 19019 “Ship and marine technology – Guidelines for the assessment of speed and power performance by analysis of speed trial data”, First edition 2002-06-15;

6- The Specialist Committee on Speed and Powering Trials. Final report and recommendations to the 23rd ITTC, page 314-367;

7- Meirovitch, Leonard. Fundamentals of vibrations. Waveland Press, 2010

8- G.Rajko “Propeller Shaft Excitation in the Ship Design Evaluation Procedure”, Brodogradnja, Vol.53, 2005

12- Program Coordination Committee:

Course Coordinator: **Dr. Waleed Yehia**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 521

International Conventions and Ship Safety

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: **International Conventions and Ship safety**	**Code Symbol**: **NME 521**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

The course aims to provide students with awareness of different conventions imposed to maritime industry and its impact on design and operations of ships, and the professional and ethical responsibilities of engineers, law and regulations, environmental science and the impact of engineering solutions in a global and societal context.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A2- Mutual relation between professional aspects of professional practice and its effects on the environment.	a2-1 Discuss Social effects of Maritime Industry.	a2-1-1 Identify different threats arising from maritime industry.
	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Recognize the role of legislations in the main evolution in ship design .

A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1Recognize the role of different regulations and conventions during the process of ship design and operation.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Identify the main features and actions controlled by conventions and/or regulations in a given project, e.g., ship conversion or ship repair.
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-2 Perform applied research on industrial and societal concerns related to Naval Architecture and Marine Engineering field (Project).	b3-1-1 Analyze the requirements of formal safety assessment of bulk carriers
B4- Risk assessment in the professional practices.	b4-1 Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development.	b4-1-1 Evaluate Risk assessment in offshore industry
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare professional reports to show the compliance of a given ship with SOLAS and /or MARPOL, or other IMO conventions.
		c2-1-2 Design specific checklists to facilitate inspection tasks related to regulations.
D. General and transferrable skills		
D3- Apply self evaluation and define personal educational needs.	d3-1 Apply self evaluation and specify his educational needs related to Naval Architecture and Marine Engineering aspects.	d3-1-1 Apply self evaluation to assess the acquired awareness of the legislations related to a specific unit (e.g. harbor tug)
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d4-1-1 Plan visits and personal contacts to discuss the responsibilities of inspectors in Port State, classification societies and different national

		authorities.
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	d7-1-1 Investigate a complete published recent conventions and regulations and their updates.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1-Marine activities	9	9	-	--	A2-1-1; d4-1-1
2- Marine accidents	12	12	--	--	A2-1-1; b3-1-1 ;b4-1-1;d7-1-1;
3- Environmental pollution	12	12	-	--	A2-1-1; a2-2-1; b4-1-1
4- Conventions for pollution control	12	12	-	--	A3-1-1;a2-2-1; b4-1-1, c2-1-1; d4-1-1,d7-1-1
5- Navigation conventions	15	15	-	--	A3-1-1;c2-1-2; d4-1-1, d7-1-1
6- Safety and rescue equipment	15	15	-	--	A3-1-1; b3-1-1; b4-1-1; c2-1-1; c2-1-2
7- Certifications and classification	15	15	-	--	B1-2-1; d2-2-1; d3-1-1, d7-1-1
Total	90	90			

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A2(a2-1); (a2-2); A3(a3-1)	B1(b1-2), B3(b3-1), B4(b4-1)	C2(c2-1)	D3(d3-1); D4(d4-1); D7(d7-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
70%	**---**	**----**	**15%**	**--**	**15%**	**---**	**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Marine activities	1-3
2nd	Marine accidents	4-7
3rd	Environmental pollution	8-11
4th	Conventions for pollution control	12-15
5th	Navigation conventions	16-20
6th	Safety and rescue equipment	21-25
7th	Certifications and classification	26-30

7- ILOs Matrix Topics

Course topics	**1^{st}**	**2^{nd}**	**3^{rd}**	**4^{th}**	**5^{th}**	**6^{th}**	**7^{th}**
Course ILOs	**Knowledge & Understanding**						
a2-1-1 Identify different threats arising from maritime industry.	x	x	x				
a2-2-1 Recognize the role of legislations in the main evolution in ship design .			x	x			
a3-1-1Recognize the role of different regulations and conventions during the process of ship design and operation.				x	x	x	
Course ILOs	**Intellectual skills**						
b1-2-1 Identify the main features and actions controlled by conventions and/or regulations in a given project, e.g., ship conversion or ship repair.							x

b3-1-1 Analyze the requirements of formal safety assessment of bulk carriers		x				x	
b4-1-1 Evaluate Risk assessment in offshore industry				x			x
Course ILOs	**Professional and practical skills**						
C2-1-1 Prepare professional reports to show the compliance of a given ship with SOLAS and /or MARPOL, or other IMO conventions.				x			
C2-1-2 Design specific checklists to facilitate inspection tasks related to regulations.					x		
Course ILOs	**General and transferrable skills**						
d3-1-1 Apply self evaluation to assess the acquired awareness of the legislations related to a specific unit (e.g. harbor tug)							x
d4-1-1 Plan visits and personal contacts to discuss the responsibilities of inspectors in Port State, classification societies and different national authorities.	x				x		
d7-1-1 Investigate a complete published recent conventions and regulations and their updates.		x		x	x		x

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a2-1-1	x	x				x							
	a2-2-1		x							x				
	a3-1-1	x		x										
Intellectual Skills	b1-2-1	x							x					
	b3-1-1	x	x											
	b4-1-1	x								x				
Professional Skills	c2-1-1								X					
	c2-1-2								x	x				
General Skills	d3-1-1									x				
	d4-1-1			x						x	x			
	d7-1-1									x				

9- Assessment

9.1 Assessment Methods

Final Written Examination to assess students' knowledge.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector -Library.

A. laboratory Usage:

None

B. Library Usage:

Students should be encouraged to use library technical resources .

11- List of references:

1- MARPOL conventions "International Convention for the Prevention of Pollution from Ships, 73/78", www.imo.org

2- International Convention for the Safety of Life at Sea (SOLAS)

3- IMO Vega computer package, version 2.1

4- Marine Pollution (4th Edition) R.B. Clark, C. Frid and M Atttrill, Oxford Science Publications, 1997,

5- Oil Spill Response in the Marine Environment J.W. Doerffer, Pergamon Press, 1992

6- www.eagle.org

7- www.imo.org

12- Program Coordination Committee:

Course Coordinator: **Dr. Heba S. El-Kilani**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME525

Automatic Control Application in Marine Engineering

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Automatic control application in marine engineering	**Code Symbol**: **NME 525**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	

B- Professional Information

1- Course Aims:

Prepare the students to be familiar with the modern automatic control methods and processes in marine power stations. The students have to know how to design, select and arrange the digital control circuits, air control circuits, hydraulic control circuits and simulation. They have to be capable of install, design and laying the control systems of marine propulsion machinery and adjustment. The student should be familiar with different methods using to control the mooring systems, cargo handling systems, steering systems and control the performance sensitivity of ship operation.After finishing the course, the student will have good knowledge and understanding to deal with the modern automatic control circuits to umprove the ship performance and increase the overall operationg efficience.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Outline a comparative study of marine power stations.
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines.	a4-1-1 Outline a comparsion between the different power stations and components.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Predict and define the suitable systems of marine power stations and piping systems.
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Identify the limit state function.
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Choose the topics and headlines to write a report for a limited task
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1 Use computer program to calculate all the marine index.

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Modeling and simulation	18	18	-	-	a1-1-1, a4-1-1, c1-1-1
Digital control circuits	12	12	-	-	a1-1-1, c1-1-1, c2-1-1
Air control circuits, hydraulic control circuits, pneumatic control circuits.	12	12	-	-	b1-1-1, c2-1-1,
Optimum control systems and filters	12	12	-	-	a1-1-1, d2-1-1
Control system of marine engines and adjustment	15	15	-	-	a1-2-1, c2-1-1
Control circuits of ship maneuvering and cargo handling systems	12	12	-	-	b1-1-1, d2-1-1
Performance sensitivity of control systems and estimation of efficiency	9	9			b1-1-1, d2-1-1
Total	90				

4- <u>Relationship between the course and the programme</u>

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1) A4(a4-1)	B1(b1-1)	C1(c1-1), C2(c2-1)	D2(d2-1)

5- Course Subjects Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---		30%	50%	20%	--		100%

6- Course Topics.

Topic No.	Topic	Weeks
1st	Modeling and simulation	1-6
2nd	Digital control circuits	7-10
3rd	Air control circuits, hydraulic control circuits, pneumatic control circuits.	11-14
4th	Optimum control systems and filters	15-18
5th	Control system of marine engines and adjustment	19-23
6th	Control circuits of ship maneuvering and cargo handling systems	24-27
7th	Performance sensitivity of control systems and estimation of efficiency	28-30

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th	7th
Course ILOs	**Knowledge & Understanding**						
a1-1-1	x	x		x			
a4-1-1	x						
Course ILOs	**Intellectual skills**						
b1-1-1			x			x	x
Course ILOs	**Professional and practical skills**						
c1-1-1	x	x					
C2-1-1		x	X		x		
Course ILOs	**General and transferrable skills**						
d2-1-1				x		x	x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method													
		Lecture	**Presentation and Movies**	**Discussion**	**Tutorial**	**Problem solving**	**Brainstorming**	**Projects**	**Report**	**Self learning**	**Cooperative**	**Discovering**	**Computer Simulation**	**Practical Experiments**
Knowledge & understanding	a1-1-1	x							x					
	a4-1-1	x							x					
Intellectual Skills	b1-2-1	x		x		x	x							
Professional Skills	c1-1-1	x				x			x					
	c2-1-1	x												
General and transferrable skills	d2-1-1	x				x								

9- Assessment

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

- Teaching aids such as overhead projector, data show and computer.
- Regular visit to the Shipyard and power plant sites.

A. laboratory Usage:

none.

B. Library Usage:

Students should be encouraged to use library.

11- **List of references:**

1. S. Barnett, Polynomials and Linear Control Systems, Marcel Dekker, New York, NY, 1983.
2. Carlos A. Smith and Armando B. Corripio, Principles and Practice of Automatic Process Control, 2nd edition, John Wiley& Sons, Inc. 1979.
3. B. D. O. Anderson and J. B. Moore, Optimal Control Linear Quadratic Methods, Dover Publica tions, 2007.
4. R. C. Dorf and R. H. Bishop, Modern Control Systems , Prentice Hall, tenth edition, 2004
5. LR, 'Rules and Regulations for the classification of ships', part 5 Main and Auxiliary Machinery, 2009.

12- **Program Coordination Committee:**

Course Coordinator: **Dr. WaleedYehia**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 527

Ship Construction (1)

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma.
Date of specification approval	August 2019

A- Basic Information

Title: **Ship Construction (1)**	**Code Symbol**: **NME 527**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

The course aims to provide students with basic knowledge and skills that are required to carry out a study on the construction of special units ofships. The course provides the students with an advanced background on the fundamental construction materials, construction criteria, the design of structural connections. It alsofamiliarizes the students with the requirements of the classification societies concerning special and inland navigation units.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Recognize the construction materials used.

A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-1 Discuss Social effects of Maritime Industry.	a2-1-1 Define the construction criteria.
	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Investigate structural connections related problems onboard ships
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1 Recognize the classification societies rules set for building and maintaining ships.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate an investigatory approach for detecting problems sources.
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Analyze and manipulate distortion measures data and technical raised problems.
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Identify problem sources via field search for actual construction failure problems.
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional technical report for construction of a special vessel.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Apply course skills in career development.
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5-1-1 Practice in a team to complete an accurate proposed project.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1. Theory of vibration and monitoring equipments identifications	15	15	-	--	a1-1-1, a2-1-1 a2-2-1, a3-1-1
2. Hull structural Vibrations	15	15			a1-1-1, a2-1-1 a2-2-1, a3-1-1
3. Shafting and Propeller Vibrations	15	15	-	--	b1-1-1, c1-1-1, c2-1-1, d5-1-1,
4. Hull- Propeller- Engine foundation compatibly	15	15	-	--	b1-1-1, b3-1-1, c2-1-1, d2-2-1, d5-1-1,
5. Vibration monitoring analysis theory and its characteristics	15	15	-	--	b3-1-1, c1-1-1, c2-1-1, d5-1-1
6. Vibration limits and criteria	15	15	-	--	b1-1-1, b3-1-1, c1-1-1, c2-1-1, d1-1-1, d2-2-1, d5-1-1
Total	90	--	-	--	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1),(a1-2) A2(a2-1), (a2-2) A3(a3-1)	B1(b1-1), B3(b3-1)	C1(c1-1) C2(c2-1)	D2(d2-2) D5(d5-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**---**	**30%**	**70%**	**--**			**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Ship Construction Materials.	1-5
2nd	Construction Criteria.	6-10
3rd	Design of Structural Connections.	11-15
4th	Construction of Special Units.	16-20
5th	Special Considerations in the Ship's Hull to Avoid Distortions.	21-25
6th	Requirements of the Classification Societies for Building & Maintaining Ships.	26-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-1-1 Recognize the construction materials used.	x	x				
a2-1-1 Define the construction criteria.	x	x				
a2-2-1 Investigate structural connections related problems onboard ships	x	x				
a3-1-1 Recognize the classification societies rules set for building and maintaining ships.	x	x				

Course ILOs	Intellectual skills					
b1-1-1 Demonstrate an investigatory approach for detecting problems sources.			x	x		x
b3-1-1 Analyze and manipulate distortion measures data and technical raised problems.				x	x	x
Course ILOs	**Professional and practical skills**					
c1-1-1 Identify problem sources via field search for actual construction failure problems.			x		x	x
c2-1-1 Prepare a professional technical report for construction of a special vessel.			x	x	x	x
Course ILOs	**General and transferrable skills**					
d2-2-1 Apply course skills in career development.				x		x
d5-1-1 Practice in a team to complete an accurate proposed project.			x	x	x	x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x												
	a1-1-2	x				x								
	a2-1-1	x				x								
	a2-2-1	x				x								
	a3-1-1	x				x								
Intellectual Skills	b1-1-1		x											
	b3-1-1		x											
Professional Skills	c1-1-1		x											
	c2-1-1		x										x	
General Skills	d2-2-1		x							x				
	d5-1-1		x							x				

9- Assessment

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some Internet research assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- List of references:

[1] Eyres, D.J., "Ship Construction", Butterworth-Heinemann, 6th edition,2006.

[2] Yasuhisa Okumoto, Yu Takeda, Masaki Mano, Tetsuo Okada, "Design of Ship Hull Structures – A Practical Guide for Engineers", Springer, 2009.

[3] Robert Taggart, "Ship Design & Construction", SNAME, 1980.

[4] IACS, "Shipbuilding & Repair Quality Standards", IACS, 2006.

[5] "FSC certification". Nrdc.org. Retrieved 2012-06-14.

[6] "Boat building lumber". Glen-l.com. Retrieved 2012-06-14.

[7] "Carvel Planking for Boats, Sailboats - Richard Joyce Montana Tech". Notablemath.weebly.com. Retrieved 2012-06-14

12- Program Coordination Committee:

Course Coordinator: **Dr. Randa Ramadan**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 528

Ship Production and Quality Assurance

Course Specification

Course Specification

Program on which the course is given	Naval Architecture &Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture &Marine Engineering
Department offering the course	Naval Architecture &Marine Engineering
Academic year/Level	Diploma.
Date of specification approval	August 2019

A- Basic Information

Title ship production and quality assurance	**Code Symbol**:**NME528**
Lecture	**3 hours**
Tutorial/ Laboratory	---------
Total	**90 hours**

B- Professional Information

1- Course Aims :

The course aims to instruct the students about methods of production control in shipyards and methods of material handling. Also production planning using (Bert and CPM).Moreover to give them a general idea about criteria of production, operation quality and application on numerical control.

2- Intended Learning Outcomes (ILOs)

A- Knowledge & Understanding		
NAQAAE Academic Reference Standards (ARS)	ILOs	Course ILOs
A1. Theories, basic»} and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field Ship structure and technology.	a1-2-1 Demonstrate the requirements of Classification Societies for ship outfitting. a1-2-2 Categorize the different types of life saving equipment.

A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines.	a4-1-1 Outline quality assurance concepts for life saving equipment.
B- Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate production control methods b1-1-2 Investigate the criteria of production
	bl-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design	b1-2-1 Analyze planning using (Bert and CPM) b1-2-2 Evaluate the adequacy of life saving equipment.
C- Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional report for material and other
D- General and Transferable skills		
D- General and Transferable skills	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d4-1-1 Using different information recourses to collect the available data for ship outfitting

3- Course Contents

Topic	*Total Hours*	*Contacthrs*			*Course ILOs Covered (By No.)*
		Lec	*Tut.*	*Lab.*	
1. Production control methods	15	15	...	...	a1-2-1, b1-2-2, d4-1-1
2. Material handling methods	15	15	...	...	b 1 -1 -1 , b1-2-1, c2-1-1, d4-1 -1
3. Production planning using (Bert and CPM)	15	15	...	...	a 1 -2-1, c2-1-1 , d4-1-1
4. Criteria of production	15	15	...	...	a4-1-1 ،b1-1-2, c2-1-1
5. Operation quality	15	15	...	...	a1-2-2 , bl-1-1, b1-2-1
6. Application on numerical control in production operation	15	15	...	...	a1-2-2 , a4-1-1 , b1-1-2 , b1-2-2 , c2-1-1
Total	90	90	...	...	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-2) A4(a4-1)	B1 (b 1 -1),(b 1-2)	C2(c2-1)	D4(d4-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Discretionary subjects	Total
...	...		100%	--			100%

6- Course Topics.

Topic No.	Topic	Weeks
1st	Production control methods	1-5
2nd	Material handling methods	6-10
3rd	Production planning using (Bert and CPM)	11-15
4th	Criteria of production	16-20
5th	Operation quality	21-25
6th	Application on numerical control in production operation	26-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-2-1 Demonstrate the requirements of Classification Societies for ship outfitting.	X		X			
a1-2-2 Categorize the different types of life saving equipment.					X	X
a4-1-1 Outline quality assurance concepts for life saving equipment.				X		X
Course ILOs	**Intellectual skills**					

b1-1-1 Demonstrate production control methods		X			X	
b1-1-2 Investigate the criteria of production				X		X
b1-2-1 Analyze planning using (Bert and CPM) b1-2-1 Analyze planning using (Bert and CPM)		X			X	
b1-2-2 Evaluate the adequacy of life saving equipment.	X					X
Course ILOs	**Professional and practical skills**					
c2-1-1 Prepare a professional report for material and other		X	X			
Course ILOs	**General and transferrable skills**					
d4-1-1 Using different information recourses to collect the available data for ship outfitting	X	X	X	X		X

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-2-1	X												
	a1-2-2	X	X						X					
	a4-1-1	X												X

Intellectual Skills	bl-1-1	X				X								
	b1-1-2	X	X						X					
	b1 -2-1	X				X								
	b1-2-2	X	X											
Professional Skills	c2-1-1	X							X					
General Skills	d4-1-1								X	X				

9- <u>Assessment</u>

9-1 Assessment Methods

Final Written: to assess students' knowledge, understanding, analysis, Examination Creativity, problem solving, and problem identification.

9-2Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some Internet research assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources to collect The required data for ship technology and quality control and prepare technical reports.

11- List of references:

1. Eyres, D., Ship Construction, 5th Edition, Butterworth-Heinmann, Oxford, UK, 2001.
2. Taylor, D., Merchant Ship Construction, 4th Edition, Institute of Marine Engineers, London,UK, 1998.

3. Taggart, R., Ship Design and Construction, SNAME, New Jersey, USA, 1980.
   Storch, R., Hammon, C., Bunch H., and Moore R., Ship Production, 2nd Edition, SNAMENew Jersey, USA, 1995.
4. Lamb, T., Ship Design and Construction I & II, SNAME, New Jersey, USA, 2003.
5. Lewis, E., Ed. Principles of Naval Architecture: Volume I - Stability and Strength, SNAME,New Jersey, USA, 2012.

12- Program Coordination Committee:

Course Coordinator: Dr. Randa Ramadan

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME P98
Post Graduate Project
Course Specifications

Post Graduate Course Specification

Program on which the course is given	Naval Architecture &Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture &Marine Engineering
Department offering the course	Naval Architecture &Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Project	**Code Symbol**: **NME P98**	
Lecture	**3 hours**	
Tutorial	---------	
Laboratory	---------	
Total	**3 hours**	
Full academic year	Prerequisite	--------------

B- Professional Information

1- Course Aims:

This course is important to post graduate students of Diploma program, where it is an independent work leading to writing an extensive article.
Also, each student should prepare a theoretical study which might include some experimental work. A complete analysis is required for each part of the project performed under a specific topic that is relevant to the diploma field of study.
The project is supposed to be presented by each student in front of the department faculty members. The dicussion and the study report are evaluated and given marks by the supervisors.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Identify project requirements. a1-1-2 Recognize the related subjects to the project topic.

	a1-4 Exhibit ability to in detail, creatively, with a high level of clarity and authority, using scientific scrutiny and adequate tools identify, explain, and assess issues pertinent to a Diploma Project in the research field, within which the project is placed.	a1-4-1 Select issues pertinent to a Diploma Project in the research field
A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-1 Discuss Social effects Maritime Industry.	a2-1-1 Identify the project core of study either theoretical or experimental.
	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Outline the methods of solving all the project requirements. a2-2-2 Outline complete analysis for each required part of the project. a2-2-3 Outline a full report illustrating all important parts of the project.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate basic hydrodynamic theory. b1-1-2 Identify the related subjects to the project topic. b1-1-3 Investigate the project core of study either theoretical or experimental.
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Choose the methods of solving all the project requirements.
	b3-2 Perform applied research on industrial and societal concerns related to Naval Architecture and Marine Engineering field (Project).	b3-2-1 Conduct a complete analysis for each required part of the project.
	b3-3 Perform applied research on industrial and societal concerns problems related to Naval Architecture and Marine Engineering field (Project).	b3-3-1 Prepare a full report illustrating all important parts of the project.
C. Professional and practical skills		

C1- Apply professional skills in the field of specialization. .	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Analyze the related subjects to the project topic.
C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Identify the project core of study either theoretical or experimental.
D. General and transferrable skills		
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	d1-1-1 Use communication skills to interact with marine engineers in Suez canal authority and their companies to collect the required data for the project.
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1 Use state-of-the-art computer design tools and applications to perform the required mission.
	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Identify the project core of study either theoretical or experimental. d2-2-2 Plan to enhance the personal skills related to project requirements.
D6- Lead teams in familiar professional context.	d6-1 Lead a team work in specified familiar professional jobs.	d6-1-1 Lead a team to collect data about all important parts of the project.
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	d7-1-1 Improve the included information of the project.
	d7-2 Seek continuous learning through continuous education, organizing and participating in seminars, workshops, national and international conferences.	d7-2-1 Present the project information in a seminar.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Understanding project requirements	15	15	--	--	a1-1-1, a1-1-2, a1-4-1, b1-1-1, b1-1-2, b1-1-3
Review of the related subjects to the project topic	15	15	--	--	a1-1-1, a1-1-2, a1-4-1, b1-1-1, b1-1-2, b1-1-3, c1-1-1
Defining the project core of study either theoretical or experimental	15	15	--	--	a2-2-1, b1-1-1, b1-1-2, b1-1-3, c2-1-1, c2-1-2, d2-2-1, d2-2-2
Introducing the methods of solving all the project requirements	15	15	--	--	a2-2-1, a2-2-2, a2-2-3, b3-1-1, b3-2-1, b3-3-1, d2-2-1, d2-2-2
Making complete analysis for each required part of the project	15	15	--	--	a2-2-1, a2-2-2, a2-2-3, b3-1-1, b3-2-1, b3-3-1
Writing a full report illustrating all important parts of the project	15	15	--	--	a2-2-1, a2-2-2, a2-2-3, b3-1-1, b3-2-1, b3-3-1, c2-1-1, c2-1-2, d1-1-1, d2-1-1, d6-1-1, d7-1-1, d7-2-1
Total	**90**	**90**	--	--	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1), (a1-4) A2(a2-1),(a2-2)	B1(b1-1) B3(b3-1), (b3-2), (b3-3)	C1(c1-1) C2(c2-1)	D1(d1-1) D2(d2-1), (d2-2) D6(d6-1) D7(d7-1), (d7-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**15%**	**30%**	**35%**	**10**	**10**		**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Understanding project requirements	**1-5**
2nd	Review of the related subjects to the project topic	**6-10**
3rd	Defining the project core of study either theoretical or experimental	**11-15**
4th	Introducing the methods of solving all the project requirements	**16-20**
5th	Making complete analysis for each required part of the project	**21-25**
6th	Writing a full report illustrating all important parts of the project	**26-30**

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-1-1	x	x				
a1-1-2	x	x				

a1-4-1	x	x				
a2-1-1			x			
a2-2-1				x	x	x
a2-2-2				x	x	x
a2-2-3				x	x	x
Course ILOs	**Intellectual skills**					
b1-1-1	x	x	x			
b1-1-2	x	x	x			
b1-1-3	x	x	x			
b3-1-1				x	x	x
b3-2-1				x	x	x
b3-3-1				x	x	x
Course ILOs	**Professional and practical skills**					
c1-1-1		x				
c2-1-1			x			x
Course ILOs	**General and transferrable skills**					
d1-1-1						x
d2-1-1						x
d2-2-1			x	x		
d2-2-2			x	x		
d6-1-1						x
d7-1-1						x
d7-2-1						x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x				x			x	x				
	a1-1-2	x				x			x	x				
	a1-4-1	x				x			x	x				
	a2-1-1	x				x			x	x				
	a2-2-1	x				x			x	x				
	a2-2-2	x				x			x	x				
	a2-2-3	x				x			x	x				
Intellectual Skills	b1-1-1		x	x					x	x				
	b1-1-2		x	x					x	x				
	b1-1-3		x	x					x	x				
	b3-1-1		x	x					x	x				
	b3-2-1		x	x					x	x				
	b3-3-1		x	x					x	x				
Professional Skills	c1-1-1		x	x					x	x				
	c2-1-1		x	x					x	x				
General and transferrable skills	d1-1-1		x	x					x	x				
	d2-1-1		x	x					x	x				
	d2-2-1		x	x					x	x				
	d2-2-2		x	x					x	x				
	d6-1-1		x	x					x	x				
	d7-1-1		x	x					x	x				
	d7-2-1		x	x					x	x				

9- Assessment

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of these **project reports.**

11- References:

Library & previous project reports & department library. Department of Naval Architecture & Marine Engineering, Faculty of Engineering, Port Said University, Egypt.

Course Coordinator: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

Program Specification

Ships Operation and Performance Diploma

Program Specifications for Ships Operation and Performance Diploma

A- Basic Information

1- Program title: Ships Operation and Performance Diploma

2- Program type: Single ✓ Double ☐ Multiple ☐

3- Department (s): Naval Architecture and Marine Engineering

4- Coordinator: Assoc. Prof. Dr. Moustafa Mohamed Moustafa

5- External evaluator(s): Prof.Dr. Mohamed A. Kotb

6- Last date of program specifications approval: August 2019

B- Professional Information

1. Program aims:

A. Understanding the engineering basic sciences.

B. Enhancing the individual skills of using computer programs, charts, tables, and standards in the different fields of Naval Architecture and Marine engineering applications.

C. Providing students with analytical and hands-on knowledge that allow him to excel in the different areas of Naval Architecture and Marine Engineering.

D. Communicating effectively in written, verbal and graphical forms.

E. Preparing students to communicate and work effectively in team and multi-disciplinary technical environments.

2. Graduate Attributes:

A. Application of the acquired specialized knowledge in his/her professional practice.

B. Identifying professional problems and proposing solutions.

C. Mastering of professional skills and the use of appropriate technological means in his/her professional practice.

D. Communication and leadership of a team to work through systematic professional work.

E. Decision making in the light of available information.

F. Employment of available resources efficiently.

G. Awareness of his/her role in the development of society and the preservation of the environment.

H. Act reflects commitment to integrity and credibility of the profession.

I. Awareness of the need to develop him/her self and to engage in continuous learning.

3. Intended Learning Outcomes (ILOs) for the whole program

Ships Operation and Performance Diploma Program is designed to achieve the above objectives through the following Intended Learning Outcomes (ILOs):

A. Knowledge and understanding			
NAQAAE Academic Reference Standards (ARS)	**ILOs**	**Graduate Attributes**	**Courses Covering such ILOs(by code)**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledgein the field ofNaval Architecture and Marine Engineering	A, C	NME501, NME502, NME503, NME511, NME512, NME516, NME520, NME523, NME525, NMEP98
	a1-2 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field Ship structure and technology		NME516, NME526
	a1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of ship hydrodynamics.		NME501, NME503, NME507

	a1-4 Exhibit ability to in detail, creatively, with a high level of clarity and authority, using scientific scrutiny and adequate tools identify, explain, and assess issues pertinent to a Diploma Project in the research field, within which the project is placed.	A, B, C, D, E, F	NMEP98
A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-1 Discuss Social effects Maritime Industry.	G	NME516, NME521, NMEP98
	a2-2 Recognize the interaction between ship design and performance.		NME511, NME516, NME520, NME521, NMEP98
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	A3-1 Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.	H	NME503, NME516, NME520, NME521
A4- Basics and principles of quality in professional practice in the field of specialization.	A4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines	C, E, F	NME502, NME507, NME512, NME520, NME523, NME525, NME526
B. Intellectual skills			
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	A	NME503, NME511, NME512, NME516, NME523, NME525, NMEP98
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.		NME501, NME507, NME512, NME521

B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering.	A, B	NME501, NME502, NME503, NME507, NME526
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	A, B, E, F	NME511, NME516, NME520, NME521, NMEP98
	b3-2 Perform applied research on industrial and societal concerns related to Naval Architecture and Marine Engineering field (Project).		NMEP98
	b3-3 Perform applied research on industrial and societal concerns problems related to Naval Architecture and Marine Engineering field (Project).		NMEP98
B4- Risk assessment in the professional practices.	b4-1 Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development.	G, H	NME520, NME521, NME526
B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	E	NME502, NME512, NME520, NME526
C. Professional and practical skills			
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest	A, B, C	NME502, NME503, NME511, NME512, NME516, NME523, NME525, NME526,

	engineering techniques, skills, and tools.		NMEP98
C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	I	NME501, NME503, NME507, NME511, NME516, NME520, NME521, NME523, NME525, NME526, NMEP98
D. General and transferrable skills			
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	D	NME512, NME520, NMEP98
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	C, F, I	NME501, NME511, NME525, NMEP98
	d2-2 Employ the information technology skills to serve his / her career development.		NME503, NME507, NME512, NME516, NME520, NME523, NMEP98
D3- Apply self evaluation and define personal educational needs.	d3-1 Apply self evaluation and specify his educational needs related to Naval Architecture and Marine Engineering aspects.	I	NME521, NME526
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual	I	NME521, NME526

	knowledge.		
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	D, F	NME501, NME511, NME516, NME520, NME526
	d5-2 Manage the time use in a perfect way.		NME501, NME502, NME520
D6- Lead teams in familiar professional context .	d6-1 Lead a team work in specified familiar professional jobs.	D	NME503, NME507, NMEP98
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	I	NME521, NMEP98
	d7-2 Seek continuous learning through continuous education, organizing and participating in seminars, workshops, national and international conferences.		NMEP98

4. Program Academic Reference Standards (ARS)

The external references for standards considered in the development of this program were the Academic Reference Standards (ARS) for postgraduate programs prepared by the National Authority for Quality Assurance and Accreditation (NAQAAE) on 2009. These standards set out the attributes and academic characteristics that are expected to be achieved by the end of the program.

5. Program Structure and Contents:

5.1 Program Duration:

2 academic years

5.2 Program Structure:

Awarding a Diploma Degree in Ships Operation and Performance required the following:

- Studying five courses amounting to 15 hours weekly during the first year (two of them are elective courses).

- Studying five courses amounting to 15 hours weekly during the second year (two of them are elective courses).
- Also, required for awarding the Diploma Degree in Ships Operation and Performance is the execution of scientific research (4hours weekly during the second year) that terminated by writing a Project report containing the research results and its complete analysis and defending it successfully.

5.3- Program courses

(Ships Operation and Performance Diploma – First Year)

Elective Courses				Basic Requirements Courses			
Code	Course Title	hrs /Week	Marks	Code	Course Title	hrs /Week	Marks
NME502	Operational Research	3	100	NME501	Numerical Methods and Programming	3	100
NME511	Ship Steering and Maneuverability	3	100	NME520	Marine Measuring Tools	3	100
NME512	Marine Systems Economics	3	100	NME523	Marine Power Stations	3	100
				NME5xx	Elective Course (1)	3	100
				NME5xx	Elective Course (2)	3	100

(Ships Operation and Performance Diploma – Second Year)

Elective Courses				Basic Requirements Courses			
Code	Course Title	hrs /Week	Marks	Code	Course Title	hrs /Week	Marks
NME516	Ship Vibrations	3	100	NME503	Ship Propulsion System	3	100
NME525	Automatic Control Application in Marine Engineering	3	100	NME507	Ship Performance	3	100
NME526	Underwater Technology	3	100	NME521	International Conventions & Ships Safety	3	100
				NME5xx	Elective Course (3)	3	100
				NME5xx	Elective Course (4)	3	100
				NMEP98	Project	4	200

6. Program admission requirements

According to the regulations set by the Faculty Council, graduate has to get a result of (Pass) at least to join the program of Ships Operation and Performance diploma.

7. Regulations for progression and program completion

The post graduate student must get a minimum of 60% to pass each course. The student achieves one of the following grades in the examinations results and in the general grade according to the marks achieved:

- ***Distinction*** : 90% of the sum of marks or more
- ***Very Good*** : from 80% to less than 90%
- ***Good*** : from 70% to less than 80%
- ***Pass*** :from 60% to less than 70%

8. Evaluation of program intended learning outcomes

- Written examination for each year after 30 weeks.
- At the end of second year, each student presents his graduation project which is evaluated by a committee from a number of the department professors.

9. Program Matrix:

The following table explains the ILO's of Ships Operation and Performance diploma program– Course (main ILOs) matrix.

Program Matrix: ILO's (Ships Operation and Performance Diploma) – Course (main ILOs) matrix.

Code	Course Title	ILOs																											
		a1-1	a1-2	a1-3	a1-4	a2-1	a2-2	a3-1	a4-1	b1-1	b1-2	b2-1	b3-1	b3-2	b3-3	b4-1	b5-1	c1-1	c2-1	d1-1	d2-1	d2-2	d3-1	d4-1	d5-1	d5-2	d6-1	d7-1	d7-2
NME 501	Numerical Methods and Programming	×		×							×	×							×		×				×	×			
NME 502	Operational Research	×							×			×					×	×								×			
NME 503	Ship Propulsion System	×		×				×		×		×						×	×			×					×		
NME 507	Ship Performance			×					×		×	×							×			×					×		
NME 511	Ship Steering and Maneuverability	×					×			×			×					×	×		×				×				
NME 512	Economics of Marine Systems	×							×	×	×						×	×		×		×							
NME 516	Ship Vibrations	×	×			×	×	×		×			×					×	×			×			×				
NME 520	Marine Measuring Tools	×					×	×	×				×			×	×		×	×		×			×	×			
NME 521	International Conventions & Ships Safety					×	×	×			×		×			×			×				×	×				×	
NME 523	Marine Power Stations	×							×	×								×	×			×							
NME 525	Automatic Control Application in Marine Engineering	×							×	×								×	×		×								
NME 526	Under Water Technology		×						×			×				×	×	×	×				×	×	×				
NME P98	Project	×			×	×	×			×			×	×	×			×	×	×	×	×					×	×	×

- ***Program Coordination Committee:***

Programme coordinator: **Assoc. Prof. Dr. Moustafa Mohamed Moustafa**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date : August 2019

NME 501
Numerical Methods and Programming Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Numerical Methods and Programming	**Code Symbol**: **NME 501**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to provide the students with the essential knowledge to understand the methods of Solution and programming of linear and non-linear systems. Also, students get specifically acquainted with the differentiation and integration programming, curves and polynomials fitting and programming, surface creation. This course aims to provide the students with the skills and principles of Numerical Methods and Programming to solve several problems related to the field of marine engineering.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the concepts and theories of mathematics and computer science appropriate to their areas of specialization in Naval Architecture and/or Marine Engineering.	a1-1-1Identify linear and non-linear systems. a1-1-2 Categorize the methods of differentiation and integration programming. a1-1-3 Show the methods of curves and polynomials fitting and programming.

	a1-3Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of ship hydrodynamics.	a1-3-1 Show the methods of surface creation to check the hydrodynamics aspects of marine units.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Evaluate the results of any non-linear system to find the optimum ship design. b1-2-2 Formulate ship hydrostatical data using the differentiation and integration programming methods.
B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering.	b2-1-1 Solve non-linear system to get the hydrodynamic characteristics of marine units. b2-1-2 Create ship lines (ship hull) using the principles of curves and polynomials fitting and programming.
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional report on hydrodynamic characteristics of marine units and its hydrostatical data.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1 Use a programming software to solve several design problems in marine filed.
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5-1-1 Use different information recourses to collect the available data on Numerical Methods and Programming
	d5-2 Manage the time use in a perfect way.	d5-2-1 Plan to achieve the steps of programming any problem in marine field based on Numerical Methods and Programming.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	*Tut.*	*Lab.*	
Solution and programming of linear systems	18	18	---	---	a1-1-1, b1-2-1, d2-1-1, d5-1-1
solution and programming of non-linear systems	18	18	---	---	a1-1-1, b2-1-1, d2-1-1, d5-1-1
differentiation and integration programming	18	18	---	---	a1-1-2 , b1-2-2 , d2-1-1, d5-1-1
curves and polynomials fitting and programming	18	18	---	---	a1-1-3 , b2-1-2 , d2-1-1, d5-1-1
surface creation, applications on marine fields.	18	18	---	---	a1-3-1, b1-2-1, b1-2-2, b2-1-1, b2-1-2, c2-1-1, d2-1-1, d5-2-1
Total	90	90	---	---	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1), (a1-3)	B1(b1-2), B2 (b2-1)	C2(c2-1)	D2 (d2-1) D5 (d5-1), (d5-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
5%	**10%**	**20%**	**35%**	**20%**	**10%**	**--**	**100%**

6.Course Topics

Topic No.	Topic	Weeks
1st	Solution and programming of linear systems	1 - 6
2nd	solution and programming of non-linear systems	7 - 12
3rd	differentiation and integration programming	13– 18
4th	curves and polynomials fitting and programming	19–24
5th	surface creation, applications on marine fields.	25–30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**
Course ILOs	**Knowledge & Understanding**				
a1-1-1Identify linear and non-linear systems.	X	X			
a1-1-2 Categorize the methods of differentiation and integration programming.			X		
a1-1-3 Show the methods of curves and polynomials fitting and programming.				X	
a1-3-1 Show the methods of surface creation to check the hydrodynamics aspects of marine units.					X
Course ILOs	**Intellectual skills**				
b1-2-1 Evaluate the results of any non-linear system to find the optimum ship design.	X				X
b1-2-2 Formulate ship hydrostatical data using the differentiation and integration programming methods.			X		X
b2-1-1 Solve non-linear system to get the hydrodynamic characteristics of marine units.		X			X

b2-1-2 Create ship lines (ship hull) using the principles of curves and polynomials fitting and programming.				X	X
Course ILOs	**Professional and practical skills**				
c2-1-1 Prepare a professional report on hydrodynamic characteristics of marine units and its hydrostatical data.					X
Course ILOs	**General and transferrable skills**				
d2-1-1 Use a programming software to solve several design problems in marine filed.	X	X	X	X	X
d5-1-1 Use different information recourses to collect the available data on Numerical Methods and Programming	X	X	X	X	
d5-2-1 Plan to achieve the steps of programming any problem in marine field based on Numerical Methods and Programming.					X

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes(ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X	X											
	a1-1-2	X	X											
	a1-1-3	X	X											
	a1-3-1	X	X											
Intellectual Skills	b1-2-1	X	X			X								
	b1-2-2	X	X			X								
	b2-1-1	X	X			X								
	b2-1-2	X	X			X								
Professional Skills	c2-1-1	X	X			X								

General Skills	d2-1-1	X	X											
	d5-1-1	X	X											
	d5-2-1	X	X											

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination: to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	31
Total	100%	

10- <u>Facilities required for teaching and learning</u>

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources to collect the required data for ship outfitting and prepare technical reports.

11- <u>List of references:</u>

1. Claude Brezinski:"Numerical Methods and Algorithms", Springer, ISSN: 1571-5698, 2007.
2. Sastry S.S : " Introductory Methods of Numerical Analysis", Fifth Edition, PHI Learing Private Limited, New Delhi, 2012.
3. Timmy Siauw&Alexandre Bayen: "An Introduction to MATLAB Programming and Numerical Methods for Engineers", First Edition, Academic Press ©2014 , 2014.

Key words for Internet Search:

Numerical Methods, linear and nonlinear programming, curve and polynomials fitting, surface creation.

12- <u>Program Coordination Committee:</u>

Course Coordinator:

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed Moustafa**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 502
Course Specification
Operations Research

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: **Operations Research**	**Code Symbol**: **NME 502**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to provide the student with skills to deal with the problems facing the industrial establishments and formulate these problems in the form of mathematical models that can be solved to assist in making decisions in favor of the establishment such as reducing the cost, increasing the profit, determining the optimal production quantity. It also helps in optimal allocation of available resources such as manpower, machinery, equipment or materials as well as in optimal planning and Scheduling processes.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Show the importance Operation Research a1-1-2 Demonstrate the importance of formulating the problem correctly a1-1-3 Identify mathematical models of Operation Research a1-1-4 Describe and interpret special cases of optimal solution.

		a1.1.5 Show what is an assignment problem
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines	a4-1-1 Recognize different methods of finding Initial Basic Feasible solution to a Transportation problem a4-1-2 Distinguish among the different types of a Transportation Problem a4-1-3 Outline an assignment problem. a4-1-4 Identify different types of assignment problems.
B. Intellectual skills		
B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related toNaval Architecture and Marine Engineering.	b2-1-1 Select graphical and simplex methods to find optimal solution to LP problems b2-1-2 Choose different methods to find optimal solution to transportation problems. b2-1-3 Choose different methods to find optimal solution to assignment problems.
B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5-1-1 Select the different previous methods to take optimal decisions
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization..	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Use the concept of networks for the planning and management of projects
D. General and transferrable skills		

D5- Work in a team and apply time management.	d5-2 Manage the time use in a perfect way.	d5-2-1Use a network to display a Project d5-2-2 Scheduling a Project with CPM (Time Controlling) d5-2-3 Scheduling and Controlling Project Costs

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	*Tut.*	*Lab.*	
1. Nature of operation research	9	9	---	---	a1-1-1, d5-2-1
2. Overview of modeling approach	9	9	---	---	a1-1-2, a1-1-3,b5-1-1
3. Linear programming model – graphical method	6	6	---	---	a1-1-2 , a1-1-3 , a1-1-4,b2-1-1,b5-1-1
4. Linear programming model – simplex method	9	9	---	---	a1-1-2 , a1-1-3 , a1-1-4, b2-1-1, b5-1-1
5. Linear programming model – duality and dual simplex method	6	6	---	---	a1-1-2 , a1-1-3 , a1-1-4, b2-1-1,b5-1-1
6. Transportation problem	9	9	---	---	a1-1-4, a4-1-1,a4-1-2,b2-1-2, b5-1-1,
7. Assignment problem	9	9			a1-1-1,a1-1-2,a1-1-5, a4-1-3, a4-1-4,b2-1-3, b5-1-1
8. Network optimization models	12	12	----	----	a1-1-1, a1-1-2, b7-1-1, c1-1-1, d5-2-1
9. Project management with CPM	9	9			a1-1-1,a1-1-2,c1-1-1, d5-2-2, d5-2-3
10. Nonlinear programming	12	12			a1-1-1,a1-1-2,b2-1-1, b5-1-1
Total	90	90	---	---	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1) A4(a4-1)	B2(b2-1), B5(b5-1)	C1(c1-1)	D5 (d5-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**---**	**30%**	**70%**	**--**			**100%**

6- Course Topics

Topic No.	Topic	Weeks
1st	Nature of operation research	1 -3
2nd	Overview of modeling approach	4- 6
3rd	Linear programming model – graphical method	7 – 8
4th	Linear programming model – simplex method	9 – 11
5th	Linear programming model – duality and dual simplex method	12 – 13
6th	Transportation problem	14 -16
7th	Assignment problem	17 - 19
8th	Network optimization models	20 - 23
9th	Project management with CPM	24 - 26
10th	Nonlinear programming	27 - 30

7- ILOs Matrix Topics

Course topics	**1^{st}**	**2^{nd}**	**3^{rd}**	**4^{th}**	**5^{th}**	**6^{th}**	**7^{th}**	**8^{th}**	**9^{th}**	**10^{th}**
Course ILOs	**Knowledge & Understanding**									
a1-1-1 Show the importance Operation Research	X						X	X	X	X
a1-1-2 Demonstrate the importance of formulating the problem correctly		X	X	X	X		X	X	X	X
a1-1-3 Identify mathematical models of Operation Research		X	X	X	X					
a1-1-4 Describe and interpret special cases of optimal solution.			X	X	X	X				
a1.1.5 Show what is an assignment problem							X			
a4-1-1 Recognize different methods of finding Initial Basic Feasible solution to a Transportation problem						X				
a4-1-2 Distinguish among the different types of a Transportation Problem						X				
a4-1-3 Outline an assignment problem.							X			
a4-1-4 Identify different types of assignment problems.							X			
Course ILOs	**Intellectual skills**									
b2-1-1 Select graphical and simplex methods to find optimal solution to LP problems			X	X	X					X
b2-1-2 Choose different methods to find optimal solution to transportation problems.						X				
b2-1-3 Choose different methods to find optimal solution to assignment problems.							X			
b5-1-1 Select the different previous methods to take optimal decisions		X	X	X	X	X	X	X		X
Course ILOs	**Professional and practical skills**									
c1-1-1 Select the concept of networks for the planning and management of projects								X	X	

Course ILOs	General and transferrable skills									
d5-2-1Use a network to display a Project	X							X		
d5-2-2 Scheduling a Project with CPM (Time Controlling)									X	
d5-2-3 Scheduling and Controlling Project Costs									X	

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes(ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	X												
	a1-1-2	X		X					X					
	a1-1-3	X		X		X			X					
	a1-1-4	X		X		X								
	a1-1-5	X		X		X								
	a4-1-1	X												
	a4-1-2	X		X		X			X					
	a4-1-3	X		X		X								
	a4-1-4	X							X					
Intellectual Skills	b2-1-1	X		X		X								
	b2-1-2	X				X			X					
	b2-1-3	X		X					X					
	b5-1-1	X				X								
Professional Skills	c1-1-1	X		X		X			X					
General Skills	d5-2-1	X		X					X					
	d5-2-2	X				X								
	d5-2-3	X		X										

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination: to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	Week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. Library Usage:

Students should be encouraged to use library technical resources to collect the required data for operations research.

11- List of references:

1. Frederick S. Hillier, Gerald J. Lieberman:"Introduction to Operations Research", McGraw-Hill, Seventh Edition, NY, 2001.
2. School of science and technology "Operations Research", National Open University of Nigeria, 2014.
3. Tommi Sottinen, "Operations Research with GNU Linear Programming Kit, University of Vaasa, 2009.
4. P. Rama Murthy,"Operation Research", New Age International (P) Ltd., Publishers, New Delhi, 2007.

- **Periodicals, Web sites, etc**

  1. Journal of Operations Research

- **Key words for Internet Search:**

Operations Research,

12- Program Coordination Committee:

Course Coordinator: **Dr. Mohamed A. Mansour**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME503
Ship Propulsion Systems
Course Specifications

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Ship Propulsion Systems	**Code Symbol**: **NME 503**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course is useful and important to Ph. D. students, where it aims to provide them with the principles of efficient and safe ship propeller design. Also it provides them with information about powering of ships, propulsion efficiency, cavitation, wake fraction and thrust deduction factor of ship propeller. The course aims also to provide Ph.D. students with an understanding of linear lifting line and lifting surface theories, and panel method. Theory of operation and applications of different non-conventional propulsion devices are also considered. Also, propeller/engine compatibility, and how to improve propeller performance are studied. Propeller vibration and energy conservation are also considered.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO’s**	**Course ILO’s**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Recognize different theories of ship propeller. a1-1-2 Identify the interaction between ship’s hull, propeller and rudder. a1-1-3 Demonstrate the propeller/engine compatibility, and propeller performance.
	a1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of ship hydrodynamics.	a1-3-1 Identify the components of marine propulsion systems. a1-3-2 Recognize the principles of powering and efficiencies.
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1 Recognize the properties of optimum & safe propeller. a3-1-2 Categorize conventional & non-conventional propulsion devices. a3-1-3 Show how to design a marine propeller
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Choose the suitable propulsion configuration. b1-1-2 Investigaet the ability to apply modern theories, methods and computer programs in propeller design.

B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering.	b2-1-1 Determine the powering requirements and efficiencies of a ship propeller.
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Use the charts to design propeller according to ship operating conditions. c1-1-2 Demonstrate the interaction between hull, propeller and rudder, for least vibration.
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare search reports for specific types of nonconventional Propellers.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Apply course skills in career development.
D6- Lead teams in familiar professional context	d6-1 Lead a team work in specified familiar professional jobs.	d6-1-1 Use the laboratory and measurement devices to conduct the propeller tests.

3- <u>Course Contents</u>

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Different Propeller Theories	9	9	--	--	a1-1-1, a3-1-3, b1-1-2
Conventional Propellers – Report on Types, Use, Components,…etc.	9	9	--	--	a1-3-1, a3-1-2 d2-2-1
Propeller Action, Arrangement, Configuration, …etc.	12	12	--	--	b1-1-1, d2-1

Powering of Ships and Interaction between Hull, Propeller, and Rudder	12	12	--	--	a1-1-2, a1-3-2, b2-1-1, c1-1-2
Open Water and Cavitation/Wind Tunnel Propeller Model Tests	9	9	--	--	a3-1-1, d6-1-1
Design of a Marine Screw Propeller Using Standard Series and Computer Applications	9	9	--	--	b1-1-2, c1-1-1, d6-1-1
Propeller Cavitation	6	6	--	--	a3-1-1, b2-1-1
Non-Conventional Propulsion Devices – Report on Types, Use, Components,…etc.	9	9	--	--	a1-3-1, a3-1-2, a6-1-3, c2-1-1
Propeller Performance and Propeller Caused Vibration	6	6	--	--	a1-1-3, a3-1-1, c1-1-2
Propeller/Engine Compatibility, and Ship Energy Conservation	9	9	--	--	a1-1-3, d6-1-1
Total	90				

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1), (a1-3) A3(a3-1)	B1(b1-1), B2(b2-1)	C1(c1-1), C2(c2-1)	D2(d2-2) D6(d6-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
-----	25%	25%	25%	15%	10%	---------	100%

6- Course Topics

Topic No.	Topic	Weeks
1st	Different Propeller Theories	1-3
2nd	Conventional Propellers – Report on Types, Use, Components,…etc.	4-6
3rd	Propeller Action, Arrangement, Configuration, …etc.	7-10
4th	Powering of Ships and Interaction between Hull, Propeller, and Rudder	11-14
5th	Open Water and Cavitation/Wind Tunnel Propeller Model Tests	15-17
6th	Design of a Marine Screw Propeller Using Standard Series and Computer Applications	18-20
7th	Propeller Cavitation	21-22
8th	Non-Conventional Propulsion Devices – Report on Types, Use, Components,…etc.	23-25
9th	Propeller Performance and Propeller Caused Vibration	26-27
10th	Propeller/Engine Compatibility, and Ship Energy Conservation	28-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**
Course ILOs	**Knowledge & Understanding**									
a1-1-1	X									
a1-1-2				X						
a1-1-3									X	X
a1-3-1		X						X		
a1-3-2				X						

a3-1-1					X		X		X	
a3-1-2		X						X		
a3-1-3	X					X				
Course ILOs	**Intellectual skills**									
b1-1-1			X							
b1-1-2	X					x				
b2-1-1				X			X			
Course ILOs	**Professional and practical skills**									
c1-1-1						x				
c1-1-2				x					X	
c2-1-1								X		
Course ILOs	**General and transferrable skills**									
d2-2-1		X	X							
d6-1-1					X	X				X

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x			x	x								
	a1-1-2	x			x	x								

	a1-1-3	x			x	x								
	a1-3-1	x			x	x								
	a1-3-2	x			x	x								
	a3-1-1	x			x	x								
	a3-1-2	x			x	x								
	a3-1-3	x			x	x								
Intellectual Skills	b1-1-1	x			x	x								
	b1-1-2	x			x	x								
	b2-1-1	x			x	x								
Professional Skills	c1-1-1	x			x	x								
	c1-1-2	x			x	x								
	c2-1-1	x			x	x								
General Skills	d2-2-1								x					
	d6-1-1								x					

9- Assessment

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some Internet research assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- List of references:

11.1. Lecture Notes:

Prof. Dr. Mo’men Gaafary, "Marine Propulsion, Theory & Design", Department of Naval Architecture & Marine Engineering, Faculty of Engineering, Port Said University, Egypt.

11.2 Recommended Books:

1. J.P. Comstock , "Principals of Naval Architecture", SNAME Publications , 2012.
2. K.J.Rawson , E.C. Tupper " Basic Ship Theory ", Vol. 2. Longman , London & New York , 2009.
3. Mo’men Gaafary, "Unsteady Forces Acting on Ship Propellers of Low-Aspect Ratio,” Ph.D. Dissertation, Stevens Institute of Technology, Hoboken, New Jersey, USA, 1987.
4. Mo’men Gaafary, “Some 12 Published International Research Papers on Marine Propulsion and Non-Conventional Propulsion Systems and Devices,” 1990-2010.

11.3 Key words for Internet Search:

Marine Propellers, Non-Conventional Propulsion, Ship Propulsion.

12- Program Coordination Committee:

Course Coordinator: Prof. Dr. Mo'men Gaafary

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 507
Ship Performance
Course Specifications

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Ship Performance	**Code Symbol**: **NME 507**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	

B- Professional Information

1- Course Aims:

This course aims to tutor the students how to estimate ship propulsion powering, propeller design, predict ship performance in service. It also aims account for ship hull and propeller roughness during powering estimation. Moreover, it helps them to estimate powering, bollard pull, and performance of tugs. Keeping students familiar with Sea trails and measurements conducted during these trials. Students will be able to predict ship speed loss due to waves and wind in service. In additoin, Students will be able to Review of the application of natural gas in marine field .

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-3 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of ship hydrodynamics.	a1-3-1 Identify the different resistance and powering calculation methods. a1-3-2 Identify propeller design theories.

A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines.	a4-1-1 Outline quality assurance concept at conducting sea trials for ships. a4-1-2 Identify the power penalty due to hull and propeller roughness.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Determine ship resistance and powering. b1-2-2 Apply Measurements for typical replica of hull and propeller surfaces.
B2- Solve specialized problems in the field of practice.	b2-1 Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering.	b2-1-1 Design of B-type marine propellers. b2-1-2 Predict ship performance for ships in service.
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare technical report for the results of sea trials. c2-1-2 Prepare a scientific report on engine performance.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Manage seminars on natural gas powered vessels.
D6- Lead teams in familiar professional context	d6-1 Lead a team work in specified familiar professional jobs.	d6-1-1 Conduct ship sea trials and awareness of related equipment.

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Introduction of ship performance	6	6	-	-	a1-3-1, b2-1-2, c2-1-2
Powering Estimation methods	6	6	-	-	a1-3-1, b1-2-1
Propeller Design and performance	12	12	-	-	a1-3-2, b2-1-1, b2-1-2
Hull and PropellerRoughness	12	12	-	-	a1-3-1, a1-3-2, a4-1-2, b1-2-1, b1-2-2
Power Penalty and speed loss	6	6	-	-	a1-3-1, a4-1-2
Modern propulsion Systems and sea trails	12	12	-	-	a4-1-1, c2-1-1, c2-1-2, d6-1-1
Speed loss due to wind and waves	12	12			d6-1-1
performance of Tug boats	6	6			b1-2-2, c2-1-2
Application of Natural Gas in marine field	12	12			d2-2-1
The effect shallow waters on ship performance	6	6			a4-1-1, b1-2-1, c2-1-2
Total	90	90			

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-3),A4(a4-1)	B1(b1-2), B2(b2-1),	C2(c2-1)	D2(d2-2), D6(d6-1)

5- Course Subjects Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	10%	20%	50%	10%	10%	--	100%

6- Course Topics.

Topic No.	Topic	Weeks
1st	Introduction of ship performance	1-2
2nd	Powering Estimation methods	3-4
3rd	Propeller Design and performance	5-8
4th	Hull and Propeller Roughness	9-12
5th	Power Penalty and speed loss	13-14
6th	Modern propulsion Systems and sea trails	15-18
7th	Speed loss due to wind and waves	19-22
8th	performance of Tug boats	23-24
9th	Application of Natural Gas in marine field	25-28
10th	The effect shallow waters on ship performance	29-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**
Course ILOs	**Knowledge & Understanding**									
a1-3-1	X	X		X	X					
a1-3-2			X	X						
a4-1-1						X				X
a4-1-2				X	X					
Course ILOs	**Intellectual skills**									
b1-2-1		X		X						X
b1-2-2				X				X		
b2-1-1			X							

b2-1-2	X		X						X	
Course ILOs	**Professional and practical skills**									
c2-1-1						X				
c2-1-2	X					X		X		X
Course ILOs	**General and transferrable skills**									
d2-2-1									X	
d6-1-1						X	X			

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	**Presentation and Movies**	**Discussion**	**Tutorial**	**Problem solving**	**Brainstorming**	**Projects**	**Report**	**Self learning**	**Cooperative**	**Discovering**	**Computer Simulation**	**Practical Experiments**
Knowledge & understanding	a1-3-1	x							x					
	a1-3-2	x												
	a4-1-1	x							x					
	a4-1-2	x							x					
Intellectual Skills	b1-2-1	x		x		x	x							
	b1-2-2	x		x		x	x							
	b2-1-1	x		x		x	x							
	b2-1-2	x												
Professional Skills	c2-1-1	x				x			x					
	c2-1-2	x												
General and transferrable skills	d2-2-1	x				x								
	d6-1-1	x												

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

- Teaching aids such as overhead projector, data show and computer.
- Regular visit to the Shipyard and power plant sites.

A. laboratory Usage:

Marine measurement laboratory.

B. Library Usage:

Students should be encouraged to use library.

11- List of references:

11.1 Course notes:

Professor notes

11.2 Recommended books:

1- Carlton, J. S., "Marine Propellers and Propulsion", Elsevier Ltd., Second edition, 2007.
2- Rawson, K. J., Tupper, E. C., "Basic Ship Theory", Elsevier Ltd., Vol.2, Chapters 10 to 16, Ship Dynamics and design, 5th edition, 2001.
3- Comstock, J. P., "Principals of Naval Architecture", SNAME Publications, Vol. III, 1989.

4- Volker Bertram, H. Schneekluth, " Ship Design for Efficiency and Economy," Butterworth-Heinemann, 15th October 1998

11.3 Papers, Periodicals, Web sites, etc:

1- Mosaad, M. A., "Marine Propeller Roughness Penalties", Dept. of Marine Technology, University of Newcastle upon Tyne, England, Ph.D. Thesis, 1986.
2- 2- Mosaad, M. A., "Experiments and Application on the Effect of Propeller Surface Roughness", International Workshop on Drag and Roughness, RINA, England, March 1990.
3- 3- Mosaad, M. A., "Underwater Ship Surface - Drag and Fuel Economy", First International Conference on E.R.D.A., Faculty of Engineering, University of Suez Canal, Port Said, Egypt, November 1991.
4- 4- Mosaad, M. A., "Ship-Model Surface Roughness Allowance" MEET MARIND'2002, Varna, Bulgaria, October 6-11, 2002.
5- 5- Mosaad, M. A., "Natural Gas Powered Ships", Gulf Maritime Conference 2007, Sharjh, UAE, April 15-18, 2007.

6- Mosaad,. M. A., Gafaary, M. M., Yehia, W. and Hassan, H.M. "On the Design of X-Bow for Energy Efficiency," Influence of EEDI on Ship Design & Operation, RINA, London, UK, September 2017.

12- Program Coordination Committee:

Course Coordinator: Prof. Dr. M. A. Mosaad

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 511
Course Specification

Ship Steering and Maneuverability

Post Graduate Course Specification

Program on which the course is given	Naval Architecture &Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture &Marine Engineering
Department offering the course	Naval Architecture &Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Ship Steering and Maneuverability	**Code Symbol: NME 511**	
Lecture	**3 hours**	
Tutorial	**---------**	
Laboratory	**---------**	
Total	**3 hours**	
Full academic year	**Prerequisite**	**-------------**

C- Professional Information

1- Course Aims:

This course is very useful and important to the students of Diploma program, where it provides them with advanced theory of ship steering and controllability. Also, it provides them with the principles of ship directional stability, course-keeping and maneuverability. The linear equations of planar ship motions are studied, together with the dynamic ship turning path simulation. The course aims also to study the influences of propeller, rudder, and ship form on effective ship steering and ship inherent stability. Also, the course introduces the types of ship maneuvers and location of ship pivoting point. In this course, ship steering in restricted waterways is included, together with the bank-, squat-, and blockage- effects act on ships that navigate in restricted waterways. Dynamics of two-way traffic simulation of ship navigation in restricted channels are studied.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering.	a1-1-1 Outline the different theories and linear equations of ship planar motions. a1-1-2 Recognize the factors that affect ship steering.

A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Identify the parameters of ship directional stability and its indices. a2-2-2 Recognize the concepts and types of ship maneuvers. a2-2-3 Show the dynamics of ship turning path and how to determine the ship pivot point location. a2-2-4 Describe the dynamics of ship steering in restricted waterways, together with bank-, squat-, and blockage effects. a2-2-5 Show how to simulate the dynamics of ship steering in two-way traffic in restricted channel.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate the ability to determine the parameters of ship directional stability and its indices.
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Choose the suitable parameters and factors that improve ship steering quality. Determine the rudder deflection and time required to achieve a specific ship turn to a new course. b3-1-2 Analyze and investigate ship steering quality through model test results. Also, apply modern theories, methods and computer programs in ship steering.
C. Professional and practical skills		
C1- Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Choose specific ship's hull design configuration for better steering quality. Practicing the ability of rudder design for better steering quality.

C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare search reports for specific types of ship maneuvers. c2-1-2 Use methods to determine the effects of bank-, squat-, and two- way traffic effects on ship steering in restricted waterways and channels.
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1 Apply course skills on ship steering in restricted waterways (bank– squat- effects and ships in two- way traffic) and in career development.
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5-1-1 lead a team to complete report about types of maneuvers and an accurate rudder design.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1. Ship steering and linear equations of ship horizontal motions, stability indeces.	15	15	-	--	a1-1-1, b1-1-1
2. Ship maneuvers, and ship directional stability	15	15	-	--	a2-2-1, a2-2-2, b1-1-1, c1-1-1, c2-1-1
3. Ship parameters and configurations affecting ship steering	15	15	-	--	a2-2-1, b1-1-1
4. Dynamics of ship steering in restricted waterways (Bank-, Squat-, and Blockage Effects)	15	15	-	--	a2-2-4, a2-2-5, c2-1-2, d2-1
5. Two-way Traffic in Restricted Channels	15	15			a2-2-4, a2-2-5, c2-1-2, d2-1-1
6. Ship Rudder Hydrodynamic Design	15	15	-	--	b3-1-1, d5-1-1
Total	**90**	**90**	**-**	**--**	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1) A2(a2-2)	B1(b1-1) B3(b3-1)	C1(c1-1) C2(c2-1)	D2(d2-1) D5(d5-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---	**15%**	**30%**	**35%**	**10**	**10**		**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Ship steering and linear equations of ship horizontal motions, stability indeces	**1-5**
2nd	Ship maneuvers, and ship directional stability	**6-10**
3rd	Ship parameters and configurations affecting ship directional stability	**11-15**
4th	Dynamics of ship steering in restricted waterways (Bank-, Squat-, and Blockage Effects)	**16-20**
5th	Two-way Traffic in Restricted Channels	**21-25**
6th	Ship Rudder Hydrodynamic Design	**26-30**

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th
Course ILOs	**Knowledge & Understanding**					
a1-1-1 Outline the different theories and linear equations of ship planar motions.	x	x				
a1-1-2 Recognize the factors that affect ship steering..	x	x				
a2-2-1 Identify the parameters of ship directional stability and its indices.	x	x				
a2-2-2 Recognize the concepts and types of ship maneuvers.	x	x				
a2-2-3 Show the dynamics of ship turning path and how to determine the ship pivot point location.	x	x				
a2-2-4 Describe the dynamics of ship steering in restricted waterways, together with bank-, squat-, and blockage effects.	x	x				
a2-2-5 Show how to simulate the dynamics of ship steering in two-way traffic in restricted channel.	x	x				
Course ILOs	**Intellectual skills**					
b1-1-1 Demonstrate the ability to determine the parameters of ship directional stability and its indices.			x	x		x
b3-1-1 Choose the suitable parameters and factors that improve ship steering quality. Determine the rudder deflection and time required to achieve a specific ship turn to a new course.				x	x	x
b3-1-2 Analyze and investigate ship steering quality through model test results. Also, apply modern theories, methods and computer programs in ship steering.				x	x	x
Course ILOs	**Professional and practical skills**					
c1-1-1 Choose specific ship's hull design configuration for better steering quality. Practicing the ability of rudder design for better steering quality.			x		x	x
c2-1-1 Prepare search reports for specific types of ship maneuvers.			x	x	x	x
c2-1-2 Use methods to determine the effects of bank-, squat-, and two- way traffic effects on ship steering in restricted waterways and channels.			x	x	x	x

Course ILOs	General and transferrable skills					
d2-1-1 Apply course skills on ship steering in restricted waterways (bank– squat- effects and ships in two- way traffic) and in career development.				x		x
d5-1-1 lead a team to complete report about types of maneuvers and an accurate rudder design.			x	x	x	x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x				x								
	a1-1-2	x				x								
	a2-2-1	x				x								
	a2-2-2	x				x								
	a2-2-3					x								
	a2-2-4	x				x								
	a2-2-5	x				x								
Intellectual Skills	b1-1-1		x											
	b3-1-1		x											
Professional Skills	c1-1-1		x											
	c2-1-1		x										x	
General Skills	d2-1-1		x							x				
	d5-1-1		x							x				

9- Assessment

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	29
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- List of References:

11.1. Lecture Notes:

1- Prof. Dr. Mo'men Gaafary, "Ship Steering and Maneuverability", Department of Naval Architecture & Marine Engineering, Faculty of Engineering, Port Said University, Egypt.

11.2. Recommended Books:

1. J.P. Comstock, "Principals of Naval Architecture", SNAME Publications, 2012
2. K. J. Rawson, E.C. Tupper, "Basic Ship Theory", Longman, 2009.
3. Mo'men Gaafary, and Mosaad Mosleh, "Hydrodynamics of Proposed Two-Way Traffic in Suez Canal with Steering Control," IMAM'07, Varna, Bulgaria, 2007.
4. Mo'men Gaafary, "Pitch and Heave Dynamic Stability of Submarines," IMAM'07, Varna, Bulgaria, 2007.
5. Mo'men Gaafary, "Dynamic Forces and Response of SWATH Ship in Lateral Waves" Black Sea International Maritime Engineering, Varna, Bulgaria, 2010.
6. Mo'men Gaafary, "Dynamic Effects of Semi-Submersible Platform in Beam Sea Waves" Black Sea International Maritime Engineering, Varna, Bulgaria, 2010.

11.3. Key words for Internet Search:

Ship Steering, Ship Course-Keeping, Ship Maneuverability, Ship Directional Stability, Ship Steering in Restricted Waterways and Channels, Two-Way Traffic in Canals.

Course Coordinator: Prof. Dr. Mo'men Gaafary

Program coordinator: Assoc. Prof. Dr. Moustafa Mohammed

Head of the Department: Assoc. Prof. Dr. Saad Bahey Eldeen

Date: August 2019

NME512
Marine Systems Economics
Course Specifications

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: **Marine Systems Economics**	**Code Symbol**: **NME 512**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

This course aims to provide the students who - are graduated as marine engineers – with the principles of economics and the applications of economics in the fields of Naval Architecture & Marine Engineering .

The information given includes the economical terminology , interest relationships , Design and operation Criteria , Profitability of ships , Optimum speeds and economical life of ships , permissible price of ships , replacement of ships , and elements of marine transport , making feasibility studies of marine projects , putting specifications and contracting terms , also tabulating works and planning .

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering,	a1-1-1 Identify the economical abbreviations applicable to marine engineering fields. a1-1-2 State the elements of marine transport tasks and documentations, And containerization activities. a1-1-3 Identify the time value of cash flow .
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines	a4-1-1 Identify the feasibility of engineering projects. a4-1-2 Outline a comparison between different alternatives in ship design and operation a4-1-3 Show how evaluating the optimum life, optimum speed, permissible price and operation constraints of ships .
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate the linkage between design and operation of ships, and to make the design which is to be the most profitable during operation .
	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Identify the time value of money. b1-2-2 Evaluate the feasibility of a ship design or operation project. b1-2-3 Determine the costs of building a ship.

B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5-1-1 Choose economic criteria and decision making considering different economical, technical and environmental issues .
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Design numerical flow chart to determine optimum ship characteristics. c1-1-2 Analyze cost and freight statistics
D. General and transferrable skills		
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	d1-1-1 Use Communicate skills to get the recent information related to ship economy.
D2- Use information technology to improve his/her professional practice.	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Use computers software to analyze statistical information about expenses of operating ships and rates of escalation

3- <u>Course Contents</u>

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Introduction to Engineering Economics , Definitions , Ship design Economics , Traditional and Modern Approaches of Ship Design , Interest Relationships	9	9	--	--	a1-1-1, a1-1-2 a1-1-3, b5-1-1, d1-1-1, d2-2-1
Economic Criteria for Design and Operation Profitability of ships before and after Tax	9	9	--	--	a1-1-3, b1-1-1 b1-2-1, b5-1-1
Profitability of ships before and after Tax	6	6	--	--	a4-1-1, a4-1-2, d2-2-1

Computer Aided Ship Design Economics , Optimum Speeds ,Economical Life and Permissible Price of Ships	9	9	--	--	a4-1-3,c1-1-1
Estimation of Cost of Building and Operating Ships	6	6	--	--	a1-1-2, a4-1-2, b1-2-3
Optimum Life and Replacement Analyses, Optimum life in case of borrowed capitals.	9	9	--	--	a4-1-1, a4-1-3, b1-2-1
Permissible Price of Ships , permissible price of ships in case of borrowed capitals	9	9	--	--	a4-1-3, a6-1-2
Relative costs of ship design parameters	6	6	--	--	b1-2-3, b5-1-1
Economy propellers for reduced power operation	3	3	--	--	c1-1-2
Feasibility of larger diameter propellers in ballast trips	6	6	--	--	a4-1-1, b1-2-2, d1-1-1
Designing ships for fuel economy	6	6	--	--	a4-1-2, b1-1-1, c1-1-2
Priorities for reducing fuel bill	3	3	--	--	b1-1-1,b5-1-1
Chartering of Ships , Elements of Marine Transport , multipurpose ships, Stowage factors, Bill of Lading , Freight Rate , Containerization ,Contracting and planning	9	9	--	--	a1-1-2, a4-1-2, b1-1-1, d1-1-1, d2-2-1
Total	90				

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1), A4(a4-1)	B1(b1-1), (b1-2) B5(b5-1)	C1(c1-1)	D1(d1-1), D2(d2-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
20%	---	30%	30%	20%	-------	---------	100%

6- Course Topics

Topic No.	Topic	Weeks
1st	Introduction to Engineering Economics , Definitions , Ship design Economics , Traditional and Modern Approaches of Ship Design , Interest Relationships	1-3
2nd	Economic Criteria for Design and Operation Profitability of ships before and after Tax	4-6
3rd	Profitability of ships before and after Tax	7-8
4th	Computer Aided Ship Design Economics , Optimum Speeds ,Economical Life and Permissible Price of Ships	9-11
5th	Estimation of Cost of Building and Operating Ships	12-13
6th	Optimum Life and Replacement Analyses , Optimum life in case of borrowed capitals	14-16
7th	Permissible Price of Ships , permissible price of ships in case of borrowed capitals	17-19
8th	Relative costs of ship design parameters	20-21
9th	Economy propellers for reduced power operation	22-22
10th	Feasibility of larger diameter propellers in ballast trips	23-24
11th	Designing ships for fuel economy	25-26

12th	Priorities for reducing fuel bill	27-27
13th	Chartering of Ships , Elements of Marine Transport , multipurpose ships, Stowage factors, Bill of Lading , Freight Rate , Containerization ,Contracting and planning	28-30

7- <u>ILOs Matrix Topics</u>

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**	**11th**	**12th**	**13th**
Course ILOs	**Knowledge & Understanding**												
a1-1-1	x												
a1-1-2	x				x								x
a1-1-3	x	x											
a4-1-1			x			x				x			
a4-1-2			x		x						x		x
a4-1-3				x		x	x						
Course ILOs	**Intellectual skills**												
b1-1-1		x									x	x	x
b1-2-1		x				x							
b1-2-2										x			
b1-2-3					x			X					
b5-1-1	x	x						X				x	
Course ILOs	**Professional and practical skills**												
c1-1-1				x									
c1-1-2									x		x		
Course ILOs	**General and transferrable skills**												
d1-1-1	x									x			x
d2-2-1	x		x										x

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x			x	x								
	a1-1-2	x			x	x								
	a1-1-3	x			x	x								
	a4-1-1	x			x	x								
	a4-1-2	x			x	x								
	a4-1-3	x			x	x								
Intellectual Skills	b1-1-1	x			x	x								
	b1-2-1	x		x	x									
	b1-2-2	x		x	x									
	b1-2-3	x		x	x									
	b5-1-1	x		x	x									
Professional Skills	c1-1-1	x		x	x									
	c1-1-2	x		x	x									
General Skills	d1-1-1	x												
	d2-2-1	x												

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some Internet research assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- List of references:

[1] Prof.Dr. GalalYounis" Lecture Notes on Ship Economy ", Department of Naval Architecture &Marine Engineering, Faculty of Engineering , Port said , 2003 www.gyounis.net/lectures/Ship Economy.

[2] Harry Benford" Fundamentals of Ship Design Economics", University of Michigan , Department of Naval Architecture & Marine Engineering , ANN RBOR ,1965.

[3] Harry Benford" Profitability Before and After Tax", University of Michigan , Department of Naval Architecture & Marine Engineering , ANN ARBOR ,1966.

[4] Galal Younis: “The Permissible price of Ships in case of Borrowed Capitals”, IX Symposium of Theory and Practice of Shipbuilding Dubrovnik , Croatia 19-21 April 1990.

[5] GalalYounis: “A New Method for Predicting Optimal Life of Ships in Cases of Equity and Borrowed Capitals”, IX Symposium of Theory and Practice of Shipbuilding Dubrovnik , Croatia 19-21 April 1990.

[6] D.G.M. Watson: “ Designing Ships for Fuel Economy “ RINA Nov. 1981.

[7] R.F. Burnett: “Designing Ships for Fuel Economy”, Shipbuilding & Marine Engineering International, Dec. 1981.

[8] R.F. Burnett: “Priorities for Reducing the Fuel Bill”, Shipbuilding & Marine Engineering International , April 1982.

[9] SMM: “Economy Propellers for Reduced Power Operation”, Stone Manganeze Marine Technical Brief No.17 , Nov.1980.

[10] J. Carreyette: “Preliminary Ship Cost Estimation”, RINA, No.4, July 1978.

[11] G.Younis: “The Feasibility of Larger Diameter Propellers in Ballast Trips”, 3rd IMAM , Athens , Greece 1984 .

[12] R. Taggart: "Ship Design and Construction", SNAME Publications , 1980

[13] L. Blank & Antony Tarquin: "Engineering Economy" McGraw-Hill, 1983

[14] Osama Ellian " Fuel and Energy saving Strategies on Ships" A Lloyd's Register Association Paper, 2015

[15]https://web.facebook.com/groups/1819292491715304/?ref=bookmarks

12- Program Coordination Committee:

Course Coordinator: **Prof. Dr. Galal M. Younis**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME516
Ship Vibrations
Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma.
Date of specification approval	August 2019

A- Basic Information

Title: **Ship Vibrations**	**Code Symbol**: **NME 516**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

The course aims to provide students with basic knowledge and skills that are required to carry out Vibration Analysis on Ships. the course gives students an advanced theoretical background in the fundamental vibration diagnoses and limitations. Familiarize students with shipboard vibration types and compatibility problem in design and in-service stages.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Recognize vibration theories
A2- Mutual relation between professional aspects of professional	a2-1 Discuss Social effects of Maritime Industry.	a2-1-1 Define the limitation and vibration criteria

practice and its effects on the Environment.	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Investigate vibration related problems onboard ships
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1Recognize theories used for vibration analysis
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate an investigatory approach for detecting problems sources
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Analyze vibration measurement data and technical raised problems
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Identify problem sources via measurements analysis
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 prepare a professional measurement report for torsional vibration
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Employ course skills in career development
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5-1-1 practice in a team to complete an accurate test/measurement

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1. Theory of vibration and monitoring equipments identifications	15	15	-	--	a1-1-1, a2-1-1 a2-2-1, a3-1-1
2. Hull structural Vibrations	15	15			a1-1-1, a2-1-1 a2-2-1, a3-1-1
3. Shafting and Propeller Vibrations	15	15	-	--	b1-1-1, c1-1-1, c2-1-1, d5-1-1,
4. Hull- Propeller- Engine foundation compatibly	15	15	-	--	b1-1-1, b3-1-1, c2-1-1, d2-2-1, d5-1-1,
5. Vibration monitoring analysis theory and its characteristics	15	15	-	--	b3-1-1, c1-1-1, c2-1-1, d5-1-1
6. Vibration limits and criteria	15	15	-	--	b1-1-1, b3-1-1, c1-1-1, c2-1-1, d1-1-1, d2-2-1, d5-1-1
Total	90		-	--	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1),(a1-2) A2(a2-1), (a2-2) A3(a3-1)	B1(b1-1), B3(b3-1)	C1(c1-1) C2(c2-1)	D2(d2-2) D5(d5-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disscretionry subjects**	**Total**
---	**---**	**30%**	**70%**	**--**			**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Theory of vibration and monitoring equipments identifications	1-5
2nd	Hull structural Vibrations	6-10
3rd	Shafting and Propeller Vibrations	11-15
4th	Hull- Propeller- Engine foundation compatibly	16-20
5th	Vibration monitoring analysis theory and its characteristics	21-25
6th	Vibration limits and criteria	26-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-1-1 Recognize vibration theories	x	x				
a2-1-1 Define the limitation and vibration criteria	x	x				
a2-2-1 Investigate vibration related problems onboard ships	x	x				
a3-1-1Recognize theories used for vibration analysis	x	x				

Course ILOs	Intellectual skills					
b1-1-1 Demonstrate an investigatory approach for detecting problems sources			x	x		x
b3-1-1 Analyze vibration measurement data and technical raised problems				x	x	x
Course ILOs	**Professional and practical skills**					
c1-1-1 Identify problem sources via measurements analysis			x		x	x
c2-1-1 prepare a professional measurement report for torsional vibration			x	x	x	x
Course ILOs	**General and transferrable skills**					
d2-2-1 Employ course skills in career development				x		x
d5-1-1 practice in a team to complete an accurate test/measurement			x	x	x	x

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x												
	a1-1-2	x				x								
	a2-1-1	x				x								
	a2-2-1	x				x								
	a3-1-1	x				x								
Intellectual Skills	b1-1-1		x											
	b3-1-1		x											
Professional Skills	c1-1-1		x											
	c2-1-1		x										x	
General Skills	d2-2-1		x							x				
	d5-1-1		x							x				

9- Assessment

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- List of references:

[1] Daniel, J., "Engineering Vibration", Prentice-Hall, Inc., Asimon & Schuster Company, Englwood cliffs, New Jersey, 1994.

[2] Khurmi, R. S., Gupta, J.K., "Theory of Machines", 11th Edition, Chapter 24, Eurasia Publishing house Ltd., New Delhi, 1994.

[3] Todd, F.H., "Ship Hull Vibration" Edward Arnold Publisher Ltd., London, 1961.

[4] Veritec, (Marine Technology Consultants), "Vibration Control in Ships," VERITEC, Noise and

[5]Meirovitch, Leonard. Fundamentals of vibrations. Waveland Press, 2010.

[6]Thomson, William. Theory of vibration with applications. CRC Press, 2008.

[7]Ogata, Katsuhiko, and Yanjuan Yang. Modern control engineering. Vol. 4. India: Prentice hall, 2002.

[8]Feese, T., and Hill, C., "Guidelines for Preventing Torsional Vibration Problems in Reciprocating Machinery," Gas Machinery Conference, Nashville, Tennessee, October 7, 2002

[9]Magazinvoić G. “Shafting Vibration Primer” technical report, CADEA, Split, Croatia, 2002.

[10]G.Rajko “Propeller Shaft Excitation in the Ship Design Evaluation Procedure”, Brodogradnja, Vol.53, 2005

[11]H. Tienhaara “Guidelines to engine dynamics and vibrations”, Värtsilä NSD Switzerland Ltd, 2004

12- Program Coordination Committee:

Course Coordinator: **Dr. Waleed Yehia**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019.

NME520

Marine Measuring Tools

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma.
Date of specification approval	August 2019

A- Basic Information

Title: **Marine Measuring Tools**	**Code Symbol**: **NME 520**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

Familiarize students with main principles of measurements, Definition of instrumentation, description of measuring instruments and statistical analysis of experimental data and calculating errors. The students should be aware of measurement procedures during sea trails and diagnostic investigation of problems sources throughout measurements. The course covers the basic control and measurements of propulsion and auxiliary machineries. Ultrasonic testing and investigation skills are also presented by this course.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Recognize theories used for diferent parameters measuremnts. a1-1-2 Identify the normal and limitations for various paremeters to satisfy functional performance

A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Investigate performance related problems through measurements
A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethnical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1 Recognize theories used for error calculation
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines .	a4-1-1 Outline quality assurance concept to new built/running ships structure and equipment
B. Intellectual skills		
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Analyze measurement data and technical raised problems
B4- Risk assessment in the professional practices.	b4-1 Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development.	b4-1-1 Evaluate the applied and new market marine systems.
B5- Take professional decisions in the light of available information.	b5-1 Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5-1-1 Assess the possible decisions of repair or renewal of marine systems.
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare a professional measurement report for sea trails or investigation reports
D. General and transferrable skills		
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	d1-1-1 Use quality assurance and investigate tests both onboard ships and in shipyards

D2- Use information technology to improve his/her professional practice.	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Apply course skills in career development
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5-1-1 Practice in a team to complete an accurate test/measurement
	d5-2 Manage the time use in a perfect way.	d5-2-1 Apply time management in test procedure

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1. Basic principles of measurements and instrumentation	15	15	-	--	a1-1-1, a1-1-2, a2-2-1, a3-1-1, a4-1-1
2. Measurements analysis and error calculations	15	15	-	--	a1-1-1, a1-1-2, a2-2-1, a3-1-1, a4-1-1
3. Sea Trials Measurements	12	12	-	--	b4-1-1, c2-1-1, d1-1-1, d5-1-1, d5-2-1
4. Main propulsion and Auxiliary Engines Measurements and Control	15	15	-	--	b3-1-1, b5-1-1, c2-1-1, d2-2-1, d5-1-1, d5-2-1
5. Vibration Measurement Analysis and Condition Monitoring	15	15	-	--	b3-1-1, b4-1-1, c2-1-1, d5-1-1, d5-2-1
6. Ultrasonic Testing and Investigations	15	15	-	--	b3-1-1, b4-1-1, b5-1-1, c2-1-1 d1-1-1, d2-2-1, d5-1-1, d5-2-1
Total	90		-	--	

4- <u>Relationship between the course and the programme</u>

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Profession al Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1) A2(a2-2) A3(a3-1) A4(a4-1)	B3(b3-1), B4(b4-1) B5(b5-1)	C2(c2-1)	D1(d1-1) D2(d2-2) D5(d5-1), (d5-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disccretionry subjects	Total
---	---	30%	70%	--			100%

Course Contents

6- Course Topics.

Topic No.	Topic	Weeks
1st	Basic principles of measurements and instrumentation	1-5
2nd	Measurements analysis and error calculations	6-10
3rd	Sea Trials Measurements	11-15
4th	Main propulsion and Auxiliary Engines Measurements and Control	16-20
5th	Vibration Measurement Analysis and Condition Monitoring	21-25
6th	Ultrasonic Testing and Investigations	26-30

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th	6th
Course ILOs	**Knowledge & Understanding**					
a1-1-1 Recognize theories used for diferent parameters measuremnts.	x	x				
a1-1-2 Identify the normal and limitations for various paremeters to satisfy functional performance	x	x				
a2-2-1 Investigate performance related problems through measurements	x	x				
a3-1-1 Recognize theories used for error calculation	x	x				

a4-1-1 Outline quality assurance concept to new built/running ships structure and equipment	x	x				
Course ILOs	**Intellectual skills**					
b3-1-1 Analyze measurement data and technical raised problems				x	x	x
b4-1-1 Evaluate the applied and new market marine systems.			x	x	x	x
b5-1-1 Assess the possible decisions of repair or renewal of marine systems.						x
Course ILOs	**Professional and practical skills**					
c2-1-1 Prepare a professional measurement report for sea trails or investigation reports			x	x	x	x
Course ILOs	**General and transferrable skills**					
d1-1-1 Use quality assurance and investigate tests both onboard ships and in shipyards			x			x
d2-2-1 Apply course skills in career development				x		x
d5-1-1 Practice in a team to complete an accurate test/measurement			x	x	x	x
d5-2-1 Apply time management in test procedure			x	x	x	x

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x												
	a1-1-2	x				x								
	a2-2-1	x				x								
	a3-1-1	x				x								
	a4-1-1		x							x				
Intellectual Skills	b3-1-1		x											
	b4-1-1		x											
	b5-1-1		x											

Professional Skills	c2-1-1		x										x	
General Skills	d1-1-1		x							x				
	d2-2-1		x							x				
	d5-1-1		x							x				
	d5-2-1		x							x				

9- Assessment

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of laboratory reports.

11- List of references:

1- Dominique P., "Fundamentals of Instrumentation and Measurement," London W1T, ISTE Ltd, 2007

2- A.K.sawhney and P.Sawheny, "A course in Mechanical Measurements and Instrumentation", Dhanpat Rai, Delhi 1998.

3- 2- Holman, "Experimental Methods for Engineering", McGraw Hill 1984.

4- ITTC Recommended procedures "Speed/Power Trial preparation", 7.5-04-0101.1, 23rd ITTC 2002;

5- International standard ISO 15016 and ISO 19019 “Ship and marine technology – Guidelines for the assessment of speed and power performance by analysis of speed trial data”, First edition 2002-06-15;

6- The Specialist Committee on Speed and Powering Trials. Final report and recommendations to the 23rd ITTC, page 314-367;

7- Meirovitch, Leonard. Fundamentals of vibrations. Waveland Press, 2010

8- G.Rajko “Propeller Shaft Excitation in the Ship Design Evaluation Procedure”, Brodogradnja, Vol.53, 2005

12- <u>Program Coordination Committee:</u>

Course Coordinator: **Dr. Waleed Yehia**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME 521

International Conventions and Ship Safety

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: **International Conventions and Ship safety**	**Code Symbol**: **NME 521**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	By law 2000

B- Professional Information

1- Course Aims:

The course aims to provide students with awareness of different conventions imposed to maritime industry and its impact on design and operations of ships, and the professional and ethical responsibilities of engineers, law and regulations, environmental science and the impact of engineering solutions in a global and societal context.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A2- Mutual relation between professional aspects of professional practice and its effects on the environment.	a2-1 Discuss Social effects of Maritime Industry.	a2-1-1 Identify different threats arising from maritime industry.
	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Recognize the role of legislations in the main evolution in ship design .

A3- Fundamentals of ethical & legal professional practice in the field of specialization.	a3-1 Recognize ethical and professional responsibility issues arising in the practice of the engineering profession.	a3-1-1Recognize the role of different regulations and conventions during the process of ship design and operation.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-2 Interpret, analyze, and evaluate a given system specific information and relate it to ship design.	b1-2-1 Identify the main features and actions controlled by conventions and/or regulations in a given project, e.g., ship conversion or ship repair.
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-2 Perform applied research on industrial and societal concerns related to Naval Architecture and Marine Engineering field (Project).	b3-1-1 Analyze the requirements of formal safety assessment of bulk carriers
B4- Risk assessment in the professional practices.	b4-1 Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development.	b4-1-1 Evaluate Risk assessment in offshore industry
C. Professional and practical skills		
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Prepare professional reports to show the compliance of a given ship with SOLAS and /or MARPOL, or other IMO conventions.
		c2-1-2 Design specific checklists to facilitate inspection tasks related to regulations.
D. General and transferrable skills		
D3- Apply self evaluation and define personal educational needs.	d3-1 Apply self evaluation and specify his educational needs related to Naval Architecture and Marine Engineering aspects.	d3-1-1 Apply self evaluation to assess the acquired awareness of the legislations related to a specific unit (e.g. harbor tug)
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d4-1-1 Plan visits and personal contacts to discuss the responsibilities of inspectors in Port State, classification societies and different national

		authorities.
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	d7-1-1 Investigate a complete published recent conventions and regulations and their updates.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1-Marine activities	9	9	-	--	A2-1-1; d4-1-1
2- Marine accidents	12	12	--	--	A2-1-1; b3-1-1 ;b4-1-1;d7-1-1;
3- Environmental pollution	12	12	-	--	A2-1-1; a2-2-1; b4-1-1
4- Conventions for pollution control	12	12	-	--	A3-1-1;a2-2-1; b4-1-1, c2-1-1; d4-1-1,d7-1-1
5- Navigation conventions	15	15	-	--	A3-1-1;c2-1-2; d4-1-1, d7-1-1
6- Safety and rescue equipment	15	15	-	--	A3-1-1; b3-1-1; b4-1-1; c2-1-1; c2-1-2
7- Certifications and classification	15	15	-	--	B1-2-1; d2-2-1; d3-1-1, d7-1-1
Total	90	90			

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A2(a2-1); (a2-2); A3(a3-1)	B1(b1-2), B3(b3-1), B4(b4-1)	C2(c2-1)	D3(d3-1); D4(d4-1); D7(d7-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
70%	**---**	**----**	**15%**	**--**	**15%**	**---**	**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Marine activities	1-3
2nd	Marine accidents	4-7
3rd	Environmental pollution	8-11
4th	Conventions for pollution control	12-15
5th	Navigation conventions	16-20
6th	Safety and rescue equipment	21-25
7th	Certifications and classification	26-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Course ILOs	**Knowledge & Understanding**						
a2-1-1 Identify different threats arising from maritime industry.	x	x	x				
a2-2-1 Recognize the role of legislations in the main evolution in ship design .			x	x			
a3-1-1Recognize the role of different regulations and conventions during the process of ship design and operation.				x	x	x	
Course ILOs	**Intellectual skills**						
b1-2-1 Identify the main features and actions controlled by conventions and/or regulations in a given project, e.g., ship conversion or ship repair.							x

b3-1-1 Analyze the requirements of formal safety assessment of bulk carriers		x				x	
b4-1-1 Evaluate Risk assessment in offshore industry				x			x
Course ILOs	**Professional and practical skills**						
C2-1-1 Prepare professional reports to show the compliance of a given ship with SOLAS and /or MARPOL, or other IMO conventions.				x			
C2-1-2 Design specific checklists to facilitate inspection tasks related to regulations.					x		
Course ILOs	**General and transferrable skills**						
d3-1-1 Apply self evaluation to assess the acquired awareness of the legislations related to a specific unit (e.g. harbor tug)							x
d4-1-1 Plan visits and personal contacts to discuss the responsibilities of inspectors in Port State, classification societies and different national authorities.	x				x		
d7-1-1 Investigate a complete published recent conventions and regulations and their updates.		x		x	x		x

8- <u>Teaching and Learning Method:</u>

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and Movies	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a2-1-1	x	x				x							
	a2-2-1		x							x				
	a3-1-1	x		x										
Intellectual Skills	b1-2-1	x							x					
	b3-1-1	x	x											
	b4-1-1	x								x				
Professional Skills	c2-1-1								X					
	c2-1-2								x	x				
General Skills	d3-1-1									x				
	d4-1-1			x						x	x			
	d7-1-1									x				

9- Assessment

9.1 Assessment Methods

Final Written Examination to assess students' knowledge.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector -Library.

A. laboratory Usage:

None

B. Library Usage:

Students should be encouraged to use library technical resources .

11- List of references:

1- MARPOL conventions "International Convention for the Prevention of Pollution from Ships, 73/78", www.imo.org

2- International Convention for the Safety of Life at Sea (SOLAS)

3- IMO Vega computer package, version 2.1

4- Marine Pollution (4th Edition) R.B. Clark, C. Frid and M Atttrill, Oxford Science Publications, 1997,

5- Oil Spill Response in the Marine Environment J.W. Doerffer, Pergamon Press, 1992

6- www.eagle.org

7- www.imo.org

12- Program Coordination Committee:

Course Coordinator: **Dr. Heba S. El-Kilani**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME523

Marine Power Stations

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Marine Power Station	**Code Symbol**: **NME 523**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	

B- Professional Information

1- Course Aims:

Prepare the students to be familiar with the modern marine power stations. The students have to know how to design, select and arrange the optimum marine engines, heat exchangers, safety equipment and piping systems. They have to be capable of install, design and laying the piping systems and components for ship hull and machinery. The student should be familiar with different methods using to reduce the pollution and calculate the machinery power.

After finishing the course, the student will have good knowledge and understanding to deal with the modern power stations and advanced methodsd to reduce the marine pollution and design the piping systems and there components. After completion of this course, the student should be able to:

- Configure and descript the equipments and components of modern marine power plants.
- Understand and discuss the different methods using to reduce marine pollution.
- Critically evaluate and compare various concepts of marine power stations
- Determine the concept and functions of the most safety and oil treatment equipment.
- Design and install the various heat exchangers and piping systems.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the concepts and theories of **mathematics and computer science** appropriate to their areas of specialization in Naval Architecture and/or Marine Engineering.	a1-1-1 Outline a comparative study of marine power stations.
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines.	a4-1-1 Outline a comparsion between the different power stations and components.
B. Intellectual skills		
B1- Analyze and evaluate the information in the field of specialization, and relate it to solve problems.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and/or marine engineering.	b1-1-1 Predict and define the suitable systems of marine power stations and piping systems.
C. Professional and practical skills		
C1- Master the basic as well as the latest professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Identify the limit state function.
C2- Write and evaluate technical and professional reports.	c2-1 Write and evaluate a professional report on the specific area of the marine industries.	C2-1-1 Choose the topics and headlines to write a report for a limited task
D. General and transferrable skills		
D2- Use information technology to enhance his professional practice	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Use computer program to calculate all the marine index.

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Study of modern trend in marine power stations	18	18	-	-	a1-1-1, a4-1-1, c1-1-1
Waste heat recovery	12	12	-	-	a1-1-1, c1-1-1, c2-1-1
Calculation of machinery power and energy	12	12	-	-	b1-1-1, C2-1-1,
Design of heat exchangers	12	12	-	-	a1-1-1, d2-2-1
Design of marine piping systems and materials	15	15	-	-	c2-1-1
Safety equipment onboard ship	12	12	-	-	b1-1-1, d2-2-1
Purifiers and pollution control in power stations	9	9			b1-1-1, d2-2-1
Total	90				

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1) A4(a4-1)	B1(b1-1)	C1(c1-1), C2(c2-1)	D2(d2-2)

5- Course Subject Area:

A	**B**	**C**	**D**	**E**	**F**	**G**	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disscretionry subjects**	**Total**
---		**20%**	**20%**	**60%**	**--**		**100%**

6- Course Contents

Topic No.	Topic	Weeks
1st	Study of modern trend in marine power stations	1-6
2nd	Waste heat recovery	7-10
3rd	Calculation of machinery power and energy	11-14
4th	Design of heat exchangers	15-18
5th	Design of marine piping systems and materials	19-23
6th	Safety equipment onboard ship	24-27
7th	Purifiers and pollution control in power stations	28-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Course ILOs	**Knowledge & Understanding**						
a1-1-1	x	x		x			
a5-1-1	x						
Course ILOs	**Intellectual skills**						
b1-1-1			x			x	x
Course ILOs	**Professional and practical skills**						
c1-1-1	x	x					
C2-1-1		x	X		x		
Course ILOs	**General and transferrable skills**						
d2-2-1				x		x	x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	**Presentation and Movies**	**Discussion**	**Tutorial**	**Problem solving**	**Brainstorming**	**Projects**	**Report**	**Self learning**	**Cooperative**	**Discovering**	**Computer Simulation**	**Practical Experiments**
Knowledge & understanding	a1-1-1	x							x					
	a5-1-1	x							x					

Intellectual Skills	b1-2-1	x		x		x	x							
Professional Skills	c1-1-1	x				x			x					
	C2-1-1	x												
General and transferrable skills	d2-2-1	x				x								

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination	:	to assess students' knowledge, understanding, analysis, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- <u>Facilities required for teaching and learning</u>

- Teaching aids such as overhead projector, data show and computer.
- Regular visit to the Shipyard and power plant sites.

A. laboratory Usage:

none.

B. Library Usage:

Students should be encouraged to use library.

11- <u>List of references:</u>

1- Harrington R.Y., Marine Engineering, 2nd edition, SNAME, USA 1992.

2- Mina Morgan, "Marine Technology Reference book",1 st edition Butterworth Ltd., Uk 1995.

3- Mc-George H.D., Marine Auxiliary Machinery, 11th edition, Butterworth, London 2014.

4- LR, 'Rules and Regulations for the classification of ships', part 5 Main and Auxiliary Machinery, 2016.

5- D.A. Taylor, Introduction to marine engineering, Elsevier, 2nd edition 2003.

6- D.A. Taylor, Introduction to Marine Engineering, Elsevier Science, 2014.

7- Breeze, Power Generation Technologies, Elsevier Science, 2014.

8- Frank Kreith, Raj M. Manglik, and Mark S. Bohn, Principles of Heat Transfer, 7th ed., Cengage Learning, Inc., 2011.

12- <u>Program Coordination Committee:</u>

Course Coordinator: **Prof. Adel A. Tawfik**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME525

Automatic Control Application in Marine Engineering

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Automatic control application in marine engineering	**Code Symbol**: **NME 525**	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	

B- Professional Information

1- Course Aims:

Prepare the students to be familiar with the modern automatic control methods and processes in marine power stations. The students have to know how to design, select and arrange the digital control circuits, air control circuits, hydraulic control circuits and simulation. They have to be capable of install, design and laying the control systems of marine propulsion machinery and adjustment. The student should be familiar with different methods using to control the mooring systems, cargo handling systems, steering systems and control the performance sensitivity of ship operation.After finishing the course, the student will have good knowledge and understanding to deal with the modern automatic control circuits to umprove the ship performance and increase the overall operationg efficience.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Outline a comparative study of marine power stations.
A4- Basics and principles of quality in professional practice in the field of specialization.	a4-1 Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines.	a4-1-1 Outline a comparsion between the different power stations and components.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Predict and define the suitable systems of marine power stations and piping systems.
C. Professional and practical skills		
C1-Apply professional skills in the field of specialization.	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Identify the limit state function.
C2- Write professional reports.	c.2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Choose the topics and headlines to write a report for a limited task
D. General and transferrable skills		
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1 Use computer program to calculate all the marine index.

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Modeling and simulation	18	18	-	-	a1-1-1, a4-1-1, c1-1-1
Digital control circuits	12	12	-	-	a1-1-1, c1-1-1, c2-1-1
Air control circuits, hydraulic control circuits, pneumatic control circuits.	12	12	-	-	b1-1-1, c2-1-1,
Optimum control systems and filters	12	12	-	-	a1-1-1, d2-1-1
Control system of marine engines and adjustment	15	15	-	-	a1-2-1, c2-1-1
Control circuits of ship maneuvering and cargo handling systems	12	12	-	-	b1-1-1, d2-1-1
Performance sensitivity of control systems and estimation of efficiency	9	9			b1-1-1, d2-1-1
Total	90				

4- <u>Relationship between the course and the programme</u>

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1-1) A4(a4-1)	B1(b1-1)	C1(c1-1), C2(c2-1)	D2(d2-1)

5- Course Subjects Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
---		**30%**	**50%**	**20%**	**--**		**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	Modeling and simulation	1-6
2nd	Digital control circuits	7-10
3rd	Air control circuits, hydraulic control circuits, pneumatic control circuits.	11-14
4th	Optimum control systems and filters	15-18
5th	Control system of marine engines and adjustment	19-23
6th	Control circuits of ship maneuvering and cargo handling systems	24-27
7th	Performance sensitivity of control systems and estimation of efficiency	28-30

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Course ILOs	**Knowledge & Understanding**						
a1-1-1	x	x		x			
a4-1-1	x						
Course ILOs	**Intellectual skills**						
b1-1-1			x			x	x
Course ILOs	**Professional and practical skills**						
c1-1-1	x	x					
C2-1-1		x	X		x		
Course ILOs	**General and transferrable skills**						
d2-1-1				x		x	x

8- **Teaching and Learning Method:**

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	**Presentation and Movies**	**Discussion**	**Tutorial**	**Problem solving**	**Brainstorming**	**Projects**	**Report**	**Self learning**	**Cooperative**	**Discovering**	**Computer Simulation**	**Practical Experiments**
Knowledge & understanding	a1-1-1	x							x					
	a4-1-1	x							x					
Intellectual Skills	b1-2-1	x		x		x	x							
Professional Skills	c1-1-1	x				x			x					
	c2-1-1	x												
General and transferrable skills	d2-1-1	x				x								

9- **Assessment**

9.1 Assessment Methods

Final Written Examination : to assess students' knowledge, understanding, analysis, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- **Facilities required for teaching and learning**

- Teaching aids such as overhead projector, data show and computer.
- Regular visit to the Shipyard and power plant sites.

A. laboratory Usage:

none.

B. Library Usage:

Students should be encouraged to use library.

11- List of references:

1. S. Barnett, Polynomials and Linear Control Systems, Marcel Dekker, New York, NY, 1983.
2. Carlos A. Smith and Armando B. Corripio, Principles and Practice of Automatic Process Control, 2nd edition, John Wiley& Sons, Inc. 1979.
3. B. D. O. Anderson and J. B. Moore, Optimal Control Linear Quadratic Methods, Dover Publica tions, 2007.
4. R. C. Dorf and R. H. Bishop, Modern Control Systems , Prentice Hall, tenth edition, 2004
5. LR, 'Rules and Regulations for the classification of ships', part 5 Main and Auxiliary Machinery, 2009.

12- Program Coordination Committee:

Course Coordinator: **Dr. WaleedYehia**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME526

Underwater Technology

Course Specification

Course Specification

Program on which the course is given	Naval Architecture and Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture and Marine Engineering
Department offering the course	Naval Architecture and Marine Engineering
Academic year/Level	Diploma degree
Date of specification approval	August 2019

A- Basic Information

Title: **Underwater Technology**	**Code Symbol**: NME 526	
Lecture	3 hours	
Tutorial / Laboratory	--	
Total	3 hours	

B- Professional Information

1- Course Aims:

This course aims to introduce graduates familiar with the technological processes that are associated with underwater naval architecture and marine engineering specialization, and the tools used in, taking into account the procedures and requirements of the Occupational Safety and security to be observed

After finishing the course, the student:

1. **Should be able to learn techniques of underwater cutting and welding**
2. **Is prepared to be familiar with equipment and tools used in underwater cutting and welding**
3. **Should be aware of the importance of the requirements of the Occupational Safety and Health to work underwater**
4. **Should understand the meaning and importance of underwater dredging**
5. **Should learn the types, techniques, and equipment underwater dredging**

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his / her professional practice.	a1.2. Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field Ship structure and technology	a1.2.1.Show the basics and technology of welding and cutting.
A4. Basics and principles of quality in professional practice in the field of specialization.	a4.1. Explain Quality Assurance concepts of different Naval Architecture and Marine Engineering disciplines	a4.1.1.Demonstrate a good understanding of the requirments of the quality of cutting and welding operations
B. Intellectual skills		
B2. Solve specialized problems in the field of practice..	b2.1. Apply broad knowledge of modern computational methods and think critically to solve unstructured problems related to Naval Architecture and Marine Engineering	b2.1.1. Predict and define the suitable amperage and voltage for underwater cutting or welding machines
B4. Risk assessment in the professional practices.	b4.1. Evaluate pros and cons of given methodologies for Naval Architecture and Marine Engineering systems development	b4.1.1.Define how to safely use the different welding, cutting and dredging b4.1.2. Identify the procedures of obtaining a certified diving certificate and have good knowledge of needed equipment and site processing
B5. Take professional decisions in the light of available information	b5.1. Acquire decision making capabilities in different situation when facing problems related to analysis, design and development of Naval Architecture and Marine Engineering systems.	b5.1.1. Evaluate the ability to make the right and quick decision in an emergency condition

C. Professional and practical skills		
C1. Apply professional skills in the field of specialization	c1.1. Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1.1.1. Define the limit state function.
C2. Write professional reports.	c2.1. Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2.1.1.Choose the topics and headlines to write a report for a limited task and have the ability to logical order of subjects
D. General and transferrable skills		
D3- Apply self evaluation and define personal educational needs.	d3-1 Apply self evaluation and specify his educational needs related to Naval Architecture and Marine Engineering aspects.	d3.1.1. Apply self-evaluation and specify his educational needs related to Naval Architecture and Marine Engineering aspects.
D4- Use different resources to obtain knowledge and information.	d4-1 Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.	d4.1.1. Use different resources of information like libraries, internet access facilities, etc. to upgrade and enhance their conceptual knowledge.
D5- Work in a team and apply time management.	d5-1 Practicing team work in specified professional jobs.	d5.1.1. Practice in a team to perform a specified professional jobs.

3-

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
1. UNDERWATER CUTTING **1.1. OXYGEN-ARC CUTTING** **1.2. EXOTHERMIC ELECTRODES** **1.3.** SEELER ENTERPRISES LU-001 EXOTHERMIC CUTTING TOOL (KERIE CABLE 1.4. SHIELDED METAL ARC CUTTING 1.5 CONCLUSION	21	21	-	-	a1.2.1, b4.1.1, b5.1.1, c1.1.1, c2.1.1, d5.1.1

2. <u>UNDERWATER WELDING</u> 2.1 MECHANICAL BARRIERS 2.2SHIELDEDMETAL-ARC WELDING 2.3 WET WELDING 2.4 SHIPBUILDING MATERIALS **2.5MATERIALS USED IN UNDERWATER SHIELDED METAL-ARC WELDING** **2.6UNDERWATER WELDING ARCS** **2.7CONDITIONS ADVERSE TO UNDERWATER WELDING** **2.8.STRENGTH OF UNDERWATER FILLET WELDS** **2.9, SURFACE CLEANING** **2.10. JOINT FIT-UP** **2.11UNDERWATER SHIELDED METAL-ARCWELDING TECHNIQUES** **2.12 PROCEDURE FOR REPAIRING SMALL CRACKS** **2.13 POST-DIVE MAINTENANCE**	21	21	-	-	a1.2.1, b2.1.1, b5.1.1, c2.1.1, d4.1.1, d5.1.1
3.<u>UNDERWATER ARC CUTTING AND WELDING EQUIPMENT</u> **3.1.EQUIPMENT USED FOR UNDERWATER ARC CUTTING AND WELDING** **3.2EQUIPMENTFOR NDERWATER SHIELDED METAL-ARC WELDING** **3.3 WELDING ACCESSORIES**	15	15	-	-	b4.1.2, b5.1.1, c1.1.1, c2.1.1, d3.1.1, d4.1.1
4. <u>SAFETY IN UNDERWATER CUTTING AND WELDING</u> **4.1 PURPOSE** **4.2 GENERAL** **4.3 EXPLOSIVE GASES** **Course Contents** **4.4 ELECTRICITY UNDERWATER** **4.5.GENERAL PRECAUTIONS FOR UNDERWATER CUTTING AND WELDING** **4.6 POWER SUPPLY** **4.7.ELECTRODE HOLDERS AND CUTTING TORCHES** **4.8.POWER CABLES AND CONNECTORS** **4.9 SAFETY SWITCH** **4.10.FIRE AND EXPLOSION PREVENTION** **4.11 COMPRESSED GAS SUPPLIES** **4.12PERSONAL SAFETY IN DIVING** **4.13 CONCLUSION**	15	15	-	-	b4.1.2, b5.1.1, c2.1.1, d3.1.1, d5.1.1

5.INTRODUCTION TO DREDGING EQUIPMENT **5.1TYPES OF DREDGING EQUIPMENTS** **5.2. MECHANICALDREDGING** **5.3. HYDRALUIC DREDGING** **5.4. CONCLUSION**	18	18	-	-	a1.2.1, b2.1.1, b5.1.1, c1.1.1, d5.1.1
Total	90	90			

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Programme Academic Standards that the course contribute in achieving	A1(a1.2),A4(a 4.1),	B2(b2.1), B4(b4.1), B5(b5.1)	C1(c1.1), C2(c2.1)	D3(d3-1), D4(d4-1), D5(d5-1)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	**Mathematics and Basic Sciences**	**Basic Engineering Science**	**Applied Engineering And Design**	**Computer Applications and ICT**	**Projects and practice**	**Disccretionry subjects**	**Total**
20%	**10%**	**40%**	**30%**	**----**	**-----**	**-----**	**100%**

6- Course Topics.

Topic No.	Topic	Weeks
1st	**UNDERWATER CUTTING**	1-7
2nd	**UNDERWATER WELDING**	8-14
3rd	**UNDERWATER ARC CUTTING AND WELDING EQUIPMENT**	15-19
4th	**SAFETY IN UNDERWATER CUTTING AND WELDING**	20-24
5th	**INTRODUCTION TO DREDGING EQUIPMENT**	25-30

7- ILOs Matrix Topics

Course topics	1st	2nd	3rd	4th	5th
Course ILOs	**Knowledge & Understanding**				
a1.2.1	x	x			x
a4.1.1			x		
Course ILOs	**Intellectual skills**				
b2.1.1		x			x
b4.1.1	x		x		
b4.1.2				x	
b5.1.1	x	x	x	x	x
Course ILOs	**Professional and practical skills**				
c1.1.1	x		x		x
c2.1.1	x	x	x	x	
Course ILOs	**General and transferrable skills**				
d3.1.1			x	x	
d4.1.1		x	x		
d5.1.1	x	x		x	x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	**Presentation and Movies**	**Discussion**	**Tutorial**	**Problem solving**	**Brainstorming**	**Projects**	**Report**	**Self learning**	**Cooperative**	**Discovering**	**Computer Simulation**	**Practical Experiments**
Knowledge & Understanding	a1.2.1	x	x	x										
	a5.1.1	x	x	x										
Intellectual Skills	b2.1.1	x	x											
	b4.1.1	x	x	x										
	b4.1.2	x		x										
	b5.1.1	x		x										
Professional Skills	c1.1.1	x	x	x										
	c2.1.1	x	x											
General and transferrable skills	d3.1.1	x		x										
	d4.1.1	x	x	x										
	d5.1.1	x		x										

9- <u>Assessment</u>

9.1 Assessment Methods

Final Written Examination	:	to assess students' knowledge, understanding, analysis, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- <u>Facilities required for teaching and learning</u>

- Teaching aids such as overhead projector, data show and computer.
- Videos for underwater cutting and welding operations.

A. laboratory Usage:

none.

B. Library Usage:

Students should be encouraged to use library.

11- <u>List of references:</u>

a) U.S. Navy Underwater Cutting & Welding Manual, June, 2002.

b) Underwater repair procedures for ship hulls (Fatigue and ductility of underwater wet welds), Ship Structure Committee, 1993.

c) A Handbook For Underwater Inspectors, Offshore Technology Information 88 539, Health and Safety Executive, 1994.

d) Lecture Notes on Dredging Equipment and Technology, Central Dredging Association, W. J. Vlasblom, (May 2003 - May 2007).

e) A Review on Underwater Welding Process, C. Sundarapandiyan, A. Balamurugan and M. Mohan, International Journal of Innovation in Engineering and Technology (IJIET), Vol. 8, February 2017.

f) Effect of Underwater Wet Welding Conditions on the Diffusible Hydrogen Content in Deposited Metal, D. Fydrych, A. Swlerczynska and G. Rogalski, La Metallurgia Italiana, 2015.

g) Fundamental Difficulties Associated With Underwater Wet Welding, Joshua E. Omajene et al., International Journal of Engineering Research and Applications, Vol. 4, Issue 6, (Version 4), June 2014.

h) Fundamental study of Underwater Welding, S. Kiran Sai Kumar, V. Pavan Kumar Reddy and C. Bharath Chowdary, Journal of Advanced Technology and Innovative Research, Vol. 07, Issue. 11, August 2015

i) Underwater Cutting and Welding Equipments – Safety and Operating Instructions – Arcair an ESAB Brand, April 2016.

j) Underwater Remote Welding Technology for Offshore Structures, Joshua Emuejevoke Omajene, Ph.D. Thesis, Lappeenranta University of Technology, Finland, November 2015.

Recommended books

a) Rules for Classification and Construction Ship Technology, Underwater Technology, Germanischer Lloyd, 2009

Periodicals, Web sites, etc

a) www.underwatermunitions.org.

Course Coordinator: **Dr. Mohammed Mansour**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019

NME P98
Post Graduate Project
Course Specifications

Post Graduate Course Specification

Program on which the course is given	Naval Architecture &Marine Engineering
Major or minor element of program	Major
Department offering the program	Naval Architecture &Marine Engineering
Department offering the course	Naval Architecture &Marine Engineering
Academic year/Level	Diploma
Date of specification approval	August 2019

A- Basic Information

Title: Project	**Code Symbol**: **NME P98**	
Lecture	**3 hours**	
Tutorial	**---------**	
Laboratory	**---------**	
Total	**3 hours**	
Full academic year	Prerequisite	--------------

B- Professional Information

1- Course Aims:

This course is important to post graduate students of Diploma program, where it is an independent work leading to writing an extensive article.
Also, each student should prepare a theoretical study which might include some experimental work. A complete analysis is required for each part of the project performed under a specific topic that is relevant to the diploma field of study.
The project is supposed to be presented by each student in front of the department faculty members. The dicussion and the study report are evaluated and given marks by the supervisors.

2- Intended Learning Outcomes (ILOs)

A. Knowledge and understanding		
NAQAAE Academic Reference Standards (ARS)	**ILO's**	**Course ILO's**
A1. Theories, basics and specialized knowledge in the field of learning, as well as the subjects that affect his/her professional practice.	a1-1 Demonstrate sufficient essential knowledge and a deep understanding of the theories, basics and specialized knowledge in the field of Naval Architecture and Marine Engineering	a1-1-1 Identify project requirements. a1-1-2 Recognize the related subjects to the project topic.

	a1-4 Exhibit ability to in detail, creatively, with a high level of clarity and authority, using scientific scrutiny and adequate tools identify, explain, and assess issues pertinent to a Diploma Project in the research field, within which the project is placed.	a1-4-1 Select issues pertinent to a Diploma Project in the research field
A2- Mutual relation between professional aspects of professional practice and its effects on the Environment.	a2-1 Discuss Social effects Maritime Industry.	a2-1-1 Identify the project core of study either theoretical or experimental.
	a2-2 Recognize the interaction between ship design and performance.	a2-2-1 Outline the methods of solving all the project requirements. a2-2-2 Outline complete analysis for each required part of the project. a2-2-3 Outline a full report illustrating all important parts of the project.
B. Intellectual skills		
B1- Define and analyze problems in the field of specialization and sorting them according to priorities.	b1-1 Demonstrate an investigatory and analytic thinking approach (Problem solving) to solve problems related to Naval Architecture and Marine Engineering.	b1-1-1 Demonstrate basic hydrodynamic theory. b1-1-2 Identify the related subjects to the project topic. b1-1-3 Investigate the project core of study either theoretical or experimental.
B3- Analytical reading researches and subjects relevant to the field of specialization.	b3-1 Analyze, interpret and manipulate data from a variety of sources and researches.	b3-1-1 Choose the methods of solving all the project requirements.
	b3-2 Perform applied research on industrial and societal concerns related to Naval Architecture and Marine Engineering field (Project).	b3-2-1 Conduct a complete analysis for each required part of the project.
	b3-3 Perform applied research on industrial and societal concerns problems related to Naval Architecture and Marine Engineering field (Project).	b3-3-1 Prepare a full report illustrating all important parts of the project.
C. Professional and practical skills		

C1- Apply professional skills in the field of specialization. .	c1-1 Express competence skills, such as identifying, formulating, analyzing, and creating engineering solutions, using latest engineering techniques, skills, and tools.	c1-1-1 Analyze the related subjects to the project topic.
C2- Write professional reports.	c2-1 Write a professional report on specialized systems related to Naval Architecture and Marine Engineering technical matters.	c2-1-1 Identify the project core of study either theoretical or experimental.
D. General and transferrable skills		
D1- Communicate effectively using all methods.	d1-1 Express professional and communication skills to innovate and to interact with the scientific community, research team and technocrats involved in multinational companies at global level in the related fields to Naval Architecture and Marine Engineering.	d1-1-1 Use communication skills to interact with marine engineers in Suez canal authority and their companies to collect the required data for the project.
D2- Use information technology to improve his/her professional practice.	d2-1 Use state-of-the-art computer design tools and applications for solving Naval Architecture and Marine Engineering problems.	d2-1-1 Use state-of-the-art computer design tools and applications to perform the required mission.
	d2-2 Employ the information technology skills to serve his / her career development.	d2-2-1 Identify the project core of study either theoretical or experimental. d2-2-2 Plan to enhance the personal skills related to project requirements.
D6- Lead teams in familiar professional context.	d6-1 Lead a team work in specified familiar professional jobs.	d6-1-1 Lead a team to collect data about all important parts of the project.
D7- Learn independently and seek continuous learning.	d7-1 Express a strong foundation of continuous learning so they can maintain their technical competency.	d7-1-1 Improve the included information of the project.
	d7-2 Seek continuous learning through continuous education, organizing and participating in seminars, workshops, national and international conferences.	d7-2-1 Present the project information in a seminar.

3- Course Contents

Topic	*Total Hours*	*Contact hrs*			*Course ILOs Covered (By No.)*
		Lec.	**Tut.**	**Lab.**	
Understanding project requirements	15	15	--	--	a1-1-1, a1-1-2, a1-4-1, b1-1-1, b1-1-2, b1-1-3
Review of the related subjects to the project topic	15	15	--	--	a1-1-1, a1-1-2, a1-4-1, b1-1-1, b1-1-2, b1-1-3, c1-1-1
Defining the project core of study either theoretical or experimental	15	15	--	--	a2-2-1, b1-1-1, b1-1-2, b1-1-3, c2-1-1, c2-1-2, d2-2-1, d2-2-2
Introducing the methods of solving all the project requirements	15	15	--	--	a2-2-1, a2-2-2, a2-2-3, b3-1-1, b3-2-1, b3-3-1, d2-2-1, d2-2-2
Making complete analysis for each required part of the project	15	15	--	--	a2-2-1, a2-2-2, a2-2-3, b3-1-1, b3-2-1, b3-3-1
Writing a full report illustrating all important parts of the project	15	15	--	--	a2-2-1, a2-2-2, a2-2-3, b3-1-1, b3-2-1, b3-3-1, c2-1-1, c2-1-2, d1-1-1, d2-1-1, d6-1-1, d7-1-1, d7-2-1
Total	**90**	**90**	--	--	

4- Relationship between the course and the programme

Field	National Academic Reference Standard(NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
Program Academic Standards that the course contribute in achieving	A1(a1-1), (a1-4) A2(a2-1),(a2-2)	B1(b1-1) B3(b3-1), (b3-2), (b3-3)	C1(c1-1) C2(c2-1)	D1(d1-1) D2(d2-1), (d2-2) D6(d6-1) D7(d7-1), (d7-2)

5- Course Subject Area:

A	B	C	D	E	F	G	
Humanities and Social Science	Mathematics and Basic Sciences	Basic Engineering Science	Applied Engineering And Design	Computer Applications and ICT	Projects and practice	Disscretionry subjects	Total
---	15%	30%	35%	10	10		100%

6- Course Topics.

Topic No.	Topic	Weeks
1st	Understanding project requirements	**1-5**
2nd	Review of the related subjects to the project topic	**6-10**
3rd	Defining the project core of study either theoretical or experimental	**11-15**
4th	Introducing the methods of solving all the project requirements	**16-20**
5th	Making complete analysis for each required part of the project	**21-25**
6th	Writing a full report illustrating all important parts of the project	**26-30**

7- ILOs Matrix Topics

Course topics	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Course ILOs	**Knowledge & Understanding**					
a1-1-1	x	x				
a1-1-2	x	x				

a1-4-1	x	x				
a2-1-1			x			
a2-2-1				x	x	x
a2-2-2				x	x	x
a2-2-3				x	x	x
Course ILOs	**Intellectual skills**					
b1-1-1	x	x	x			
b1-1-2	x	x	x			
b1-1-3	x	x	x			
b3-1-1				x	x	x
b3-2-1				x	x	x
b3-3-1				x	x	x
Course ILOs	**Professional and practical skills**					
c1-1-1		x				
c2-1-1			x			x
Course ILOs	**General and transferrable skills**					
d1-1-1						x
d2-1-1						x
d2-2-1			x	x		
d2-2-2			x	x		
d6-1-1						x
d7-1-1						x
d7-2-1						x

8- Teaching and Learning Method:

Course Intended learning outcomes (ILOs)		Teaching and Learning Method												
		Lecture	Presentation and	Discussion	Tutorial	Problem solving	Brain storming	Projects	Report	Self learning	Cooperative	Discovering	Computer Simulation	Practical Experiments
Knowledge & understanding	a1-1-1	x				x			x	x				
	a1-1-2	x				x			x	x				
	a1-4-1	x				x			x	x				
	a2-1-1	x				x			x	x				
	a2-2-1	x				x			x	x				
	a2-2-2	x				x			x	x				
	a2-2-3	x				x			x	x				
Intellectual Skills	b1-1-1		x	x					x	x				
	b1-1-2		x	x					x	x				
	b1-1-3		x	x					x	x				
	b3-1-1		x	x					x	x				
	b3-2-1		x	x					x	x				
	b3-3-1		x	x					x	x				
Professional Skills	c1-1-1		x	x					x	x				
	c2-1-1		x	x					x	x				
General and transferrable skills	d1-1-1		x	x					x	x				
	d2-1-1		x	x					x	x				
	d2-2-1		x	x					x	x				
	d2-2-2		x	x					x	x				
	d6-1-1		x	x					x	x				
	d7-1-1		x	x					x	x				
	d7-2-1		x	x					x	x				

9- Assessment

9.1 Assessment Methods

Final Written Examination	to assess students' knowledge, understanding, analysis, creativity, problem solving, and problem identification.

9.2 Assessment Schedule and Grades Distribution

Assessment Method	Percentage	week
Final Examination	100	31
Total	100%	

10- Facilities required for teaching and learning

Class Room Equipped with Computer and Video Projector - Computer Lab - Library.

A. laboratory Usage:

Students are expected to prepare and conduct some computer simulation assignments using computer labs.

B. Library Usage:

Students should be encouraged to use library technical resources in the preparation of these **project reports.**

11- References:

Library & previous project reports & department library. Department of Naval Architecture & Marine Engineering, Faculty of Engineering, Port Said University, Egypt.

Course Coordinator: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Program coordinator: **Assoc. Prof. Dr. Moustafa Mohammed**

Head of the Department: **Assoc. Prof. Dr. Saad Bahey Eldeen**

Date: August 2019